DEPARTMENT OF TECHNICAL EDUCATION

From	To
The Commissioner, Directorate of Technical Education, Chennai – 600 025.	The Principals of Government, Government Aided, Self-Financing Polytechnic Colleges and Special Institutions.

Letter No. 23069/Y3/CDC/2022 Dated 11.12.2023

Sir/Madam,

Sub:	Technical Education – Curriculum Development Centre – Diploma in Engineering and Technology - Hosting of second semester syllabi under New Regulation 2023 for the academic year 2023-2024 – Reg.

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The second semester syllabi under New Regulation 2023 for Diploma Programmes in Engineering and Technology from the academic year 2023-2024 is hosted in the DoTE website (www.dte.tn.gov.in).

All the Principals are requested to inform the same to the HoD/Faculty Members concerned and display the same on the notice board.

Sd/- xx xx xx

Commissioner of Technical Education

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
REGULATION 2023 :: SECOND SEMESTER

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1010**	**Civil Engineering (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CE232120	Basics of Civil Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	**

*Note (applicable for all courses) : Test & Revision: 60 periods and Library: 15 periods

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	1012	Architectural Assistantship (Full Time)		II

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	AA232120	Theory of Architecture	4-0-0	60	4	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Engineering Science	Practicum	AA232440	Basic Design & Visual Arts	2-0-2	60	3	Practical
5	Engineering Science	Lab	AA232260	Architectural Drawing – I	0-0-4	60	2	Practical
6	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
7	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
8	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
9	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
10	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
11	Audit Course		**	Emerging Technology Seminars	**	8	0	**
12	Audit Course		**	Shop Floor Immersion	**	8	0	**
13	Audit Course		**	Health & Wellness	**	30	0	**
14	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1013**	**Civil and Environmental Engineering (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CN232120	Basics of Civil and Environmental Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name	Semester
R2023	**1014**	**Interior Decoration**	**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	AA232120	Theory of Architecture	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Engineering Science	Practicum	AA232440	Basic Design & Visual Arts	1-0-2	45	2	Practical
5	Engineering Science	Practicum	AA232260	Architectural Drawing - I	0-0-4	60	2	Practical
6	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
7	Humanities & Social Science	Practicum	EN232480	Communicative English - II	1-0-2	45	2	Practical
8	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
9	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
10	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
11	Audit Course		**	Emerging Technology Seminars	**	8	0	**
12	Audit Course		**	Shop Floor Immersion	**	8	0	**
13	Audit Course		**	Health & Wellness	**	30	0	**
14	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1015**	**Architecture (Full Time)**		**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	AA232120	Theory of Architecture	4-0-0	60	4	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Engineering Science	Practicum	AA232440	Basic Design & Visual Arts	2-0-2	60	3	Practical
5	Engineering Science	Lab	AA232260	Architectural Drawing – I	0-0-4	60	2	Practical
6	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
7	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
8	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
9	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
10	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
11	Audit Course		**	Emerging Technology Seminars	**	8	0	**
12	Audit Course		**	Shop Floor Immersion	**	8	0	**
13	Audit Course		**	Health & Wellness	**	30	0	**
14	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1020**	**Mechanical Engineering (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					565*	20	**

.GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	1021	Automobile Engineering (Full Time)					II

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1023**	**Agricultural Engineering (Full Time)**		**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
		TOTAL(s)				**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1024**	**Refrigeration and Air Conditioning (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1025**	**Diploma in Production Engineering**		**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1026**	**Metallurgy (Full Time)**		**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	MT232120	Basics of Allied Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
		TOTAL(s)				**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1027**	**Marine Engineering (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	MR232120	Basics of Marine Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	**

GOVERNMENT OF TAMIL NADU

DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1030**	**Electrical and Electronics Engineering (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1032**	**Electrical Engineering and Electric Vehicle Technology**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1040**	**Electronics and Communication Engineering (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1042**	**Instrumentation and Control Engineering (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	IC232120	Basics of Electronics and Instrumentation	4-0-0	60	4	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practical	IC232260	Basics of Electronics and Instrumentation Practical	0-0-2	30	1	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name				Semester
R2023	**1046**	**Information Technology (Full Time)**				**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CS232120	Basics of Computer Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name				Semester
R2023	1047	Mechatronics (Full Time)				II

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1049**	**Electronics (Robotics) Engineering (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					**565***	**20**	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1051**	**Computer Science and Engineering (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CS232120	Basics of Computer Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**1052**	**Computer Engineering (Full Time)**					**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CS232120	Basics of Computer Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					**565***	**20**	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name	Semester
R2023	1054	3D Animation and Graphics (Full Time)	II

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	AN232120	Basics of 3D Animation and Graphics Engineering	3-0-0	45	3	Theory
3	Engineering Science	Practicum	MA232432	Applied Mathematics - II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	AN232460	Art & Foundation – I Practical	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1055**	**Communication & Computer Networking (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CS232120	Basics of Computer Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1056**	**Artificial Intelligence and Machine Learning (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CS232120	Basics of Computer Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
		TOTAL(s)				565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	1057	Web Designing (Full Time)					II

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Practicum	WD232320	Basics of Programming Language	1-0-2	45	2	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics - II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English - II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
		TOTAL(s)				565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1058**	**Computer Engineering and IoT (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CS232120	Basics of Computer Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1059**	**Computer Science and Information Technology (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CS232120	Basics of Computer Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name						Semester
R2023	**1060**	**Textile Technology (Full Time)**						**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	TT232120	Basic of Textile Technology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	TT232460	Basics of Textile Machineries	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**1061**	**Textile Processing (Full Time)**					**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	TT232120	Basic of Textile Technology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	TT232460	Basics of Textile Machineries	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			**565***	**20**	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**1064**	**Textile Marketing and Management (Full Time)**					**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	TT232120	Basic of Textile Technology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	TT232460	Basics of Textile Machineries	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**1066**	**Garment Technology (Full Time)**					**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	TT232120	Basic of Textile Technology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	GT232460	Apparel Machinery Engineering Practie	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1068**	**Textile Technology (Knitting) (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	TT232120	Basic of Textile Technology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	GT232460	Apparel Machinery Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565**	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1069**	**Apparel Technology (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	TT232120	Basic of Textile Technology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	GT232460	Apparel Machinery Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
		TOTAL(s)				565	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name						Semester
R2023	1070	Chemical Technology (Full Time)						II
##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	HE232120	Industrial Chemistry	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1074**	**Sugar Technology (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	SU232120	Basic Engineering for Sugar Industry	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – 1	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics - 1	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – 1	1-0-2	45	2	Practical
6	Engineering Science	Practicum	SU232460	Basic Engineering Practical for Sugar Industry	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**1075**	**Petrochemical Engineering (Full Time)**					**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	PC232120	Basics of Petrochemical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name						Semester
R2023	**1076**	**Chemical Engineering**						**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	HE232120	Industrial Chemistry	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			**565***	**20**	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**1079**	**Paper Technology (Full Time)**					**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	PT232120	Basics of Printing & Paper Technology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name	Semester
R2023	1091	Aircraft Maintenance Engineering (Avionics) (Full Time)	II

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1093**	**Biomedical Engineering (Full Time)**		**II**
##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	BM232120	Basics of Anatomy & Physiology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	BM232460	Anatomy Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
		TOTAL(s)				**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1094**	**Logistics Technologies (Full Time)**		**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
		TOTAL(s)				**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1121**	**Mining Engineering (Full Time)**		**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
		TOTAL(s)				**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**1122**	**Fire and Safety (Full Time)**					**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	FS232120	Basics of Fire Technology and Safety	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			565	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**1123**	**Mechanical Engineering (CAD) (Full Time)**					**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1141**	**Medical Electronics (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ML232120	Basics of Medical Electronics	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Lab	ML232260	Basics of Medical Electronics Practical	0-0-4	60	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	25	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	25	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	25	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**1142**	**Medical Laboratory Technology**					**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name				Semester
R2023	1143	Technician X-Ray Technology (Full Time)				II
##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1144**	**Automation and Robotics (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1145**	**Biomedical Electronics (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	BM232120	Basics of Anatomy & Physiology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	BM232460	Anatomy Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1146**	**ECG Technologies (Full Time)**		**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	BM232120	Basics of Anatomy & Physiology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	BM232460	Anatomy Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1147**	**Digital Manufacturing Technology (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	DM232120	Basics of Digital Manufacturing	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1202**	**Printing Technology (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	PT232120	Basics of Printing & Paper Technology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	1220	Mechanical Engineering (Tool and Die) (Full Time)		II

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1221**	**Mechanical Engineering (Refrigeration & Air Conditioning) (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**1222**	**Agricultural Technology (Full Time)**					**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1223**	**Fashion Technology (Full Time)**		**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	TT232120	Basic of Textile Technology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	GT232460	Apparel Machinery Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**1224**	**Textile Technology (Textile Design and Weaving) (Full Time)**					**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	TT232120	Basic of Textile Technology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	TT232460	Basics of Textile Machineries	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1225**	**Textile Technology (Man Made Fiber) (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	TT232120	Basic of Textile Technology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	TT232460	Basics of Textile Machineries	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**1226**	**Applied Arts and Crafts (Fashion and Apparel Design) (Full Time)**		**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	TT232120	Basic of Textile Technology	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	GT232460	Apparel Machinery Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name	Semester
R2023	1513	Gaming and Animation (Full Time)	II

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	GA232120	Basics of Gaming and Animation Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	AN232460	Art & Foundation – I Practical	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
	TOTAL(s)					565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**2010**	**Civil Engineering (Sandwich)**		**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CE232120	Basics of Civil Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**2020**	**Mechnical Engineering (Sandwich)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	2022	Mechnical Engineering (Machine Tool Maintenance and Repairs) (Sandwich)		II

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**2023**	**Automobile Engineering (Sandwich)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**2024**	**Mechanical Engineering (Automobile) (Sandwich)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**2040**	**Electronics and Communication Engineering (Sandwich)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**2047**	**Mechatronics (Sandwich)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**2050**	**Computer Technology (Sandwich)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CS232120	Basics of Computer Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name	Semester
R2023	**2074**	**Polymer Technology (Sandwich)**	**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	PL232120	Basic Organic Chemistry	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**2079**	**Chemical Engineering (Sandwich)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	HE232120	Industrial Chemistry	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**2080**	**Ceramic Technology (Sandwich)**					**II**
##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CR232120	Basics of Ceramic Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	CR232460	Basic Ceramic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
			TOTAL(s)			**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	2101	Leather Technology (Sandwich)					II

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	LT232120	Introduction to Leather and Leather Products	4-0-0	60	4	Theory
3	Basic Science	Practicum	MA232433	Applied Mathematics	1-0-2	45	2	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	16	0	**
13	Audit Course		**	Shop Floor Immersion	**	15	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
TOTAL(s)						565*	20	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**2149**	**Robotics and Automation (Full Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232432	Applied Mathematics – II	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232442	Applied Physics – II	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232452	Applied Chemistry – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name					Semester
R2023	**3010**	**Civil Engineering (Part Time)**					**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Basic Science	Practicum	PH231330	Basic Physics	2-0-2	60	3	Theory
3	Program Core	Theory	CE232120	Basics of Civil Engineering	3-0-0	45	3	Theory
4	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
5	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
6	Engineering Science	Practicum	WP231360	Basic Workshop Practices	1-0-2	45	2	Practical
TOTAL(s)						**300**	**15**	******

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation		Course Code		Course Name					Semester
R2023		**3020**		**Mechanical Engineering (Part Time)**					**II**
##	**Category**		**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory		TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Basic Science	Practicum		PH231330	Basic Physics	2-0-2	60	3	Theory
3	Program Core	Theory		ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
4	Basic Science	Practicum		MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
5	Engineering Science	Practicum		WP231360	Basic Workshop Practices	1-0-2	45	2	Practical
6	Humanities & Social Science	Practicum		EN232480	Communicative English II	1-0-2	45	2	Practical
TOTAL(s)							**300**	**15**	******

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**3030**	**Electrical and Electronics Engineering (Part Time)**		**II**
##	**Category**	**Type**	**Code**	**Title**	**L-T-P**	**Period**	**Credit**	**End Exam**
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Basic Science	Practicum	PH231330	Basic Physics	2-0-2	60	3	Theory
3	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
4	Basic Science	Practicum	MA232432	Applied Mathematics - II	1-0-4	75	3	Practical
5	Engineering Science	Practicum	WP231360	Basic Workshop Practices	1-0-2	45	2	Practical
6	Humanities & Social Science	Practicum	EN232480	Communicative English II	1-0-2	45	2	Practical
TOTAL(s)						**300**	**15**	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**3040**	**Electronics and Communication Engineering (Part Time)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Basic Science	Practicum	PH231330	Basic Physics	2-0-2	60	3	Theory
3	Program Core	Theory	EE232120	Basics of Electrical and Electronics Engineering	3-0-0	45	3	Theory
4	Basic Science	Practicum	MA232432	Applied Mathematics II	1-0-4	75	3	Practical
5	Engineering Science	Practicum	WP231360	Basic Workshop Practices	1-0-2	45	2	Practical
6	Humanities & Social Science	Practicum	EN232480	Communicative English II	1-0-2	45	2	Practical
TOTAL(s)						**300**	**15**	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**7010**	**Civil Engineering (Full Time) (Tamil Medium)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	CE232120	Basics of Civil Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	**

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN ENGINEERING TECHNOLOGY

Regulation	Course Code	Course Name		Semester
R2023	**7020**	**Mechnical Engineering (Full Time) (Tamil Medium)**		**II**

##	Category	Type	Code	Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	TA232110	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	2-0-0	30	2	Theory
2	Program Core	Theory	ME232120	Basics of Mechanical Engineering	3-0-0	45	3	Theory
3	Basic Science	Practicum	MA232431	Applied Mathematics – I	1-0-4	75	3	Practical
4	Basic Science	Practicum	PH232441	Applied Physics – I	1-0-2	45	2	Practical
5	Basic Science	Practicum	CH232451	Applied Chemistry – I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	EP232460	Basic Engineering Practices	1-0-2	45	2	Practical
7	Engineering Science	Lab	DP232270	Drafting Practices	0-0-4	60	2	Practical
8	Humanities & Social Science	Practicum	EN232480	Communicative English – II	1-0-2	45	2	Practical
9	Open Elective	Advanced Skill Certification	BE232290	Advanced Skills Certification - II	1-0-2	45	2	NA
10	Humanities & Social Science	Integrated Learning Experience	**	Growth Lab	**	30	0	**
11	Audit Course		**	I&E/ Club Activity / Community Initiatives	**	30	0	**
12	Audit Course		**	Emerging Technology Seminars	**	8	0	**
13	Audit Course		**	Shop Floor Immersion	**	8	0	**
14	Audit Course		**	Health & Wellness	**	30	0	**
15	Audit Course		**	Student Led Initiative	**	24	0	**
				TOTAL(s)		**565***	**20**	****

*Note (applicable for all courses) : Test & Revision: 60 periods and Library: 15 periods

AA232120	Theory of Architecture	L	T	P	C
Theory		4	0	0	4

Introduction

Students of architectural Assistantship at diploma level are supposed to understand basic principles of theory of architecture while designing some building. The present syllabus of Theory of architecture compiled for Diploma Architectural students restricts itself to certain limits, where it concentrates on basic concepts and useful applications viz. Basic forms, Elements, Shapes and its derivatives, Orders, Principles, Circulation, Articulation that can be applied as design in building. Various ideologies and philosophies of contemporary architects and their works are also included.

Course Objectives

The objective of this course is to enable the students to

- Architectural theory is a key to dispelling confusion because it helps students have a clear understanding of the facts that make up an architectural design, how to classify them, and how they relate to one another.
- To develop and critically analyze architectural design. Students will: demonstrate an ability to recognize and manipulate the interplay between form, function structure, and materiality in 3D spaces; conceive original design solutions that endow spaces with utilitarian, aesthetic, and affective value.

Course Outcomes

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

CO1: Develop knowledge and skills in elements of architecture.
CO2: Know about the components and principles of composition.
CO3: Describe the components of design and principles of composition.
CO4: Understand the architectural forms and space.
CO5: Gain knowledge about the articulation and circulation of buildings

Pre-requisites

Nil

AA232120	**Theory of Architecture**	L	T	P	C
Theory		4	0	0	4

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	-	-	2	-	3
CO2	3	2	-	-	2	-	3
CO3	3	2	-	-	2	-	3
CO4	3	2	-	-	2	-	3
CO5	3	2	-	-	2	-	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world architectural and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcomes and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible.

AA232120	**Theory of Architecture**	L	T	P	C
Theory		4	0	0	4

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III & IV)	Quiz/MCQ	Model Exam	Written Examination
Duration	2 hours	2 hours	1 hour	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Marks	40				60

Note:

- CA1 and CA2: Assessment tests should be conducted. Best of one will be considered for the internal assessment of 20 Marks.
- CA3: Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 Marks for the internal assessment.
- CA4: Model examination should be conducted as per the end semester question pattern. The marks should be converted to 10 Marks for the internal assessment.

AA232120	Theory of Architecture	L	T	P	C
Theory		4	0	0	4

Unit I	**INTRODUCTION TO ELEMENTS OF ARCHITECTURE**	
Definition of Architecture - Architectural design - Difference between architecture and civil engineering, architectural vocabulary -Elements of Architecture – point, line, plane and volume - various building Examples		12
Unit II	**COMPONENTS OF DESIGN AND PRINCIPLES OF COMPOSITION**	
COMPONENTS: Proportion, scale -Ordering principles - balance, symmetry, rhythm, datum, hierarchy, pattern with building examples. **PRINCIPLES OF COMPOSITION:** Unity, contrast, emphasis, harmony and specific qualities of design to include dominance, punctuating effect.		12
Unit III	**ARCHITECTURAL FORMS AND SPACE**	
Unity of opposites, visual and emotional effects of geometric forms - The sphere, The cube, the pyramid, and cone and their derivatives. Subtractive & Additive forms. Form defining space – horizontal elements, vertical elements		12
Unit IV	**ORGANIZATION OF FORM AND SPACE**	
SPATIAL RELATIONSHIPS: (i) Space within space (ii) Interlocking spaces iii) adjacent spaces iv) Space linked by a common space. **SPATIAL ORGANIZATION:** Influencing factors and their types: (i) Centralized (ii) Linear (iii) Radial iv) Clustered v) Grid Formal spaces and informal spaces.		12
Unit V	**ARTICULATION AND CIRCULATION**	
ARTICULATION OF FORM: Types: (i) Edges and corners, (ii) Surfaces articulation Works of contemporary architects and their ideologies and philosophies using the forms and space – Le Corbusier, B.V Doshi **CIRCULATION:** Function of building circulation- Types of circulation (Horizontal & Vertical) Simple circulation diagram for simple residence.		12
TOTAL HOURS		**60**

AA232120	**Theory of Architecture**	L	T	P	C
Theory		4	0	0	4

Reference

- The Theory of Architecture - Concepts and themes- Paul Alan Johnson
- Elements of Architectural Design - A visual resource- Ernest Burden
- Design Fundamentals in Architecture- V.S. Pramar
- An initiation to design- Helm Marie Evans and Caria David Dunneshil
- A History of Architecture- Sir Bannister Fletcher

Web-based / Online Resources

- https://arquiteturavirtual.weebly.com/uploads/1/9/5/7/19576183/architectural_theory.pdf
- https://webstor.srmist.edu.in/web_assets/srm_mainsite/files/downloads/theoryofarch.pdf
- https://uomustansiriyah.edu.iq/media/lectures/5/5_2018_12_09!07_40_56_PM.pdf
- https://wiki.p2pfoundation.net/images/Geometrical_Fundamentalism.pdf
- https://library.uc.edu.kh/userfiles/pdf/3.Structure%20as%20architecture%20a%20source%20book%20for%20architects%20and%20structural%20engineers.pdf
- https://ndl.iitkgp.ac.in/
- https://nptel.ac.in/

AA232260	**Architectural Drawing - I**	L	T	P	C
Practical		0	0	4	2

Introduction

The students of diploma in Architectural Assistantship should have sufficient skills to draw isometric drawings, besides this they should also be introduced to pencil sketching and measured drawing of simple objects. While preparing drawings, teachers should lay considerable stress on proportioning, dimensioning and composition of drawing work. They should be given sufficient exercises in rendering of isometric drawings, pencil sketching and measured drawing. So that they are able to perform well in the field/industry.

Course Objectives

The objective of this course is to

- To develop skills in manual presentation techniques, use of various media of presentation, Principles of 2-D & 3-D compositions.
- To make the students to apply scale and projections in composition of drawings.
- To draw the plan, elevation, section and construction details of elements of building components.
- To develop a design idea into a coherent proposal.
- To communicate ideas and concepts, to convince the clients of the merits of a design, or to make a record of a completed construction project.

Course Outcomes

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

CO1: Sketching and rendering with pencil.
CO2: Prepare architectural isometric drawings.
CO3: Explain the Principle of basic architectural drafting.
CO4: Prepare measured drawings of simple objects.
CO5: Prepare the measured drawing.

Pre-requisites

Nil

AA232260	**Architectural Drawing - I**	L	T	P	C
Practical		0	0	4	2

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	-	2	2	-	3
CO2	3	2	-	2	2	-	3
CO3	3	2	-	2	2	-	3
CO4	3	2	-	2	2	-	3
CO5	3	2	-	2	2	-	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- Course in Architectural Drawing - I shall be conducted by giving small time exercises.
- Each exercise shall be aimed at teaching the principles of scale, proportions, composition and its application in Architectural design.
- Goals and Objectives of each exercise shall be made clear to the students before starting the exercises.
- Each exercise shall have meaningful sequence with the previous exercises and the next   exercise.

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Practical Test (Unit – I)	Practical Test (Unit – II)	Practical Test (Unit – III)	Practical Record Submission	Practical Examination
Duration	2 hours				3 hours
Exam Marks	50	50	50	50	100
Converted to	25	25	25	10	60
Marks	Average of Best Two from CA1, CA2 and CA3 (25 marks)			15	60

Note: CA1, CA2 & CA3 Assessment test should be conducted. Average of best two will be considered for 25 Marks.

AA232260	**Architectural Drawing - I**	L	T	P	C
Practical		0	0	4	2

Unit I	**PENCIL SKETCHING**	
Exercise with Straight line, curvilinear line, Planes, Volume and Texture to understand various forms in Nature and Manmade forms Freehand Sketching Exercise to understand the Characteristic of Elements in Nature and Manmade forms. Sketching from memory - Basic Knowledge of Scale, Proportion, Light and Shade -Enlarging and Reducing of drawing. Sketching of various Compositions with Natural and Geometrical Form – Rendering and sketching exercises with Pencil. **(Minimum 4 exercises by covering all the components)** **Using dots, lines and shapes student should create a compositions like patterns, natural scenery etc. (rendering with pencil.)**	15

Unit II	**ARCHITECTURAL ISOMETRIC DRAWINGS**	
Architectural details like pergolas, some alphabetical shapes Addition of solids and voids that will create more 3-dimensional expression – Building forms. **(Minimum 4 exercises by covering all the components)** **Using drafting equipment student should create the3-dimensional view of the building component and furniture.**	15

Unit III	**MEASURED DRAWING**	
Observation, measurement and drafting- plans, elevations of simple objects like furniture, Entrance gates, etc. and building components like columns, cornice, door, window, etc. Principle of basic architectural drafting - line value, lettering basic and sections presentation formats. Measured drawing of simple objects like Furniture, Entrance Gates, etc. and building components like Stools, Table and Chair, Door, Window, etc. (Metric units should be followed) **(Minimum 4 exercises by covering all the components)** **Using measuring tape, student should measure the components of the building and draft it.**	15

AA232260	**Architectural Drawing - I**	L	T	P	C
Practical		0	0	4	2

Unit IV	DETAILED DRAWING	
Detailed measured drawing of a single room building. **(Minimum 1 exercise by covering all the components)** **Using measuring tape student should document a building.** **(NOT FOR EXAMINATION)**		10
TOTAL HOURS		**50**

Reference

- "Sketch Like an Architect: Advanced Techniques" by David Drazil.
- Architectural Graphics by Frank Ching.
- Basic Visual Concepts and Principles for Artists, Architects and Designers by Charles Wallschlaeger, Cynthia Busic-Snyder.
- Absolute Essentials of Architectural Drawing by Pardeep Singh Maan.
- How To Do Architectural Drawing - A Text Book And Practical Guide For Students In Architectural Draftsmanship by Oscar Schutte Teale
- Architectural Drawing and Draughtsmen by Reginald Blomfield.
- Architectural Drawings by Paulo Zavala Web-based/Online Resources

Web-based / Online Resources

- https://www.huduser.gov/portal/sites/default/files/pdf/Architectural-Drawing-Part-1.pdf
- https://www.archdaily.com/911414/the-best-drawing-tutorials-for-architects-on-youtube
- https://cedreo.com/blog/architectural-drawings/
- https://ia801402.us.archive.org/0/items/easystepsinarch00hodg/easystepsinarch00hodg.pdf
- https://www.youtube.com/watch?v=_X2ofaqGWlw
- https://en.wikipedia.org/wiki/Architectural_drawing\
- https://www.youtube.com/watch?v=1miyDqc0bsg
- https://ndl.iitkgp.ac.in/
- https://nptel.ac.in/

AA232440	**Basic Design and Visual Arts**	L	T	P	C
Practicum		2	0	2	3

Course Description

Student of Architectural Assistantship at diploma level are expected to assist in the preparation of architectural models of various kind in their professional career. This skill can also for basic of self-employment Architecture model as three-dimensional representations are made in different mediums. The student should be acquainted with all of these mediums.

Course Objectives

The objective of this course is to

- To develop skills in manual presentation techniques, use of various media of presentation, Principles of 2-D & 3-D compositions, Principles of Design.
- To understand the Visual & aesthetic qualities of Art and relating these to Architectural Design situation.

(These subject forms the direct input to Design. Basic Design is the foundation of all Professional courses which deals directly or indirectly with Aesthetic.)

Course Outcomes

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

CO1: Develop knowledge and skills in sketching and observation.
CO2: Understand about colour theory.
CO3: Develop knowledge and skills in elements of visual compositions.
CO4: Develop knowledge and skills in principles of visual compositions.
CO5: Create sculptures in planer forms and Create symbolic sculptural forms and spaces using mount board.

Pre-requisites

Nil

AA232440	**Basic Design and Visual Arts**	L	T	P	C
Practicum		2	0	2	3

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	-	2	2	2	-	3
CO2	3	-	2	2	2	-	3
CO3	3	-	2	2	2	-	3
CO4	3	-	2	2	2	-	3
CO5	3	-	2	2	2	-	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III & IV)	Practical Test (Unit V)	Practical Record Submission	Practical Examination
Duration	2 hours				3 hours
Exam Marks	50	50	50	15	100
Converted to	25	25	25	15	60
Marks	Average of Best Two from CA1, CA2 and CA3 (25 marks)			15	60

Note: CA1, CA2 & CA3 Assessment test should be conducted. Average of best two will be considered for 25 Marks.

AA232440	**Basic Design and Visual Arts**	L	T	P	C
Practicum		2	0	2	3

Unit I	**BASICS AND DRAWING FROM OBSERVATION**	
Introduction to Drawing through various period of History – Study of historical painting and sculpture - Tanjore painting, Mysore painting, Mughal painting, Kerala mural painting. Expressing (Qualities of Lines / Drawing tools and Quality of Expressions – Pen and Pencil)-Free hand sketching of natural/manmade-Light and shadows. **(Minimum 2 exercise by covering all the components)**	10
The processes of seeing, Imagining and Representing - Observations on Line and Shape - Observation on Tone and Texture - Observations on Form and Structure - Observations on Space and Depth - Sketching Exercises related to the contents specified above. **(Minimum 2 exercise by covering all the components)**	10
Unit II	**COLOUR THEORY**	
Study of classification of colours with different tint, tone, shade, hues and values, Colour wheel and colour composition, properties of colour and its impact. **(Minimum 2 exercise by covering all the components)**	10
Unit III	**ELEMENTS OF VISUAL COMPOSITIONS**	
Assignment shall be aimed at understanding role of the following basic elements of visual design existing in paintings, compositions, murals, sculptures, building and in nature - Dots, Lines, Planes, Patterns, Shapes, Forms - Spaces, Colour, Texture, Levels, Light, etc. **(Minimum 2 exercises by covering all the components)**	10
Unit IV	**PRINCIPLES OF VISUAL COMPOSITIONS**	
The exercises shall be aimed at understanding and using principles like Repetition, Rhythm, Focal point, Symmetry, asymmetry, Background, Foreground, Sense of Direction, Harmony, Balance and Proportion. **(Minimum 2 exercises by covering all the components)**	10
Unit V	**PLANAR FORMS AND SOLID AND VOIDS**	
PLANAR FORMS: This exercise shall be aimed at creating sculptures out of Mount Board, Box Board/ Metal Foils, wire and any other planar material and also exploring the possibility of adopting the sculptures to Architectural functions. **(Minimum 1 exercise by covering all the components)** **SOLIDS AND VOIDS:** This exercise shall include creation of symbolic Sculptures for outdoor and indoor spaces, forms and spaces using mount board / any moldable material. **(Minimum 1 exercise)**	10
TOTAL HOURS	**60**

AA232440	**Basic Design and Visual Arts**	L	T	P	C
Practicum		2	0	2	3

Reference

- Fundamental Of Visual Art by Mukesh Kumar.
- Art: The Definitive Visual Guide" by Iain Zaczek and Mary Acton
- Art and Visual Perception – A Psychology of the Creative Eye 50th Anniversary by Rudolf Arnheim

Web-based/Online Resources

- https://creativemarket.com/blog/10-basic-elements-of-design
- https://edu.gcfglobal.org/en/beginning-graphic-design/fundamentals-of-design/1/
- https://www.youtube.com/watch?v=B4Zv500TEPA
- https://www.firstinarchitecture.co.uk/architecture-design-basics-form/
- https://en.wikipedia.org/wiki/Visual_arts
- https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SDE1201.pdf
- https://ndl.iitkgp.ac.in/
- https://nptel.ac.in/

Allocation of Marks for End Semester Examinations

Part	Description	Marks
A	One question from Unit I & II	25
B	One question from Unit III & IV	35
C	One question from Unit V	40
TOTAL MARKS		**100**

Note: Examination will be conducted for 100 marks and it will be reduced to 60 marks.

AN232120	**Basics of 3D Animation &**	L	T	P	C
Theory	**Graphics Engineering**	1	2	0	3

Introduction

This course is focuses on providing a detailed knowledge about multimedia, animation, computer graphics, Filmmaking, product designing, graphic designing and VFX etc. The basic of 3d animation and graphics will introduce for the strong foundations in concepts and practical skills, students will understand the elements of multimedia, VFX, graphic & animation around the world. there is the obvious global connection that comes from the study of animation graphics.

Course Objectives

The objective of this course is to enable the student to

- To learn about multimedia
- To understand the various elements of multimedia
- To understand the technologies behind multimedia applications
- Demonstrate the knowledge of uses and applications of Animation
- To Demonstrate the fundamentals of virtual reality systems.

Course Outcomes

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

CO1: Define what Multimedia is and how that works
CO2: Justify the right way of manipulating multimedia systems
CO3: Develop computer Animation in 2D and 3D
CO4: To innovate best practices for elements of design, virtual reality and gaming
CO5: demonstrate how VR &AR systems work and list the applications of VR & AR

Pre-requisites

Nil

AN232120	**Basics of 3D Animation &**	L	T	P	C
Theory	**Graphics Engineering**	1	2	0	3

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	3	2	1	1	
CO2	3	3	3	2	1	1	
CO3	3	3	3	2	2	1	
CO4	3	3	3	2	2	1	
CO5	3	3	2	2	1	1	

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III & IV)	Quiz / MCQ	Written Model Exam (All units)	Written Examination
Duration	2 hours	2 hours	1 hour	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Marks	20		20		60

Note:

- CA1 and CA2: Assessment tests should be conducted. Best of one will be considered for the internal assessment of 20 Marks.
- CA3: Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 Marks for the internal assessment.
- CA4: Model examination should be conducted as per the end semester question pattern. The marks should be converted to 10 Marks for the internal assessment.

AN232120	**Basics of 3D Animation &**	L	T	P	C
Theory	**Graphics Engineering**	1	2	0	3

Unit I	INTRODUCTION TO MULTIMEDIA	
Definition of Multimedia, Multimedia Basics, Multimedia Elements, Multimedia Applications, Text, Images, About Fonts And Faces, Using Text In Multimedia, Hypermedia and Hypertext, Bitmaps, 1 Bit Images, 8-Bit Gray Level Images, 8-Bitcolor Images, Dithering, 24 Bit Color Images, Binary Image, Color& Gary Scale, Vector images, Computerized Color, Color Palettes, Color Look-Up Table. Image Processing¸ Image Acquisition, Color Image Processing, Image File Formats.		10
Unit II	**FUNDAMENTALS OF AUDIO AND VIDEO**	
The Power of Sound, Digital Audio, Making Digital Audio Files, MIDI Audio, MIDI vs. Digital Audio, Multimedia System Sounds, Audio Recording, Keeping Audio CDs, Sound for your Mobile, Internet, Video, Digital Video, digital video fundamentals, Displays, Digital Video Containers, Codec, Video Format Converters, Obtaining Video Clips, Shooting and Linear editing, Nonlinear editing Video mixers and its functions.		10
Unit III	**DATA COMPRESSION AND TECHNOLOGIES**	
Need for Data compression, General Data Compression Scheme, Compression standards, non-lossy compression for images, Lossy compression for Photographs and Video, Data and File Format Standards, Architecture of a VIDEO CARD, various capturing card, Graphic cards GUI, Soundcard Functions, Digital broad casting, study of multimedia networking, quality of data transmission, buffering& streaming, media on demand, wireless and mobile networks, web-based application, e- learning & education.		9
Unit IV	**INTRODUCTION TO ANIMATION TECHNIQUES**	
History & Origin of Animation, Silent Era, Animated Cartoons and Their Evolution, Walt Disney, MGM Cartoon Studios, Warner Bros Studios, Pixar Studio, Different Types Of Animation, Various Animation Software, Basic Principles of Animation, Multimedia And Animation, Introduction To Computer Graphics And Animation, Motion Capture Advantages And Disadvantages, Motion Graphic Techniques, VFX Techniques.		9

AN232120	**Basics of 3D Animation &**	L	T	P	C
Theory	**Graphics Engineering**	1	2	0	3

Unit V	**FUNDAMENTALS OF AR & VR**	
Defining Virtual Reality, History of VR, Human Physiology and Perception, Key Elements of Virtual, Reality Experience, Virtual Reality System, Interface to the Virtual World-Input & output- Visual, Aural & Haptic Displays, Applications of Virtual Reality, Visual Representation in VR Defining augmented reality, history of augmented reality, The Relationship Between Augmented Reality and Other Technologies-Media, How Does Augmented Reality Work?, Concepts Related to Augmented Reality.		7
TOTAL HOURS		**45**

Suggested List of Students Activity

- Presentation/Seminars by students on any recent technological developments based on the course.
- Periodic class/online quizzes conducted based on the course.
- Blended learning activities to explore the recent trends and developments in the field

Reference

- S.Gokul, "Multimedia Magic", BPB Publications, 2nd Edition.
- Tay Vaughen , "Multimedia Making it Work", TMH, 6th Edition.
- Ranjan Parekh, Principles of Multimedia, 2nd Edition, McGraw Hill Education, 2013
- Charles Solomon, Enchanted Drawings: The history of animation,1994
- Bob Thomas, The Art of Aanimation,1958
- Virtual Reality, Steven M. LaValle, Cambridge University Press, 2011 Developing Virtual Reality

Web-based / Online Resources

- NPTEL & MOOC courses titled Multimedia
- https://nptel.ac.in/courses/106105163/
- w3schools.com/html/html-media.asp

AN232460	**Art & Foundation – I Practical**	L	T	P	C
Practicum		1	0	2	2

Introduction

Art & Foundations is addressing the elements and principles of design (line, color, shape, texture, space, form, value, unity, balance, variety, scale, proportion, rhythm, emphasis). The technique you use will habitually be determined by the initial purpose of your drawing, or the aspirations you have for the illustration, Students are presented with visual problems to solve by hand on, sketching for a water color would require an entirely different technique than that for a detailed photo-realistic drawing.

Course Objectives

The objective of this course is to enable the student to

- Drawing shapes & forms
- Features in Perspective drawings
- Understand Light shadows
- Understand different shading techniques
- Learn about painting techniques& color wheel

Course Outcomes

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

CO1: Draw still life & Perspective drawings
CO2: Sketch Visual Graphics Illustration
CO3: Draw freehand & outdoor sketching
CO4: Handle painting medium
CO5: Create drawing portfolio

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	3	3	2	1	
CO2	3	3	3	3	2	2	
CO3	3	3	3	3	2	2	
CO4	2	2	2	1	1	2	
CO5	2	3	3	1	1	2	

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

AN232460	Art & Foundation – I Practical	L	T	P	C
Practicum		1	0	2	2

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test Unit I & III	Practical Test 5 Expts	Written Test Unit II & IV	Practical Test 5 Expts	Practical Examination
Duration	2 hours	3 hours	2 hours	3 hours	3 hours
Exam Marks	20	40	20	40	100
Converted to	10	10	10	10	60
Marks	20		20		60

AN232460	Art & Foundation – I Practical	L	T	P	C
Practicum		1	0	2	2

Unit I	**BASIC TECHNIQUES OF DRAWING**	
Drawing as a Form of Communication–Drawing Inside & outside of arts–Art history Renowned artist – Definition –Western artist– Indian artist –Material equipment's–Definition–Ancient Materials–Modern materials –Drawing elements – Principles of Design Elements – Line& basic shape: Types of lines– Uses & creation of line – Types of shapes – shape creation methods. Free hand drawing practice		4
Ex. 1	Draw the different types of lines.	
Ex. 2	Draw various 2D shapes.	5
Ex. 3	Draw the different types of 3D geometric shapes.	
Unit II	**DRAWING OF SHAPES & FORMS**	
Usual & unusual shapes – Definition of forms – Types of forms – Symmetrical & Non-Symmetrical Design – Approaching & creating forms–Making groups–Measurement Techniques–analyzing subject– measuring proportions– Rule of thumb – Framing Still life Drawing practice.		3
Ex. 4	Draw and creating triangles as 3d form pyramid & creating rectangle as 3d form cube.	
Ex. 5	Draw and creating pentagon as 3d form pentagon & creating hexagon as 3d form hexagon.	6
Ex. 6	Draw and creating square as 3d form cube & creating plane as 3d form cylinder.	
Unit III	**VISUAL GRAPHICS**	
Graphics Definition –Silhouette – geometric – Type face – Alphabetical Designs - logos & icons –Info Graphics – Layout & Template Design – Vector Graphics – Visual design principles – – Basic study of light –characteristics of shading tones–various methods of Pencil Shading–various objects shading Hands on practice exercise.		3
Ex. 7	Draw the info graphics data / template design.	
Ex. 8	Draw logo with pencil shading tones.	6
Ex. 9	Draw still life drawing with shading tones.	

AN232460	Art & Foundation – I	L	T	P	C
Practicum		1	0	2	2

Unit IV	**PERSPECTIVE AND NATURE STUDY**	
Types of perspective: linear perspective–atmospheric perspective - Isographic & Orthographic View–Perspective of a Circle–Perspective Terms–Horizon line – Picture plane – Vanishing Point –Orthogonal lines –construction of perspective–one point Perspective –Two point Perspective –Three point perspective – Four point perspective – Landscape environment –Atmospheric perspective–nature element–landscape composition–perspective drawing practice.		3
Ex. 10	Draw One-point perspective.	
Ex. 11	Draw Two-point perspective.	6
Ex. 12	Draw Three-point perspective.	
Ex. 13	Draw Aerial perspective.	
Unit V	**THE STUDY OF COLORS**	
Color an overview– Qualities of Color – Characteristics & Value – The color wheel– primary colors - Secondary colors–complementary colors- Warm or cool colors –values of colors– Tint ,Tone, Shade- Types of brushes–Types of painting mediums–process of painting - Water color – poster color painting – Oil canvas painting - Acrylic painting-Glass painting.		3
Ex. 14	Draw primary and secondary color wheel.	
Ex. 15	Draw still life painting.	6
Ex. 16	Draw any texture with acrylic/water color.	
TOTAL HOURS		**45**

AN232460	Art & Foundation – I	L	T	P	C
Practicum	**Practical**	1	0	2	2

References

- Richard Williams, Animation Survival Kit revised edition, Faber, Main - Revised edition 2009
- Bob Thomas, The Art of Aanimation,1958
- Complete Guide to Drawing by Giovanni Civardi 2005- First Edition
- Drawing Light and Shade Giovanni Civardi 2006 Second Edition
- Perspective by Milind Mulik -- Jyotsna Prakashan.
- Sketch Book by MillindMulick 2008 Fourth Edition.

Web-based/Online Resources

http://en.wikipedia.org/wiki/Color_theory
http://www.colormatters.com/color-and-design/basic-color-theory
http://en.wikipedia.org/wiki/Design_elements_and_principles

BM232120	BASICS OF ANATOMY AND PHYSIOLOGY	L	T	P	C
Theory		3	0	0	3

Introduction:

This course will give the scientific study of the body structure and their functions and helps to study about the components of various organisms.

Course Objectives:

The objective of this course is to

- Know about introduction to human body.
- Know about cells and tissues of body.
- Know about reproductive organs.
- Know about sense organs.
- Know about Endocrine.

Course Outcomes:

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

CO1: Analyze the structure of the cell.

CO2: Identify the organs of body.

CO3: Discuss the Anatomy and Physiological aspects of systems of the human body.

CO4: Explain the structure and functions of various systems in human body.

CO5: Analyze the structure and functions of sense organs and glands.

Pre-requisites:

Knowledge of basic Science.

CO/PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	1	1	2	3
CO2	3	2	3	1	1	2	3
CO3	3	2	3	1	1	2	3
CO4	3	2	3	1	1	2	3
CO5	3	2	3	1	1	2	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- Focus on health science context.
- Focus on medical terminology.
- Conduct laboratory-based activities that allow students to use their own bodies.
- Explore and solve a medical mystery.

Assessment Methodology:

	Continuous Assessment (40 marks)				End Semester Examination (60 Marks)
	CA1	CA2	CA3	CA4	
Mode	Written Unit I & II	Written Unit III & IV	Written Model Exam Units I to V	Quiz/MCQ/ Activity/ Assignment	Written Examination
Duration	2 hours	2 hours	3 hours	2 hours	3 hours
Exam Marks	60	60	100	100	100
Converted to	20	20	10	10	60

Marks	20	20	60

Note:
- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for 20Marks.
- CA3 Model examination should be conducted as per the question pattern.
- CA4 Online quiz examination (MCQ) should be conducted covering the complete syllabus.

BE232120	**BASICS OF ANATOMYAND PHYSIOLOGY**	L	T	P	C
Theory		3	0	0	3

Unit I	**CELLSANDTISSUES**	
Structure of Cell – structure and functions of sub organelles – Cell Membrane –Transport ofAcross Cell Membrane - Action Potential – Cell to Cell Signalling – Cell Division. Types ofSpecializedtissues–Functions		9
Unit II	**CIRCULATORYSYSTEM**	
Structureofcirculatorysystem–structureofheart,bloodvessels– typesofcirculation–doublecirculation – cardiac cycle – blood flow through heart – Electrocardiogram (ECG)–disordersofcirculatorysystem.		9
Unit III	**REPRODUCTIVESYSTEM**	
Reproductive system-Male reproductive organs-female reproductive organs-Menstrualcycle-hormones-pregnancy and fertilization-functions of male reproductive system-functionsoffemalereproductivesystem-Gametogenesis-fertilizationandimplantation		9
Unit IV	**MUSCULOSKELETALSYSTEM**	
Muscular system-types of muscles-functions-disorders of muscular system-skeletal system-bones-typesofbones-functionsofthorax-spinalcord−functionsofskeletalsystem-disordersofskeletalsystem Lymphaticsystems-functions		9
Unit V	**ENDOCRINE SYSTEM**	

Endocrine system-glands-pituitary gland-thyroid gland-parathyroid glands-adrenal glands-pancreas-functions Sense organs-ear-structure-functions-skin-structure-functions of skin-nose-structure -functions-mechanismof breathing	9
TOTAL HOURS	**45**

TextBooks:

- Prabhjot Kaur.Text BookofAnatomyandPhysiology.LotusPublishers.2014.
- Elaine.N.Marieb,"EssentialofHumanAnatomyandPhysiolog y", EightEdition,PearsonEducation,NewDelhi,2007.

References:

- FundamentalsofAnatomyandPhysiology.PearsonPublishers,2014.
- GillianPocock, ChristopherD. Richards,ThehumanBody– AnintroductionforBiomedicalandHealthSciences,OxfordUniversityPress,USA,2 013.
- WilliamF. Ganong,"ReviewofMedicalPhysiology",22ndEdition,McGrawHill,NewDelhi,2010.
- EldraPearlSolomon, "IntroductiontoHumanAnatomyandPhysiology", W.B.SaundersCompany,2015.
- Guyton & Hall, "Medical Physiology", 13th Edition, Elsevier Saunders, 2015.

BM232460	ANATOMY PRACTICES	L	T	P	C
Practicum		1	0	2	2

Introduction:

This course will give the scientific study of the body structure and their functions and helps to study about the components of various organisms.

Course Objectives:

The objective of this course is to

- Know about Introduction to human body.
- Know about Nervous System and Cardiovascular System.
- Know about Blood and Lymph.
- Know about Respiratory System.
- Know about Digestive System & Urinary System.

Course Outcomes:

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

CO1: Analyse the structure of the cell.

CO2: Identify bones of human skeleton.

CO3: Discuss the Anatomy and Physiological aspects of respiratory systems.

CO4: Explain the structure and functions of various systems in human body.

CO5: Explain about the biomedical waste management.

Pre-requisites:

Knowledge of basic Science.

CO/PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	1	1	2	3
CO2	3	2	3	1	1	2	3
CO3	3	2	3	1	1	2	3
CO4	3	2	3	1	1	2	3
CO5	3	2	3	1	1	2	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- Focus onhealthsciencecontext.
- Focusonmedicalterminology.
- Conductlaboratory-based activitiesthat allowstudentstousetheirownbodies.
- Exploreandsolveamedicalmystery.

Assessment Methodology:

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)	
	CA1	CA2	CA3	CA4	Written Examination	Practical Examination
Mode	Assignment	Record Writing	Written Test	Lab Test	Written Examination	Practical Examination
Duration	-	-	2 hours	2 hours	1 hour	2 hours
Exam Marks	20	10	30	70	30	70

Converted to	10	10	10	10	60	
Marks	40				60	

BM232460	ANATOMY PRACTICES	L	T	P	C
Practicum		1	0	2	2

Unit I	BLOODCELLSANDSKELETALSYSTEM	
THEORY Blood groups-Estimation of RBC, WBC and Platelet - blood cell-composition-origin of RBCParts of Skeleton and Bones – Skull – Cranium – Facial Bones – Skull Bone – VertebralColumn – Thorax – Bones of the Limbs– Bones of the Lower Limb – Joint – Types ofJoints.		10
PRACTICAL **Experiment-1**:Exposuretohumananatomyusingmodelsofbloodstructureusing microscope		4
Experiment 2:ExposuretohumananatomyusingmodelsofHumanSkeleton		4

Unit II	CARDIOVASCULAR AND DIGESTIVE SYSTEM	
THEORY Structureandfunctionofheart-mainarteries–veins-nervesupplyandplexusforthis system. Digestivesystem of human alimentary canal,digestiveglands, theductsystem of liver,gallbladderandpancreas,processofDigestion		10
PRACTICAL **Experiment** **3**:Exposuretohumananatomyusingmodelsofcardiovascularsystem		4 4

Experiment 4:ExposuretohumananatomyusingmodelsofDigestivesystem		
Unit III	**EXCRETORYANDRESPIRATORY SYSTEM**	
THEORY ExcretorySystem:Introduction−ExcretoryOrgans−UrinarySystem−Kidneys− FunctionsofUrinarySystem RespiratorySystem:Introduction−Nose−Pharynx−Larynx−Bronchi−Lungs− Respiration−ImportanceofRespiration		10
PRACTICAL **Experiment5**:ExposuretohumananatomyusingmodelsofExcretorysystem **Experiment6**:ExposuretohumananatomyusingmodelsofRespiratorysystem		4 4
Unit IV	**NERVOUSSYSTEMANDSENSEORGANS**	
THEORY Nervoussystem-parts-nerves-brain-peripheralnervoussystem-functions. Senseorgans-Tongue-structure-tastebuds-eye-structureofeye − functions- visualactivity-defects ofeye		10
PRACTICAL **Experiment7**:Todemonstratevisualactivity **Experiment 8**:Toexaminedifferenttypes oftaste		4 4
Unit V	**CLINICALMEASUREMENTS-MEDICALWASTE**	
THEORY Medicalwaste-typesofmedicalwaste-disposalmethods-procedure-treatment- Measurementofheartrate-measurementofbodytemperature-		10

measurementofrespirationrate	
PRACTICAL **Experiment 9**:Wastedisposalprecautionsinwastemanagement. **Experiment10**:Recordingofbodytemperature	4 4
TOTAL HOURS	**90**

TextBooks:

- Prabhjot Kaur.Text BookofAnatomyandPhysiology.LotusPublishers.2014.

- Elaine.N.Marieb,"EssentialofHumanAnatomyandPhysiology",
EightEdition,PearsonEducation,NewDelhi,2007.

References:

- FundamentalsofAnatomyandPhysiology.PearsonPublishers,2014.

- GillianPocock, ChristopherD. Richards,ThehumanBody–
AnintroductionforBiomedicalandHealthSciences,OxfordUniversityPress,USA,2
013.

- WilliamF.
Ganong,"ReviewofMedicalPhysiology",22ndEdition,McGrawHill,NewDelhi,2010.

- EldraPearlSolomon, "IntroductiontoHumanAnatomyandPhysiology",
W.B.SaundersCompany,2015.

- Guyton&Hall,"MedicalPhysiology",13thEdition,Elsevier Saunders, 2015.

CE232120	**Basics of Civil Engineering**	L	T	P	C
Theory		3	0	0	3

Introduction

This course is designed to provide a comprehensive introduction to the field of Civil Engineering, offering fundamental knowledge across various sub-disciplines within this field. It is tailored to meet the educational requirements typically outlined in the syllabus for diploma studies in Engineering. The topics covered are based on the syllabus for diploma studies in Engineering and technology. The contents are arranged in sequence, that starts from the basic concepts and followed in List of materials, Details of materials, Introduction to building planning, Building Construction, Introduction to Surveying, Levelling and Advancements in Civil Engineering.

Throughout this course, students can expect to acquire a solid foundation in civil engineering, providing them with valuable insights into the complexity of industrial projects and the skills required for success in this field. The goal is to equip students with the knowledge and expertise needed to excel in the diverse and challenging world of civil engineering.

Course Objectives

The objective of this course is to enable the student to

- Introduction to Civil Engineering: Provide students with a fundamental understanding of the field and its significance in various industries and society.
- Foundational Knowledge: Impart essential principles, theories, and concepts in physics, mathematics, and materials science that are pertinent to civil engineering.
- Materials Understanding: Familiarize students with the properties and usage of common construction materials like concrete, steel, and timber.
- Building Planning: Enable students to comprehend architectural plans, designs, and considerations for constructing safe, functional, and aesthetically pleasing buildings.
- Surveying Skills and Levelling Proficiency: Illustrate the basics of land measurement, surveying instruments, and techniques for precise mapping. Provide knowledge and skills related to levelling techniques to ensure accurate elevation measurements in construction projects.
- Awareness of Advancements: Explore emerging technologies and trends in civil engineering, promoting an understanding of the field's ongoing evolution.

CE232120	**Basics of Civil Engineering**	L	T	P	C
Theory		3	0	0	3

Course Outcomes

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

CO1 Describes the uses of different materials in Civil Engineering.
CO2 Interpret various aspects of the building planning.
CO3 Identify the various building components and methods of constructions.
CO4 Illustrate the different equipment for angular and linear measurements.
CO5 Describes various public transportation systems, water conservation methods, and advances in civil engineering.

Pre-requisites

Nil

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	1	1	1	3
CO2	3	1	1	1	1	1	3
CO3	3	1	1	1	1	1	3
CO4	3	1	1	2	1	1	3
CO5	3	1	1	1	1	1	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- Engage and Motivate: Teachers should actively engage students to boost their learning confidence.

- Real-World Relevance: Teachers are expected to physically show various building materials while imparting instructions. Students should be encouraged to collect sample of various building materials so as to create a museum of materials in the polytechnic.

CE232120	**Basics of Civil Engineering**	L	T	P	C
Theory		3	0	0	3

- Interactive Learning: Teachers are expected to organize demonstrations and field visits to show various stages of construction operations., use of various measurements, instruments in surveying and also train the students to use appropriate instruments to avoid/minimize errors during surveying for better learning experiences.

- Application-Based Learning: Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure the outcome of the learning is employability-based.

- Simulation and Real-World Practice: In addition to theoretical instructions, different activities pertaining to the simulated Environment, transitioning to real-world scenarios, when possible, like expert lectures, seminars, visits to greenhouse, effluent treatment plant of any industry, rain water harvesting plant etc. may also be organized.

- Encourage Critical Analysis: Foster an environment where students can understand the experiment outcomes and infer the potential sources of error in case of any discrepancies.

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III & IV)	Quiz/ MCQ	Model Examination	Written Examination
Duration	2 hours	2 hours	1 hour	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Marks	40				60

- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for the internal assessment of 20 Marks.
- CA3 Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 marks for the internal assessment
- CA4 Model examination should be conducted as per the end semester question pattern. The marks should be converted to 10 marks for the internal assessment.

CE232120	**Basics of Civil Engineering**	L	T	P	C
Theory		3	0	0	3

Unit I	INTRODUCTION TO CIVIL ENGINEERING AND CIVIL ENGINEERING MATERIALS	
Introduction to Civil Engineering – Various disciplines of Civil engineering - Scope, Impact - Role of Civil Engineer - Units of measurement - Unit conversion (Length, Area, Volume) - List of materials, Details (types, properties, uses) of materials: Cement, Aggregate, Brick, Steel, Concrete, Stone, Soil, Mortar, Timber, Plastic, Epoxy, Fly Ash, Steel slag, Copper slag, Bitumen, Optical fiber, Pipe, Wire, Cable and FRP.		10

Unit II	INTRODUCTION TO BUILDING PLANNING	
Introduction: Introduction to National Building Code of India 2016 and its parts – Classification of buildings Conventions, Symbols: General – Conventions - Title block- Scales- Line work- Lettering-Symbols-Abbreviations. **Building Bye-Laws:** Objects of bye-laws - Importance of bye-laws- Function of local authority - Setbacks - Plot Coverage - Number of floors - Height of building - Built up Area - Floor space index (FSI) - Views and details necessary for the preparation of a civil engineering drawing. **Planning of Buildings:** Basic requirements, elements - Introduction to various buildings, computation of plinth area, computation of carpet area - Introduction to the types of buildings as per NBC - Selection of site for construction of buildings - Components of a residential building - Requirements - Types of Rooms – Minimum Size requirement for each type of rooms - Introduction to the Industrial buildings - Types - Introduction to the public buildings - Types - General requirements of Public Buildings.		10

Unit III	BUILDING CONSTRUCTION	
Building Construction: Foundations, Classifications - Masonry Works – classifications, definition of different technical terms, Roofs – functional requirements, basic technical terms, roof covering materials, Floors – functions, types, flooring materials (brief discussion), Plastering and Painting – objectives, types.		8

CE232120	**Basics of Civil Engineering**	L	T	P	C
Theory		3	0	0	3

Unit IV	INTRODUCTION TO SURVEYING AND LEVELLING	
Introduction, Conventional systems of measurements, Fundamental principles, Classifications. Linear measurement: Instruments used, Chain Survey on plane ground, Offset, Ranging. **Angular measurement:** Compass - Instrument used, Meridian, Bearing and Local attraction. **Leveling:** Instrument used, Terminology, Types of leveling, and Methods of leveling, Introduction to contour survey. **Modern tools:** Introduction to Theodolite, Total Station, Introduction to Global Positioning System (GPS) and Geographic information system (GIS).	9
Unit V	**ADVANCEMENTS IN CIVIL ENGINEERING**	
Mass Transportation systems - Bus Rapid Transit System (BRTS), Metro Railway, Solid waste management systems, Rainwater harvesting systems, Smart city and its features, Green buildings, Energy efficient buildings, Heritage structures & its conservations - Descriptions with Sketches only.	8
TOTAL HOURS		**45**

Suggested List of Students Activities

- Draw the line plan of 1BHK, 2BHK homes.
- Identification, demonstration & prepare sketches of Locally Available building materials
- Prepare Sketches of masonry works.
- Collect the information about modern survey instruments available in the market and prepare the report.
- Visit any one construction site and prepare the construction activity report
- Presentations about any recent technological developments in civil engineering field
- Study the Road, Rail Transportation systems, Rainwater harvesting systems in your city or nearest place and submit the reports
- Conduct class quizzes on a fortnightly basis.
- Prepare Models of any one of the following - Residential building, Commercial, Primary health center, School building
- Micro project that shall be an extension of any practical lab exercise to real-world civil engineering application

CE232120	**Basics of Civil Engineering**	L	T	P	C
Theory		3	0	0	3

Reference Books

- S.C. Rangwala, Engineering Material, Charotar Publication.
- S.C. Rangwala. Civil Engineering Drawing, Charotar Publication.
- Gurucharan Singh, Building planning, designing and scheduling, Standard Publisher.
- Dr. B. C. Punamia, Building Construction Publisher: Laxmi Pub. Delhi.
- N. N. Basak, Surveying and leveling, Tata McGraw Hill Education.
- H.S. Peavy, D.R. Rowe and G. Tchbanoglous, Environmental Engineering, McGraw Hill International Edition.
- Khanna S. K. and Justo C. E.G., Highway Engineering, Publisher :Nemchand and Brothers.
- Papacostas C.S., Prevedouros, "Transportation Engineering and Planning, 3 rd Edition, Prentice Hall of India, New Delhi, 2002.
- Vukan R.Vuchie, Urban Transit Systems and Technology, John Wiley and Sons, 2007.
- M.S.Palanichamy, Basic Civil Engineering, McGraw Hill.S. Ramamrutham, Basic Civil Engineering , Dhanpatrai Publication.
- Gkhirasaar, Basic Civil Engineering Dhanpatrai Publication.
- SS Bhavikatti, Introduction to civil engineering, New Age international Publishers.

Web-based/Online Resources

- https://nptel.ac.in/courses/105106201
- https://nptel.ac.in/courses/105102088/
- https://nptel.ac.in/courses/124105013/
- http://nptel.ac.in/courses/105107122/
- http://nptel.ac.in/courses/105107157/
- https://nptel.ac.in/courses/105102015/
- http://nptel.ac.in/courses/105101087/
- http://nptel.ac.in/courses/105104100/
- https://nptel.ac.in/courses/105103205/
- https://nptel.ac.in/courses/105102195/

CH232451	Applied Chemistry – I	L	T	P	C
Practicum	(Non-Circuit Branches)	1	0	2	2

Introduction

This course will give the outline and applications of some important chemistry principles which are relevant for non-circuit polytechnic branches

Course Objectives

The objective of this course is

1. To acquire skill on water quality parameter and art of water monitoring.
2. To understand basic knowledge on soft and hard water -EDTA experiment and scale formation.
3. To understand the harmful effects of heavy metal ions effluents and their health hazards.
4. To build understanding on methods of softening hard water- Ion exchange and reverse osmosis method and purification of drinking water

Course Outcomes

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

CO1: Differentiate hard and soft water and estimate the total hardness in the given sample
CO2: Adopt suitable cost-effective methods for the softening of hard water
CO3: Identify the reason s for the hardness and check the standard of water quality parameters
CO4: Design a suitable model to address the disadvantage boiler scales

Pre-requisites

10th Standard Chemistry

CH232451	**Applied Chemistry – I**	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	2	2

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	1	1	1	3
CO2	3	3	2	1	1	1	3
CO3	3	3	2	1	1	1	3
CO4	3	3	2	1	1	1	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where they could be the source of error, if any.

CH232451	Applied Chemistry – I	L	T	P	C
Practicum	(Non-Circuit Branches)	1	0	2	2

Assessment Methodology

	Continuous Assessment (40 marks)					End Semester Examination (60 marks)
	CA1		CA2		CA3	
Mode	Written Test (Unit – I)	Practical Test (4 expts)	Written Test (Unit – II)	Practical Test (Ex: 4 expts)	Model Practical Exam (Ex: 1 to 8)	Practical Exam
Duration	1 hour	2 hours	1 hour	2 hours	3 hours	3 hours
Exam Marks	20	60	20	60	100	100
Converted to	20		20		20	60
Final Marks	20				20	60

Note:

- Average of CA 1 and CA 2 should be considered for the internal assessment of 20 marks
- CA 3 Model examination should be conducted as per the End Semester guidelines. The same should be considered for the internal assessment of 20 marks

CH232451	**Applied Chemistry – I**	L	T	P	C
Practicum	(Non-Circuit Branches)	1	0	2	2

Unit I	WATER ANALYSIS	
Sources of water – depletion of underground water – Reasons – Basic Idea of rain water harvesting - Hard water and soft water – Hardness of water – Carbonate and Non–carbonate hardness – Methods of expressing hardness – mg/lit and ppm – Estimation of total hardness by EDTA method –simple Problems on total hardness only-Disadvantages of using hard water in boilers –Scale formation, Corrosion of boiler metal, Caustic Embrittlement – Priming and Foaming (definition only).		6

Ex.No	Name of the Exercise	
1	Estimation of total hardness of water by EDTA method	
2	Determination of alkalinity of sample of hard water	12
3	Estimation of residual chlorine in a given water sample	
4	Estimation of oxalic acid by permanganometry	

Unit II	WATER TREATMENT	
Determination of residual chlorine in the given sample of hard water-identification of sulphate and chloride ions- identification of heavy metal ions in the given sample of effluent- Softening of hard water – Ion-Exchange method and Reverse Osmosis method – chemical methods of purification of water- Municipal supply – purification of drinking water – Calculation of pH, H^+ ions and TDS of different samples of acid and base – Quality of portable water (WHO Standard)		6

Ex.No	Name of the Exercise	
5	Calculation of pH, H^+ ion and TDS of different samples	
6	Estimation of copper by Complexometry	12
7	Effluent analysis of heavy metal ions - lead, copper & zinc	
8	Systematic analysis of acid radicals such as carbonate, nitrate and sulphate ions.	
	Test & Assessment	9
	TOTAL HOURS	**45**

CH232451	Applied Chemistry – I	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	2	2

Suggested List of Students Activity

- Presentation/Seminars by students on any recent technological developments based on the course
- Periodic class quizzes conducted on a weekly/fortnightly based on the course
- Micro project that shall be an extension of any practical lab exercise to real-world application

Reference

- XI and XII Standard Tamilnadu State Board Chemistry Text Book, 2023 edition, Textbook Corporation Tamil Nadu
- Essentials of Physical Chemistry, Bahl & Tuli, 28th edition, S. Chand Publishing House.
- A Textbook of Engineering Chemistry, Dr.Sunita Rattan, 2020 reprint, S.K.Kataria&Sons
- Textbook of Physical Chemistry, P.L Soni,O.P.Dharmarha & U.N.Dash,2022 edition, S. Chand Publishing House.

Web-based/Online Resources

- https://libguides.lib.msu.edu/chemistry/teachonline
- https://www.khanacademy.org/science/chemistry
- https://phet.colorado.edu/
- https://www.sciencebysimulation.com/chemreax/Faq.aspx
- www.olabs.gov.in

Allocation of marks in End Semester Practical Examination and Model Practical Examination

- Practical observation note book is sufficient and no need of separate practical record note book. Submission of Practical observation note book to model practical exam and end semester practical exam is mandatory.

CH232451	**Applied Chemistry – I**	L	T	P	C
Practicum	(Non-Circuit Branches)	1	0	2	2

For Experiment No: 1, 2, 3, 4 & 6

SNo	Description	Marks
1	Short Procedure	5
2	Titration I	35
3	Titration II	35
4	Calculation	15
5	Result	5
6	Viva Voce	5
	TOTAL MARKS	**100**

Skill Value

- Less than or equal to 2% with correct tabular column and details - 35 marks
- More than 2% - 15 marks
- More than 4% - 5 marks
- Wrong tabular column even if reading is correct – only 5 marks

For Experiment No: 5

SNo	Description	Marks
1	Definition of pH and formula	10
2	Water quality parameters (any 5)	20
3	pH reading for 3 samples	15
4	Calculation of hydrogen ion concentration	30
5	TDS reading for 3 samples	15
6	Result	5
7	Viva Voce	5
	TOTAL MARKS	**100**

CH232451	Applied Chemistry – I	L	T	P	C
Practicum	(Non-Circuit Branches)	1	0	2	2

For Experiment No: 7 (Effluent Analysis)

SNo	Description	Marks
1	Definition	5
2	Any three test for 3 effluents	45
3	Any five sources for each effluent	20
4	Any five harmful effects for each	20
5	Result	5
6	Viva Voce	5
TOTAL MARKS		**100**

For Experiment No: 8 (Analysis of Acid Radicals)

SNo	Description	Marks
1	Systematic analysis of three acid radicals with five tests for each	60
2	Confirmatory test for each radical	30
3	Result	5
4	Viva Voce	5
TOTAL MARKS		**100**

Allocation of Marks for CA1 & CA2 Practical Tests

For Experiment No: 1, 2, 3, 4 & 6

SNo	Description	Marks
1	Short Procedure	5
2	Titration I	15
3	Titration II	15
4	Calculation	10
5	Result	5
6	Observation Note Book	10
TOTAL MARKS		**60**

- Less than or equal to 2% with correct tabular column and details - 15 marks
- More than 2% - 10 marks
- More than 4% - 5 marks
- Wrong tabular column even if reading is correct – only 5 marks

For Experiment No: 5

SNo	Description	Marks
1	Definition of pH and formula	5
2	Water quality parameters (any 5)	10
3	pH reading and 3 samples	5
4	Calculation of hydrogen ion concentration	20
5	TDS reading for 3 samples	5
6	Result	5
7	Observation Note Book	10
	TOTAL MARKS	**60**

For Experiment No: 7 (Effluent Analysis)

SNo	Description	Marks
1	Definition	5
2	Any three test for 3 effluents	20
3	Any five sources for each effluent	10
4	Any five harmful effects for each	10
5	Result	5
6	Observation Note Book	10
	TOTAL MARKS	**60**

CH232451	**Applied Chemistry – I**	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	2	2

For Experiment No: 8 (Analysis of Acid Radicals)

SNo	Description	Marks
1	Identification of three acid radicals with two tests for each	25
2	Confirmatory test for each radical	20
3	Result	5
4	Observation Note Book	10
	TOTAL MARKS	**60**

Allocation of Marks for CA1 & CA2 Theory Tests

Part – A Theory	5 questions to be answered out of 7 questions	5 x 2 marks	10 marks
Part – B Practical	2 questions to be answered out of 3 questions	2 x 5 marks	10 marks
TOTAL			**20 marks**

CH232452	**Applied Chemistry – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	2	2

Introduction

This course will give the outline and applications of some important chemistry principles which are relevant for circuit polytechnic branches

Course Objectives

The objective of this course is to

- Analyze soft and hard water, EDTA titrations on hardness of water and boiler scale formation.
- To empower the leaner with the fundamental knowledge on components of battery and working.
- To understand the process of electroplating and appreciate the role of electroplating in daily life.
- To build understanding on methods of softening hard water- Ion exchange and reverse osmosis method and drinking water quality parameters (WHO).

Course Outcomes

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

CO1: Differentiate hard water and soft water and reason out the salts responsible for hardness
CO2: Compare the hardness of water samples in different regions
CO3: Identify and apply the methods for effective conversion of hard water into soft water
CO4: Construct the electroplating model and apply the concept in daily life situations

Pre-requisites

10th Standard Chemistry

CH232452	**Applied Chemistry – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	2	2

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	1	1	1	3
CO2	3	3	2	1	1	1	3
CO3	3	3	2	1	1	1	3
CO4	3	3	2	1	1	1	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where they could be the source of error, if any.

CH232452	Applied Chemistry – II	L	T	P	C
Practicum	(Circuit Branches)	1	0	2	2

Assessment Methodology

	Continuous Assessment (40 marks)					End Semester Examination (60 marks)
	CA1		CA2		CA3	
Mode	Written Test (Unit – I)	Practical Test (4 expts)	Written Test (Unit – II)	Practical Test (Ex: 4 expts)	Model Practical Exam (Ex: 1 to 8)	Practical Exam (8 expts)
Duration	1 hour	2 hours	1 hour	2 hours	3 hours	3 hours
Exam Marks	20	60	20	60	100	100
Converted to	20		20		20	60
Final Marks	20				20	60

Note:

- Average of CA 1 and CA 2 should be considered for the internal assessment of 20 marks
- CA 3 Model examination should be conducted as per the End Semester guidelines. The same should be considered for the internal assessment of 20 marks

CH232452	Applied Chemistry – II	L	T	P	C
Practicum	(Circuit Branches)	1	0	2	2

Unit I	WATER ANALYSIS AND TREATMENT	
Sources of water – depletion of underground water – Reasons - Hard water and soft water – Hardness of water – Carbonate and Non–carbonate hardness – Methods of expressing hardness – mg/lit and ppm – Estimation of total hardness by EDTA method –simple Problems on total hardness only -- identification of sulphate and chloride ions- identification of heavy metal ions in the given sample of effluent- Softening of hard water – Ion-Exchange method and Reverse Osmosis- Calculation of pH, H^+ ion and TDS of different samples		6
Ex.No	Name of the Exercise	
1	Estimation of total hardness of water by EDTA method	
2	Determination of alkalinity of sample of hard water	12
3	Estimation of residual chlorine in a given water sample	
4	Estimation of copper by Complexometry	

Unit II	BATTERIES AND CELLS	
Metallic and electrolytic conduction –differences- Faradays laws of electrolysis- electronic concept of oxidation and reduction - electroplating- definition- examples-chrome plating, copper plating and galvanization-Energy sources – Primary and secondary battery- electrochemical cell – construction and working of dry cell – lead acid battery - advantages construction and working of solar cell.		6
Ex.No	Name of the Exercise	
5	Calculation of pH, H^+ ion and TDS of different samples	
6	Effluent analysis of heavy metal ions - lead, copper & zinc	12
7	Process of electroplating / copper plating using Copper Voltameter	
8	Systematic analysis of acid radicals such as carbonate, nitrate and sulphate ions.	
	Test & Revision	**9**
	TOTAL HOURS	**45**

CH232452	**Applied Chemistry – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	2	2

Suggested List of Students Activities

Other than classroom learning, the following are the suggested student related co-curricular activities which can be undertaken to accelerate the attainment of the various outcomes in this course.

- Presentation/Seminars by students on any recent technological developments based on the course
- Periodic class quizzes conducted on a weekly/fortnightly based on the course
- Micro project that shall be an extension of any practical lab exercise to real-world application

References

1. XIth and XIIth standard Tamilnadu Chemistry Text Book, 2023 edition, Textbook Corporation Tamil Nadu
2. Essentials of Physical Chemistry, Bahl & Tuli, 28th edition, S.Chand Publishing House.
3. A textbook of Engineering Chemistry, Dr.Sunita Rattan, 2020 reprint, S.K.Kataria&Sons
4. Textbook of Physical Chemistry, P.L Soni,O.P.Dharmarha & U.N.Dash,2022 edition, S.Chand Publishing House.

Web-based/Online Resources

1. https://libguides.lib.msu.edu/chemistry/teachonline
2. https://www.khanacademy.org/science/chemistry
3. https://phet.colorado.edu/
4. https://www.sciencebysimulation.com/chemreax/Faq.aspx
5. www.olabs.gov.in

Allocation of marks in End semester practical exam and Model exam

- Practical observation note book is sufficient and no need of separate practical record note book. Submission of Practical observation note book to model practical exam and end semester practical exam is mandatory.

CH232452	Applied Chemistry – II	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	2	2

For Experiment No: 1, 2, 3 & 4

SNo	Description	Marks
1	Short Procedure	5
2	Titration I	35
3	Titration II	35
4	Calculation	15
5	Result	5
6	Viva Voce	5
	TOTAL MARKS	**100**

Skill Value

- Less than or equal to 2% with correct tabular column and details - 35 marks
- More than 2% - 15 marks
- More than 4% - 5 marks
- Wrong tabular column even if reading is correct – only 5 marks

For Experiment No: 5

SNo	Description	Marks
1	Definition of pH and formula	10
2	Water quality parameters (any 5)	20
3	pH reading and 3 samples	15
4	Calculation of hydrogen ion concentration	30
5	TDS reading for 3 samples	15
6	Result	5
7	Viva Voce	5
	TOTAL MARKS	**100**

CH232452	**Applied Chemistry – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	2	2

For Experiment No: 6 (Effluent Analysis)

SNo	Description	Marks
1	Definition	5
2	Any three test for 3 effluents	45
3	Any five sources for each effluent	20
4	Any five harmful effects for each	20
5	Result	5
6	Viva Voce	5
	TOTAL MARKS	**100**

For Experiment No: 7 for Circuit Branches (Electroplating)

SNo	Description	Marks
1	Electroplating- definition of chromplating, copper plating and galvanization	10
2	Apparatus required	5
3	Anode cathode and electrolyte	15
4	Circuit diagram	20
5	Cell reaction at anode	20
6	Cell reaction at cathode	20
7	Result	5
8	Viva	5
	TOTAL MARKS	**100**

For Experiment No: 8 (Analysis of Acid Radicals)

SNo	Description	Marks
1	Systematic analysis of three acid radicals with five tests for each	60
2	Confirmatory test for each radical	30
3	Result	5
4	Viva Voce	5
	TOTAL MARKS	**100**

CH232452	**Applied Chemistry – II**	L	T	P	C
Practicum	(Circuit Branches)	1	0	2	2

Allocation of Marks for CA1 & CA2 Practical Tests

For Experiment No: 1, 2, 3 & 4

SNo	Description	Marks
1	Short Procedure	5
2	Titration I	15
3	Titration II	15
4	Calculation	10
5	Result	5
6	Observation Note Book	10
TOTAL MARKS		**60**

- Less than or equal to 2% with correct tabular column and details - 15 marks
- More than 2% - 10 marks
- More than 4% - 5 marks
- Wrong tabular column even if reading is correct – only 5 marks

For Experiment No: 5

SNo	Description	Marks
1	Definition of pH and formula	5
2	Water quality parameters (any 3)	10
3	pH reading and 3 samples	5
4	Calculation of hydrogen ion concentration	20
5	TDS reading for 3 samples	5
6	Result	5
7	Observation Note Book	10
TOTAL MARKS		**60**

CH232452	**Applied Chemistry – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	2	2

For Experiment No: 6 (Effluent Analysis)

SNo	Description	Marks
1	Definition	5
2	Any three test for 3 effluents	20
3	Any five sources for each effluent	10
4	Any five harmful effects for each	10
5	Result	5
6	Observation Note Book	10
	TOTAL MARKS	**60**

For Experiment No: 7 for Circuit Branches (Electroplating)

SNo	Description	Marks
1	Electroplating- definition of chromplating, copper plating and galvanization	3
2	Apparatus required	2
3	Anode cathode and electrolyte	5
4	Circuit diagram	15
5	Cell reaction at anode	10
6	Cell reaction at cathode	10
7	Result	5
8	Observation Note Book	10
	TOTAL MARKS	**60**

For Experiment No: 8 (Analysis of Acid Radicals)

SNo	Description	Marks
1	Identification of three acid radicals with two tests for each	25
2	Confirmatory test for each radical	20
3	Result	5
4	Observation Note Book	10
	TOTAL MARKS	**60**

CH232452	**Applied Chemistry – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	2	2

Allocation of Marks for CA1 & CA2 Theory Tests

Part – A Theory	5 questions to be answered out of 7 questions	5 x 2 marks	10 marks
Part – B Practical	2 questions to be answered out of 3 questions	2 x 5 marks	10 marks
TOTAL			**20 marks**

CN232120	**Basics of Civil and Environmental Engineering**	L	T	P	C
Theory		3	0	0	3

Introduction

This course is designed to provide a comprehensive introduction to the field of Civil and Environmental Engineering, offering fundamental knowledge across various sub-disciplines within this field. It is tailored to meet the educational requirements typically outlined in the syllabus for diploma studies in Engineering. The topics covered are based on the syllabus for diploma studies in Engineering. The courses are arranged in sequence, that starts from the basic concepts and followed in List of materials, Details of materials, Introduction to building planning, Construction and Building Services, Introduction to Environmental Engineering, Ecosystems and Environmental Pollution.

Throughout this course, students can expect to acquire a solid foundation in Civil and Environmental engineering, providing them with valuable insights into the complexity of industrial projects and the skills required for success in this field. The goal is to equip students with the knowledge and expertise needed to excel in the diverse and challenging world of Civil and Environmental engineering.

Course Objectives

The objective of this course is to enable the students to

- Introduction to Civil Engineering: Provide students with a fundamental understanding of the field and its significance in various industries and society.
- Foundational Knowledge: Impart essential principles, theories, and concepts in physics, mathematics, and materials science that are pertinent to civil engineering.
- Materials Understanding: Familiarize students with the properties and usage of common construction materials like concrete, steel, and timber.
- Building Planning: Enable students to comprehend architectural plans, designs, and considerations for constructing safe, functional, and aesthetically pleasing buildings.
- Building Services: Introduce concepts related to building infrastructure, including plumbing, electrical systems, HVAC, and fire protection.
- Environmental Engineering: Provides fundamental concepts in Environmental field, focusing on the interaction between humans and the environment.

- Ecosystems and Pollutions: Covers the principles, practices, and technologies used to address environmental problems and promote sustainability.

Course Outcomes

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

- Describe the use of different materials in Civil Engineering
- Interpret various aspect of the building plan.
- Identify the various building components, method of constructions, and services
- Understand the fundamental principles of environmental engineering and identify key environmental issues and their impact on society
- Explore the roles and responsibilities of environmental engineers in sustainable development and develop critical thinking and problem-solving skills to address environmental challenge

Pre-requisites

Nil

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	2	1	1	3
CO2	3	1	1	2	1	1	3
CO3	3	1	1	2	1	1	3
CO4	3	1	1	2	1	1	3
CO5	3	1	1	2	1	1	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- Engage and Motivate: It is advised that teachers take steps to student attention and boost their learning confidence.
- Real-World Relevance: Teachers are expected to physically show various building materials while imparting instructions. Students should be encouraged to collect sample of various building materials so as to create a museum of materials in the polytechnic.
- Interactive Learning: Teachers are expected to organize demonstrations and field visits to show various stages of construction process.
- Application-Based Learning: Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome and employability based one.
- Simulation and Real-World Practice: In addition to theoretical instructions, different activities pertaining to simulated environment and transitioning to real-world scenarios, when possible, like expert lectures, seminars, visits to green houses, effluent treatment plant of any industry, rainwater harvesting plant etc. may also be organized.
- Encourage Critical Analysis: Foster an environment where students can understand the experiment outcomes and infer the potential sources of error in case of any discrepancies.

CN232120	**Basics of Civil and Environmental Engineering**	L	T	P	C
Theory		3	0	0	3

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III & IV)	Quiz/MCQ	Model Exam(All units)	Written Examination
Duration	2 hours	2 hours	1 hour	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Marks	40				60

Note:
- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for 20 Marks.
- CA3 Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 marks for the internal assessment.
- CA4 Model examination should be conducted as per the question pattern. The marks should be converted to 10 marks for the internal assessment.

CN232120	Basics of Civil and Environmental Engineering	L	T	P	C
Theory		3	0	0	3

Unit I	INTRODUCTION TO CIVIL ENGINEERING	
Introduction- Definition, history, and significance of Civil Engineering. Overview of sub-disciplines and their interconnections- Role of civil engineers in society. Ethical considerations and responsibilities.		8
Unit II	**CIVIL ENGINEERING MATERIALS**	
Building Materials - Geological classification of Rocks, Requirements of good building stone, General characteristics of stone, Properties of sand and uses, Classification of coarse aggregate according to size, Fine aggregate-types- Constituents of Good brick earth, Characteristics of good brick, Field tests on Bricks, Cement-Types and its uses –Timber - Types, properties and its uses, Steel-types and its uses, Plastics - Properties and uses of plastics, Paints and Distempers, Ingredients and their uses. Properties of good paint, Varnishes with their uses, Flooring and wall tiles, Water proofing material- Types and its suitability in Construction, Termite proofing- Types and its suitability in construction.		10
Unit III	**INTRODUCTION TO BUILDING PLANNING, CONSTRUCTION AND BUILDING SERVICES**	
Introduction: Introduction to National Building Code of India 2016 and its parts – Classification of buildings. **Conventions & Symbols:** General – Conventions- Title block- Scales- Line work- Lettering- Symbols-Abbreviations -Units of measurement, Unit conversion (Length, Area, Volume). **Building Construction**: Types of building, Components of building & its functions, types of loads acting on building, Typical building layout, Nominal dimensions for door, window and furniture. **Building Services:** Symbols used for water supply, plumbing and sanitation. Types of building services like plumbing & sanitation, water supply& drainage system, electricity, building finishes, HVAC.		9
Unit IV	**INTRODUCTION TO ENVIRONMENTAL ENGINEERING**	
Definitions, scope, and importance of environmental engineering. Need for Public Awareness Historical perspective and evolution of environmental regulations. Environmental compartments: air, water, soil, and their interactions. Overview of natural and engineered environmental systems.		9

CN232120	Basics of Civil and Environmental Engineering	L	T	P	C
Theory		3	0	0	3

Unit V	ECOSYSTEM AND ENVIRONMENTAL POLLUTION	
Concepts of ecosystem-structure and function of an ecosystem-Producers, Consumers and Decomposters- Energy flow in ecosystem-Ecological Succession- pollution-Types, sources, and impacts of environmental pollutants. Roles of individual in prevention of pollution –Global and local environmental challenges - climate change, Green House Effect, Acid Rain.		9
TOTAL HOURS		**45**

Suggested List of Students Activity (Ungraded)

- Demonstration of Locally Available building materials
- Draw the line plan of 1BHK, 2BHK homes.
- Identification, demonstration & prepare sketches of Locally Available building materials
- Visit any one construction site and prepare the construction activity report
- Prepare the documentation about Global Warming, Green House Effect
- Study the various sources of pollution and its impact and submit the report
- Visit local recycle centre and make a report about processing
- Study the Waste Collection in your locality and submit the report
- Periodic class quizzes conducted on a weekly/fortnightly based on the course
- Micro project that shall be an extension of any practical lab exercise to real-world Civil and Environmental engineering application

Reference

- M.S.Palanichamy, Basic Civil Engineering, McGraw Hill
- S.C. Rangwala, Civil engineering Drawing, Charotar Publication
- Dr.B.C.Punmia, Basics Civil Engineering, Laxmi Publications. Delhi
- Gilbert M.Masters,Introduction to Environmental Engineering and Science, Prentice-Hall of India Pvt Ltd
- Khitoliya R.K, Environmental Pollution, S.Chand & Company Ltd
- Ramamrutham, Basic Civil Engineering , Dhanpatrai Publication

- Gk Hirasaar, Basic Civil Engineering Dhanpatrai Publication
- Satheesh gopi , Basic Civil Engineering,   Pearson Publication
- SS Bhavikatti, Introduction to Civil engineering, New Age international Publishers.
- K N Duggal ,Elements of Environmental Engineering,S.Chand Publication
- Anil Kumar Misra, Building Materials and Construction, S.Chand Publication

Web Reference QR Codes

- http://nptel.ac.in/courses/105107122/
- http://nptel.ac.in/courses/105107157/
- http://nptel.ac.in/courses/105101087/
- http://nptel.ac.in/courses/105104100/
- ttp://www.nptel.iitm.ac.in/courses.php?branch=Civil
- http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IIT
- https://ekumbh.aicte-india.org/feedback.php
- https://ndl.iitkgp.ac.in/homestudy/engineering

CR232120	**BASICS OF CERAMIC ENGINEERING**	L	T	P	C
Theory		3	0	0	3

Introduction:

Fundamental knowledge in the field of Ceramic Engineering is essential for all engineers. They must thoroughly study the material properties, machine tools and its components before delving into advanced applications. This foundational subject is crucial for a comprehensive grasp of the principles. To develop the necessary psychomotor skills in this area, students should not only understand the concepts but also apply them effectively.

Course Objectives:

The objective of this course is to enable the student to

- Understand the essential knowledge and skills of basic Ceramic Engineering encountered in professional practice for diploma holders.
- Comprehend the fundamental concepts and scope of Ceramic Engineering.
- Introduce various traditional and advanced ceramic products and their applications
- Familiarize the ceramic products which the students come across in their day today life.
- Serve as a preparatory course for the subjects which the students will be learningin the subsequent years.

Course Outcomes:

On completion of the course students are expected to

CO1: Be aware of the traditional ceramic products like porcelain, terracotta

CO2: Having the knowledge of glaze and other ceramic coatings and advanced ceramic products.

CO3. Having the knowledge on basic preparatory methods of glass

CO4: Acquire basic knowledge of Refractories and their types.

CO5: Be aware for the various advanced ceramic products and their uses

Pre-requisites:

Knowledge of basic Science

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	-	-	-	-
CO2	1	2	3	-	-	-	-
CO3	-	-	3	-	-		
CO4	3	2	2	-	-	-	-
CO5	3	2	2	-	-	-	-
CO6	2	1	2	-	-	-	-

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:
- Engage and Motivate: Instructors should actively engage students to boost their learning confidence.
- Real-World Relevance: Incorporate relatable, real-life examples and engineering applications to help students understand and appreciate course concepts.
- Interactive Learning: Utilize demonstrations and plan interactive student activities for an engaging learning experience.

- Application-Based Learning: Employ a theory-demonstrate-practice-activity strategy throughout the course to ensure outcome-driven learning and employability.
- Simulation and Real-World Practice: Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real-world scenarios when possible.
- Encourage Critical Analysis: Foster an environment where students can honestly assess experiment outcomes and analyse potential sources of error in case of discrepancies

Assessment Methodology:

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Unit I & II	Written Unit III & IV	Written Model Exam	Quiz	Written Examination
Duration	2	2	3	2	3 hours
Exam Marks	60	60	100	100	100
Converted to	20	20	10	10	60
Marks	20		20		60

Note:

- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for 20 Marks.
- CA3 Model examination should be conducted as per the question pattern.
- CA4 Online quiz examination (MCQ) should be conducted covering the complete syllabus.

CR232120	BASICS OF CERAMIC ENGINEERING	L	T	P	C
Theory		3	0	0	3

Unit I	WHITEWARES	
Introduction − Definition − Classification − Triaxial bodies − raw materials, body composition, preparation, shaping methods, drying, firing − properties and uses of terracotta, majolica, earthenware, stoneware, porcelain.		9
Unit II	**CERAMIC COATINGS**	
Introduction − Glaze formulation − Segar formula, preparation − raw materials, glaze preparation, application methods, decoration, glaze defects. Enamels − types, substrate preparation, application methods, defects.		9
Unit III	**GLASS**	
Introduction, classification, glass preparation− raw materials, melting furnaces − pot furnace and tank furnace, manufacture of glass products − flat ware and hollow ware, glass defects.		9
Unit IV	**REFRACTORIES**	
Introduction, definition, − Definition of some important refractory properties − Classification of refractory − Raw material, preparation, properties and applications of silica, fireclay, alumina, magnesia, dolomite and chrome refractory.		9
Unit V	**OTHER CERAMIC PRODUCTS**	
Abrasives − major raw materials, Coated abrasives − process flow sheet, applications; Bonded abrasives − types of bonds, process flow sheet, applications. Cement − raw materials, preparation by dry process and wet process, types of cement − ordinary Portland cement, hydrophobic cement, white cement, oil well cement; properties of cement − consistency, setting time, soundness of cement.		9
TOTAL HOURS		45

Suggested List of Students Activity:

- Presentation/Seminars by students on any recent technological developments based on the course.
- Periodic class quizzes conducted on a weekly/fortnightly based on the course.
- Mini project that shall be an extension of any practical lab exercise to real-world application.

Reference

1. Modern Pottery Manufacture by H.N.Bose
2. Ceramic Whiteware by Sudirsen, Oxford & IBH Publishing Co., New Delhi, 1992
3. Ceramic Raw materials by Worral – W.E., Pergamon press, NY 1998
4. Modern Industrial Ceramics by Eugene C.Stafford, 1980.

Web-based/Online Resources

1. Ceramic Raw materials ebook – W E Worral
2. Earthernware – M.Anbarasu PDF online

CR232460	**Basic Ceramic Engineering practices**	L	T	P	C
Practicum		1	0	2	2

Unit I	**QUARTZ & FELDSPAR**	
Megascoping identification of Mineral and study of their properties		9 Periods
Experiment #1:		
Unit II	**CALCITE & TALC**	
Megascoping identification of Mineral and study of their properties		9 Periods
Experiment #2:		
Unit III	**GRAPHITE & CHINA CLAY**	
Megascoping identification of Mineral & Clay and study of their properties		9 Periods
Experiment #3:		
Unit IV	**BALL CLAY & FIRE CLAY**	
Megascoping identification of Clays and study of their properties		9 Periods
Experiment #4:		
Unit V	**THAN CLAY & TERROCOTTA CLAY OR RED CLAY**	

Megascoping identification of Clays and study of their properties	9 Periods
Experiment #5:	

Physical identification of Minerals and Clays by the students to improve the knowledge about Ceramics Minerals and Clays

Reference

1. A Text book of Mineralogy by E.S.Dana
2. Rock forming Minerals by Deer, Howie, Zussman
3. Clay Mineralogy, Ralf E Grim
4. Text book of Mineralogy, Sablibury Dana
5. Mineralogy, Berry mason & die trich
6. Elements of Mineralogy, H.H. Reed

Web-based/Online Resources

1. Geological Survey of India website
2. Indian Bureau of Mines Website
3. Department of Geology and Mining Website

CR232260	**Basic Ceramic Engineering**	L	T	P	C
Practical	**Practices**	0	0	3	1

Rationale

This subject helps to reinforce their understanding of basic raw materials. This subject allows students to develop important skills such as identification of various ceramic materials. These skills are essential for a career in Ceramic Engineering field. Practical exercises are essential for teaching students how to identify the nature and properties of various ceramic materials. Understanding how to use these ceramic materials in many fields, including research and industry.

Course Objectives

The objective of this course is to enable the student

1. to identify the minerals
2. to examine the properties of minerals
3. To examine the characteristics of clays
4. to know the use of minerals in ceramic industry
5. to examine the static characteristics of minerals and clays in advanced ceramic product industries

Course Outcomes

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

CO1: know easy physical identification of minerals
CO2: know physical identification of various clays
CO3: know the occurrence and origin of the minerals and clay
CO4: use the minerals for specific products
CO5: use the minerals and clays as value added products

Pre-requisites

Nil

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	3	3	-	-	-
CO2	3	3	3	3	-	-	-
CO3	3	3	3	3	-	-	-
CO4	3	3	3	3	-	-	-
CO5	3	3	3	3	-	-	-

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Practical Test (Ex: 1 to 5)	Practical Test (Ex: 6 to 10)	Model Examination	Record Work	Practical Examination
Duration	2 hours			-	3 hours
Exam Marks	20	20	20	20	100
Converted to	10	10	10	10	60
Marks	40				60

CR232260	Basic Ceramic Engineering practices	L	T	P	C
Practical		0	0	2	1
Ex.No	Name of the Exercise			Hours	
1	• Megascopic identification of Quartz and its varieties. • Study of their properties and uses			4	
2	• Megascopic identification of Feldspar and its group minerals. • Study of their occurrence, properties and uses			4	
3	• Megascopic identification of Calcite and its varieties. • Study of their occurrence, properties and uses			4	
4	• Megascopic identification of Talc and its types • Study of their occurrence, properties and uses			4	
5	• Megascopic identification of Graphite. • Study of its occurrence, properties and uses			4	
6	• Megascopic identification of China clay • Study of its occurrence, properties and uses			4	
7	• Megascopic identification of Ball clay • Study of its occurrence, properties and uses			4	
8	• Megascopic identification of Fire clay • Study of its occurrence, properties and uses			4	
9	• Megascopic identification of Than clay • Study of its occurrence, properties and uses			4	
10	• Megascopic identification of Terracotta or red clay • Study of its occurrence, properties and uses			3	
	Test			6	
TOTAL HOURS				**45**	

Reference
1. A Text book of Mineralogy by E.S.Dana
2. Rock forming Minerals by Deer, Howie, Zussman
3. Clay Mineralogy, Ralf E Grim
4. Text book of Mineralogy, Sablibury Dana
5. Mineralogy, Berry mason & die trich
6. Elements of Mineralogy, H.H. Reed

Web-based/Online Resources

1. Geological Survey of India website
2. Indian Bureau of Mines Website
3. Department of Geology and Mining Website

Allocation of Marks

Part	Description	Marks
A	Identification of the mineral or clay	10
B	Examine the properties	35
C	Description of the properties	35
D	Result	10
E	Viva-voce	10
TOTAL MARKS		**100**

Equipment Required

Sl.No	Item Description	Quantity Required
1.	Quartz, Milky Quartz, Rosy quartz, Banded Agate	1 no
2.	Feldspar, Orthoclase, Microcline, Amazon stone	1 no
3.	Calcite, Honey calcite	1 no
4	Talc, Steatite	1 no
5	Graphite	1 no
6	China clay	1 no
7.	Ball clay	1 no
8	Fire clay	1 no
9	Than clay	1 no
10	Terracotta or Red clay	1 no

CS232120	**Basics of Computer Engineering**	L	T	P	C
Theory		3	0	0	3

Introduction

Understanding the basic components and working of a computer gives more freedom for the learners to explore and innovate. The knowledge about the various hardware and software devices will help the learners to choose the devices according to the needs. The ability to differentiate the types of software is essential in the career of a computer engineer. This course will inculcate the much-needed essential information about the computers in the minds of young engineers.

Course Objectives

The objective of this course is to enable the student to

- Comprehend the basics of computer organization.
- Investigate various input and output devices.
- Classify the different storage devices.
- Identify the types of software.
- Grasp the concept of the World Wide Web.

Course Outcomes

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

CO1: Remember the basic organization of computers.
CO2: Distinguish between the various input and output devices.
CO3: Examine the different storage devices.
CO4: Describe the types of software.
CO5: Identify the concept of the internet and security issues related to internet use.

Pre-requisites

Nil

CS232120	**Basics of Computer Engineering**	L	T	P	C
Theory		3	0	0	3

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	3	-	-	3	1
CO2	3	3	3	-	-	3	2
CO3	3	3	3	-	-	3	1
CO4	3	3	3	-	-	3	2
CO5	3	3	3	-	-	3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- Engage and Motivate: Instructors should actively engage students to boost their learning confidence.

- Real-World Relevance: Incorporate relatable, real-life examples and engineering applications to help students understand and appreciate course concepts.

- Interactive Learning: Utilize demonstrations and plan interactive student activities for an engaging learning experience.

- Application-Based Learning: Employ a theory-demonstrate-practice-activity strategy throughout the course to ensure outcome-driven learning and employability.

- Simulation and Real-World Practice: Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real-world scenarios when possible.

- Encourage Critical Analysis: Foster an environment where students can honestly assess experiment outcomes and analyze potential sources of error in case of discrepancies.

CS232120	Basics of Computer Engineering	L	T	P	C
Theory		3	0	0	3

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III & IV)	Quiz/ MCQ	Model Examination	Written Examination
Duration	2 hours	2 hours	1 hour	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Marks	40				60

- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for the internal assessment of 20 Marks.
- CA3 Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 marks for the internal assessment
- CA4 Model examination should be conducted as per the end semester question pattern. The marks should be converted to 10 marks for the internal assessment.

CS232120	Basics of Computer Engineering	L	T	P	C
Theory		3	0	0	3

Unit I	INTRODUCTION TO COMPUTERS	
Introduction – Characteristics of Computers – Evolution of Computers - Data, Information and Program - Basic Computer organization - Central Processing Unit, Processor Speed, Arithmetic and Logic Unit (ALU), Memory Unit, Input and Output Unit.		8
Unit II	INPUT DEVICES AND OUPTUT DEVICES	
Introduction to Input Devices – Keyboard - Scanner - Microphone – Mouse (Optical Mouse, Mechanical Mouse), Touch Screen, Web Camera, Wearable Devices - Computer Output Fundamentals – Printers (Laser Printer, 3D Printers) – Monitors (Liquid Crystal Display, Light Emitting Diodes) - Projector – Speaker – Computer Cables (HDMI, VGA, USB, PS/2, Ethernet, 3.5mm jack).		10
Unit III	COMPUTER MEMORY AND STORAGE	
Introduction - Bits and Bytes – Memory Hierarchy - Primary Memory – Random Access Memory (RAM) – Read Only Memory (ROM) - Secondary Memory – Secondary Storage Devices – Hard Disk, Optical Disks, Flash Drive, Solid State Drives (SSD) – Cache Memory.		10
Unit IV	COMPUTER SOFTWARE	
Computer Software –Types of Software – System Software: Compilers, Linker, Loader, Operating Systems (Windows, Linux Basics) – Application Software: Word Processors, Presentation Software, Graphics Software - Difference between Program and Packages – Introduction to Python Programming - Real Time Applications of Software: ERP, Finance.		10
Unit V	INTERNET AND SECURITY	
Concept of Internet - Applications of Internet - Popular Web Browsing Software – Search Engines – Computer Ethics –Social Networks and E-Commerce - Cloud Computing Basics - Security Issues Over the Internet – Introduction to Cyber Security.		7
TOTAL HOURS		45

CE232120	**Basics of Computer Engineering**	L	T	P	C
Theory		3	0	0	3

Suggested List of Students Activity

Presentation/Seminars by students on any recent technological developments based on the course.
Periodic class/online quizzes conducted based on the course.
Blended learning activities to explore the recent trends and developments in the field.

References

- Tamilnadu SCERT, Chapters 1-5, 17, Introduction to Computers, Number Systems, Computer Organization, Theoretical Concepts of Operating System, Working with Windows Operating System, Computer Ethics and Cyber Security, Computer Science, Class XI, 2022.
- NCERT, Chapter 1-3: Computer System, Encoding Scheme and Number Systems, Emerging Trends, Class XI, 2023.
- Tamilnadu SCERT, Chapter 15, Introduction to Internet and Email, Class XI, Computer Technology, 2019.
- Tamilnadu SCERT, Chapter 15, E-Commerce, Class XII, Computer Applications, 2022.
- Computer Programming and IT, Ashok N. Kamthane, Raj Kamal, Pearson India, 2012, ISBN: 9788131774694
- Computer Ethics Etiquette and Safety (for the 21st century student), Nancy E. Wilfred, Viva Books Private Limited 2009. ISBN-13 : 978-8130909042
- Cloud Computing, A. Srinivasan, Pearson India, 2014, ISBN: 9789332537439

Web-based/Online Resources

CPU Speed
https://www.intel.com/content/www/us/en/gaming/resources/cpu-clock-speed.html

Types of Computer Cable Connections
https://www.buildcomputers.net/computer-cable-connections.html

Social Network
https://www.britannica.com/technology/social-network

DM232120	**BASICS OF DIGITAL**	L	T	P	C
Theory	**MANUFACTURING**	3	0	0	3

Introduction:

Fundamental knowledge in the field of Manufacturing Engineering is essential for all Engineers. They must thoroughly study the material properties, Machine tools and its components before delving into advanced applications. This foundational subject is crucial for a comprehensive grasp of the principles. To develop the necessary psychomotor skills in this area, students should not only understand the concepts but also apply them effectively.

Course Objectives

The objective of this course is to enable the student to

● Understand the essential knowledge and skills of Manufacturing Engineering encountered in professional practice for diploma holders.

● Comprehend the fundamental concepts and scope of Manufacturing Engineering.

● Describe the properties of materials and the variety of machine tools used in the industry.

● Examine the workings and applications of power transmission drives in mechanical systems.

● Understand the basic Digital Manufacturing tools .

Course Outcomes

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

CO1:   Recognize the importance of Mechanical Engineering in industrial applications.

CO2:   Classify the different types of materials used in metal forming and joining processes.

CO3:   Illustrate the principles and industrial applications of lathe, drilling, and milling machines.

CO4:   Acquire basic knowledge about power transmission through belt and gear drives.

CO5:   Illustrate the applications of Digital Manufacturing Tools.

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Pre-requisites

Knowledge of basic science.

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	1	1	1	2
CO2	2	2	3	1	1	1	2
CO3	3	2	2	1	1	1	2
CO4	3	2	3	1	1	1	1
CO5	3	1	1	1	1	1	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- Engage and Motivate: Instructors should actively engage students to boost their learning confidence.
- Real-World Relevance: Incorporate relatable, real-life examples and engineering applications to help students understand and appreciate course concepts.
- Interactive Learning: Utilize demonstrations and plan interactive student activities for an engaging learning experience.
- Application-Based Learning: Employ a theory-demonstrate-practice-activity strategy throughout the course to ensure outcome-driven learning and employability.
- Simulation and Real-World Practice: Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real-world scenarios when possible.
- Encourage Critical Analysis: Foster an environment where students can honestly assess experiment outcomes and analyze potential sources of error in case of discrepancies

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (unit 1 & 2)	Written Test (unit 3 & 4)	Quiz / MCQ	Model Examination	Written Examination
Duration	2 hours	2 hours	1 hour	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Marks	40				60

Note:

- CA1 and CA2: Assessment tests should be conducted. Best of one will be considered for the internal assessment of 20 Marks.
- CA3: Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 Marks for the internal assessment.
- CA4: Model examination should be conducted as per the end semester question pattern. The marks should be converted to 10 Marks for the internal assessment.

DM232120	BASICS OF DIGITAL MANUFACTURING	L	T	P	C
Theory		3	0	0	3
Unit I	ROLES AND RESPONSIBILITIES OF MECHANICAL ENGINEERING				
Introduction to Mechanical Engineering-Who is a Mechanical Engineer-Job Description-Roles and Responsibilities-Scope and Opportunities – Mechanical Engineering-Manufacturing-Automobile-PowerGeneration-Maintenance-				9 Hrs	

ServiceDesign-Quality-Materials Management-Logistics.	
Unit II ENGINEERING MATERIALS, METAL FORMING AND JOINING	
Engineering Materials Importance of Materials - Types - Properties - Mechanical - Thermal - Electrical - Magnetic - Chemical - Usages - Applications. **Metal Forming** Definition – Types – Hot and Cold working – Hot working –Description and working of drop hammer – Rolling – Roll forging – Extrusion – Cold working – Description and working of Mechanical press- Wire drawing **Metal Joining** Types of Joints – Temporary and Permanent - Temporary -Screws, Nuts and Bolts - Permanent - Soldering, Brazing and Welding –Definitions and Applications.	9 Hrs
Unit III FUNDAMENTALS OF MACHINE TOOLS	
Machine Tools – Introduction - **Lathe** - Principle of Lathe – Description and function of Lathe - **Drilling Machine** - Principle of Drilling – Upright Drilling **Milling Machine** - Principle of Milling – Horizontal Milling Machine – Vertical milling machine –	9 Hrs
Unit IV POWER TRANSMISSION DRIVES AND LUBRICATION	
Power Transmission Drives Belt drive – Types - Flat, V Belt & Circular or Rope Drive- Applications - Chain drive – Applications of chain drive – Gear drives – Types of gear drives – spur gear drive – Helical gear drive – Bevel gear drive – Worm and Worm wheel drive – Rack and pinion drive – Applications. Cam Drive - Applications **Lubrication** Lubricants - Types -Solid, Semi Solid, Liquid –Properties of lubricants - Purpose of lubrication –Methods of lubrication - Ring Oiler Lubrication, Drip feed Lubrication and Grease Cup Lubrication.	9 Hrs
Unit V **DIGITAL MANUFACTURING TOOLS**	
CNC Introduction to CNC and its applications **Rapid Prototyping** Introduction – Additive Manufacturing – 3D Printing – FDM- SLS –	9 Hrs

stereolithography.	
TOTAL HOURS	**<>**

Suggested List of Students Activity

● Presentation/Seminars by students on any recent technological developments based on the course.

● Periodic class quizzes conducted on a weekly/fortnightly based on the course.

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Text Books

- Fundamentals of Mechanical Engineering / G.S.Sawheny-PHI.

- An Integrated Course in Mechanical Engineering / R.K.Rajput / Birala Publications.

- Strength of Materials by R.K.Rajput, S.Chand& Company.

- CAD/CAM Computer Aided Design and Manufacturing by M.Groover, E. Zimmers, Perarson Publications.

Reference

- A textbook of Rapid Prototyping by Ramesh S, Ane Books Pvt. Ltd.

Web-based/Online Resources

- NPTEL (Website): The National Programme on Technology Enhanced Learning (NPTEL) offers free online courses on manufacturing processes and other Mechanical Engineering topics. NPTEL Mechanical Engineering.

- **https://www.protolabs.com/resources/guides-and-trend-reports/rapid-prototyping-processes/**

- **https://engineeringproductdesign.com/knowledge-base/rapid-prototyping-techniques/**

DP232270	**Drafting Practices**	L	T	P	C
Practical		0	0	4	2

Introduction

Engineering drawing is the language of engineers. By means of drawing, the shape, size, finish, colour, and construction of any object can be described accurately and clearly. Hence, drawing is a way for communicating engineer's ideas, designs, and thoughts to others. It is necessary for the engineers to develop their skill in preparing engineering drawings.

This subject is planned to include sufficient practices which would help the student in visualization of two-dimensional objects and developing the drawing skills. Nowadays, Computer Aided Drafting (CAD) practices are used invariably in all the industries to create drawings easily and quickly. Hence this subject is aimed to acquire basic knowledge in manual drafting as well as in CAD.

The chapters are arranged in sequence and starts from the basic concepts of lettering, dimensioning, geometrical constructions, construction of polygon and department specific drawings.

Course Objectives

The objective of this course is to enable the student to

- List the usage of various drawing instruments.
- Understand the basics of lettering and dimensioning of drawings.
- Acquire the ability to draw the basic geometrical constructions.
- Understand the basics of CAD.
- Use CAD in designing and developing department specific drawings.

Course Outcomes (CO)

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

CO1: Utilize various drawing instruments to create manual drawing.
CO2: Construct the drawings as per BIS
CO3: Build the basic geometrical constructions
CO4: Create department specific drawings using various commands in CAD

Pre-requisites

Nil

DP232270	Drafting Practices	L	T	P	C
Practical		0	0	4	2

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	-	-	-	-
CO2	2	3	2	-	-	-	-
CO3	2	1	3	-	-	-	-
CO4	-	-	-	3	-	-	-
CO5	-	-	-	-	-	-	-

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- **Engage and Motivate:** Instructors should actively engage students to boost their learning confidence.

- **Real-World Relevance:** Incorporate relatable, real-life examples and engineering applications to help students understand and appreciate course concepts.

- **Interactive Learning:** Utilize demonstrations and plan interactive student activities for an engaging learning experience.

- **Application-Based Learning:** Employ a theory-demonstrate-practice-activity strategy throughout the course to ensure outcome-driven learning and employability.

- **Simulation and Real-World Practice:** Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real-world scenarios when possible.

- **Encourage Critical Analysis:** Foster an environment where students can honestly assess experiment outcomes and analyze potential sources of error in case of discrepancies.

DP232270	**Drafting Practices**	L	T	P	C
Practical		0	0	4	2

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Manual Drafting (Unit – I)	Manual Drafting (Unit – II)	Model Exam	Practices and Record of Work Done	Practical Examination
Duration	2 hours	2 hours	3 hours	***	3 hours
Exam Marks	60	60	100	100	100
Converted to	10	10	10	10	60
Marks	40				60

Note:

CA1: Three questions should be given from Unit – I to draw in the drawing sheet and the same should be evaluated for 60 Marks. Each question carries 20 Marks.

CA2: Three questions should be given from Unit – II to draw in the drawing sheet and the same should be evaluated for 60 Marks. Each question carries 20 Marks.

CA3: Model Examination for 100 Marks.

CA4: All exercises [4 Drawing sheets (each 5 marks) + 8 CAD Drawings (each 10 marks)]. The same should be submitted for the board examination as a record of work done.

DP232270	**Drafting Practices**	L	T	P	C
Practical		0	0	4	2

COMMON TO ALL BRANCHES

PART – A (Manual Drafting) **[The drawings (Ex. No: 1 to 4) should be drawn on drawing sheets** **and the same should be submitted for evaluation]**

Unit I	**BASICS OF DRAWING AND DIMENSIONING**	
Importance of engineering drawing - drawing practice as per BIS code - drawing instruments: drawing board, mini drafter, drawing sheets, drawing pencils, set squares, etc. Lettering and numbering as per BIS - single stroke letters - uppercase and lowercase letters. Dimensioning – need for dimensioning - terms and notations as per BIS - parallel, chain and progressive dimensioning.		4
Ex.No	Name of the Experiment	
1	a) Rewrite the given statement in a single stroke vertical uppercase letters (5 statements) b) Rewrite the given statement in a single stroke vertical lowercase letters (5 statements)	4
2	Redraw the given drawing and dimension it as per BIS. (Figure: 1 to 4)	6
Unit II	**GEOMETRIC CONSTRUCTION AND CONSTRUCTION OF POLYGONS**	
Geometric Constructions: Bisect a straight line, an arc and an angle – divide a straight line and circle into a number of equal divisions – construct an arc touching two straight lines at any angle – construct an arc touching two arcs. **Construction of Polygons:** Triangle, square, rectangle, pentagon and hexagon – various positions – side of the polygon is parallel, perpendicular and inclined to principal planes.		4
Ex.No	Name of the Experiment	
3	a) Divide a straight line and circle into given number of equal divisions b) Construct an arc touching two straight lines c) Construct an arc touching two arcs	4
4	Construct the polygon of given size (Choose any suitable method) (Triangle, Rectangle, Square, Pentagon and Hexagon)	4

DP232270	**Drafting Practices**	L	T	P	C
Practical		0	0	4	2

PART – B (Computer Aided Drafting)
[Note: The drawings (Figure: 1 to 8) should be created using CAD Software and the printout should be submitted for evaluation]

Unit III	BASICS OF COMPUTER AIDED DRAFTING (CAD)	
Introduction to CAD – applications – advantages of CAD over manual drafting – understanding user interface – types of coordinate systems - absolute, relative, polar – drafting settings – Limits – Units – Creating objects using draw commands – Line, Arc, Circle, Rectangle, Ellipse, Polygon, Point, Pline, Sketch – Creating text – Dtext, Mtext, Text styles – Mline, spline – Drawing with precision – Osnap options – drawing aids – Fill, Snap, Grid, Ortho lines – Function keys – Editing and modify commands – Object selection methods – Erasing object – Oops – Canceling and undoing a command – Copy – Move – Array – Offset – Scale – Rotate – Mirror – Break – Trim – Extend – Explode – Divide – Measure – Stretch – Lengthen – Changing properties – Color, Line types, LT scale – Matching properties – Editing with grips – Pedit – Ddedit – Mledit. Basic dimensioning – Editing dimensions – Dimension styles – Adding leaders – Creation of blocks – Wblock – Inserting a block – Block attributes – Hatching – Pattern types – Boundary hatch – Working with layers – View group commands – Zoom, redraw, regen, pan – Enquiry tools. Page setup in layout – Viewports – Plotting drawings.		8
Ex.No	Name of the Experiment	
5	Draw the given drawing and dimension it as per BIS using CAD (Figure: 1 to 4)	5

FOR MECHANICAL ENGINEERING AND ALLIED BRANCHES ONLY

Unit IV	ORTHOGRAPHIC VIEWS USING CAD	
Orthographic projections – planes of projection – principal orthographic views – first angle projection – third angle projection – Construction of orthographic views of simple components using CAD.		4
Ex.No	Name of the Experiment	
6	Draw the orthographic views of the given component using CAD (Figure: 5 to 8)	4

DP232270	Drafting Practices	L	T	P	C
Practical		0	0	4	2

FOR CIVIL AND ALLIED COURSES ONLY		
Unit IV	BASIC CIVIL ENGINEERING DRAWINGS USING CAD	
Important terminologies used in Civil Engineering Drawing – Basic conventional symbols – materials, doors, windows, stairs, walls, sanitary fittings, etc. – Basic civil engineering drawing using CAD.		4
Ex.No	Name of the Experiment	
6	Draw the given civil engineering drawing using CAD (Figure: 5 to 8) a) Cross sectional view of L -section, T-section, Channel and I - Section b) Plan, Elevation and Sectional view of a Single storey, Single room consisting of RCC Flat Roof, Masonry walls, Lintel cum Sunshade, Door and windows of standard size. c) Floor plan of a 2BHK residential building. d) Plan and Sectional Elevation of a RCC Column with square isolated footings	8
FOR EEE AND ALLIED COURSES ONLY		
Unit IV	BASIC ELECTRICAL WIRING CIRCUITS USING CAD	
Basic electrical symbols - fuse, main switch, electrical bell, earth, SPST, DPST, TPST, Neutral link, ammeter, voltmeter, wattmeter, energy meter, frequency meter, power factor meter, timer, buzzer, MCB, etc. – Drawing of basic electrical circuits diagrams using CAD.		4
Ex.No	Name of the Experiment	
6	Draw the given electric circuit diagram using CAD. (Figure: 5 to 8) a) Stair-case wiring electric circuit b) Control and main circuit of automatic star delta starter c) Control circuit for jogging in cage induction motor d) Single phase wiring circuit	8

DP232270	**Drafting Practices**	L	T	P	C
Practical		0	0	4	2

FOR ECE, COMPUTER AND ALLIED COURSES ONLY	
Unit IV	**BASIC ELECTRONIC CIRCUITS USING CAD**

Basic electronics symbols - Resistor, Capacitor, Inductor, PN Junction Diode, Zener Diode, BJT, JFET, MOSFET, GND and VCC, Transformer, Switch, Buzzer, Battery, etc. Drawing of basic electronics circuits diagram using CAD.	4

Ex.No	Name of the Experiment	
6	Draw the given electronics circuit diagram using CAD. (Figure: 5 to 8) a) Half Wave Rectifier circuit b) Bridge Rectifier circuit c) Common Emitter Amplifier circuit d) Fire Alarm circuit	8
Continuous Assessment Test & Revision		8
TOTAL HOURS		**60**

Note: Suitable drawings should be provided to students for Ex. Nos: 2, 5 & 6

Suggested List of Students Activities

- Download and learn the BIS Codes for various engineering practices.
- Prepare 3D models of drawings with the help of cardboard to visualize and understand the orthographic views.
- Presentation/Seminars by students on any recent technological developments based on the course
- Periodic class quizzes conducted on a weekly/fortnightly based on the course
- Mini project that shall be an extension of any practical lab exercise to real-world application

Text Books

- Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53 Edition, 2019.
- Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.
- T. Jayapoovan, "Engineering Drawing & Graphics Using Autocad", Vikas Publishing House Pvt. Ltd.

DP232270	Drafting Practices	L	T	P	C
Practical		0	0	4	2

- M. Yogesh, B. S. Nagaraja, N. Nandan, "Computer Aided Electrical Drawing", PHI Learning Pvt. Ltd.
- Thomas Tumilty, "AutoCAD for Electronics", PHI Learning Pvt. Ltd.

References

- Basant Agrawal, Agrawal C M "Engineering Drawing", McGraw hill HED
- Venugopal.K, Prabhu Raja V, "Engineering Graphics", New Age International Publishers.
- Mark Dix, Paul Riley, "Fundamentals of AutoCAD" PHI Learning Pvt. Ltd.
- BL Theraja, AK Theraja, "A Textbook of Electrical Technology", S. Chand & Company Ltd.
- D Chattopadhyay, PC Rakshit, "Fundamentals of Electric Circuit Theory", S. Chand & Company Ltd.
- R. S. Sedha, "A Textbook of Electronic Circuits", S. Chand & Company Ltd.

Web-based / Online Resources

https://www.autodesk.in/campaigns/autocad-tutorials
https://www.mycadsite.com/tutorials.html

BOARD EXAMINATIONS

Allocation of Marks

Description	Marks
Part – A: Short Answer Questions	
25 one-mark questions from Unit – I, II & III (25 x 1 = 25 Marks)	25
Pert – B: Computer Aided Drafting	
Drawing & Dimensioning using CAD from Unit – III Any one drawing out of four drawings (1 x 25 = 25 Marks)	25
Department specific drawing using CAD from Unit – IV Any one drawing out of four drawings (1 x 45 = 45 Marks)	45
Viva – voce	5
TOTAL MARKS	**100**

DRAWINGS FOR LAB EXERCISES

COMMON FOR ALL BRANCHES   *(All dimensions are in mm)*
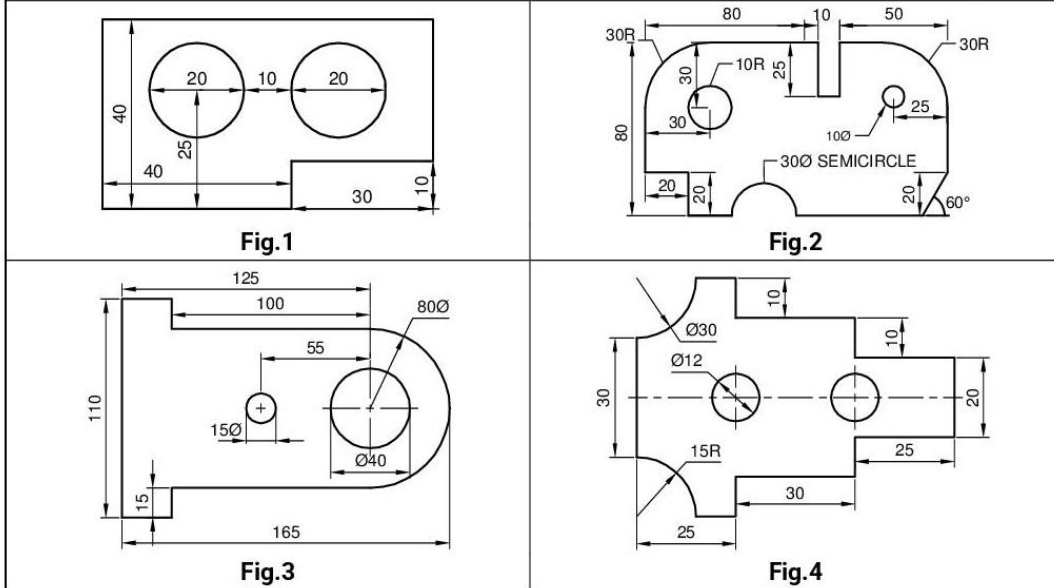
Fig.1

Fig.2

Fig.3

Fig.4

FOR MECHANICAL ENGINEERING AND ALLIED COURSES ONLY

Fig.5

Fig.6

Fig.7

Fig.8
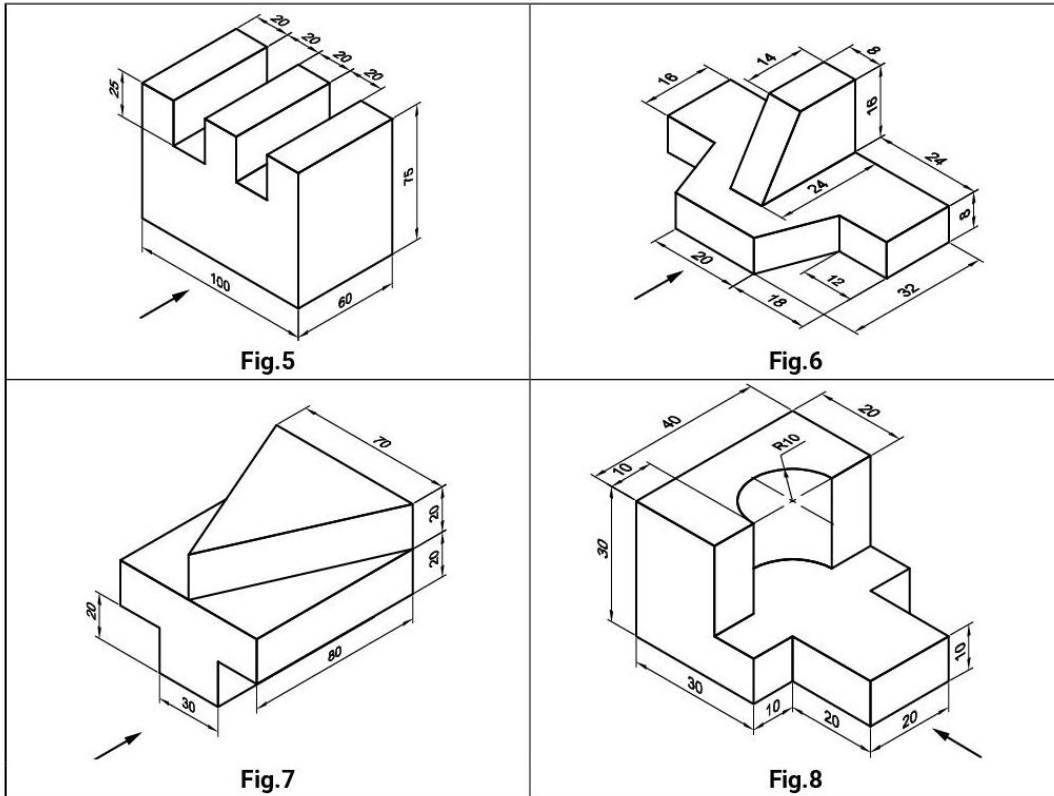
FOR CIVIL ENGINEERING AND ALLIED COURSES ONLY

All dimensions are in mm
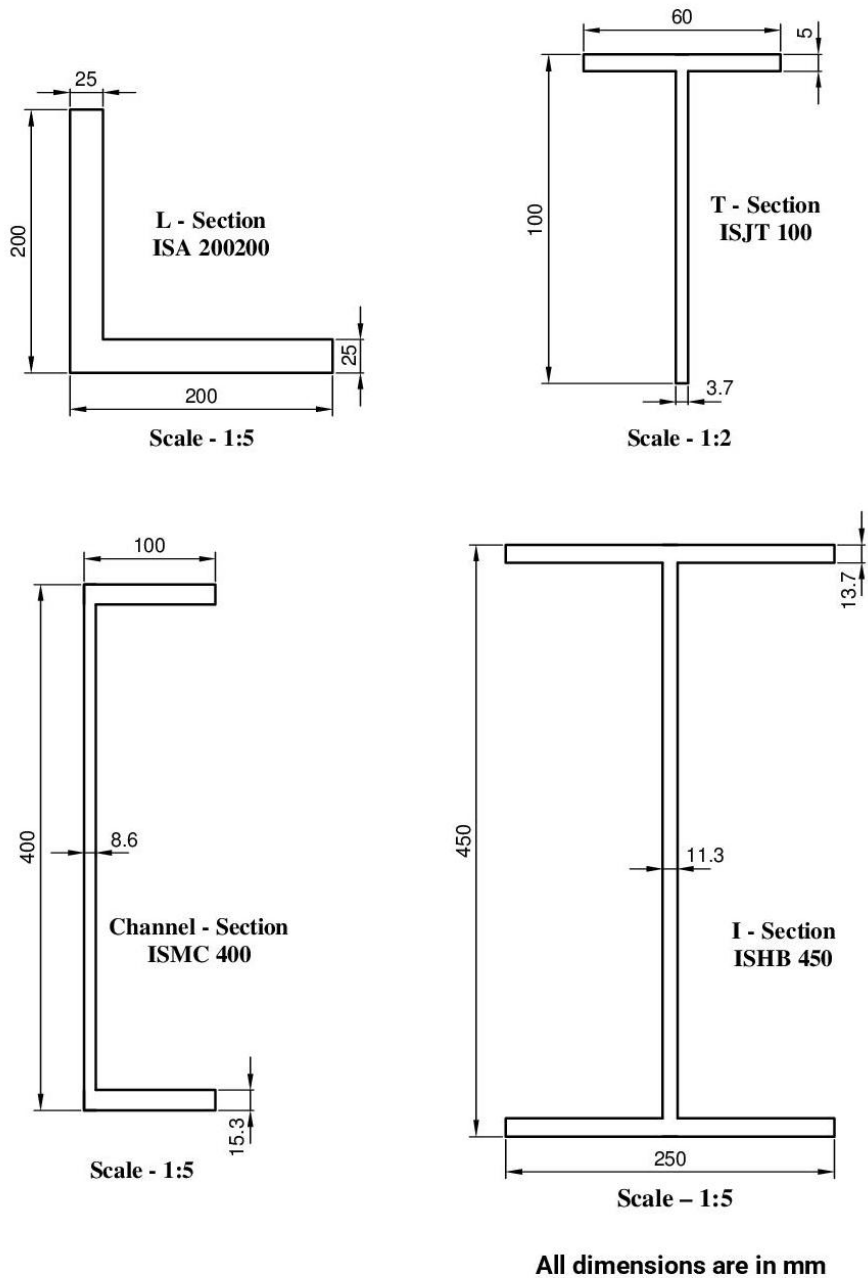
Fig.5. Cross sectional view of L -section, T-section, Channel section and I- Section

WEATHERING COURSE, 75mm THICK
PARAPET, 200mm THICK
ROOF SLAB, RCC, 1:2:4
WALL 200mm THICK
PLASTERING, CM, 1:5
LINTEL BEAM, RCC, 1:2:4
FLOORING, CM 1:3, 12mm THICK
PCC, 1:4:8, 150mm THICK
DAMP PROOF COURSE, CM 1:3, 20mm THICK
STEPS, 150mm RISE, 250mm TREAD
GL
SECOND FOOTING, 400mm THICK
FIRST FOOTING, 500mm THICK
PCC, 1:4:8

SECTION ON X-X

SCALE - 1:100
All dimensions are in mm

D - Door - 1000mm x 2100mm
W - Window - 900mm x 1200mm

ELEVATION

PLAN
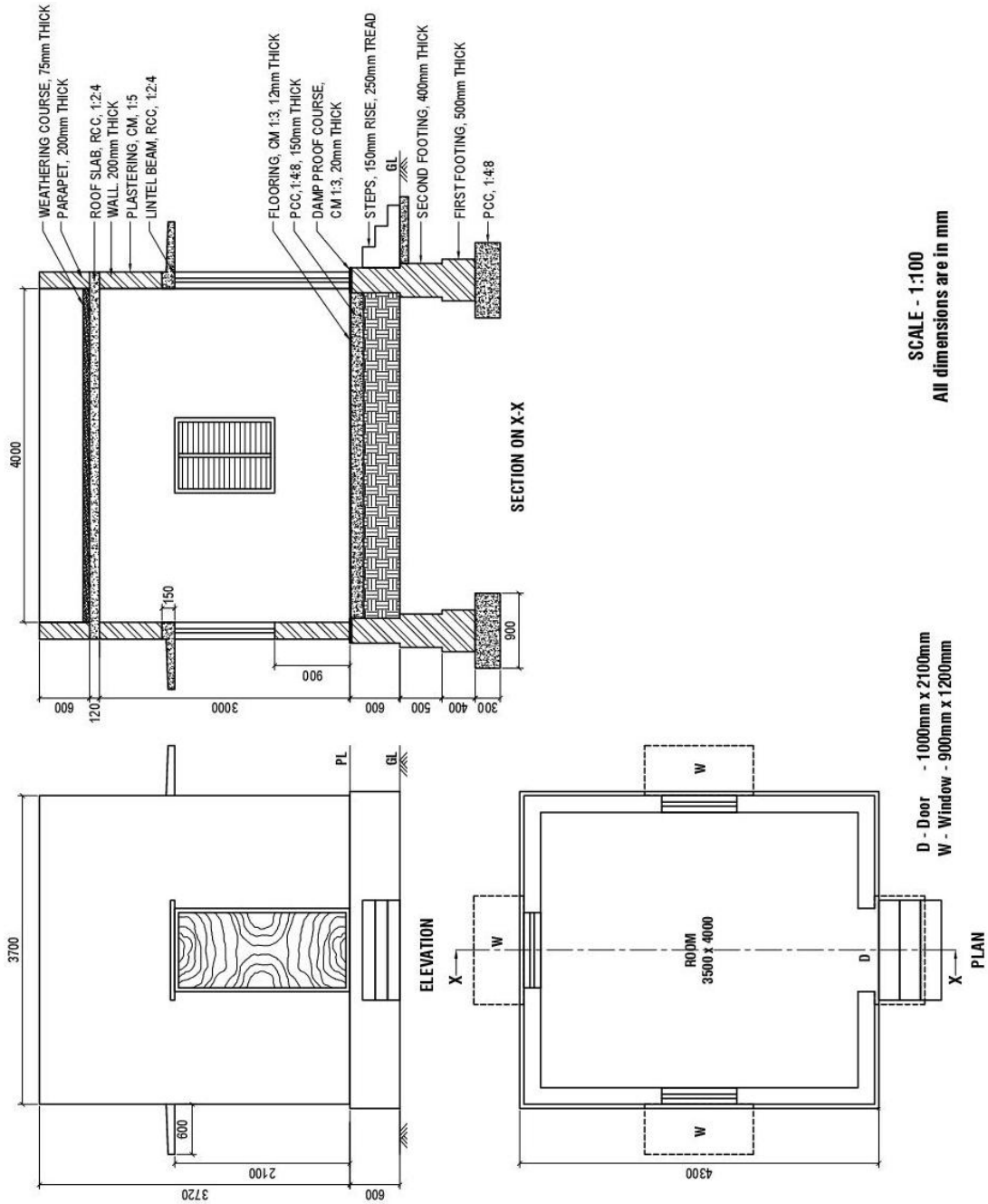
ROOM
3500 x 4000

Fig.6. Plan, Elevation and Sectional view of a single storey building with single room
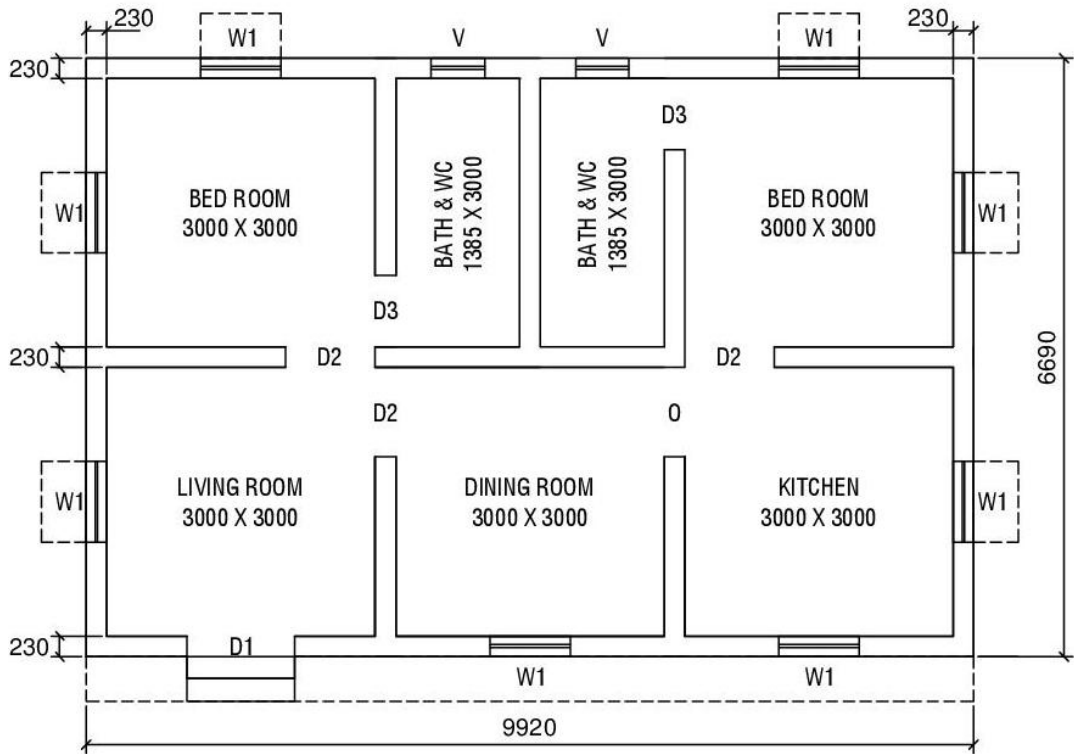
Window (W)   - 900 mm x 1200 mm   Door (D1) - 1200 mm x 2100 mm
Ventilator (V) - 600 mm x 600 mm   Door (D2) - 1000 mm x 2100 mm
                                     Door (D3) - 800 mm x 2100 mm

SCALE – 1:100
All dimensions are in mm

Fig.7. Floor plan of 2 BHK residential building

DP232270	Drafting Practices	L	T	P	C
Practical		0	0	4	2
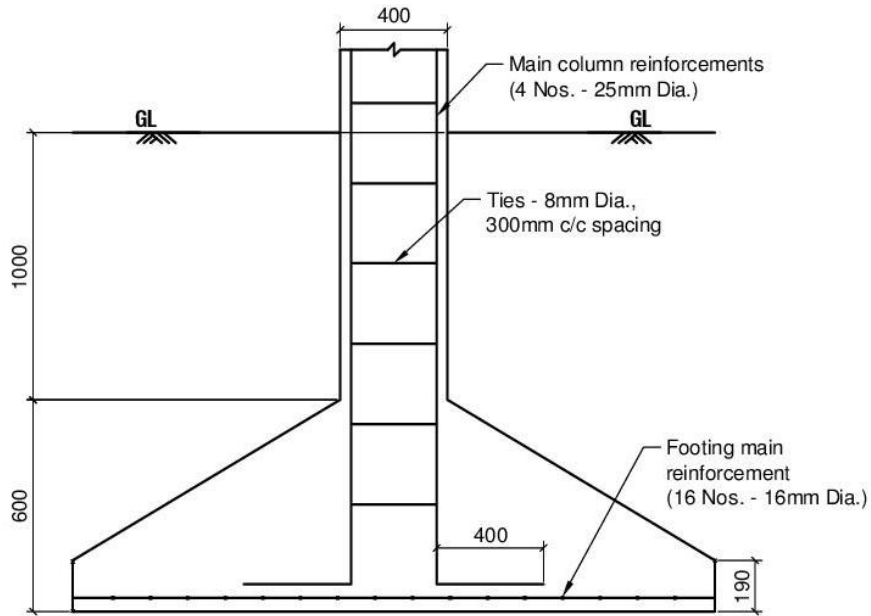
SECTIONAL ELEVATION OF COLUMN AND FOOTINGS

Main column reinforcements
(4 Nos. - 25mm Dia.)

Ties - 8mm Dia.,
300mm c/c spacing

Footing main
reinforcement
(16 Nos. - 16mm Dia.)

400

1000

600

190

400

Footing main
reinforcement
(16 Nos. - 16mm Dia.)

Square column

2400

320

400

2400
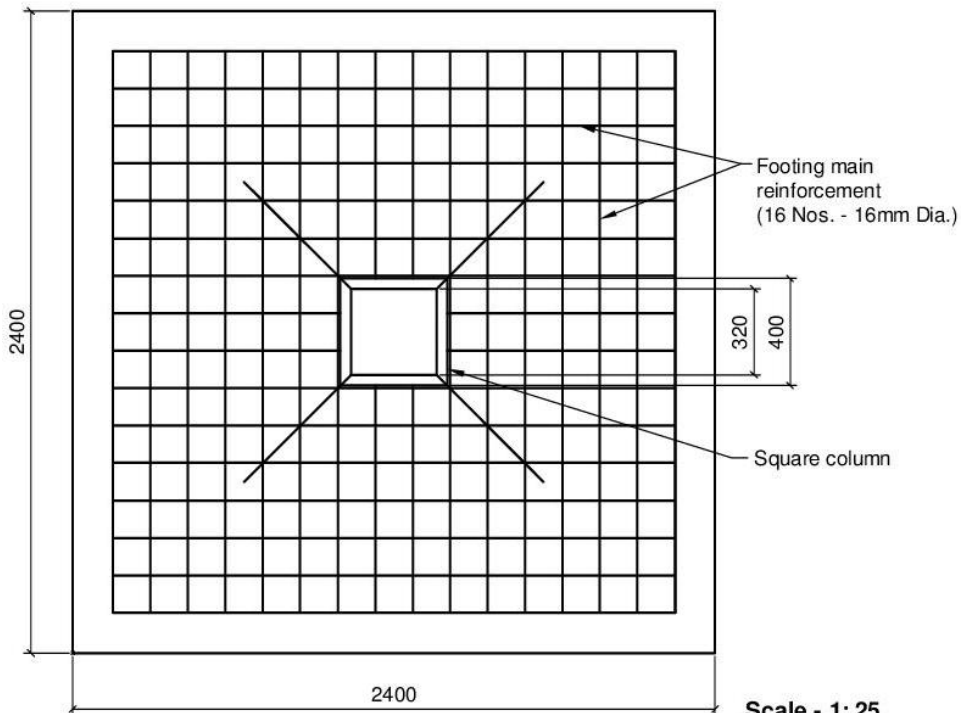
PLAN OF FOOTINGS

Scale - 1: 25
All dimensions are in mm

Fig.8 RCC column with square isolated footing

DP232270	**Drafting Practices**	L	T	P	C
Practical		0	0	4	2
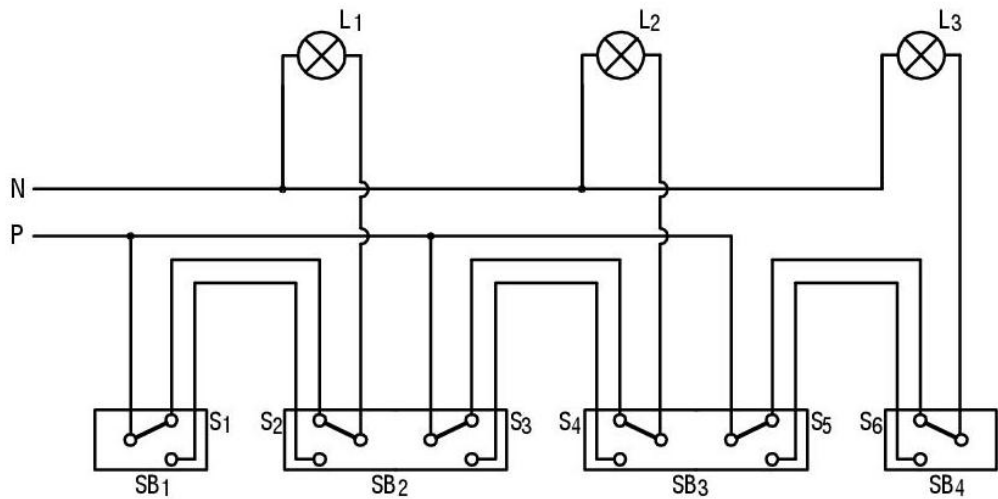
N - Neutral
P - Phase
SB - Switch Board
S - Switch
L - Light Bulb

Fig.5. Staircase wiring electric circuit

DP232270	**Drafting Practices**	L	T	P	C
Practical		0	0	4	2

3 Phase, 440 V - AC Supply

TPST - Three Pole, Single Throw
OLR - Over Load Relay
M - Main contactor
S - Star contactor
D - Delta contactor
T - Timer
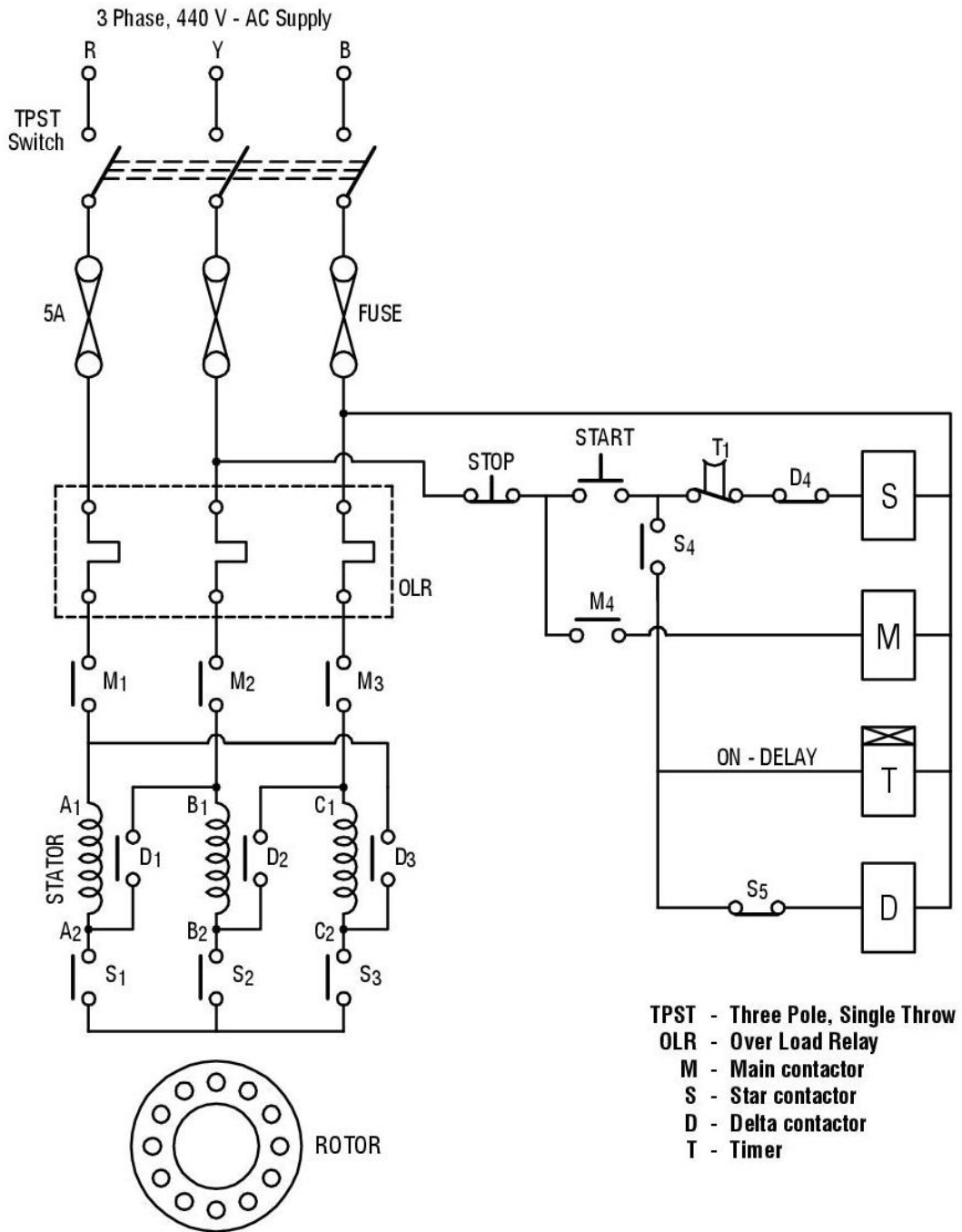
Fig.6. Control and main circuit for automatic star delta starter

DP232270	**Drafting Practices**	L	T	P	C
Practical		0	0	4	2
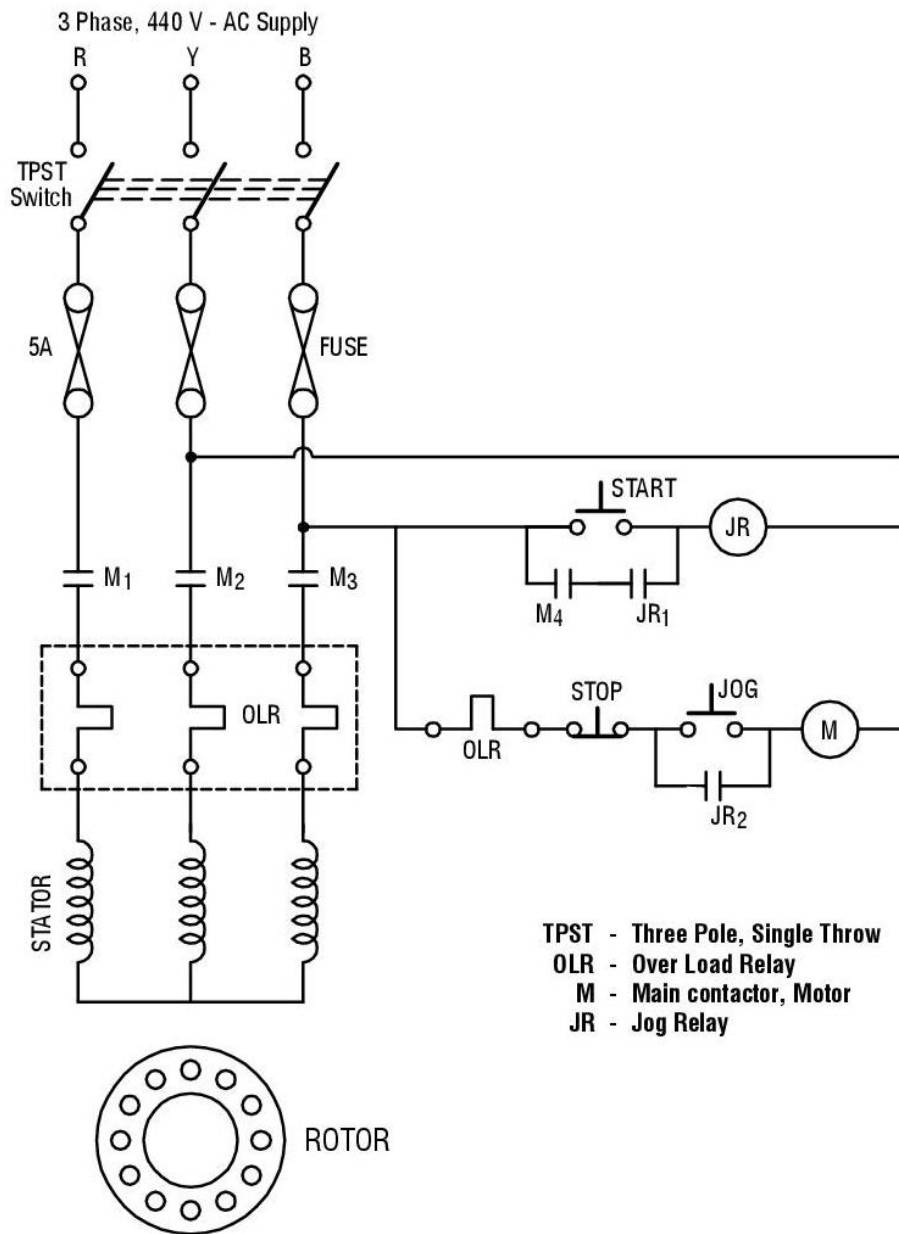
Fig.7. Control circuit for jogging in cage induction motor

3 Phase, 440 V - AC Supply

TPST - Three Pole, Single Throw
OLR - Over Load Relay
M - Main contactor, Motor
JR - Jog Relay

DP232270	**Drafting Practices**	L	T	P	C
Practical		0	0	4	2

Fig.8. Single phase wiring circuit

Labels within figure:
- Energy Meter
- ICDP Switch
- Indicator Lamp
- Cut-out
- Phase
- From O.H Line
- Neutral
- Sub Circuit-1
- Sub Circuit-2
- Sub Circuit-3
- To Motor
- 6A SP MCP
- 20A DP MCP
- Phase
- Neutral
- Earth
- Distribution Board
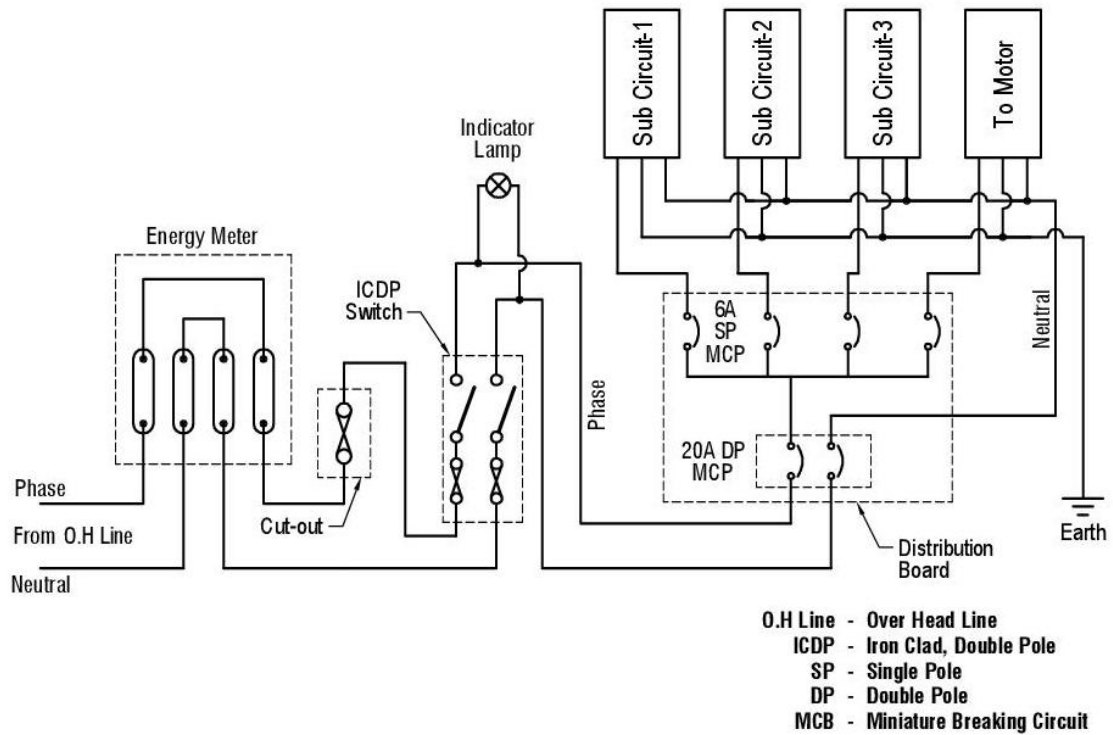
O.H Line - Over Head Line
ICDP - Iron Clad, Double Pole
SP - Single Pole
DP - Double Pole
MCB - Miniature Breaking Circuit

DP232270	**Drafting Practices**	L	T	P	C
Practical		0	0	4	2
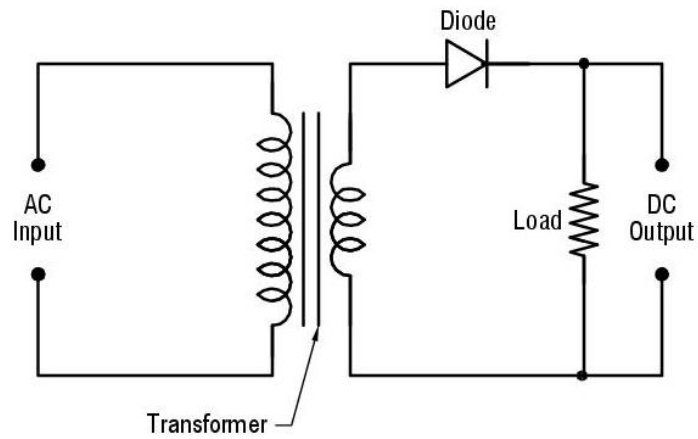
Fig.5. Half wave rectifier circuit
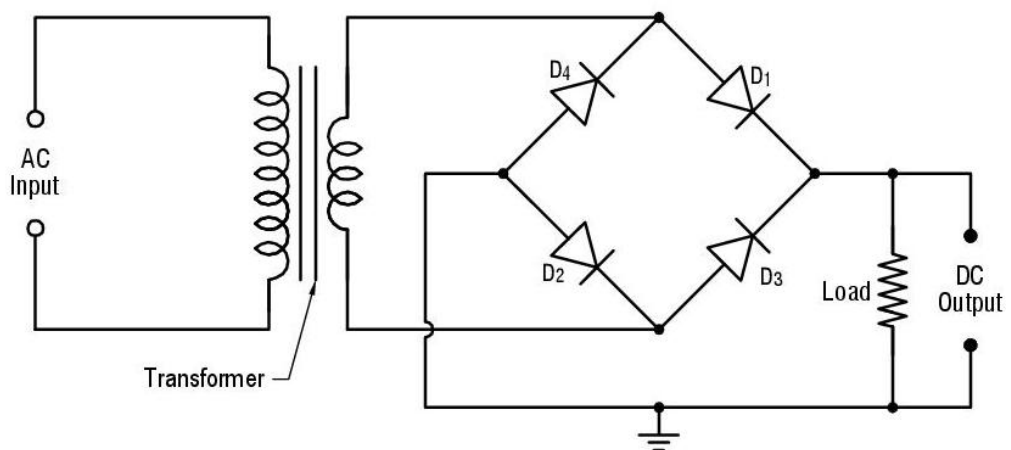
Fig.6. Bridge rectifier circuit

DP232270	Drafting Practices	L	T	P	C
Practical		0	0	4	2
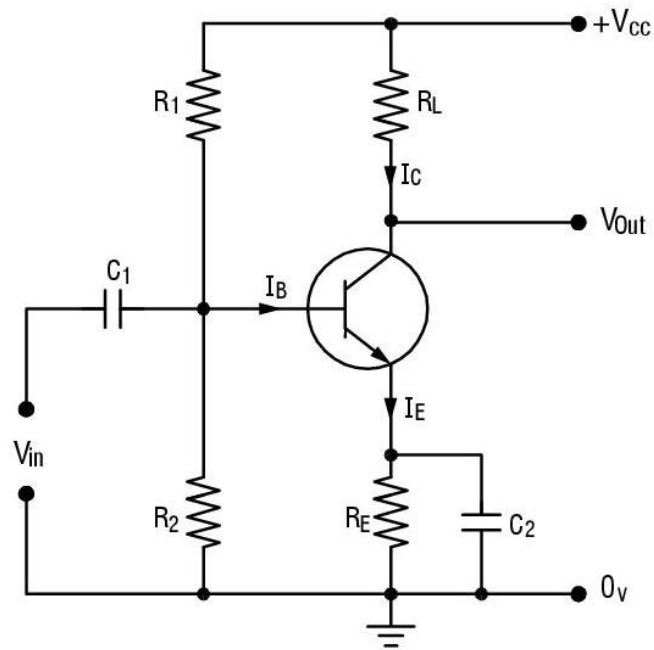
Fig.7. Common emitter amplifier circuit
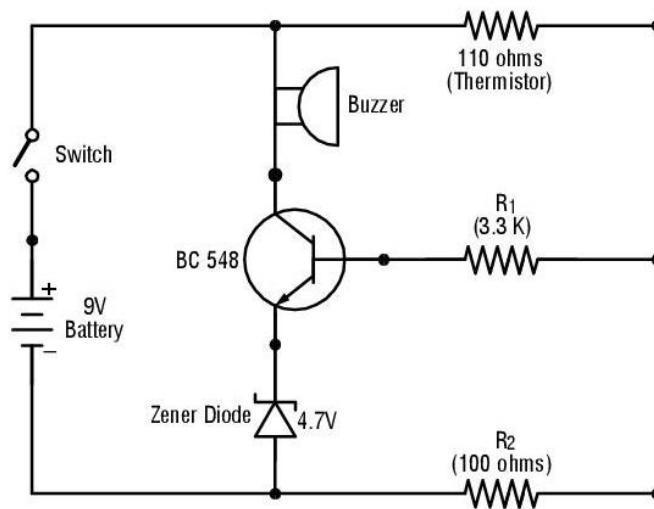
Fig.8. Fire alarm circuit

EE232120	**Basics of Electrical and Electronics Engineering**	L	T	P	C
Theory		3	0	0	3

Introduction

Fundamental knowledge in the field of Electrical and Electronics are essential for all engineers. They must thoroughly study the characteristics of electrical & electronic components before delving into advanced applications. This foundational subject is crucial for a comprehensive grasp of the principles. To develop the necessary psychomotor skills in this area, students should not only understand the concepts but also apply them effectively.

Course Objectives

The objective of this course is to enable the student to

- Understand the fundamental knowledge and skills in basic electrical engineering relevant for diploma holders in their professional life.
- Comprehend the core concepts and an overview of Electrical Engineering for circuit branch specialization.
- Understand and outline the principles of resistors, capacitors, and inductors in electronic circuit design.
- Grasp the fundamentals of semiconductor physics and the behavior of PN junction and Zener diodes.
- Develop expertise in electrical safety, PCB preparation, and soldering techniques.

Course Outcomes

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

CO1: Analyze the foundational principles of electrical quantities and basic laws for precise calculations in DC circuits with resistors and capacitors.

CO2: Explore different power generation methods and the role of electricity in different job sector.

CO3: Design electronic circuits effectively using resistors, capacitors, and inductors

CO4: Analyze and interpret the characteristics of PN junction and Zener diodes in electronic circuits.

CO5: Evaluate and implement appropriate safety protocols, PCB design strategies, and soldering techniques for efficient and secure electronic work environments.

Pre-requisites

Knowledge of basic Mathematics and Science

EE232120	Basics of Electrical and Electronics Engineering	L	T	P	C
Theory		3	0	0	3

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	-	-	-	-
CO2	1	3	2	-	-	-	-
CO3	3	1	-	-	-	-	-
CO4	3	2	2	-	-	-	-
CO5	3	2	2	-	-	-	-

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- Engage and Motivate: Instructors should actively engage students to boost their learning confidence.

- Real-World Relevance: Incorporate relatable, real-life examples and engineering applications to help students understand and appreciate course concepts.

- Interactive Learning: Utilize demonstrations and plan interactive student activities for an engaging learning experience.

- Application-Based Learning: Employ a theory-demonstrate-practice-activity strategy throughout the course to ensure outcome-driven learning and employability.

- Simulation and Real-World Practice: Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real-world scenarios when possible.

- Encourage Critical Analysis: Foster an environment where students can honestly assess experiment outcomes and analyze potential sources of error in case of discrepancies.

	EE232120	**Basics of Electrical and Electronics Engineering**	L	T	P	C
	Theory		3	0	0	3

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III & IV)	Quiz/ MCQ	Model Examination	Written Examination
Duration	2 hours	2 hours	1 hour	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Marks	40				60

- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for the internal assessment of 20 Marks.
- CA3 Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 marks for the internal assessment
- CA4 Model examination should be conducted as per the end semester question pattern. The marks should be converted to 10 marks for the internal assessment.

EE232120	**Basics of Electrical and Electronics Engineering**	L	T	P	C
Theory		3	0	0	3

Unit I	FUNDAMENTALS OF ELECTRICAL ENGINEERING	
Introduction to Electricity: Uses of Electricity in Engineering & Health care - Duties & responsibilities of Electrical Engineer

Important Terms: Electrical materials -Electrical quantities- [Charge, Current, Potential difference, DC & AC supply – Types & Difference, Power & Energy]

Basic Laws: Coulomb's law - Lenz Law -Fleming's rule.

Electric Components & Circuits: Voltage, Current, Power & Energy simply calculation using Series & Parallel connection of Resistors, inductors & Capacitors using Ohm's law only. | | 9 |

Unit II	ELECTRICAL SYSTEMS	
Power Generation: Energy sources – Power stations - Block Diagram of AC transmission – Functions of TANGEDCO

Conversion of Energy: Motor, Generator and Transformer – main parts, types (names only) and uses. Different types of lamps – Simple lamp circuit - Applications of Solar PV panels – Concept of Electric Vehicles -Types – Domestic house wiring | | 9 |

Unit III	PASSIVE COMPONENTS	
Types of Electronic Components - Resistor, Capacitor and inductor - Symbol, Working Principle, Properties, Types and Uses - Colour Coding of Resistor - Self and Mutual Inductance		9

Unit IV	FUNDAMENTALS OF SEMICONDUCTORS	
Semiconductors: Energy Band, Fermi level, Intrinsic and Extrinsic Semiconductors, P-Type and N-Type Semiconductors, Drift Current, Diffusion Current.

PN Junction Diode and Zener Diode: Symbol, construction and working - Forward Bias, Reverse Bias, VI Characteristics, Applications. | | 9 |

EE232120	Basics of Electrical and Electronics Engineering	L	T	P	C
Theory		3	0	0	3

Unit V	**ELECTRICAL SAFETY, PCB AND SOLDERING**	
Electrical Safety: Hazards of electricity [shock, burns, arc-blast, Thermal Radiation, explosions, fires, effects of electricity on the human body] –Safety precautions - First Aid for Electrical Accidents - Protective devices– Earthing – lightning arrester Introduction to PCB - Types, PCB Materials, Steps involved in preparation of a PCB. Introduction to Soldering - Types of Solder, Soldering Tools, Soldering Safety precautions.		9
TOTAL HOURS		45

Suggested List of Students Activity

- Presentation/Seminars by students on any recent technological developments based on the course
- Periodic class quizzes conducted on a weekly/fortnightly based on the course
- Micro project that shall be an extension of any practical lab exercise to real-world application
- Electricity Billing for domestic and institutional purposes
- Demonstration of Electrical Components
- Calculating Resistance value by Colour Coding Techniques
- Fabricating PCB for a simple circuit - with 2 or 3 elements

Text Books

- Engineering Circuit Analysis by W.H. Hayt& J.K. Kemmerly and Steven M. Durbin, Tata McGraw Hill, 7th edition, New Delhi, 2007
- Principles of Power Systems by VK. Metha& Rohit Metha, S. Chand Publishers, 3rd Edition, 2005.
- Electric and Hybrid Vehicles by A K Babu, Second Edition, Khanna Publishers
- Electronic Devices and Circuit Theory by Robert L. Boylestad and Louis Nashelsky
- Semiconductor Physics and Devices by Donald A. Neamen
- Electrical Safety Handbook, by John Cadick, Mary Capelli-Schellpfeffer, Dennis K. Neitzel, Al Winfield, Fourth Edition, The McGraw-Hill Companies, Inc. 2012.

EE232120	**Basics of Electrical and Electronics Engineering**	L	T	P	C
Theory		3	0	0	3

Reference Books

- Electric Circuit Analysis by Sudhakar A and Shyam Mohan SP, Tata McGraw Hill, New Delhi, 2008
- Electric Circuits by Mahmood Nahvi, Joseph A Edminister, Tata McGraw - Hill Education, 5th Edition, 2010
- Renewables and Efficient Electric Power Systems by Gilbert M. Master, John Wiley and Sons, 2004.
- Non-Conventional Sources Of Energy Sources, RAI G D, Khanna Publishers, 2012
- Printed Circuit Boards: Design, Fabrication and Assembly by Raghbir Khandpur, 2005

Web-based/Online Resources

- NPTEL (Website): The National Programme on Technology Enhanced Learning (NPTEL) offers free online courses on semiconductor devices and other electrical engineering topics. NPTEL Electrical Engineering

- Electronics Hub (Website): Offers tutorials and articles on PCB design, soldering techniques, and electronics projects. Electronics Hub

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

Introduction

Communication is the foundation for all human relationships and language is one of the prime tools of communication. Communication is reliant on cognitive skills such as eloquent speech, vocabulary, reading comprehension and critical thinking. The present syllabus focuses on four Language Skills Listening, Speaking, Reading, and Writing. It enables the students to shed their inhibitions be confident in their approach and acquire the skills to build good working relationships in their career. It helps the student at the Diploma level to gain confidence and enhance them to face their career commitments with globalized standards.

Course Objectives

The objective of this course is to enable the students to

- Improve the communicative competence in English.
- Enhance the vocabulary and LSRW Skills.
- Foster their confidence in group communication skills.
- Learn the techniques of effective writing.
- Enable them to communicate effectively and appropriately in real-life situations.

Course Outcomes

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

CO1: Boost confidence in expressing ideas, and plans, interpreting the same in social and professional situations.

CO2: Frame grammatically correct sentences with clarity and coherence both in oral and written communication.

CO3: Analyze and evaluate the information with supporting ideas logically and coherently.

CO4: Communicate effectively using appropriate vocabulary and grammar in every situational context.

CO5: Provide adequate exposure and opportunities to imbibe, develop, practice and use LSRW skills and seek opportunities for further language development outside the classroom.

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

Pre-requisites

Nil

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	-	-	-	-	-	3	2
CO2	-	-	-	-	-	3	2
CO3	-	-	-	-	-	3	2
CO4	-	-	-	-	-	3	2
CO5	-	-	-	-	-	3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

The instructional strategy for Communicative English classes employs a learner-centered and communicative approach that focuses on active student participation and engagement. Here are some key strategies to be followed.

- **Communicative Activities:** Activities that develop active vocabulary and encourage role plays and language games for everyday applications.
- **Pair and Group Work:** Promotes student interaction in a confident way in day-to-day conversation. It also reinforces their language skills through communication with their peers.
- **Authentic Materials:** News articles, videos, and podcasts develop comprehension and critical thinking skills.
- **Task-Based Learning:** Implement task-based learning activities for students and use English for real-world purposes.

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

- **Language Output and Output Balance**: Ensure a balance between language input like exposure to domain-specific vocabulary and grammar structures with examples. Enable language output by giving opportunities for students to build both receptive skills (Listening and Reading) and productive skills (Speaking and Writing).
- **Use of Technology:** Technology tools and resources such as language learning apps, online platforms, and virtual communication tools can be used to provide practice opportunities.
- **Regular Assessment:** Formative and Summative assessments are conducted to gauge students' progress and encourage them in their language learning journey

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)	
	CA1	CA2	CA3	CA4		
Mode	Written Test (Theory + Writing Skill)	Written Test (Theory + Writing Skill)	Model Exam Oral (S & R)*	Model Exam (T, L & W)*	Oral Exam (S,R)*	Written Exam
	Unit I & II	Unit III, IV & V	Unit I to V	Unit I to V	All Units	All Units
Duration	2 hours	2 hours	2 hours	2 hours	3 hours	
Exam Marks	30 + 10 (Record Marks) Unit I & II	30 + 10 (Record Marks) Unit III, IV & V	50	50	50	50
Converted to	20	20	20	20	60	
Marks	Best of CA1 & CA2 (20 marks)		Average of CA3 & CA4 (20 marks)		60	

*L – Listening Skill, S – Speaking Skill, R – Reading Skill, W – Writing Skill and T – Theory

Note:

- **CA1** - 30 Marks [Written Exam from Unit I & II].
- **CA2** - 30 Marks [Written Exam from Unit III, IV & V].
- **Record Writing** - 10 Marks for each exercise

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

- **CA3** - Model Exam (Unit I, II, III, IV & V) – Speaking Skills and Reading Skills.
- **CA4** - Model Exam (Unit I, II, III, IV & V) – Theory, Listening Skills and Writing Skills.
- **End Semester Examination**
  - **Oral** (Speaking and Reading Skills)
  - **Written** (Theory, Listening Skills and Writing Skills)
- Selected lists will be provided in the e-Text Book wherever mentioned.

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

Unit I	SITUATIONAL ENGLISH

<table>
<tr><td>
Theory (Prose):
Science Fiction Story [Any Short Story with Technical Words]

Focus on:
   a) Technical words [Textual]
   b) Conversions: Nouns, Verbs, Adjectives and Adverbs using affixes [Textual/General]
</td><td>3</td></tr>
<tr><td colspan="1" align="center">PRACTICAL (Lab/Activity)
Exercise No: 1</td><td></td></tr>
<tr><td>
Listening

a) Listening to Scientific and Technological Passages.
   • Minimum 3 passages
   • Conversions: Nouns, verbs, adjectives, and adverbs using affixes
   • Minimum 5 conversions from each of the 3 passages

b) One Word Substitution [Technical]
   • Minimum 5 words from each passage

     (To be recorded in the Record Notebook)
</td><td rowspan="4">6</td></tr>
<tr><td>
Speaking

a) Process Description
   • Making of working models and Lab procedures

b) Situational dialogues: WH, Yes or No
</td></tr>
<tr><td>
Reading

Short passages based on Professional Ethics
</td></tr>
<tr><td>
Writing
a) Rules for email etiquette
b) Email writing (Business Letters and Job Applications)
</td></tr>
</table>

Unit II	FUNCTIONAL ENGLISH

<table>
<tr><td>
Theory (Poem): The Bangle Sellers by Sarojini Naidu
Focus on:
   a) Poetry Comprehension (poetry lines to be given with related questions to be answered in one or two lines)
   b) Comparison of Adjectives (Textual)
   c) Fill in the blanks with suitable forms of adjectives (General)
</td><td>3</td></tr>
<tr><td>
Listening
   Listening to Lyrical Poems and noting down the Descriptive Adjectives
</td><td></td></tr>
</table>

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

PRACTICAL (Lab/Activity) **Exercise No: 2**	

Speaking
 	
a) Word Cloud
    • Minimum 3 word clouds
    • Frame 5 sentences from each Word Cloud (Minimum 5 words)
 	
b) Homophones and their meanings (General)
    • A selected list of 25 homophones will be provided
          (To be recorded in the Record Notebook)	

Reading a) Reading Comprehension (News articles) Questions and Answers, Synonyms/ Antonyms, Completing the Sentence b) Newspaper Reading Practice is to be given.	6

Writing
 	
a) Collocations of Technical Words (Match the Collocations)
    • With 5 words in one set
    • A selected list of 25 Collocations will be provided
 	
b) Punctuations
    • Sentences and Passages	

Unit III	**EXPRESSIVE ENGLISH**	

Theory (Prose): Narrative Essay:
          On Saying Please by A.G. Gardiner
 	
Focus on:
 	
a) MCQs (based on the Prose)
b) Short questions with one or two-line answers (Prose)
c) Reporting Dialogues
    • Textual/General
    • Change into Reported Speech
	3

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

Listening:

• Listen to Scientific Passages (Questions and Answers)

Speaking:

(a) Facing an Interview
   • Preparations (Checklist)
   • Body Language (Tips)
(b) Mock Interviews (Practical Model to be given)

PRACTICAL (Lab/Activity) **Exercise No: 3**	

Reading

• Reading Idiomatic Expressions with their meanings.
• Matching the idioms with their meanings
• 5 Idioms in each set
• A selected list of 25 idioms with their meanings will be provided

(To be recorded in the Record Notebook)

6

Writing

• Info graphics/Picture Reading
(General/Technical)
(Comprehending it as a Paragraph)

Unit IV	**EFFECTIVE ENGLISH**

Theory (Prose):
General Prose Passage (Speech by a famous Indian Personality)
Focus on:
   • Identification of Types of Sentences
   • Four Types: Assertive, Interrogative (Wh-type and Yes or No type), Imperative and Exclamatory (Textual/General)

Listening:
Speeches of Great Personalities (Note-Taking)

Speaking:
   • Group Discussion
   (General Topics: Environmental and Creating Awareness)

3

Reading:
   • Reading various types of sentences with intonation
   [Four Types: Assertive, Interrogative (Wh-type and Yes or No type) Imperative and Exclamatory (Falling Tone and Rising Tone)]

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

PRACTICAL (Lab/Activity) Exercise No: 4	
Writing • Advertisement Writing (Classifieds: Educational, Rental, Real Estate, Automotive & Business Offers) • Minimum one from each classified (To be recorded in the Record Notebook)	6

Unit V	CREATIVE ENGLISH

Theory:
    Passages on Motivational Topics (Minimum 3)
Focus on:
a) Identification of Phrasal Verbs from the passages. (Textual)
b) Phrasal Verbs [General]
   • Framing sentences using the Phrasal Verbs: Textual and General
   • A selected list of 25 Phrasal Verbs will be provided under General Category
	3

Listening Listening to the Weather Reports (Fill up the information gaps)	

PRACTICAL (Lab/Activity) Exercise No: 5	
Speaking • Describing Oneself (Physical Features, Character Traits, Likes and Dislikes) • Describe in Points under each aspect. (To be recorded in the Record Notebook)	
Reading • Interpreting Graphics into Verbal (Pie Chart / Bar Diagram/Flow Chart)	6
Writing (a) Completing a story (b) Caption writing for News Reports	

| **TOTAL HOURS** | **45** |

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

Incorporate some of these activities in the Language Class

- New Words and Meanings
- Proverbs and its Meanings
- Contextual Vocabulary
- Frequently Mispronounced Words
- Cross Word Puzzles (General/Technical)
- Abbreviations (social media)
- Newspaper Reading Practice

Suggested List of Student Activities

- Presentation/Seminars by students on any recent technological developments based on the branch of study.
- Quizzes are to be conducted based on the course on a weekly/fortnightly basis.
- Role Plays to Practice Speaking and Listening Skills.
- Descriptive Presentations about a specific topic using appropriate vocabulary.
- Language Games like word puzzles, vocabulary quizzes, and interactive games.
- News Discussions to express their opinions on several topics.
- Collaborative writing promotes teamwork which improves writing skills.

References

- Cambridge English Skills: Real Listening and Speaking by Miles Craven
- Writing Better English for ESL Learners by Ed Swick
- English Grammar in Use by Raymond Murphy
- Practical English Usage by Michael Swan
- Oxford Basics – Simple Reading Activities by Jill Hadfield. Charles Hadfield
- Oxford Basics – Simple Speaking Activities by Jill Hadfield, Charles Hadfield

Web-based/Online Resources

- https://www.bbc.co.uk/learningenglish/

- https://www.fluentu.com/

- https://www.englishclub.com/

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

Assessment Pattern

Continuous Assessment – I
(30 Marks)

Unit I & II (Theory & Writing Skills only)

I	Pick out any 5 technical words from the given passage. **(Passage from Science Fiction Short Story – Textual)**	5 x 1 = 5
II	Read the given poetry lines and answer the following questions. **Poem: The Bangle Sellers – Sarojini Naidu (5 questions)**	5 x 1 = 5
III	Match the technical words and form corresponding collocations. **(5 words in one set)**	5 x 1 = 5
IV	Correct the paragraph by adding appropriate punctuation and capitalization. **(2 small paragraphs)**	2 x 2½ = 5
V	Convert the following words into their corresponding derivatives. **(Textual/General – N/V/Adj/Adv)**	5 x 1 = 5
VI	E-Mail Writing: Business/Job Applications. **(Under any one of the mentioned categories)**	1 x 5 = 5

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

Continuous Assessment – II
(30 Marks)

Unit III, V & II (Theory & Writing Skills only)

I	Choose the correct answer. (Multiple Choice) **Prose: On Saying Please by A.G. Gardiner (5 Questions)**	5 x 1 = 5
II	Identify the types of sentences. **General/Textual –Affirmative, Interrogative: Wh-type and Yes or No type, Imperative and Exclamatory (5 sentences)**	5 x 1 = 5
III	Frame sentences using the given Phrasal Verbs. **(General/Textual: 5 phrasal verbs)**	5 x 1 = 5
IV	Write a paragraph of 50 words using the given info graphics/picture. **(General/Technical)**	1 x 5 = 5
V	Write classified advertisement – (Educational / Rental / Real Estate / Automotive / Business Offers) **(Under any one of the specified categories)**	1 x 5 = 5
VI	Write suitable captions for the given news reports. **(2 news reports)**	2 x 2½ = 5

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

Continuous Assessment – III
(50 Marks)

Oral Exam (Speaking and Reading Skills)

	TEST ON SPEAKING SKILLS (40 marks)	
I	Describe the process of (Making working models / Lab procedures) **(Under any one of the mentioned categories)**	1 x 10 = 10
II	Describe oneself: (Physical features / Character traits / Likes and dislikes**) (Under any one of the aspects)**	1 x 10 = 10
III	Interpret the given Graphics into Verbal. (Pie chart / Bar Diagram / Flow chart) **(Under any one of the mentioned categories)**	1 x 10 = 10
IV	Frame questions using WH and YES or NO type for the given situations. **(5 situations to be given)**	5 x 1 = 5
V	Frame sentences using any 5 words from the given word cloud.	5 x 1 = 5
	TEST ON READING SKILLS (10 marks)	
VI	Match the idiomatic expressions with their corresponding meanings. **(5 idiomatic expressions in one set)**	5 x 1 = 5
VII	Read the following sentences with proper intonation. **(5 sentences - under 4 types of sentences - Affirmative, Interrogative (Wh-type and Yes or No type) Imperative and Exclamatory) (Falling Tone and Rising Tone)**	5 x 1 = 5

EN232480	Communicative English II	L	T	P	C
Practicum		1	0	2	2

Continuous Assessment – IV
(50 Marks)

Written Exam (Theory, Listening and Writing Skills)

	TEST ON THEORY PART (15 marks)	
I	Read the given poetry lines and answer the following questions: **(Poem: The Bangle Sellers by Sarojini Naidu – 5 Questions with Poetry lines)**	5 x 1 = 5
II	Answer the following short questions in one or two lines: **(Prose: On Saying Please by A.G. Gardiner – 5 Questions)**	5 x 2 = 10
	TEST ON LISTENING SKILLS (5 marks)	
III	Listen to weather reports and fill in the information gaps. **(2 weather reports)**	2 x 2½ = 5
	TEST ON WRITING SKILLS (30 marks)	
IV	Fill in the blanks with suitable adjectives. **(General - 5 fill-ups with options)**	5 x 1 = 5
V	Change the following dialogue into reported speech. **(General/Textual – 2 dialogues)**	2 x 2½ = 5
VI	E-Mail Writing – Business / Job Applications. **(Under any one of the mentioned categories)**	1 x 5 = 5
VII	Write a paragraph of about 50 words using the given info graphics/picture.	1 x 5 = 5
VIII	Complete the story within 3 to 5 lines and give a title.	1 x 5 = 5
IX	Match the technical words and form collocations. **(5 words in one set)**	5 x 1 = 5

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

Board Examination (100 Marks)
(Oral Skills: 50 Marks + Written Skills: 50 Marks)

ORAL SKILLS (50 marks)

		TEST ON SPEAKING SKILLS (30 marks)	
	I	Describe Oneself: (Physical features / Character traits / Likes and dislikes**) (Under any one of the aspects)**	1 x 10 = 10
		a) Frame questions using (WH / Yes or No) for the given situations**. (5 Situations to be given)**	5 x 1 = 5
	II	OR	
		b) Give the meaning for the set of homophones. **(2 homophones in one set)**	2 x 2½ = 5
	III	Frame sentences using any 5 words in the word cloud.	5 x 1 = 5
	IV	Group Discussion: (Environmental / Creating Awareness) **(Topics given according to the groups divided)**	1 x 10 = 10
		TEST ON READING SKILLS (20 marks)	
	V	Interpret the given Graphics into Verbal. (Pie chart / Bar Diagram / Flow chart) **(Under any of the mentioned categories)**	1 x 10 = 10
	VI	Match the idiomatic expressions with their corresponding meanings. **(5 idiomatic expressions in one set)**	5 x 1 = 5
	VII	Read the following sentences with proper intonation. **(5 sentences - under 4 types of sentences - Affirmative, Interrogative: Wh-type and Yes or No type, Imperative and Exclamatory)**	5 x 1 = 5

EN232480	**Communicative English II**	L	T	P	C
Practicum		1	0	2	2

WRITTEN SKILLS (50 marks)

	TEST ON THEORY PART (10 marks)	
I	Read the poetry lines and answer the following questions: **(Poem: The Bangle Sellers by Sarojini Naidu – 4 Questions with Poetry lines)**	4 x 1 = 4
II	Answer the following short questions in one or two lines: **(Prose: On Saying Please by A.G. Gardiner – 3 Questions)**	3 x 2 =6
	TEST ON LISTENING SKILLS (20 marks)	
III	Listen to the speech of the **(great personality)** and take down notes.	1 x 10 = 10
IV	Listen to the **(scientific passage)** and answer the following questions:	1 x 10 = 10
	TEST ON WRITING SKILLS (20 marks) **(Answer ANY FOUR questions)**	
V	Fill in the blanks with suitable adjectives: **(General – 5 fill-ups)**	1 x 5 = 5
VI	Frame sentences using phrasal verbs: **(5 phrasal verbs)**	5 x 1 = 5
VII	E-Mail Writing – Business / Job Applications. **(Under any one of the mentioned categories)**	1 x 5 = 5
VIII	Write a paragraph of about 50 words using the given info graphics/picture.	1 x 5 = 5
IX	Match the technical words and form collocations. **(5 words in one set)**	5 x 1 = 5
X	Write suitable captions for the news reports given: **(2 news reports)**	2 x 2½ = 5

EP232460	**Basic Engineering Practices**	L	T	P	C
Practicum		1	0	2	2

Introduction

It has been realized that Tamil Nadu would become a prosperous and a modern state by rising skill levels. It is very much important for fresh technicians to be highly skilled in dealing with the modern technologies in the Mechanical, Electrical, Plumbing and Safety & Security system works of building since the building systems have become more integrated. Besides, having the onsite experience is valid to build up quality craftsmanship.

By understanding the huge demand of the skilled technicians in the basic engineering practices. This course equips participants with the knowledge and skills needed to install water supply and drainage systems, guarantee water quality, Low Voltage power supply installation, and safety & security systems.

Course Objectives

The objective of this course is to prepare the student,
- To understand the work area and piping materials and tools for plumbing.
- To install the water supply system, drainage system, pipes, sanitary fixtures and pipe fittings.
- To install a water pump and to operate and maintain a water purifier unit.
- To perform the basic distribution of electrical supply and installation of electrical fixtures for domestic applications.
- To study and connect the basic security and safety systems.
- To learn about the fire-fighting extinguisher and fire-fighting systems.

Course Outcomes

On successful completion of this course, the student will be able to,
CO1: Execute the installation of assembled pipes, fittings, and other components for water supply and drainage systems.
CO2: Establish the installation of pipes, fittings, and other components for drainage systems.
CO3: Learn and Install the water pump and water purifier.
CO4: Affix electrical fixtures and implement Lightning Arrester and Earthing Systems for Low Voltage System.
CO5: Install the safety and security system.

Pre-requisites

Nil

EP232460	**Basic Engineering Practices**	L	T	P	C
Practicum		1	0	2	2

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	1	1	1	2
CO2	3	3	2	1	1	1	2
CO3	3	3	2	1	1	1	2
CO4	3	3	2	1	1	1	2
CO5	3	3	2	1	1	1	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their curiosity to learn.
- Implement task-based learning activities where students work on specific tasks or projects.
- Incorporate technology tools and resources, such as online platforms, interactive multimedia, and virtual communication tools, to enhance engagement and provide additional practice opportunities.
- Incorporate formative and summative assessments to gauge student progress and provide targeted feedback.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome and employability based.
- All demonstrations/Hand-on practices may be followed in the real environment as far as possible.

EP232460	**Basic Engineering Practices**	L	T	P	C
Practicum		1	0	2	2

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Practical Test (Ex. 1, 2, 5 & 6)	Practical Test (Ex. 3, 4, 7 & 8)	Model Practical Exam (All Exercises)	Record of Work Done (8 Exercises + 2 Reports)	Practical Examination
Duration	2 hours	2 hours	3 hours	***	3 hours
Exam Marks	80	80	100	100	100
Converted to	15	15	15	10	60
Marks	15		15	10	60

Note:

- **CA1 and CA2:** It should be conducted as per the end semester question pattern for 80 Marks (without written test). The 80 marks will be converted to 15 Marks. The best one will be considered for the Internal Assessment of 15 Marks.

- **CA 3**: After completion of all the exercises, model examination should be conducted as per end semester question pattern. The mark should be converted to 15 Marks for the internal assessment.

- **CA 4:** Record of work done should be maintained and the same have to be evaluated after completion of each practical exercise before the commencement of the next exercise for 10 Marks. Two activity reports should be completed and the same should be evaluated for 10 marks each. The average of 8 practical exercises and 2 reports marks should be converted to 10 Marks for the internal assessment.

EP232460	**Basic Engineering Practices**	L	T	P	C
Practicum		1	0	2	2

THEORY	
Plumbing - Sanitary Work - Safety during work - Types of plumbing pipes - Plumbing tools - Cutting Tools - Plumbing Symbols - Pipe Fittings - Types of pipe joints - Pipe bending tools - Pipe Cutting - Threading a Pipe - Methods of Testing Pipelines - Smoke Test - Pressure Hydraulic Test - Plumbing and Sanitary Fixtures - Tap or Faucet - Shower - Water Closets - Flushing Cistern - Geyser - Valves. Types of Pumps - Deep Well Pump - Centrifugal Pump - Reciprocating Pump - Jet Well Pump - Rotary Pump - Water Meter. Causes of Damage to the Pipeline and Plumbing System - Steps for Repair - defects commonly encountered in the functioning of taps and faucets, its causes and remedial measures - The defects commonly encountered during the functioning of stopcock, its causes and remedial measures - The commonly encountered defects during the operation of gate valves, their causes and remedial measures. Types of water purifiers - Reverse Osmosis (RO) water purifiers - Ultra Filter water purifiers - Ultraviolet (UV) Water Purifiers - Gravity Based water purifiers - Activated Carbon water purifiers - Guidelines for Installation of Water Purifier - Identify the Fault - Common problems and their solutions.	5

Ex.No	Name of the Experiment	
1	Install the water supply system as shown in the layout(shower with hot and cold water supply) and prepare the bill of material with specifications.	3
2	Install the drainage system as shown in the layout and prepare the bill of material with specifications.	3
3	Install the given pump for the water supply to storage. Prepare the list of components with specifications.	3
4	Install the Water Purifier and mount the filter. Demonstrate how to replace the damaged components, membrane, filter, valve and water tank.	3

EP232460	**Basic Engineering Practices**	L	T	P	C
Practicum		1	0	2	2

THEORY	
Basic Concept of Electricity - Types of electricity - Voltage - Current - Classification of current - Resistance - Electric power - Power factor - Basic Electric Circuit - Series Circuit - Parallel Circuit - Ohm's Law - Kirchhoff's Law - Power - Energy - Tools and Equipment - Importance of Earthing System - Types of Earthing - Pipe Earthing - Plate Earthing - Lightning - Lightning Arrester - Wiring materials - Insulating Materials - Wiring Accessories - Miniature Circuit Breaker (MCB) - Conduit Wiring - Concealed Wiring - Colour Code - Distribution Board - Electrical Hazard - Fire Extinguisher - First Aid for Electrical Emergencies - Electrical Rescue Techniques. Different Types of CCTV Cameras - Components Needed for CCTV Camera Installation - IP Camera Installation - Security Cameras - Best Locations for Indoor and Outdoor Camera - Installing Network Video Recorders (NVR) for CCTV Systems - Configuring and Testing the CCTV Systems - Maintenance and Troubleshooting of CCTV Camera Systems - Tips for Mounting Cameras Safely. Fire Alarm System Components - Alarm Signaling Systems - Automatic Alarm-Initiating Devices - Manually Actuated Alarm-Initiating Devices - Inspection and Testing / Smoke Detector using Arduino and Smoke Sensor: Components used - Arduino UNO development board - 16×2 LCD - Smoke Sensor - Breadboard - Connecting wires. - Fire alarm - Installation procedure.	6

Ex.No	Name of the Experiment	
5	Connect the single phase power supply for domestic applications as per the circuit diagram. List the bill of materials with specifications.	3
6	Prepare an earth bit and erect the earth electrode / plate. Mention the importance of Earthing and Lightning arrester.	3
7	Install a CCTV camera and configure. Mention the list of components.	3
8	Install the Smoke Detector Alarm / Fire alarm system as per the circuit. (Electrical / IoT based)	3
Assessment Test		10
TOTAL HOURS		**45**

EP232460	**Basic Engineering Practices**	L	T	P	C
Practicum		1	0	2	2

Suggested List of Student Activity

- Study the existing water supply / drainage system / water recycling plant and prepare the report.
- Study the existing water treatment plant and prepare the report.
- Study the existing CCTV system and prepare the report.
- Study the existing fire-fighting system and prepare the report.

Note: Four students can be grouped as a batch to prepare and submit the activity report. Each batch should submit any two reports from the above activity. The report should have the layout of the system, bill of materials with specifications and important common troubles/errors and rectification procedure.

References

- Multi Skill Technician (Electrical) QP Code: ELE/Q3115.
- Plumber Practical (I Year) - Neelkanth, English NSQF Level - 3 ITI Book.
- Plumber Theory - Manish Sharma
- Plumber Trade Practical NIMI, Chennai.
- Craftsmen Training Scheme (CTS) NSQF Level-3 Central Staff Training and Research Institute, Kolkata.
- IoT Based Smart Home Automation and Energy Management.
- Multi Skill Technician (Electrical) ELE/Q3109 v1.0.
- Jal Vitaran Sanchaalak (Water Distribution Operator) (Multi - Skill) PSC/Q0122.
- Selection, Installation and Maintenance of First-Aid Fire Extinguishers — Code of Practice (Third Revision)
- CCTV Camera Equipment Installation, Service & Maintenance.
- CCTV Camera installation Book Mr.Prabhu, Prabhu and Manikanda Prabhu

EP232460	**Basic Engineering Practices**	L	T	P	C
Practicum		1	0	2	2

- CCTV Surveillance: A CCTV security system training book Kindle Edition by M. J. Ansari.
- Selection, Installation and Maintenance of Control and indicating equipment for fire detection and alarm system - Code of practice.

Web-based/Online Resources

- Major Water Supply Schemes | TWAD (tn.gov.in)
- Deposit Works | TWAD (tn.gov.in)
- Rural Water Supply Schemes | TWAD (tn.gov.in)
- Urban Water Supply Schemes | TWAD (tn.gov.in)
- Under Ground Sewerage Schemes | TWAD (tn.gov.in)
- https://youtu.be/OTI9iSGIObU
- https://youtu.be/FBu_DU-hK04
- https://youtu.be/xNrZ1uZS8uU
- https://youtu.be/Hyjr44BcazA
- https://youtu.be/JAiwJP7l3ko
- https://youtu.be/kDg-0DbVsxQ
- https://youtu.be/2bCLDM74F2k
- https://youtu.be/obkUNBH1xnY
- https://youtu.be/USajjGYjUH4
- https://youtu.be/UrWgV1F7JFs
- https://youtu.be/Y8duhoCdDz4
- https://youtu.be/GUmI_lH9cAc
- https://youtu.be/JWXh-WwqlwI

Additional Instructions

- For the record of work done for practical exercises, a notebook or printed manual may be used. In this, the student should draw a diagram, and mention the readings/observations, calculations and result manually. The same has to be submitted for the end-semester examination on the first attempt.

- The proper safety procedure and norms should be followed with proper uniform (Khaki pants & half-hand shirt) with safety shoes during the practices.

EP232460	**Basic Engineering Practices**	L	T	P	C
Practical		1	0	2	2

- All the exercises should be completed before the Board Practical Examinations. Students will be permitted to select any one exercise by lot or the question paper provided by the DOTE.

Allocation of Marks for End Semester Practical and Model Practical Examination

Part	Description	Marks
A	Layout / Circuit	10
B	List of Tools / Equipments and Materials	10
C	Procedure / Observation / Installation	30
D	Finish / Completion	20
E	Written test (MCQ question) *	20
F	Viva voce	10
TOTAL MARKS		**100**

*Written Test (MCQ): Twenty questions (one mark each) shall be asked from the Theory Portions.

Sample diagram / Layout for Practical Exercises.

The following diagrams are suggestions for the practical exercise not limited to this. The practical exercises should have minimum practices to learn and meet the course outcome.

Exercise 1 – Water Supply System
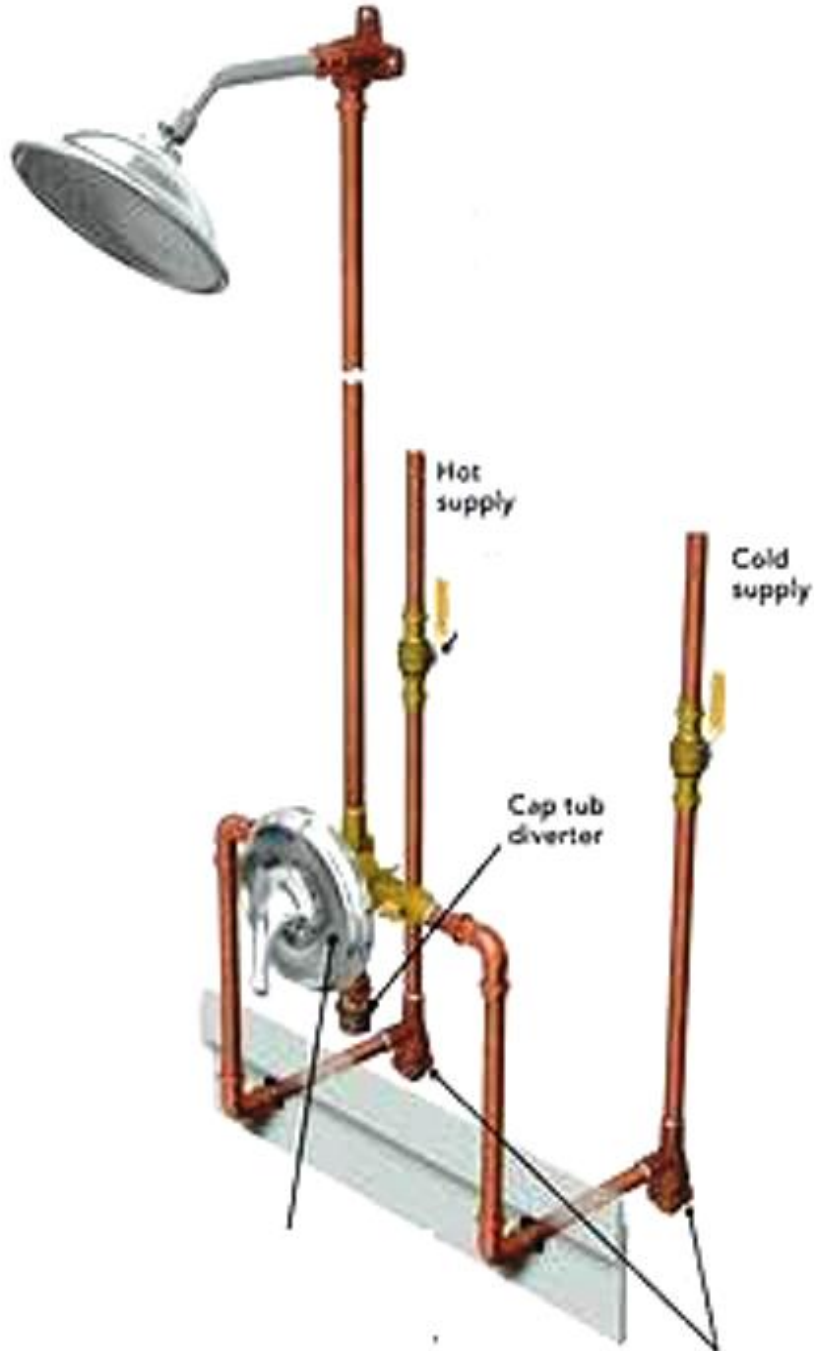
Hot supply

Cold supply

Cap tub diverter
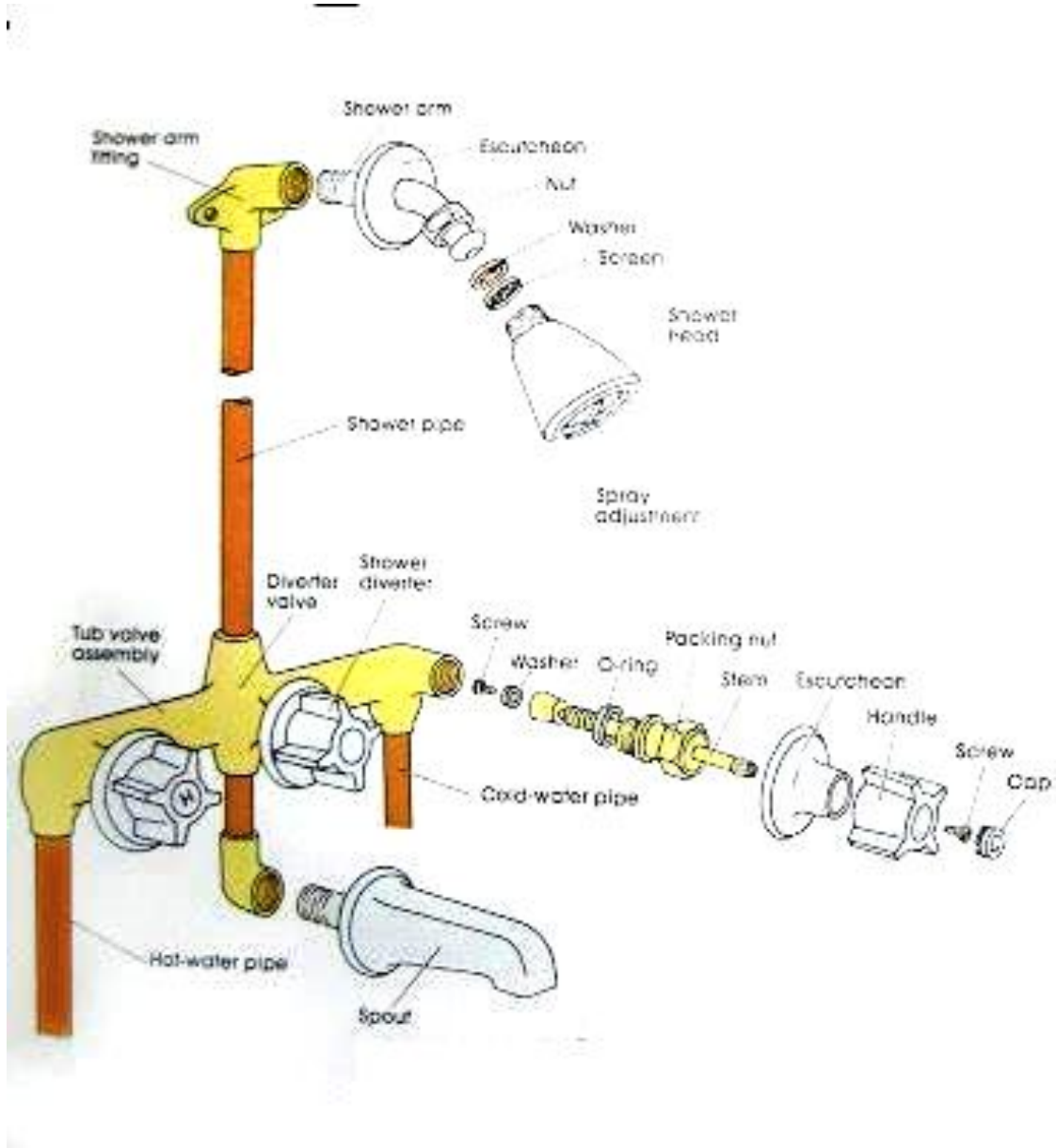
Exercise 2 – Drainage System
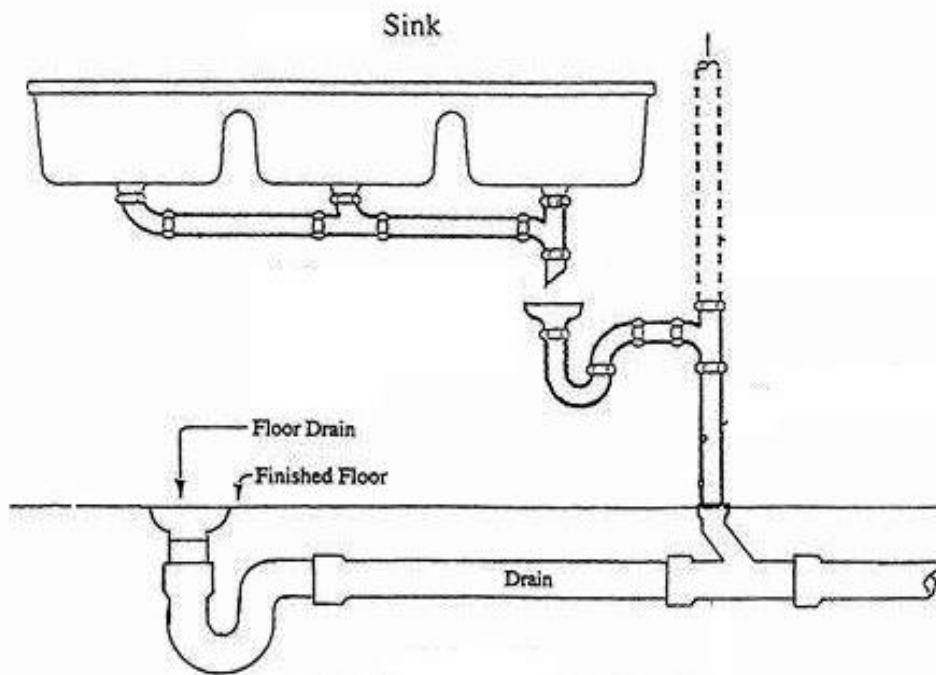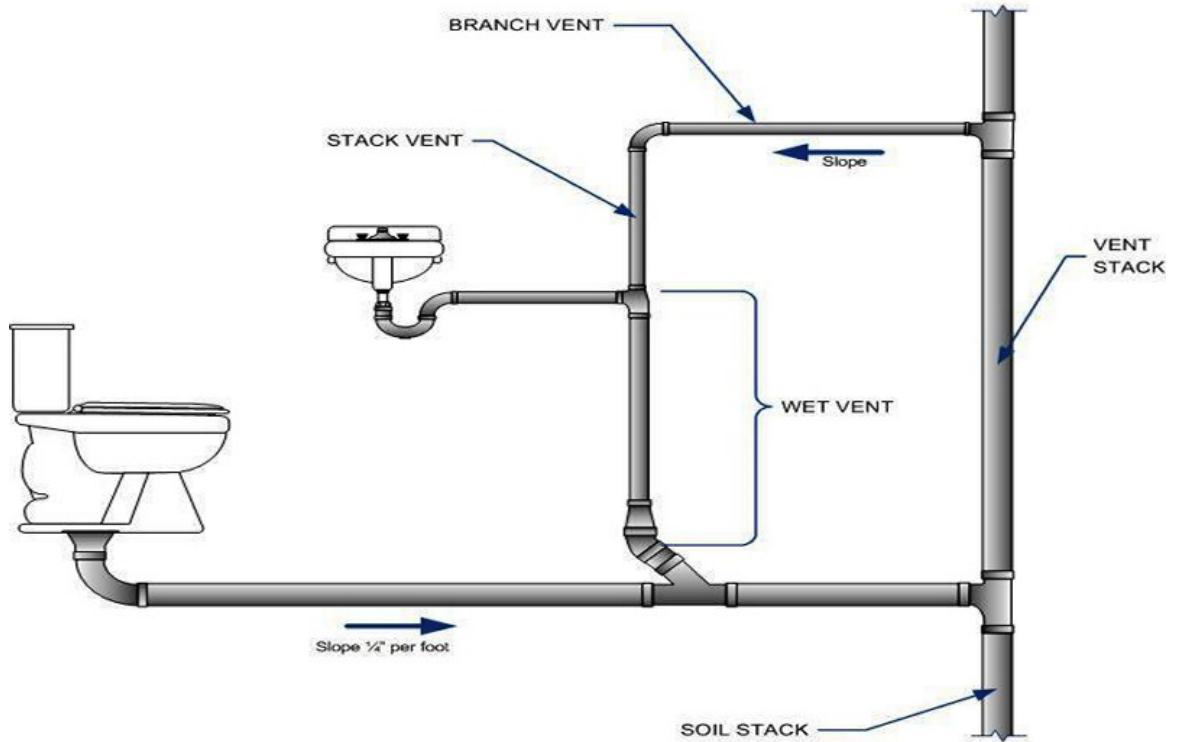
Exercise 3: Water pump Installation
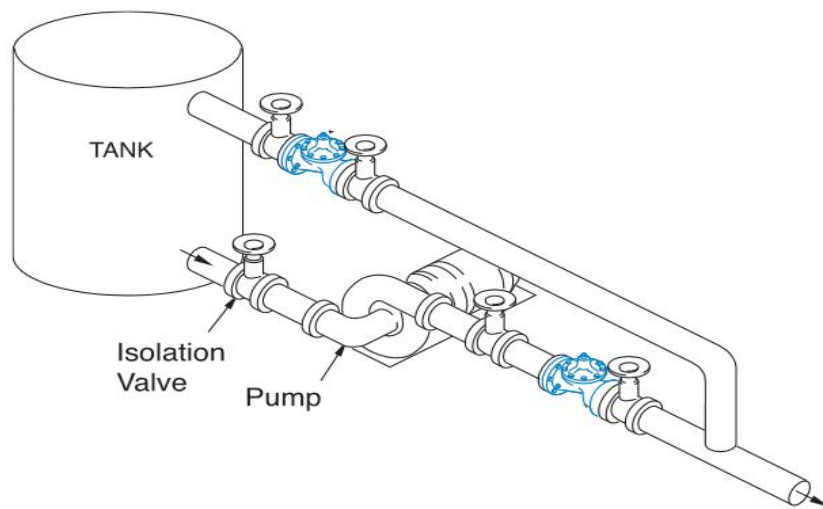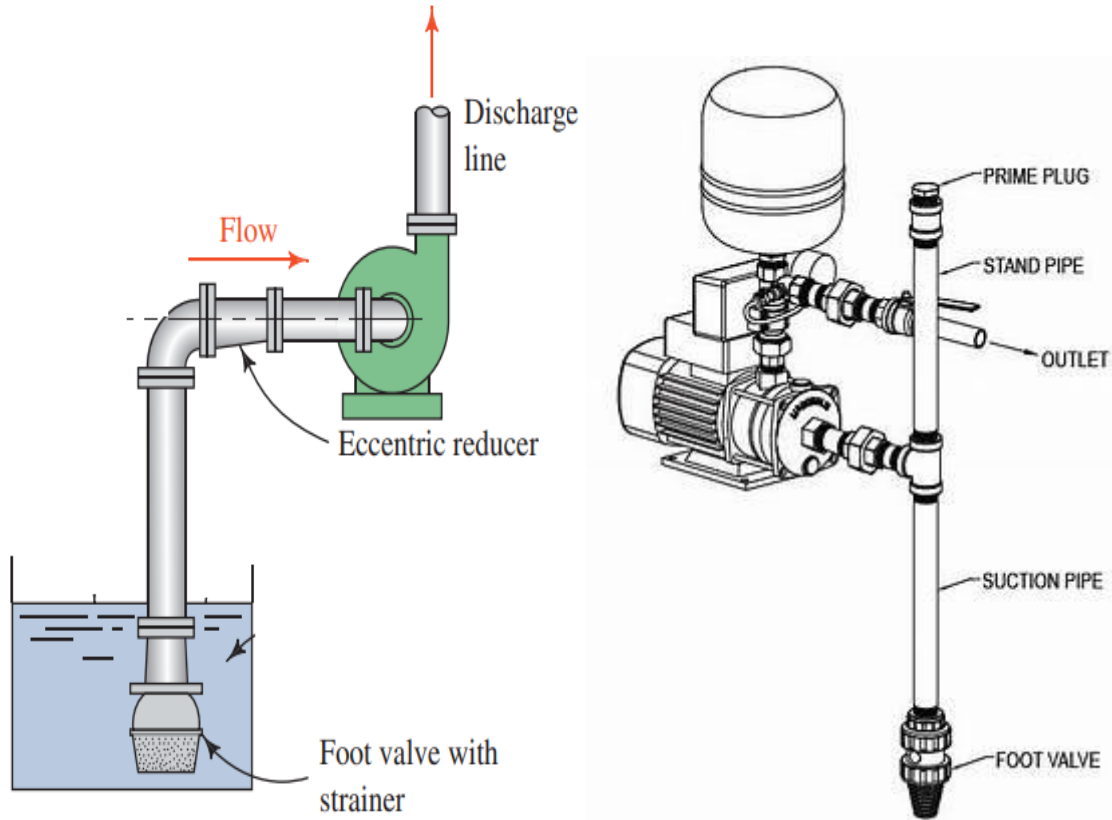
Exercise 5: Electrical Power Supply for Domestic Applications
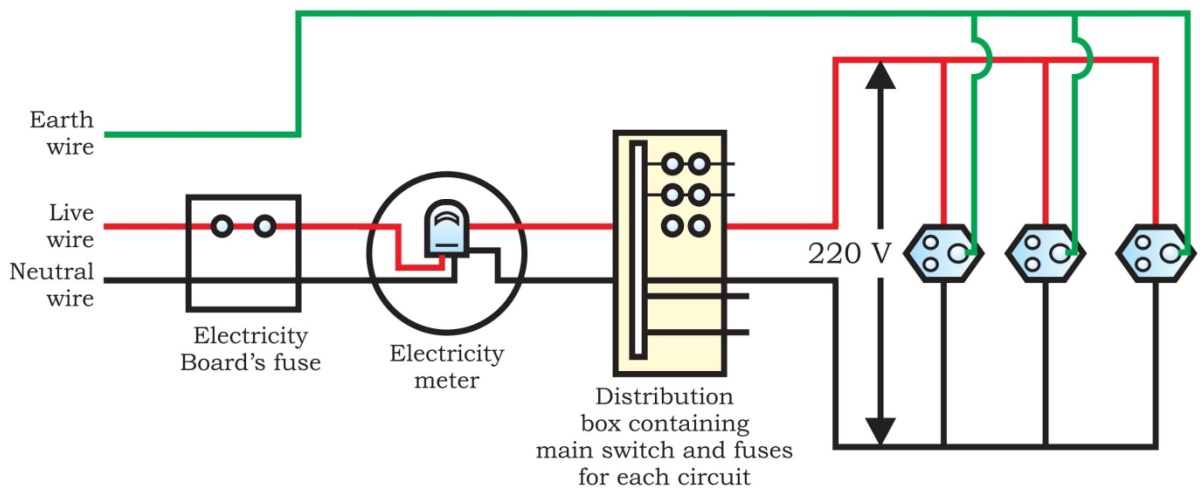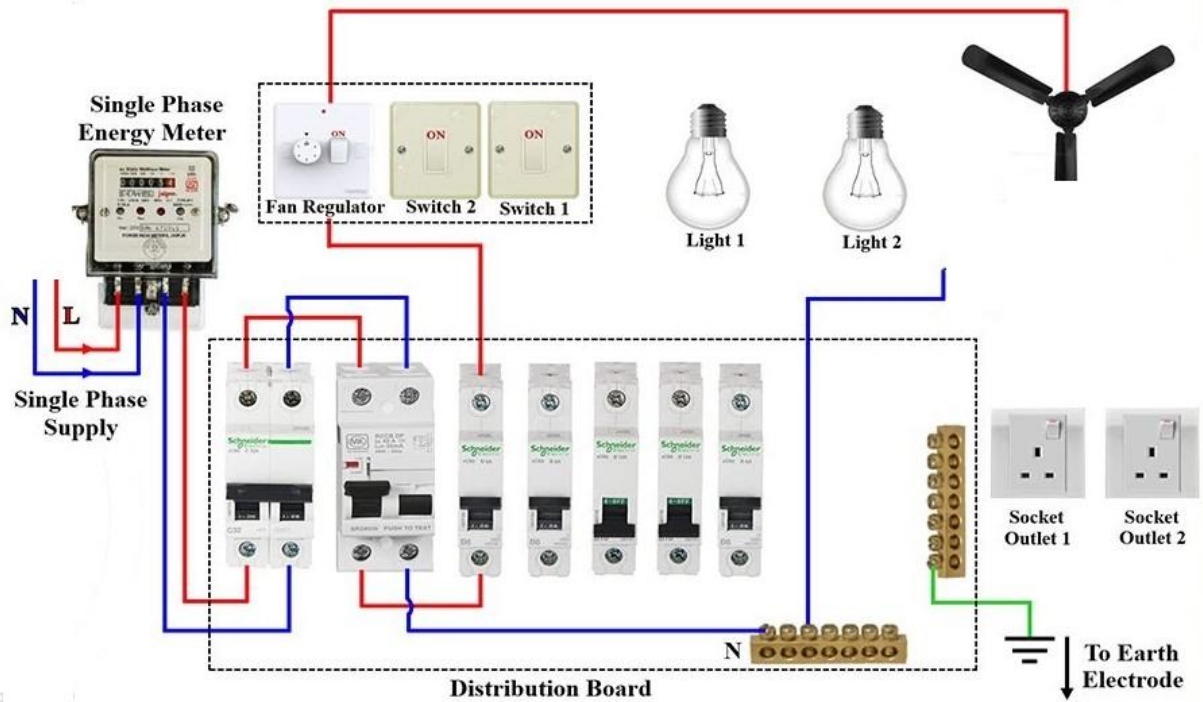
FS232120	**Basics of Fire Technology and Safety**	L	T	P	C
Theory		3	0	0	3

Introduction:

All students must possess a basic understanding of fire technology and safety before going into complex applications, they have to completely understand the components of the fire technology and safety includesbasic physics and chemistry related to fire, anatomy of fire, classification of fire and extinguishers, hazard, risk and accident and safety concept. A thorough understanding of the concepts is an essential one to excel in this course.

Course Objectives:

The objective of this course is to enable the student to

- To Understanding of the basic physics and chemistry related to fire.
- To enable the students to learn about the anatomy of fire.
- To enable students to have knowledge on classification of fire and extinguishers.
- To have knowledge about sources of information for hazard, risk and accident.
- To familiarize students with evaluation of safety concept.

Course Outcomes:

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

CO1: Understand the basic physics and chemistry related to fire.

CO2: Enable the students to learn about the anatomy of fire.

CO3: Illustrate the classification of fire and extinguishers.

CO4: Acquire basic knowledge about hazard, risk and accident.

CO5: Understand the basics of safety concept.

Pre-requisites:

Knowledge of basic Science

CO/PO Mapping:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	-	2	-	1	-	-
CO2	3	-	2	-	1	-	-
CO3	3	-	2	-	1	-	-
CO4	3	-	2	-	1	-	-
CO5	3	-	2	-	1	-	-

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- **Engage and Motivate:** Instructors should actively engage students to boost their learning confidence.
- **Real-World Relevance:** Incorporate relatable, real-life examples and engineering applications to help students understand and appreciate course concepts.
- **Interactive Learning:** Utilize demonstrations and plan interactive student activities for an engaging learning experience.
- **Application-Based Learning:** Employ a theory-demonstrate-practice-activity strategy throughout the course to ensure outcome-driven learning and employability.
- **Simulation and Real-World Practice:** Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real-world scenarios when possible.
- **Encourage Critical Analysis:** Foster an environment where students can honestly assess experiment outcomes and analyse potential sources of error in case of discrepancies

Assessment Methodology:

	ContinuousAssessment(40marks)				EndSemester Examination(60marks)
	CA1	CA2	CA3	CA4	
Mode	Written UnitI&II	WrittenU nitIII&IV	WrittenM odelExam	Quiz	WrittenExaminat ion
Duration	2	2	3	2	3hours
ExamMarks	60	60	100	100	100
Convertedto	20	20	10	10	60

Marks	20	20	60

Note:

- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for 20 Marks.
- CA3 Model examination should be conducted as per the question pattern.
- CA4 Online quiz examination (MCQ) should be conducted covering the complete syllabus.

FS232120	**Basics of Fire Technology and Safety**	L	T	P	C
Theory		3	0	0	3

UNIT 1	Basic Physics and Chemistry related to Fire	
Definition of matter and energy, physical properties of matter - density, specific gravity, relative density, vapor density, melting and boiling point, flammable limits, latent heat, effects of density on behaviour of gases, basics of oxidizing and reducing agents, acids. Flammable liquids- classification and types of tanks, dust and explosion, liquid and gas fires, LPG. UCVE, BLEVE, slope over and boil over, gas laws, P-V-T relation for perfect gas.		9
UNIT 2	Anatomy of Fire	
Definition of Combustion, Elements of Combustion, Products of Combustion, Heat of reaction and calorific value, Flash point, Fire point, Ignition temperature and spontaneous combustion. Fire Triangle, Tetrahedron and Pyramid, source of heat (chemical, mechanical. Electrical & Nuclear), Classification of fire and methods of fire extinguishment, Oxygen and its effects on combustion, Mode of heat transfer (Conduction, Convection & Radiation).		9
UNIT 3	Classification of Fire and Extinguishers	
Classification of fire and types of extinguishers, maintenance, method of operation. Techniques of fire extinction, smothering cooling and starvation. Halon and its detrimental effect on environment, alternatives of halon. Types of fire extinguishing agents, rating system for portable fire extinguishers, limitation of fire extinguishers, inspection requirement.		9
UNIT 4	Hazard, Risk and Accident	
Hazard and risk, causes, identification, evaluation & control. HAZOP+HIRA sources for information on hazard evaluation. Risk and risk analysis.		9

Theories and principles of accident causation, the effect of accident, cost analysis and accident prevention, accident prevention methods		
UNIT 5	Safety Concept	
Introduction to safety, goals, need, history of safety, importance of industrial safety, safety management, safety policy, safety committee. Responsibility of management, safety officers' duties & responsibilities, safety targets, objectives, standards, practices and performances.		9
Total Hours		45

Suggested List of Students Activity:

- Presentation/Seminars by students on any recent technological developments based on the course.
- Periodic class quizzes conducted on a weekly/fortnightly based on the course.
- Mini project that shall be an extension of any practical lab exercise to real-world application.

Text Books:

1. Das A K. Principles of Fire Safety Engineering: Understanding Fire and Fire Protection. Prentice Hall India Learning Private Limited
2. William E Clark. Firefighting principles and practices. Fire Engineering Books Videos.
3. Gupta R.S. Hand Book of Fire Technology.

References:

1. John A. Purkiss. Fire Safety Engineering Design of Structures. CRC Press.

2. Prof. Sunil S.Rao. Electrical Safety, Fire Safety Engineering and Safety Management. Khanna Publishers.

Web-based/Online Resources:

1. Dr. B. Bhattacharjee. Fire Protection, Services and Maintenance Management of Building, IIT Delhi. https://nptel.ac.in/courses/105102176

2.Prof.JhareswarMaiti. Industrial Safety Engineering, IIT Kharagpur. https://nptel.ac.in/courses/110105094

GT232460	**Apparel Machinery Engineering Practices**	L	T	P	C
Practicum		1	0	2	2

Introduction

The basic idea about the transmission of motion and power, A C motors limit switch, sensors and different types of meters will be taught to the students. Basics of Mechanical Engineering, Electrical Engineering and Electronics Engineering will enhance the student technical skills.

Course Objectives

The objective of this course is to enable the student to

- have knowledge of Drives
- know about clutches, brakes, belts, chains and gears
- have knowledge of fundamentals of electrical engineering
- understand the fundamental of electrical motors and Generators
- know about measuring instruments, sensors, and limit switch.

Course Outcomes

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

CO1: Belt Drives
CO2: Gears and Foots
CO3: Clutch, Bearing, Brake and cam
CO4: Measuring instruments and Sensors
CO5: Motors in their relevant technological fields

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	2	1	3
CO2	3	2	2	2	1	2	3
CO3	3	2	2	1	2	1	3
CO4	3	2	2	2	1	2	3
CO5	3	2	2	1	2	1	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

GT232460	**Apparel Machinery Engineering Practices**	L	T	P	C
Practicum		1	0	2	2

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.

- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples.

- The demonstration can make the subject exciting and foster in the students a scientific mindset.

- Student activities should be planned on all the topics.

- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome and employability based.

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)	
	CA1	CA2	CA3	CA4		
Mode	Written Test	Written Test	Practical	Record	Practical Examination	
Duration	2 hours	2 hours	3 hours	***	3 hours	
Exam Marks	50	50	100	100	Experiment	50
					Procedure	20
					Viva Voce	10
					Written Examination (10 x 2)	20
					Total	100
Converted to	10	10	10	10	60	
Marks	40				60	

GT232460	Apparel Machinery Engineering Practices	L	T	P	C
Practicum		1	0	2	2

Unit I	**BELT DRIVES**	
Introduction – Drives, Types of drives – Belt, Rope, Chain, Flat belt, V Belt, Toothed belt and tape – Applications of chain and sprockets.		9
Ex. 1	Study of rope belt drives used in sewing machine	
Ex. 2	Study of V Belt used in Industrial sewing machine	
Ex. 3	Study of toothed belt used in machineries.	
Unit II	**GEARS AND FOOTS**	
Types of gears – Spur, Rack and pinion, helical, bevel, worm and worm wheel; Gear trains –simple gear train, compound gear, Epicyclical gear train; Types of pressure foots used in sewing machines.		9
Ex. 4	Study of spur gears used in machines.	
Ex. 5	Study of rack and pinion gears used in machines.	
Ex. 6	Study of presser foots used in sewing machines.	
Unit III	**CLUTCH, BEARING, BRAKE AND CAM**	
Clutch: Types of clutches – mechanical lockup clutch and frictional clutch, applications. **Bearing:** Types of bearing – Bush bearing, ball bearing and roller bearing. **Cam:** Types and applications. **Brake:** Types and applications.		9
Ex. 7	Study of clutches used in sewing machine.	
Ex. 8	Study of bearing used in sewing machines.	
Ex. 9	Study of cams and tappet used in sewing machines.	

GT232460	Apparel Machinery Engineering Practices	L	T	P	C
Practicum		1	0	2	2

Unit IV	**MEASURING INSTRUMENTS AND SENSORS**	
Introduction – functions of sensors – Types of sensors – applications of sensors – Definition of temperature, pressure, infrared sensor – Limit switch, photo sensors and its application.		9
Ex. 10	Study of limit switch used in machines.	
Ex. 11	Study of sensors switch used in machines.	
Unit V	**MOTORS**	
Construction of electrical motors and generators – Principles of working of single, two and three phase motors – necessity of starter. Induction motor and its types. Servo motor and its application.		9
Ex. 12	Study of direct drive servo motors used in sewing machines.	
TOTAL HOURS		**45**

Suggested List of Student Activities

- Presentation/Seminars by students on any successful Management

- Periodic class quizzes conducted on a weekly/ fortnightly basis to reinforce the basic of Management concepts

- Instructed to the students will be interacted with aluminous of the Department to know the current scenario of the textile market

- The students should visit to the nearest industry, to acquire the practical knowledge in their interested area topics.

- Teacher / Lecturer should be motivated to their students to make small scale entrepreneur.

- Students have to develop the good relationship with Core Company

- The students have to read the latest research journal and upgrade their knowledge and to create the innovative ideas.

References

- Thermal Engineering R.Rudramoorthy Tata Megraw Hills Educational pvt Ltd. New delhi 2010
- Theory of machines, PL Ballaney, Kanna Pub, Delhi – 1980
- Text book of machine design, R S Khurmi & J K Gupta, Eurasia Pub, Delhi - 1998
- A Text Book on Hydraulics,Fluid Mechanics and Hydraulic machines R.S.Khurmi S.Chand& Co, Ram nager New Delhi-110055 1981
- Thermal Engineering R.Rudramoorthy Tata Megraw Hills Educational pvt Ltd. New delhi 2010
- A Text Book on Hydraulics,Fluid Mechanics and Hydraulic machines R.S.Khurmi S.Chand& Co, Ram nager New Delhi-110055 1981
- Mechanical Technology V.Sivarajan V.K.Publishers
- Welding and Welding Technology Richard. L. Little Tata Megraw Hills Pub.co.Ltd., 2005
- A Text Book of Electrical Technology B.L.Theraja Publication Division,Niraja, New Delhi 2005
- Electronic Principles Malvino Tata McGraw Hill Publication 2010 7 Electrical Machines Smarajit Ghosh Person Education (Singapore) P.Ltd., Indian Branch - 482, FIE. Patparaganj .Delhi-110 092 2005
- Vol. 1&2, The Textile Institute, Manchester, 1977.
- Ashok Kumar L and SenthilKumar M, Automation in Textile Machinery Instrumentation and Control System Design Principles, CRC press, 2018.

IC232120	**Basics of Electronics and Instrumentation**	L	T	P	C
Theory		4	0	0	4

Introduction

Any student of diploma in instrumentation and control engineering will be required to work with various instrumentation devices when he/she reaches the industry. As most of the devices are electrical and electronics based, the student is required to develop a basic understanding of the concepts and related terms of electricity, electronics, and instrumentation, which is the backdrop against which this course has been designed. An Instrumentation Engineer must be familiar with basics of measurements, measuring units, and calibration of instruments, which is also dealt in this subject

Course Objectives

The objective of this course is to enable the students to

- Identify the different types of Passive components
- Identify the different types of Active components
- Explain the working of passive and active components
- Define Instrumentation and identify the instrument
- Explain the static and Dynamic characteristics of Instrument
- Explain the calibration and how to calibrate the ammeter, voltmeter and Thermometer
- To identify the different types of error occurring during measurement
- Identify the different types of switches and relays and use it in the circuit

Course Outcomes

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

CO1: To identify the different types of passive and active components
CO2: Explain the construction, working and characteristics of Diode and Transistor.
CO3: To learn the basic terms and units in Measurements
CO4: To use different types of Switches and relays in different applications
CO5: To calibrate and test different types of Instruments

Pre-requisites

High School Physics – Electrical and Electronics Fundamentals

IC232120	**Basics of Electronics and Instrumentation**	L	T	P	C
Theory		4	0	0	4

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	-	2	2	-	-	-
CO2	3	-	2	2	-	-	-
CO3	3	-	2	3	-	-	-
CO4	3	-	2	3	-	-	-
CO5	3	-	3	3	-	-	-

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers have to use different teaching methods to stimulate the interest of students in learning.
- To help students to learn different types of electrical, electronic components, switches and relays. Teachers should use PPT presentation of image and symbol of components and to show video of application of the components. Also, should explain examples from daily life, realistic situations, and real-world engineering and technological applications.
- Students may be shown all the electrical and electronic components, switches and relays in the lab. The demonstration can make the subject exciting and foster in the students a scientific mind set. Student activities should be planned on all the topics.
- Demonstration method may be used with step-by-step procedure to test the various components using meters.
- Teachers are advised to follow inductive strategy to help the students to discover the working principle of various components, switches and relays.
- Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where could be the source of error, if any.

IC232120	**Basics of Electronics and Instrumentation**	L	T	P	C
Theory		4	0	0	4

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit 1 & 2)	Written Test (Unit 3 & 4)	Quiz/MCQ	Model Examination	Written Examination
Duration	2 hours				3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Final Marks	20		20		60

Note:

- CA1 and CA2: Assessment tests should be conducted. Best of one will be considered for the internal assessment of 20 Marks.
- CA3: Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 Marks for the internal assessment.
- CA4: Model examination should be conducted as per the end semester question pattern. The marks should be converted to 10 Marks for the internal assessment.

IC232120	**Basics of Electronics and Instrumentation**	L	T	P	C
Theory		4	0	0	4

Unit I	PASSIVE COMPONENTS	
Resistor - symbol - Equation - color coding - Fixed Resistor - types – carbon composition - Wire wound – thick film - thin film - Variable Resistor - types – potentiometer - rheostat - trimmer.		4
Inductor - symbol and unit - working - self and mutual inductance – Reactance - types of inductors- air core - ferrite core - toroidal core - applications.		4
Capacitor - symbol and unit - working of capacitor- identification of value of capacitor- Reactance - types of capacitors – fixed - polarized – electrolytic - non polarized – ceramic - film - mica - variable capacitor – tuning - trimmer - applications.		4
Unit II	**ACTIVE COMPONENTS**	
Semiconductor - classification - intrinsic – doping - extrinsic - P type and N type semiconductor - PN junction diode - Forward and Reverse bias – VI characteristic – Zener Diode - working - VI Characteristic - Photo Diode - Light Emitting Diode - LASER Diode.		6
Transistor – symbol- Types – PNP transistor- NPN Transistor - Construction and working- CB – CE - CC configuration – Characteristics – comparison-Phototransistor – working principle		6
Unit III	**SWITCHES AND RELAYS**	
Switch - Characteristic of switch - Types - Mechanical switches – Instrumentation switches – Electronic switches.		2
Mechanical Switches – symbol - Working – SPST – SPDT – DPST – DPDT pushbutton switch - Toggle switch		3
Instrumentation Switches - Limit Switch - Float switch – Flow switch - Pressure switch - Temperature switch - Joystick switch -Rotary switch		2
Electronic Switches - Diode as switch - Transistor as Switch – working.		2
Relay - Construction and Working - symbol - types - SPST - SPDT - DPST - DPDT relays - Applications.		3

IC232120	**Basics of Electronics and Instrumentation**	L	T	P	C
Theory		4	0	0	4

Unit IV	BASICS OF INSTRUMENTATION	
Instrumentation – definition - evolution - scope in industries - generalized Instrumentation systems block diagram representation - Measuring Instruments - Static and Dynamic characteristics of measurement systems.		6
Pressure – definition - absolute and gauge pressure – units – conversion - temperature – units – conversion - flow rate - units.		6
Unit V	CALIBRATION AND ERROR	
Calibration – definition - need for calibration – standards - International Standards - Primary – Secondary - Working Standards - Calibration of Ammeter - Calibration of Voltmeter - Calibration of Thermometer.		6
Errors in Measurements – types - limiting error - gross error - systematic error- instrumental error - environmental error - observational error - simple problems.		6
TOTAL HOURS		60

Suggested List of Students Activity (Ungraded)

- Check the web portal for Image and video of different types of Electrical, Electronic Components, Switches and Relays.
- Periodical quizzes should be conducted on a weekly/fortnightly basis to reinforce the symbols, units, image of different types of components, and working principles
- Students might be asked to find the various components in real life equipment, circuits.
- Students might be asked to see the demonstration video of various electrical electronics components.
- Students might work the series and parallel connection, working of components using simulation software in the virtual laboratory web portal.

Reference

- V K Metha, Rohit Metha, Principles of Electronics , S Chand Publications
- B L Theraja, Basic Electronics - Solid State, S Chand and Company Limited
- A.K.Sawhney, Electrical and Electronic Measurements and Instrumentation, Dhanpat rai & sons, Educational and technical publishers, Delhi

IC232120	**Basics of Electronics and Instrumentation**	L	T	P	C
Theory		4	0	0	4

Web Reference QR Codes

Sl.No	Topic	QR Code
1.	Resistors	
2.	Inductors	
3.	Capacitors	
4.	Switches	
5.	Relay	
6.	Diode	
7.	Transistors	
8.	Diode Animation Video	
9.	Transistor Animation Video	

IC232260	**Basics of Electronics and Instrumentation Practical**	L	T	P	C
Practical		0	0	2	1

Rationale

This subject helps to reinforce their understanding of electronic principles and instrumentation techniques. This subject allows students to develop important skills such as circuit construction, testing, and the use of various instruments. These skills are essential for a career in Electronics and instrumentation Engineering. Practical exercises are essential for teaching students how to calibrate and use various measuring instruments. Understanding how to accurately measure and record data is crucial in many fields, including research and industry.

Course Objectives

The objective of this course is to enable the student

1. to find the value of resistor, inductor and capacitor using multimeter
2. to construct the circuit to learn the behavior of capacitor and inductor
3. to use the diode and transistor as switch
4. to examine the static characteristics of Instrument and to perform statistical analysis on measured readings.
5. to calibrate the given ammeter, voltmeter and thermometer

Course Outcomes

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

CO1: Use the resistor, inductor and capacitor in the required place in the circuit
CO2: To use the diode and transistor in the circuit as switch
CO3: To construct the simple circuit in bread board and test
CO4: To use measuring instruments such as ammeter and voltmeter
CO5: To calibrate the ammeter, voltmeter and thermometer

Pre-requisites

Nil

IC232260	**Basics of Electronics and Instrumentation Practical**	L	T	P	C
Practical		0	0	2	1

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	3	3	-	-	-
CO2	3	3	3	3	-	-	-
CO3	3	3	3	3	-	-	-
CO4	3	3	3	3	-	-	-
CO5	3	3	3	3	-	-	-

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Practical Test (Ex: 1 to 5)	Practical Test (Ex: 6 to 10)	Model Examination	Record Work	Practical Examination
Duration	2 hours			-	3 hours
Exam Marks	20	20	20	20	100
Converted to	10	10	10	10	60
Marks	40				60

IC232260	**Basics of Electronics and Instrumentation Practical**	L	T	P	C
Practical		0	0	2	1

Ex.No	Name of the Exercise	Hours
1	• Identify the value of given 5 different value of resistors using color code • Find the value of given 5 resistors using digital multimeter • Find the value of a resistor by constructing circuit with DC source, ammeter and voltmeter using Ohm's Law	2
2	• Identify the value of given capacitor (ceramic and electrolytic) • Construct a simple circuit with DC source, resistor, LED, 1000µF capacitor and voltmeter to examine the charging and discharging of capacitor. Observe the voltage building up.	2
3	• Identify the value of given Inductor • Construct a simple circuit with DC source, resistor, LED, Inductor and ammeter. Observe the current building up.	2
4	From the voltage and current rating of given LED, find the value of resistor required using Ohm's law and construct a simple circuit using DC source, resistor with LED and observe LED is glowing.	2
5	Construct a simple circuit using diode, resistor and LED to use the diode as switch. Observe LED glowing when forward bias and LED OFF when reverse biased.	2
6	Construct a simple circuit using transistor and relay to switch ON and OFF a 230V bulb through SPDT Relay	4
7	Conduct experiment to measure the voltage across a resistor using moving coil voltmeter in simple DC series circuit having 10V DC and two 1KΩ resistors in series. Observe minimum 6 readings by each individual of a batch. Perform statistical analysis with observed readings to find Arithmetic mean, deviation, standard deviation and variance.	4
8	Conduct experiment to measure the voltage across a resistor using moving coil voltmeter in a simple DC series circuit having 10V DC and two 1KΩ resistors in series. Observe the following static characteristics of the voltmeter: range, span, Accuracy, Precision and linearity.	4
9	Construct a simple circuit to calibrate the given ammeter and voltmeter	4
10	Calibrate the given thermometer	4
	TOTAL HOURS	**30**

IC232260	**Basics of Electronics and Instrumentation Practical**	L	T	P	C
Practical		0	0	2	1

Allocation of Marks

Part	Description	Marks
A	Circuit Construction / Experimental Setup	10
B	Testing / Experimenting	40
C	Tables / Graph	35
D	Observing Result	10
E	Viva-voce	5
TOTAL MARKS		**100**

Equipments Required

Sl. No	Item Description	Range	Quantity Required
1.	¼ Watt Resistors	100Ω, 1K, 2.2K, 3.3K, 4.7K, 10K	Each 10 Numbers
2.	Digital Multimeter	-	5
3.	Regulated Power Supply	(0-30V)	5
4	Ammeter	(0-10mA), (0-25mA), (0-50mA)	2 in each range
5	Voltmeter	(0-10V), (0-25V), (0-50V)	2 in each range
6	Ceramic and Electrolytic Capacitors	1 µF, 10 µF, 100 µF, 1000 µF, 22 µF	10 in each range
7.	Inductors		
8	LED	Forward Voltage: 1.8 to 5V (any value) Current: 20mA to 75mA (any value)	10
9	Diode	1N4007 / 1N4001	10
10	Transistor	BC107 / BC548	10
11	Relay	SPDT	5
12	230V Bulb with Holder	-	2
13	Thermometer	-	4

LT232120	INTRODUCTION TO LEATHER AND	L	T	P	C
Theory	LEATHER PRODUCTS	4	0	0	4

Introduction

The objective of this paper is to equip the student with the fundamental knowledge aboutleather and Leather products manufacture. This paper will help the student to know about the various unit operations involved in Leather processing and how to differentiate the leather with non leathermaterials. This paper will give a clear idea about various leather products and their Export market contribution. Also this paper will give a clear view of Indian Leather and Leather products industry.

Course Objectives

Theobjectiveofthiscourseistoenablethestudentto

1. Acquire knowledge in Live stock potential of Hides/Skins
2. Acquire knowledge in the structure of Hides/Skins.
3. Acquire knowledge in the Light Leathers and Heavy Leathers.
4. Knowledge on Leather Products.
5. Acquire knowledge in the global scenario of Leather and Product Industry.

Course Outcomes

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

CO1: Understand the significance of live-stock population and Defects of Hides and Skins

CO2: Understand the fundamental of Heavy leather and light Leather

CO3: Understand the basic knowledge about the Leather Products.

CO4: Understandtheglobal scenario about the Leather and Leather Products

CO5: Understand the Challenges in Leather industry and HRD developments.

Pre-requisites:

Knowledge of basic Science

Assessment Methodology:

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Unit I & II	Written Unit III & IV	Written Model Exam	Quiz	Written Examination
Duration	2	2	3	2	3 hours
Exam Marks	60	60	100	100	100
Converted to	20	20	10	10	60
Marks	20		20		60

Note:

- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for 20 Marks.
- CA3 Model examination should be conducted as per the question pattern.
- CA4 Online quiz examination (MCQ) should be conducted covering the complete syllabus.

CO/PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3

CO3	3	3	3	3	3	3	3
CO4	3	3	3	3	2	2	2
CO5	3	3	3	3	2	2	2

Legend:3-HighCorrelation,2-MediumCorrelation, 1-LowCorrelation

Instructional Strategy:

- Engage and Motivate: Instructors should actively engage students to boost their learning confidence.
- Real-World Relevance: Incorporate relatable, real-life examples and engineering applications to help students understand and appreciate course concepts.
- Interactive Learning: Utilize demonstrations and plan interactive student activities for an engaging learning experience.
- Application-Based Learning: Employ a theory-demonstrate-practice-activity strategy throughout the course to ensure outcome-driven learning and employability.
- Simulation and Real-World Practice: Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real-world scenarios when possible.
- Encourage Critical Analysis: Foster an environment where students can honestly assess experiment outcomes and analyze potential sources of error in case of discrepancies

LT232120	INTRODUCTION TO LEATHER AND LEATHER PRODUCTS	L	T	P	C
Theory		4	0	0	4

Unit I	Hides and Skins	
Live stock population –Classification & Availability of Hides & Skins -Defects in hides and skins - Flaying of animals –Histological characteristics , Structure &Chemical constituents of Hides and Skins -Assortment and Grading of raw Hides & Skins - cow, buff, goat and sheep		12

Unit II	Heavy Leather and Light Leather	
Introduction to Heavy Leathers-General Properties of Heavy Leathers-Applications of Heavy Leathers-Sports Leather. Introduction to Light Leathers-General Properties of Light Leathers-Various applications of Light Leathers.		12

Unit III	Leather Products	
Introduction to Footwear-Types of Footwear-Various components of footwear. Introduction to Leather Goods-Classification of Leather Goods-Sports goods-Introduction to Leather Garments-Types of Leather Garments-Various parts of Leather Garments.		12

Unit IV	Leather Clusters in India	
Leather Clusters in India-Leather Products Clusters in India-Global Scenario of Leather Sector- Global Scenario of Leather allied Sector-Import and Export strategies of Leather and Leather allied industries-Government policies in promotion of Leather and Leather Products sector.		12

Unit V	HRD in Leather Sector	
Strength and weakness of Indian Leather sector-Challenges in Indian Leather industry-Human Recourse Development in Leather and Leather allied industry-Various Higher Education Institution offers Leather and allied courses in India.		12

Total Hours	60

Reference Books:

1. Theory and Practice of Leather Manufacture by K.T. Sarkar, AjoySorcor, Chennai.

2. Koteswara Rao. C and Olivannan M.S Lecture notes on dyeing and finishing of leathers, Chennai.

3. Introduction to the principles of Leather Manufacture - S.S. Dutta , Indian Leather Technologist Association, Culcutta.

4. Practical aspects of the manufacture of upper Leather - Jyotirmay Dey, Indian Leather Technologist Association, Culcutta.

5. . Manual of Shoe making by R.G. Miller - Clarks Ltd., Publications, 1989.

6. Text Book of Footwear Manufacture by J.H. Thornton - The National Trade Press Ltd., London, 1970.

7. "Know Your Footwear" by B. Venkatappaiah _NICLAI Publications.

8. The Complete Hand Book of Leather Crafting by Jame O. Grarmes - Robert E. Krieger Publishing Co., Malabar Florida.

9. How to sew Leathers Suede by G. Philips W. Schewbke - Macmillan, New York 1979

List of Software/Learning Websites:

1. https://www.youtube.com/watch?v=Cu6wGtT-lSo
2. https://www.youtube.com/watch?v=9vbTCeYwt_g
3. https://www.youtube.com/watch?v=jTg5BSg3VN0
4. https://www.youtube.com/watch?v=EAe6GjDyDFA

MA232431	**Applied Mathematics – I**	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	4	3

Introduction

The knowledge of Mathematics is necessary for a better understanding of all engineering and science subjects. Computer based visual representations such as graphs, animations, and tables of Mathematical ideas will enhance the applicability of Mathematics in engineering domains. This course is designed to give a comprehensive coverage at an introductory level to the topics of Coordinate Geometry, Differential Calculus, Integral Calculus and Statistical Process Control and some of their applications to engineering domains.

Course Objectives

The objective of this course is to enable the students to

- Summarize the properties of families of circles.
- Identify the type of conic represented by a general second-degree equation in two variables.
- Acquire knowledge in the principles of differentiation.
- Summarize the methods of integration and their engineering applications.
- Identify the statistical tools required for the quality control of manufacturing processes.

Course Outcomes

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

CO1: Determine whether two circles with given equations touch internally or externally.
CO2: Compute the vertex, focus, directrix and latus-rectum of parabola and ellipse.
CO3: Calculate limits and derivatives of one variable functions.
CO4: Evaluate definite integrals and indefinite integrals.
CO5: Determine the out-of-control signals in manufacturing processes.

Pre-requisites

High School Mathematics

PH232431	**Applied Mathematics – I**	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	4	3

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	1	1	1	3
CO2	3	3	2	1	1	1	3
CO3	3	3	2	1	1	1	3
CO4	3	3	2	1	1	1	3
CO5	3	3	2	1	1	1	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- Use explicit instruction for developing Math vocabulary and conceptual understanding.
- Use inducto-deductive approach to achieve the desired learning objectives.
- Use open-ended questions to nurture the problem-solving and reasoning skills among students.
- A theory-demonstrate-practice-activity strategy may be used throughout the course to ensure that learning is outcome-based and employability-based.
- Encourage students through illustrated problems and hand-on activities to use visual methods and simulations to solve real problems.

MA232431 **Practicum/ Practical**	**Applied Mathematics – I** (Non-Circuit Branches)	L	T	P	C
		1	0	4	3

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Lab Test (Ex. 1 to 4)	Written Test Units I to III	Lab Test (Ex. 5 to 10)	Practical observation note book (Ex. 1 to 10)	Practical Exam
Duration	2 hours	2 hours	2 hours	***	3 hours
Exam Marks	70	30	70	100	100 (Theory: 30 + Practical: 70)
Converted to	10	10	10	10	60
Final Marks	40				60

Note:

- One practical exercise question shall be given for each CA1 and CA3. The mark allocation is Aim: 10 marks, Procedure: 20 marks, Output: 30 marks, Viva-voce: 10 marks.
- 20 questions shall be given from the theory portion for CA2, out of which 15 have to be answered. Each question carries 2 marks.
- Each experiment should be evaluated for 10 marks in CA4.
- Practical observation note book is sufficient and no need of separate practical record note book. Submission of Practical observation note book to end semester practical exam is mandatory.

MA232431	**Applied Mathematics – I**	L	T	P	C
Practicum/ Practical	**(Non-Circuit Branches)**	1	0	4	3

Unit I	**COORDINATE GEOMETRY – I**

THEORY: Equation of a circle with given centre and radius – General equation of circles – Centre and radius of a circle from general equation – Concentric circles – Contact of circles – Orthogonal circles – Simple problems.	3
PRACTICAL: Basics of GeoGebra (Not for examinations) • Familiarize the interfaces of GeoGebra such as Graphics View, Algebra View, Graphics2, Spreadsheet, Computer Algebra System (CAS), Probability Calculator and 3D Graphics. • Familiarize the Tool Bar and important tools of GeoGebra.	5

Exercise No: 1
For the given equations of the circles $x^2 + y^2 + 2g_1x + 2f_1y + c_1 = 0$ and $x^2 + y^2 + 2g_2x + 2f_2y + c_2 = 0$ with appropriate coefficients,
  i. Graph the equations of the circles in the Cartesian plane.
  ii. Determine the coordinates of the centres and radii of the circles and mark them on the graph.
  iii. Determine the distance between the centres of the circles.
  iv. Determine whether the circles are touching each other or not.
  v. If the circles are touching each other, determine whether they are touching internally or externally.
  vi. Verify whether any of the relationships $C_1C_2 = r_1 + r_2$ or $C_1C_2 = |r_1 - r_2|$ holds or not.
	5

Exercise No: 2
A pair of spur gears consists of $(z_p =)$ 20 teeth pinion meshing with $(z_g =)$ 120 teeth gear. Let the module be $(m =)$ 4 mm.
  i. Calculate the pitch circle diameters of the pinion and the gear using the formulae $d_p = mz_p$ and $d_g = mz_g$.
  ii. Calculate the distance between the centres of the pinion and the gear using the formula $\frac{1}{2}(d_p + d_g)$.
  iii. Draw two externally touching circles to represent pinion and gear with appropriate centres and radii $\frac{1}{2}d_p$ and $\frac{1}{2}d_g$. Determine the equations of the pinion and gear. Calculate the distance between the centres of the circles from the graph and verify that it is equal to $\frac{1}{2}(d_p + d_g)$.
  iv. Calculate the tooth thickness using the formula $t = 1.5708m$.
  v. Calculate the gear ratio using the formula $i = \frac{z_g}{z_p}$.
 	
Note: Appropriate values for $z_p, z_g, (z_g > z_p)$ and m can be assigned by the course teacher/examiner in Exercise No: 2
	6

MA232431	**Applied Mathematics – I**	L	T	P	C
Practicum	(Non-Circuit Branches)	1	0	4	3

Unit II	**COORDINATE GEOMETRY – II**	
THEORY General equation of conics – Classification of conics – Standard equations of parabola – Vertex, focus, axis, directrix, focal distance, focal chord, latus-rectum of parabola – Standard equations of ellipse – Vertices, foci, major axis, minor axis, directrices, eccentricity, centre and latus-rectums of ellipse – Simple problems.		3
PRACTICAL **Exercise No: 3** Do the following activities. 　i.　Draw the graphs of the parabolas $(y-k)^2 = 4a(x-h)$ and $(x-h)^2 = 4a(y-k)$ for the given values of a, b, h and k. Determine the vertex, focus, axis, directrix, latus-rectum of each parabola and mark them on the graphs. 　ii.　Draw the graphs of the ellipse $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$ for the given values of a, b, h and k. Determine the eccentricity, centre, foci, vertices, major axis, minor axis, directrices, and latus-rectums and mark them on the graph.		5
Exercise No: 4 Do the following activities for the given image of a parabolic shaped arch. 　i.　Draw a parabola which fits the given arch. 　ii.　Write the equation of the parabola. 　iii.　Find the vertex, focus, directrix and latus-rectum and mark them on the graph. 　iv.　Find the ratio of height and width of the arch.		6

Unit III	**DIFFERENTIAL CALCULUS**	
THEORY Limits of polynomials and rational functions – Limits of the form $\lim\limits_{x\to 0} \frac{\sin ax}{bx}$ and $\lim\limits_{x\to 0} \frac{\tan ax}{bx}$ (x in radians) (results only) – Definition of differentiability – Differentiation formulae for standard functions – Differentiation of sum, difference, product and quotient of functions – Chain rule – Second order derivatives – Radius of curvature – Simple problems.		3

MA232431	**Applied Mathematics – I**	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	4	3

PRACTICAL

Exercise No: 5

Do the following activities.
  i.   Graph the polynomial function $f(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$, where $a_n, a_{n-1}, \ldots, a_0$ are real numbers and $a_n \neq 0$. Find the value of $f(x)$ at $x = a$ and the limit of $f(x)$ at $x = a$.
  ii. Graph the rational function $R(x) = \frac{a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0}{b_m x^m + b_{m-1} x^{m-1} + \cdots + b_1 x + b_0}$, where $a_n, a_{n-1}, \ldots, a_0, b_m, b_{m-1}, \ldots, b_0$ are real numbers and $a_n, b_m \neq 0$. Find the value of $f(x)$ and the limit of $f(x)$ at $x = a$.
  iii. Graph the functions $\frac{\sin ax}{bx}$ and $\frac{\tan ax}{bx}$ where a and b are real numbers and $a, b \neq 0$. Evaluate $\lim_{x \to 0} \frac{\sin ax}{bx}$ and $\lim_{x \to 0} \frac{\tan ax}{bx}$.
  iv. Graph the functions $c\,(constant)$, x^n, $\sin x$, $\cos x$, $\tan x$, $\csc x$, $\sec x$, $\cot x$, e^x and $\log x$. Find their first derivative and second derivative.

Note: Only two functions will be given in Board Practical Examination in subdivision-(iv) of Ex-5.

Exercise No: 6

Two parallel straights of $'x'$ m apart are to be connected by a reverse curve consisting of arcs of same radius. The distance between the end points of the curve is $'y'$ m.
  i.   Find the approximate value of the common radius.
  ii. Find the length of the whole curve.

Unit IV	**INTEGRAL CALCULUS**

THEORY

Integration formulae of standard functions as inverse operation of differentiation – Bernoulli's formula – Definite integrals (Properties are excluded) – Area and volume using integration – Simple problems.

(Exercise column values: 5, 6, 3)

MA232431	Applied Mathematics – I	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	4	3

PRACTICAL
 	
Exercise No: 7
 	
Do the following activities.
  i.   Graph the functions $c\ (constant)$, $x^n, n \in \mathbb{R}$, e^x, $\sin x$, $\cos x$, $\sec^2 x$, $\operatorname{cosec}^2 x$, $\sec x \tan x$ and $\operatorname{cosec} x \cot x$. Find their indefinite integrals.
  ii.   Evaluate the definite integral $\int_a^b f(x)\,dx$ and relate it to the area under the curve $y = f(x)$ between x-axis, $x = a$ and $x = b$.
  iii. Find the volume of the solid generated by the revolution of the area bounded by $y = f(x), x$-axis, $x = a$ and $x = b$ about x-axis.
Note: Only two functions will be given in Board Practical Examination in subdivision-(i) of Ex-7.
	5

Exercise No: 8
 	
Do the following activities for the given image of a closed irregular plane figure.
  i.   Mark the required number of points on the boundary of the figure.
  ii.   Draw the boundary of the figure by joining the points.
  iii. Divide the figure into trapeziums using the points on the boundary.
  iv. Calculate the approximate area of the figure.
	6

Unit V	STATISTICAL PROCESS CONTROL

THEORY Random variables – Continuous random variables – Normal distribution – Process average and process variation using arithmetic mean and variance – Central line (CL), upper control limit (UCL) and lower control limit (LCL) – Control charts – $\bar{X}$ charts – Out-of-control signals – Simple problems.	3

MA232431	**Applied Mathematics – I**	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	4	3

PRACTICAL

Exercise No: 9

Do the following activities.

i. Find the mean μ for the given data $x_1, x_2, x_3, \ldots, x_{50}$ of size $N = 50$.

ii. Find the variance σ^2 and standard deviation σ for the data given in (i).

iii. Fit the normal curve $f(x) = N(\mu, \sigma^2) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}, -\infty < x < \infty$.

iv. Calculate the probability $p = P(X_1 < X < X_2)$ for some X_1, X_2 in the range of the data given in (i) using the formula $\int_{X_1}^{X_2} f(x) dx$. Verify the answer using probability calculator.

v. Calculate the number of data points in the interval (X_1, X_2) using the formula $n = Np$.

5

Exercise No: 10

Consider the 4 samples each of size 5 taken from the production lot of a machine.

Sample Number	S_{i1}	S_{i2}	S_{i3}	S_{i4}	S_{i5}
S_1	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}
S_2	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}
S_3	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}
S_4	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}

i. Calculate the sample means $\bar{S}_1, \bar{S}_2, \bar{S}_3, \bar{S}_4$ and the mean of the sample means $\bar{S} = \frac{\bar{S}_1 + \bar{S}_2 + \bar{S}_3 + \bar{S}_4}{4}$.

ii. Calculate the sample variances v_1, v_2, v_3, v_4 and $\sigma = \sqrt{\frac{1}{4}\sum_{i=1}^{4} v_i}$.

iii. Determine the central line $CL = \bar{S}$, lower control limit $LCL = \bar{S} - \frac{2.58}{\sqrt{5}}\sigma$ and upper control limit $UCL = \bar{S} + \frac{2.58}{\sqrt{5}}\sigma$.

iv. Draw the $\bar{X}$ chart and determine the out-of-control signals.

6

TOTAL HOURS	**75**

MA232431	**Applied Mathematics – I**	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	4	3

Suggested List of Students Activities

- Other than classroom learning, the following are the suggested student related co-curricular activities which can be undertaken to accelerate the attainment of the various outcomes in this course.
- Explore the working principle of gear wheels in laboratory.
- Find the equation of a parabolic bridge using GeoGebra simulation
- Find the radius of curvature of an image of a train road.
- Find the volume of a water bottle using GeoGebra simulation of the image of the bottle.
- Collect samples from an industry and draw $\bar{X}$ chart for the data.

References

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- GeoGebra Manual, The Official Manual of GeoGebra (PDF Version), 2016.
- GeoGebra Handbook for Senior Secondary Mathematics Teachers, Regional Institute of Education, Mysuru, 2016.
- Steve Phelps, An Introduction to GeoGebra, GeoGebra Institute of Ohio, University of Cincinnati.

MA232431	**Applied Mathematics – I**	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	4	3

Web-based/Online Resources

https://www.khanacademy.org/math/
https://www.mathportal.org/
https://openstax.org/subjects/math
https://www.mathhelp.com/
https://www.geogebra.org/
https://www.desmos.com/
https://phet.colorado.edu/

Hardware Requirement

- Desktop Computers: 30 + 2 Nos.
- Projector and Screen
- Printer

Software Requirement

- Operating System: Windows 7 or later
- GeoGebra Classic 5 (Free version)

Allocation of Marks for End Semester Examination

Part	Description	Marks
A	Written Test (Theory Portion)	30
B	Aim	10
C	Procedure	20
D	Output	30
E	Viva Voce	10
TOTAL MARKS		**100**

Note:

- 20 questions shall be given from the theory portion, out of which 15 have to be answered. Each question carries 2 marks.
- One practical exercise question along with respective unfilled output table(s) shall be given for practical exam.

MA232432	**Applied Mathematics – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	4	3

Introduction

The knowledge of Mathematics is necessary for a better understanding of all engineering and science subjects. Computer based visual representations such as graphs, animations, and tables of Mathematical ideas will enhance the applicability of Mathematics in engineering domains. This course is designed to give a comprehensive coverage at an introductory level to the topics of Coordinate Geometry, Trigonometry, Complex Numbers, Differential Calculus and Integral Calculus and some of their applications to engineering domains.

Course Objectives

The objective of this course is to enable the students to

- Identify the type of conic represented by a general second-degree equation in two variables.
- Understand the properties of inverse trigonometric functions.
- Identify the applications of complex numbers in solving engineering problems.
- Acquire knowledge in the principles of differentiation.
- Summarize the methods of integration and their engineering applications.

Course Outcomes

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

CO1: Compute the vertex, focus, directrix and latus-rectum of parabola and ellipse.
CO2: Solve problems using the properties of inverse trigonometric functions.
CO3: Solve problems using arithmetic operations on complex numbers.
CO4: Calculate limits and derivatives of one variable functions.
CO5: Evaluate definite integrals and indefinite integrals.

Pre-requisites

High School Mathematics

MA232432	Applied Mathematics – II	L	T	P	C
Practicum	(Circuit Branches)	1	0	4	3

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	1	1	1	3
CO2	3	3	2	1	1	1	3
CO3	3	3	2	1	1	1	3
CO4	3	3	2	1	1	1	3
CO5	3	3	2	1	1	1	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- Use explicit instruction for developing Math vocabulary and conceptual understanding.
- Use inducto-deductive approach to achieve the desired learning objectives.
- Use open-ended questions to nurture the problem-solving and reasoning skills among students.
- A theory-demonstrate-practice-activity strategy may be used throughout the course to ensure that learning is outcome-based and employability-based.
- Encourage students through illustrated problems and hand-on activities to use visual methods and simulations to solve real problems.

MA232432	**Applied Mathematics – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	4	3

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Lab Test (Ex. 1 to 4)	Written Test Units I to III	Lab Test (Ex. 5 to 10)	Practical observation note book (Ex. 1 to 10)	Practical Exam
Duration	2 hours	2 hours	2 hours	***	3 hours
Exam Marks	70	30	70	100	100 (Theory: 30 + Practical: 70)
Converted to	10	10	10	10	60
Final Marks	40				60

Note:

- One practical exercise question shall be given for each CA1 and CA3. The mark allocation is Aim: 10 marks, Procedure: 20 marks, Output: 30 marks, Viva-voce: 10 marks.
- 20 questions shall be given from the theory portion for CA2, out of which 15 have to be answered. Each question carries 2 marks.
- Each experiment should be evaluated for 10 marks in CA4.
- Practical observation note book is sufficient and no need of separate practical record note book. Submission of Practical observation note book to end semester practical exam is mandatory.

MA232432	**Applied Mathematics – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	4	3

Unit I	**COORDINATE GEOMETRY**

THEORY General equation of conics – Classification of conics – Standard equations of parabola – Vertex, focus, axis, directrix, focal distance, focal chord, latus-rectum of parabola – Standard equations of ellipse – Vertices, foci, major axis, minor axis, directrices, eccentricity, centre and latus-rectums of ellipse – Simple problems.	3
PRACTICAL Basics of GeoGebra (Not for examinations) • Familiarize the interfaces of GeoGebra such as Graphics View, Algebra View, Graphics2, Spreadsheet, Computer Algebra System (CAS), Probability Calculator and 3D Graphics. • Familiarize the Tool Bar and important tools of GeoGebra.	5
Exercise No: 1 Do the following activities. i. Draw the graph of the parabolas $(y-k)^2 = 4a(x-h)$ and $(x-h)^2 = 4a(y-k)$ for the given values of a, b, h and k. Determine the vertex, focus, axis, directrix, latus-rectum of each parabola and mark them on the graphs. ii. Draw the graph of the ellipse $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$ for the given values of a, b, h and k. Determine the eccentricity, centre, foci, vertices, major axis, minor axis, directrices, and latus-rectums and mark them on the graph.	5
Exercise No: 2 Do the following activities for the given image of a parabolic shaped satellite dish antenna. i. Draw a parabola which fits the given image of the dish antenna. ii. Write the equation of the parabola. iii. Find the vertex, focus, directrix and latus-rectum and mark them on the graph. iv. How far from the vertex should the receiver of the antenna be placed? Note: The dish antenna given in the image will be exactly open right-side, left-side or upside.	6

MA232432	**Applied Mathematics – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	4	3

Unit II	INVERSE TRIGONOMETRIC FUNCTIONS	
THEORY Recapitulation of domain and range of $\sin x, \cos x, \tan x, \operatorname{cosec} x, \sec x$ and $\cot x$ and their graphs – Definition of inverse trigonometric functions – Domain and range of $\sin^{-1} x, \cos^{-1} x, \tan^{-1} x, \operatorname{cosec}^{-1} x, \sec^{-1} x, \cot^{-1} x$ and their graphs – Principal values of inverse trigonometric functions – Simple problems.		3

PRACTICAL
 	
 Exercise No: 3
 	
 Do the following activities.
 	
   i.   Draw the graphs of $A\sin(Bx + C)$ and $A\cos(Bx + C)$ for some fixed finite real values of A, B and C. Find their domain, range, maximum value, minimum value, amplitude, period and phase shift.
  ii. Draw the graphs of $\sin^{-1} x$ and $\cos^{-1} x$. Find their domain, range, maximum value and minimum value.
		5

Exercise No: 4
 	
 The alternating current passing through a circuit is $i(t) = I_m \sin \omega t$, where I_m is the maximum value of current and ω is the angular velocity. Let R be the resistance and V_m be the maximum voltage.
   i.   Graph the sinusoidal waveform of $i(t)$ for the given values of I_m and ω.
  ii. Calculate the maximum voltage V_m using the formula $V_m = I_m R$ for the given value of R.
 iii. Graph the sinusoidal waveform of voltage using the formula $v(t) = V_m \sin\left(\omega t + \frac{\pi}{2}\right)$.
 iv. Determine the value of root mean square (r.m.s) current using the formula $I_{rms} = \frac{I_m}{\sqrt{2}}$.
  v. Determine the frequency using the formula $F = \frac{\omega}{2\pi}$.
 vi. Calculate the instantaneous value of the current at t sec.
		6

MA232432	**Applied Mathematics – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	4	3

Unit III	COMPLEX NUMBERS	
THEORY Definition of a complex number – Real and imaginary parts – Modulus and argument – Polar form of a complex number – Conjugate of a complex number – Representation of complex numbers on Argand plane – Addition, subtraction, multiplication and division of complex numbers – De-Moivre's theorem (without proof) - Simple problems.		3

PRACTICAL
 	
Exercise No: 5
 	
Do the following activities:
  i.   Mark the given complex number z on the Argand plane. Find the real and imaginary parts of z. Find the distance of z from x-axis and relate it to the real part of z. Find the distance of z from y-axis and relate it to the imaginary part of z.
  ii. Find the conjugate of z. Mark $\bar{z}$ on the Argand plane. Find the reflection of z on x-axis and relate it to $\bar{z}$.
  iii. Find the modulus of z. Find the distance between z and origin of the Argand plane and relate it to the modulus of z. Find the modulus of $\bar{z}$ and relate it to the modulus of z.
  iv. Find the argument of z. Find the angle between the line segment Oz and x axis and relate it to the argument of z. Find the argument of $\bar{z}$ and relate it to the argument of z.
		5

Exercise No: 6
 	
Do the following activities.
  i.   The representation of apparent power as phasor sum of active power and reactive power is given by $S = 550 + 952.63j$. Draw the phasor diagram of the system. Find the numerical value of the apparent power. Also calculate the phase angle and power factor of the system.
  ii. A machine takes 10KW (real power, P) at a power factor of 0.6 from 400V supply. Calculate the total load in KVA (apparent power, S) and KVAR (reactive power, R). Represent the apparent power as a phasor sum of active power and reactive power.
 	
Note: The course teacher/examiner can assign appropriate values for S, P, power factor and supply in Ex-6.
		6

MA232432	**Applied Mathematics – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	4	3

Unit IV	DIFFERENTIAL CALCULUS	
THEORY Limits of polynomials and rational functions – Limits of the form $\lim\limits_{x \to 0} \frac{\sin ax}{bx}$ and $\lim\limits_{x \to 0} \frac{\tan ax}{bx}$ (x in radians) (results only) – Definition of differentiability – Differentiation formulae for standard functions – Differentiation of sum, difference, product and quotient of functions – Chain rule – Second order derivatives – Maxima and minima – Simple problems.		3

PRACTICAL
 	
Exercise No: 7
 	
Do the following activities.
  i. Graph the polynomial function $f(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$, where $a_n, a_{n-1}, \ldots, a_0$ are real numbers and $a_n \neq 0$. Find the value of $f(x)$ at $x = a$ and the limit of $f(x)$ at $x = a$.
  ii. Graph the rational function $R(x) = \frac{a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0}{b_m x^m + b_{m-1} x^{m-1} + \cdots + b_1 x + b_0}$, where $a_n, a_{n-1}, \ldots, a_0, b_m, b_{m-1}, \ldots, b_0$ are real numbers and $a_n, b_m \neq 0$. Find the value of $f(x)$ and the limit of $f(x)$ at $x = a$.
  iii. Graph the functions $\frac{\sin ax}{bx}$ and $\frac{\tan ax}{bx}$ where a and b are real numbers and $a, b \neq 0$. Evaluate $\lim\limits_{x \to 0} \frac{\sin ax}{bx}$ and $\lim\limits_{x \to 0} \frac{\tan ax}{bx}$.
  iv. Graph the functions c (constant), x^n, $\sin x$, $\cos x$, $\tan x$, $\csc x$, $\sec x$, $\cot x$, e^x and $\log x$. Find their first derivative and second derivative.
Note: Only two functions will be given in Board Practical Examination in subdivision-(iv) of Ex-7.
		5

Exercise No: 8
 	
The alternating current passing through a circuit is $i(t) = I_m \sin \omega t$ where, I_m is the maximum value of current and ω is the angular velocity. Let L be the inductance.
  i. Graph the sinusoidal wave form of $i(t)$ for the given values of I_m and ω.
  ii. Graph the voltage using the formula $v(t) = L \frac{di(t)}{dt}$ for the given value of L.
  iii. Determine the values of $i(t)$ and $v(t)$ for a fixed t and different values of ω.
  iv. Determine the values of $i(t)$ and $v(t)$ for fixed value of ω and different values of t.
  v. Determine the values of t for which $i(t)$ and $v(t)$ are equal.
		6

MA232432	**Applied Mathematics – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	4	3

Unit V	**INTEGRAL CALCULUS**	
THEORY Integration formulae of standard functions as inverse operation of differentiation – Bernoulli's formula – Definite integrals (Properties are excluded) – Area and volume using integration – Simple problems.		3

PRACTICAL
 	
Exercise No: 9
 	
Do the following activities.
  i. Graph the functions $c\ (constant)$, $x^n, n \in \mathbb{R}$, e^x, $\sin x$, $\cos x$, $\sec^2 x$, $\mathrm{cosec}^2 x$, $\sec x \tan x$ and $\mathrm{cosec}\, x \cot x$. Find their indefinite integrals.
  ii. Evaluate the definite integral $\int_a^b f(x)\,dx$ and relate it to the area under the curve $y = f(x)$ between x-axis, $x = a$ and $x = b$.
  iii. Find the volume of the solid generated by the revolution of the area bounded by $y = f(x), x$-axis, $x = a$ and $x = b$ about x-axis.
Note: Only two functions will be given in Board Practical Examination in subdivision-(i) of Ex-9
		5

Exercise No: 10
 	
Let V be the voltage, L be the inductance and R be the resistance of a circuit.
  i. Graph the function of current at time t using the formula $I(t) = \frac{V}{R}\left(1 - e^{-\frac{Rt}{L}}\right)$.
  ii. Graph the function of charge passing through the coil at time t using the formula $Q(t) = \int I(t)dt$.
  iii. Find the values of $I(t)$ and $Q(t)$ for given values of V, L and R at different t values.
  iv. Find the values of $I(t)$ and $Q(t)$ at a fixed time for different values of V, L and R.
		6

TOTAL HOURS		75

Note: While setting up the practical exercise questions, the course teacher/examiner shall assign appropriate functions/constants wherever they are not mentioned explicitly.

MA232432	**Applied Mathematics – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	4	3

Suggested List of Students Activities

- Other than classroom learning, the following are the suggested student related co-curricular activities which can be undertaken to accelerate the attainment of the various outcomes in this course.
- Operate a cathode-ray oscilloscope (CRO) and visualize the formation of ellipse on the screen.
- Examine a satellite dish antenna and verify that the receiver is fixed at its focus.
- Draw the phasor diagram and visualize the triangular relationship between apparent power, active power and reactive power.
- Find the height of a mountain using GeoGebra simulation of the image of the mountain.
- Find the volume of a water bottle using GeoGebra simulation of the image of the bottle.

References

- Higher Secondary First Year Mathematics Volume-I & Volume-II, Tamil Nadu Textbook and Educational Services Corporation, Government of Tamil Nadu, 2022.
- Higher Secondary Second Year Mathematics Volume-I & Volume-II, Tamil Nadu Textbook and Educational Services Corporation, Government of Tamil Nadu, 2022.
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MA232432	**Applied Mathematics – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	4	3

Web-based/Online Resources

https://www.khanacademy.org/math/
https://www.mathportal.org/
https://openstax.org/subjects/math
https://www.mathhelp.com/
https://www.geogebra.org/
https://www.desmos.com/
https://phet.colorado.edu/

Hardware Requirement

- Desktop Computers: 30 + 2 Nos.
- Projector and Screen
- Printer

Software Requirement

- Operating System: Windows 7 or later
- GeoGebra Classic 5 (Free version)

Allocation of Marks for End Semester Examination

Part	Description	Marks
A	Written Test (Theory Portion)	30
B	Aim	10
C	Procedure	20
D	Output	30
E	Viva Voce	10
TOTAL MARKS		**100**

Note:

- 20 questions shall be given from the theory portion, out of which 15 have to be answered. Each question carries 2 marks.
- One practical exercise question along with respective unfilled output table(s) shall be given for practical exam.

MA232433	APPLIED MATHEMATICS*	L	T	P	C
Practicum		1	0	4	3

* For leather technology(sandwich) branch

Introduction

The knowledge of Mathematics is necessary for a better understanding of all engineering and science subjects. This subject will give a application based mathematical knowledge in leather and leather product sector. This course is to give a comprehensive coverage at an introductory level to the topics of Differential Calculus, Integral Calculus, and Percentage conversion, Area calculation of Hides and Skins and Costing techniques of leather Products.

Course Objectives

The objective of this course is to enable the students to

- Acquire knowledge in the principles of differentiation.

- Summarize the methods of integration and their engineering applications.

- Summarize the properties of families of circles

- Acquire Knowledge in Ratio-Proportion and time-work problems related in leather industry.

- Acquire knowledge in costing of leather products and to find Break Even point from the given data.

Course Outcomes

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

CO1: Calculatelimits and derivatives of one variable functions

CO2: Evaluate definite integrals and indefinite integrals

CO3: Determine whether two circles with given equations touch internally or externally.

CO4: Estimate the area of hides and skins and percentage to mass conversion

CO5: Calculate the leather Processing and product manufacturing cost by using specific methods.

Pre-requisites

Secondary School Mathematics

CO/POMapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	1	1	1	3
CO2	3	3	2	1	1	1	3
CO3	3	3	2	1	1	1	3
CO4	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3

Legend:3-HighCorrelation,2-MediumCorrelation,1-LowCorrelation

Instructional Strategy

- UseexplicitinstructionfordevelopingMathvocabularyandconceptualunderstanding.
- Useinducto-deductiveapproachtoachievethedesiredlearningobjectives.
- Useopen-endedquestionstonurturetheproblem-solvingandreasoningskillsamongstudents.
- A theory-demonstrate-practice-activity strategy may be used throughout the course to ensure that learning is outcome-based and employability-based.
- Encouragestudentsthroughillustratedproblemsandhand-

onactivitiestousevisualmethodsandsimulationstosolve real problems.

Assessment Methodology

	Continuous Assessment (40marks)				End Semester Examination (60 marks)	
	CA1	CA2	CA3	CA4		
Mode	Assign ment	Record Writing	Written Test	Lab Test	Written Exam	Practical Exam
Duration			2 hour	2 hours	1 hour	2hours
Exam Marks	20	10	60	70	30	70
Converted to	10	10	10	10	60	
Marks	40				60	

Unit	Name of the Topic	Hours
Unit I	**Differential Calculus**	
Theory	Limits of polynomials and rational functions – Limits of the form $\lim\limits_{x\to 0}\frac{sinax}{ax}$ and $\lim\limits_{x\to 0}\frac{tanbx}{bx}$ and (x in radians) (results only) – Definition of differentiability – Differentiation formulae for standard functions – Differentiation of sum, difference, product and quotient of functions – Chain rule – Second order derivatives – Radius of curvature – Simple problems.	

Practical	1. i) Graph the polynomial function f(x)$= a_n x^n + a_{n-1}x^{n-1} + \cdots a_1 x + a_0$Where$a_n, a_{n-1}, \ldots. a_1, a_0$are real and $a_n \neq 0. find\ the\ value\ of\ f(x)$at x=a and limit of f(x) at x=a.
	
	ii) Graph the functions $\frac{sinax}{ax}$and $\frac{tanbx}{bx}$ $where\ a\ and\ b$ are real numbers and a,b$\neq$ 0. Evaluate $\lim\limits_{x\to 0}\frac{sinax}{ax}$ and $\lim\limits_{x\to 0}\frac{tanbx}{bx}$
	
	iii) Graph the rational function $R(x) = \frac{a_n x^n + a_{n-1}x^{n-1}+\cdots a_1 x + a_0}{b_n x^n + b_{n-1}x^{n-1}+\cdots b_1 x + b}$ where $a_n, a_{n-1}, \ldots. a_1, a_0$ and $b_n, b_{n-1}, \ldots. b_1, b_0$are real and $a_n, b_n \neq 0$. Find the value of f(x) and the limit of f(x) at x=a.
	
	2. i) Graph the functions c(constant), $x^n,\ sinx,\ cosx,\ tanx,$ $cotx,\ secx,\ cosecx\ ,\ logx,\ e^x$. Find their derivatives
	
	ii) For the given two functions u(x) and v(x) from the set $\{x^n,\ sinx,\ cosx,\ tanx,\ cotx,\ secx,\ cosecx\ ,\ logx,\ e^x\}$ and constants $c_1\ and\ c_2$. Graph the functions and find their derivatives.
	
	    a) $c_1 u(x) \pm c_2 v(x)$.
	    b) $u(ax)\ and\ v(ax)$
	    c) $u(x)v(x)$
	    d) $\frac{u(x)}{v(x)}$
	
	3. For any given function y=f(x) from the set $\{x^n,\ sinx,\ cosx,\ tanx,\ cotx,\ secx,\ cosecx\ ,\ logx,\ e^x\}$. Find $y^{''}$.
		15

Unit II	**Integration Calculus**	
Theory	Integration- meaning- Integration formulae of standard functions - integration using decomposition method- integrals of the form $\int \frac{dx}{a^2 \pm x^2}, \int \frac{dx}{x^2-a^2}, \int \frac{dx}{\sqrt{a^2-x^2}}, \int \sqrt{a^2-x^2}dx, \int \sqrt{x^2 \pm a^2}dx$-simple problems. Bernoulli's formula- Area and volume -Simple Problems.	

Practical	4. Do the following activities for the given image of a closed irregular plane figure.
	  i) Mark the required number of points on the boundary of the figure.
	  ii) Draw the boundary of the figure by joining the points.
	  iii) Divide the figure into trapeziums using the points on the boundary.
	  iv) Calculate the approximate area of the figure.
	
	5. i) Evaluate the definite integral $\int_a^b f(x)dx$ and relate it to the area under the curve $y = (x)$ between x-axis, $x = a$ and $x = b$.
	ii) Find the volume of the solid generated by the revolution of the area bounded by $y = (x)$, x-axis, $x = a$ and $x = b$ about x-axis.
		15

Unit III	**COORDINATE GEOMENTRY**	
Theory	Equation of a circle with given center and radius – General equation of a circle – Centre and radius of a circle from general equation – Equation of a circle with given diametrical end points – Concentric circles – Contact of circles – Orthogonal circles – Simple problems.	**15**

Practical	6. Basics of GeoGebra (Not for examinations)
	
	    i) Familiarize the interfaces of GeoGebra such as Graphics view, Algebra view, Graphics2, spreadsheet, computer Algebra system (CAS), Probability Calculator and 3D Graphics.
	
	    ii) Familiarize the Tool Bar and important tools of GeoGebra
	
	7. Given the equation of two circles $x^2 + y^2 + 2g_1 x + 2f_1 y + c_1 = 0$ and $x^2 + y^2 + 2g_2 x + 2f_2 y + c_2 = 0$ in general form with appropriate coefficients.
	
	    i) Graph the equations of the circles in the Cartesian plane.
	
	    ii) Determine the coordinates of the centres and radii of the circles and mark them on the graph.
	
	    iii) Determine the distance between the centres of the circles.
	
	    iv) Determine whether the circles are touching each other or not.
	
	    v) If the circles are touching each other, determine whether they are touching internally or externally.
	
	    vi) Verify whether any of the relationships $C_1 C_2 = r_1 + r_2$ or $C_1 C2_= |r_1 - r_2|$ holds or not.
	
	8. Given the equation of two circles $x^2 + y^2 + 2g_1 x + 2f_1 y + c_1 = 0$ and $x^2 + y^2 + 2g_2 x + 2f_2 y + c_2 = 0$ in general form with appropriate coefficients
	
	    i) Graph the equations of the circles in the Cartesian plane.
	
	    ii) Determine the points of intersection of circles. Let the points of intersections be A and B.
	
	    iii) Draw the tangents to the circles at A. Measure the angle between their tangents at the point A.	

		Verify whether angle between the tangents at A is 90° or not.	
	iv)	Draw the tangents to the circles at B. Measure the angle between their tangents at the point B. Verify whether angle between the tangents at A is 90° or not	
	v)	Verify whether the circles intersect orthogonally or not.	
	vi)	Verify whether $2g_1g_2 + 2f_1f_2 = c_1 + c_2$ is true or not.	
Unit IV	**Ratio- Proportion & Percentage, Area and Volume**		
Theory	Problems involving percentage, applications of percentage in profit, loss, overhead expenses, discount - Time and work problems. Ratio-Proportions. Area of rectangle, square, parallelogram, triangles and irregular shapes. Volume of cylinder, cone, sphere, cuboids - with different unit conversions -- . - simple problems		
Practical	9. Estimation of volume of the chemical by the given percentage based on the raw material weight. 10. Estimation of Area of Hides and skins. 11. Calculate the volume of the leather processing drum and estimate the capacity of raw material to be loaded. 12. If the price of a product is first decreased by 25% and then increased by 20%, then what is the percentage change in the price? 13. To complete a piece of work, Ram takes 6 days and Siva takes 12 days alone respectively. Ram and Siva took Rs.3600 to do this work. When Sam joined them, the work was done in 3 days. What amount was paid to Sam?		**15**
Unit V	**Costing of Leather Products**		

Theory	Interest - simple interest, compound interest - Break even Analysis Various Cost-Costing Calculation of Leather Products – parallelogram method - Rush and small method - various currency symbols and their values in rupee- Currency conversion.		**15**
Practical	14. Calculate the total manufacturing cost of wet blue leather and various leather finishing cost by using the given data. 15. Estimation of Costing of Leather Products. 16. Estimation of Break Even Point from the given Data.		
		Total Hours	**75**

References:

1. Higher Secondary First Year Mathematics Volume-I & Volume-II, Tamil Nadu Textbook and Educational Services Corporation, Government of Tamil Nadu, 2022.

2. Higher Secondary Second Year Mathematics Volume-I & Volume-II, Tamil Nadu Textbook and Educational Services Corporation, Government of Tamil Nadu, 2022.

3. John Bird, Higher Engineering Mathematics, Newnes (Elsevier), 6th Edition, 2010.

4. Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2012.

5. Deepak Singh, Mathematics-I, Khanna Book Publishing Co. (P) Ltd., 2021.

6. Garima Singh, Mathematics-II, Khanna Book Publishing Co. (P) Ltd., 2021.

7. John Vince, Calculus for Computer Graphics, Second Edition, Springer, 2019.

8. GeoGebra Manual, The Official Manual of GeoGebra (PDF Version), 2016.

9. GeoGebra Handbook for Senior Secondary Mathematics Teachers, Regional Institute of Education, Mysuru, 2016.

10. Steve Phelps, An Introduction to GeoGebra, GeoGebra Institute of Ohio, University of Cincinnati.

Allocation of Marks for End Semester Exam

Part	Description	Marks
A	Written Test (Theory Por	30

B	Aim	10
C	Procedure	30
D	Output	20
E	Viva-voce	10
	Total	100

ME232120	**Basics of Mechanical Engineering**	L	T	P	C
Theory		3	0	0	3

Introduction

Fundamental knowledge in the field of Mechanical Engineering are essential for all engineers. They must thoroughly study the material properties, machine tools and its components before delving into advanced applications. This foundational subject is crucial for a comprehensive grasp of the principles. To develop the necessary psychomotor skills in this area, students should not only understand the concepts but also apply them effectively.

Course Objectives

The objective of this course is to enable the student to

- Understand the essential knowledge and skills of basic Mechanical Engineering encountered in professional practice for diploma holders.
- Comprehend the fundamental concepts and scope of Mechanical Engineering.
- Describe the properties of materials and the variety of machine tools used in the industry.
- Examine the workings and applications of power transmission drives in mechanical systems.
- Identify the various types of engines and power plants to enhance the understanding of their operational efficiencies and energy conversions.

Course Outcomes

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

CO1: Recognize the importance of Mechanical Engineering in industrial applications.
CO2: Classify the different types of materials used in metal forming and joining processes.
CO3: Illustrate the principles and industrial applications of lathe, drilling, and milling machines.
CO4: Acquire basic knowledge about power transmission through belt and gear drives.
CO5: Understand the basics of Internal Combustion (IC) Engines and the various types of power plants.

Pre-requisites

Knowledge of basic Science

ME232120	**Basics of Mechanical Engineering**	L	T	P	C
Theory		3	0	0	3

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	-	-	-	-
CO2	1	2	3	-	-	-	1
CO3	-	-	3	-	-		1
CO4	3	2	2	-	-	-	1
CO5	3	2	2	-	-	-	1

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- Engage and Motivate: Instructors should actively engage students to boost their learning confidence.

- Real-World Relevance: Incorporate relatable, real-life examples and engineering applications to help students understand and appreciate course concepts.

- Interactive Learning: Utilize demonstrations and plan interactive student activities for an engaging learning experience.

- Application-Based Learning: Employ a theory-demonstrate-practice-activity strategy throughout the course to ensure outcome-driven learning and employability.

- Simulation and Real-World Practice: Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real-world scenarios when possible.

- Encourage Critical Analysis: Foster an environment where students can honestly assess experiment outcomes and analyze potential sources of error in case of discrepancies.

ME232120	**Basics of Mechanical Engineering**	L	T	P	C
Theory		3	0	0	3

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III & IV)	Quiz/ MCQ	Model Examination	Written Examination
Duration	2 hours	2 hours	1 hour	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Marks	40				60

- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for the internal assessment of 20 Marks.
- CA3 Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 marks for the internal assessment
- CA4 Model examination should be conducted as per the end semester question pattern. The marks should be converted to 10 marks for the internal assessment.

ME232120	**Basics of Mechanical Engineering**	L	T	P	C
Theory		3	0	0	3

Unit I	ROLES AND RESPONSIBILITIES OF MECHANICAL ENGINEERS	
Introduction to Mechanical Engineering-Who is a Mechanical Engineer-Job Description-Roles and Responsibilities-Scope and Opportunities – Mechanical Engineering-Manufacturing-Automobile-PowerGeneration-Maintenance-Service-Design-Quality-Materials Management-Logistics.		9
Unit II	ENGINEERING MATERIALS, METAL FORMING AND JOINING	
Engineering Materials: Importance of Materials - Types - Properties: Mechanical - Thermal - Electrical - Magnetic - Chemical - Usages - Applications. **Metal Forming:** Definition – Types – Hot and Cold working – Hot working –Description and working of drop hammer – Rolling – Roll forging – Extrusion – Cold working – Description and working of Mechanical press - Wire drawing **Metal Joining:** Types of Joints – Definitions and Applications: Temporary and Permanent - Examples.		9
Unit III	FUNDAMENTALS OF MACHINE TOOLS	
Machine Tools – Introduction **Lathe:** Principle of Lathe – Description and function of Lathe **Drilling Machine:** Principle of Drilling – Types - Upright Drilling (Description and Function only) **Milling Machine:** Principle of Milling – Horizontal Milling Machine – Vertical milling machine (Description and Function only) **CNC:** Introduction to CNC and its applications		9
Unit IV	POWER TRANSMISSION DRIVES AND LUBRICATION	
Power Transmission Drives Belt drive – Types - Flat, V Belt & Circular or Rope Drive Applications - Applications of chain drive – Gear drives – Types of gear drives – spur gear drive – Helical gear drive – Bevel gear drive – Worm and Worm wheel drive – Rack and pinion drive – Cam Drive - Descriptions. **Lubrication** Lubricants - Types -Solid, Semi Solid, Liquid – Properties of lubricants - Purpose of lubrication –Methods of lubrication - Ring Oiler Lubrication, Drip feed Lubrication and Grease Cup Lubrication.		9

ME232120	**Basics of Mechanical Engineering**	L	T	P	C
Theory		3	0	0	3

Unit V	FUNDAMENTALS OF HEAT POWER ENGINEERING	
Thermodynamics: Definition - Heat - Modes of heat transfer – conduction, convection and radiation (Definition only) **IC Engines:** Classification of IC Engines – Working of – Four stroke Petrol Engine – Diesel Engine –Introduction to Battery Electrical Vehicles (BEV) **Power Plants:** Power Plants- Introduction to Steam Power plant – Introduction to Nuclear Power plant –Introduction to Solar power plant (PV only) - Introduction to Windmill - Horizontal axis and vertical axis wind mill		9
TOTAL HOURS		**45**

Suggested List of Students Activity

- Presentation/Seminars by students on any recent technological developments based on the course.
- Periodic class quizzes conducted on a weekly/fortnightly based on the course.
- Mini project that shall be an extension of any practical lab exercise to real-world application.

Text Books

- Fundamentals of Mechanical Engineering / G.S.Sawheny-PHI.
- AnIntegrated Course in Mechanical Engineering / R.K.Rajput / Birala Publications.
- I.C.Engines / V.GANESAN-TMH.
- Strength of Materials by R.K.Rajput, S.Chand & Company.
- Thermal Engineering / R.K.Rajput / LakshmiPublications.
- Elements of Workshop Technology - Vol. 1 & 2 - Hajra Choudhury - Media Publishers & Promoters, India.

ME232120	**Basics of Mechanical Engineering**	L	T	P	C
Theory		3	0	0	3

References

- Thermodynamics and Heat Engines / R .Yadav / Central Book Depot.
- Strength of Materials by R.K.Bansal, Laxmi Publishers.
- Engineering Mechanics Statics and dynamics by A.K.Tayal, Umesh Publication, Delhi.
- Fundamentals of I.C.Engines - P.W.Gill, J.H.Smith & Ziurys - IBH & Oxford pub.
- Workshop Technology Part 1 & Part 2 - W A J Chapman - Cambridge University Press
- A Textbook of Production Engineering - PC Sharma - S Chand

Web-based/Online Resources

- NPTEL (Website): The National Programme on Technology Enhanced Learning (NPTEL) offers free online courses on manufacturing processes and other Mechanical Engineering topics. NPTEL Mechanical Engineering.

ML232120	**BASICS OF MEDICAL ELECTRONICS**	L	T	P	C
Theory		3	0	0	3

Introduction

Any student of Diploma in Medical Electronics will be required to work with various health care devices when he/she reaches the industry. As most of the devices are electronics based, the student is required to develop a basic understanding of the concepts and related terms of anatomy, electronics and Medical Instrumentation which is in this backdrop that this subject has been designed. A Medical Electronics Engineer must be familiar with basics of human body, electronics, instruments which is also dealt in this subject.

Course Objectives

The objective of this course is to enable the students to

- Understand the scientific study of the body's cells
- Learn about the cell division and cell cycle
- Study the biomedical instrument system
- Understand the function of passive elements
- Identify and understand the basic of semiconductor devices along with working and application
- Identify the logic gates and their simplification

Course Outcomes

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

CO1: To learn the human physiological system

CO2: To learn the various division processes in the cell

CO3: To learn the basic biomedical instruments system

CO4: To use different types of passive elements and diodes in various applications

CO5: To understand the basics of logic gates

Pre-requisites

Knowledge of basic Mathematics and Science

CO/PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3		2	2			
CO2	3		2	2			
CO3	3		2	3			
CO4	3		2	3			
CO5	3		3	3			

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers have to use different teaching methods to stimulate the interest of students in learning.

- To help students to learn different types of cell, cell cycle, passive electronic components, semiconductor and logic gates. Teachers should use PPT presentation of image and symbol of components and show the videos which are related to application of the components. Also should explain examples from daily life, realistic situations, and real-world engineering and technological applications.

- Students may be shown all the electronic components in the lab. The demonstration can make the subject exciting and foster in the students a scientific mind set.

- Demonstration method may be used with step-by-step procedure to test the various components using meters.

- Teachers are advised to follow inductive strategy to help the students to discover the working principle of various electronic components.

Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where could be the source of error, if any.

Assessment Methodology

	Continuous Assessment(40marks)				End Semester Examination (60marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test	Written Test	Written Test	Quiz/MCQ/ Activity/ Assignment	Written Examination
Duration	2 hours				3 hours
Exam Marks	30	30	30	10	100
Converted to	15	15	15	10	60
Total Marks :100 (A + B + C)	Best Two of CA1, CA2 & CA3 (A) (30 marks)			10 (B)	60 (C)

Note:
- CA1, CA2 and CA3 Assessment test should be conducted. Best of two will be considered for the internal assessment of 30 Marks.
- CA3 can be Quiz / MCQ / Activity / Assignment should be conducted covering the complete syllabus. The marks should be converted to 10 marks for the internal assessment
- CA4 Model examination should be conducted as per the end semester question pattern. The marks should be converted to 60 marks for the internal assessment.

ML232120	**BASICS OF MEDICAL ELECTRONICS**	L	T	P	C
Theory		3	0	0	3

UNIT I   HUMAN BODY SYSTEMS

Level of organization of the Human body – Cell – Types of Cells – Prokaryotic – Eukaryotic – Tissue – Types of Tissue – Different system of Human body.	8

UNIT II   CELLS

Structure of the cell – Function of the cell – Cell cycle - Cell division - Mitosis – Meiosis – Apoptosis – Transport of substances across Cell Membrane – Nature of the Cancer Cell.	8

UNIT III   BIOELECTRIC SIGNAL & INSTRUMENT

Bio potential and their generation – Resting and Action Potential – Propagation of Action Potential - Design of Medical Instrument – Factors to be considered to make an Instrument – Components of Medical Instrument System.	8

UNIT IV   BASICS OF ELECTRONICS

Resistor – Inductor – Capacitor – Current – Voltage – Potential – Power - Energy - Ohm's law – Kirchoff's Laws - Resistance in series – Resistance in parallel – Simple problems – Semiconductor – Doped – Energy Band - Types of semiconductors – Intrinsic – Extrinsic - PN Junction diode – Construction – Working principle – Forward bias – Reverse bias.	12

UNIT V   LOGIC GATES AND SIMPLIFICATION

Positive and Negative logic – AND, OR, NOT Gates - Universal Gates – Exclusive Gates -Definition, Symbol, Truth table - Boolean expression – De-Morgans theorem- Simplification using K-maps.	9

TOTAL HOURS	45

Suggested List of Students Activity (Ungraded)

- Check the web portal for image and video of different types of electronic components.
- Periodical quizzes should be conducted on a weekly/fortnightly basis to reinforce the symbols, units, image of different types of components, and working principles.
- Students might be asked to find the various components in real life equipment, circuits.
- Students might be asked to see the demonstration video of various electronic components.
- Students might work with the simulation software in virtual laboratory web portal to understand about the working of components.

Reference

- Dr. M. Arumugam, Biomedical Instrumentation, Anuradha Publications
- V K Mehta, Rohit Mehta, Principles of Electronics, S Chand & Co Ltd
- B L Theraja, Basic Electronics: Solid State, S Chand & Co Ltd

Web Reference QR Codes

Sl.No	Topic	QR Code
1.	Resistors	
2.	Inductors	
3.	Capacitors	
4.	Diode	
5.	Transistors	
8.	Apoptosis	
9.	Cell	
10.	Different systems in body	

ML232260	BASICS OF MEDICAL ELECTRONICS PRACTICAL	L	T	P	C
Practical		0	0	4	2

Introduction:

These practical exercises aim to foster a deeper understanding of biological and electrical concepts while enhancing analytical and problem-solving skills. From examining human anatomy at the cellular and tissue levels to delving into electrical circuits and logic gates, each experiment offers valuable insights. The hands-on exploration begins with anatomical models, progresses through circuit analysis using instruments like ammeters and voltmeters, and extends to the study of electronic components, resistor calculations, and the application of Ohm's Law in both series and parallel connections. Furthermore, the exploration delves into digital logic gates with a focus on understanding their truth tables. Additionally, the verification of de-Morgan's theorem serves as a key element in establishing foundational principles across these experiments.

Course Objectives:

The objective of this course is to enable the student to

- Understand medical electronics and basic electrical circuits
- Examine human anatomy models
- Calculate electrical parameter
- Analyze resistive circuits
- Understand digital logic gates
- Verify Ohm's law.

Course Outcomes (CO):

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

CO1 : To acquire knowledge in examining human anatomy at the cellular, tissue, and cancer cell.
CO2 : To acquire practical skills in calculating current, voltage and power in series and parallel electrical circuits through application of ohm's law.
CO3 : To understand digital logic (AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR) along with truth tables.
CO4 : To develop the ability to calculate resistor values using color coding and test active/passive components with a multimeter.
CO5 : To verify de-Morgan's theorem, enhancing comprehension of logical circuit transformations.

Pre-requisites: Basic Physics

CO/PO Mapping:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3		1			
CO2	3	1		2			
CO3	3	1		2			
CO4	3	3		3			
CO5	3	2		3			

Legend:3-High Correlation,2-Medium Correlation,1-Low Correlation

Instructional Strategy:

✦ **Engage and Motivate:** Instructors should actively engage students to boost their learning confidence.

✦ **Real-World Relevance:** Incorporate relatable, real-life examples and engineering applications to help students understand and appreciate course concepts.

✦ **Interactive Learning:** Utilize demonstrations and plan interactive student activities for an engaging learning experience.

✦ **Application-Based Learning:** Employ a theory-demonstrate-practice-activity strategy throughout the course to ensure outcome-driven learning and employability.

✦ **Simulation and Real-World Practice:** Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real-world scenarios when possible.

✦ **Encourage Critical Analysis:** Foster an environment where students can honestly assess experiment outcomes and analyze potential sources of error in case of discrepancies.

Assessment Methodology

	Continuous Assessment (40 marks)		End Semester Examination (60 marks)
	CA1	CA2	
Mode	Model Exam	Practices and Record of Work done	Practical Examination
Duration	3 Hours	-	3 Hours
Exam Marks	100	100	100
Converted to	20	20	60
Marks	**40**		**60**

Note:

1) CA1: Model Examination for 100 Marks.

2) CA2: All exercises should be recorded in Manual/Record Note. The same should be submitted for the board examination as a record of work done.

ML232260	BASICS OF MEDICAL ELECTRONICS PRACTICAL	L	T	P	C
Practical		0	0	4	2

PART - I HUMAN BODY SYSTEMS AND CELLS	
1. Examine human anatomy using models of cells. 2. Examine human anatomy using models of tissue. 3. Examine the human anatomy using models of cancer cells. 4. Examine any one system in the human body by using a model.	25

PART - II BASICS OF ELECTRONICS	
5. Measure the current and voltage by using an ammeter and voltmeter in a simple circuit and verify using ohm's law. 6. a. Calculate the resistor value using colour coding b. Test the active and passive components using a multimeter. 7. Draw V-I characteristics across each resistor in series circuit and verify with ohm's law. 8. Draw V-I characteristics across each resistor in parallel circuit and verify with ohm's law. 9. Verify AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR gate with truth table. 10. Verify the de-Morgan's theorem. 11. Construct a circuit to verify Kirchoff's voltage and current law. 12. Construct a circuit to test the forward and reverse bias characteristics of a PN Junction Silicon diode. Find the value of its cut-in voltage	35
TOTAL HOURS	60

Suggested List of Students Activity:

- The circuits can be simulated by MULTISIM and PSPICE software.
- Presentation/Seminars by students on any recent technological developments based on the course
- Periodic class quizzes conducted on a weekly/fortnightly based on the course
- Mini project that shall be an extension of any practical lab exercise to real-world application

Text Books:

- Dr. M. Arumugam, Biomedical Instrumentation, Anuradha Publications
- V K Mehta, Rohit Mehta, Principles of Electronics, S Chand & Co Ltd
- B L Theraja, Basic Electronics: Solid State, S Chand & Co Ltd
- Paul W Tuinenga, SPICE a guide to Circuit Simulation and Analysis using PSpice, Prentice Hall, Englewood Cliffs, Newjersey
-

Web-based / Online Resources:
- **https://labsland.com/en/labs/electronics-community**
- **https://www.circuitlab.com/**
- **https://be-iitkgp.vlabs.ac.in/List%20of%20experiments.html**

BOARD EXAMINATIONS

Allocation of Marks (EXPERIMENT 1 -4)

S. No.	Description	Allocation of Marks
1	Diagram	30
2	Handling of the Models	30
3	Drawing of Anatomical Structure	20
4	Result	10
5	Viva Voce	10
TOTAL		**100**

Allocation of Marks (EXPERIMENT 5 -10)

S. No.	Description	Allocation of Marks
1	Circuit Diagram & Truth Table	30
2	Connections & Procedure	30
3	Tabulation & Graph	25
4	Result	10
5	Viva Voce	5
TOTAL		**100**

MR232120	**Basics of Marine Engineering**	L	T	P	C
Theory		3	0	0	3

Introduction

Marine engineering involves the construction, operation and maintenance of equipment used in ships. This includes machinery, piping, power, propulsion and maneuvering parts of ships. The basic job of a marine engineer includes the designing, building and maintenance of ships and its equipments. Crew members need to be aware of the hazards of fire, collision, grounding and bad weather. Safety and survival of personnel need to be given paramount importance.

Course Objectives

The objective of this course is to enable the students to

- Acquire knowledge about shipping industry.
- Learn the workings of machineries used in ships.
- Familiarize with the safety aspects in ships.
- Understand the difficulties faced during voyage.
- Have a basic information about ports and shipyards.

Course Outcomes

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

CO1: Elucidate about the types of ships and different departments of ships.
CO2: Know the machineries used in ships.
CO3: Understand the safety aspects in ships.
CO4: Summarize the life saving techniques in ships.
CO5: Have an idea about the activities in harbours and shipyards.

Pre-requisites

Knowledge of Basic Science.

MR232120	Basics of Marine Engineering	L	T	P	C
Theory		3	0	0	3

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	1	2	2	2	3	3
CO2	2	2	3	3	2	2	2
CO3	2	3	3	2	3	3	2
CO4	1	3	3	2	3	3	3
CO5	1	1	3	2	3	3	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations and real world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome-based and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

MR232120	**Basics of Marine Engineering**	L	T	P	C
Theory		3	0	0	3

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III & IV)	Quiz	Written Model Exam (All units)	Written Examination
Duration	2 hours	2 hours	2 hours	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Marks	40				60

Note:

- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for internal assessment 20 Marks.
- CA3 Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 marks for the internal assessment.
- CA4 Model examination should be conducted as per the end semester question pattern.The marks should be converted to 10 marks for the internal assessment.

MR232120	**Basics of Marine Engineering**	L	T	P	C
Theory		3	0	0	3

Unit I	**SHIPPING INDUSTRY**	
Ship types – Bulk carrier – Oil tanker – Passenger ship – Gas carrier – Chemical carrier – RO-RO ship – Container ship – Passenger ships – War ships. Ship departments – Engine department – Duties of Engineer officers – Deck department – Duties of deck officers – Master of the ship – Duties and responsibilities of the Master – Certificates of competency. Ship registries – Classification societies – IMO – SOLAS conventions.		9
Unit II	**SHIP MACHINERIES**	
Knowledge of machineries – Main engine – Power generator – Boiler – Pumps – Crane – Derrick – Winch – Windlass – Capstan – Anchor – Gang way – Ladders – Propeller – Rudder – Engine room layout – Hatches and Hatch covers. Anchoring – Mooring.		9
Unit III	**SHIP SAFETY**	
Fire – Properties of flammable materials – Conditions of fire – Fire triangle – Fire prevention principle – Fire pump – Fire detectors – Fire alarm – Classes of fire – Fire drill in ship. First aid – Principle of first aid – Aim of first aid – Responsibilities of first aider – Sea sickness – Medical kit for first aid.		9
Unit IV	**SHIP VOYAGE**	
Life saving – Meaning of survival – Man overboard – Search and rescue – Equipments for life saving in ship. Ship design – Size of ship – Tonnage of ship – Port side and Starboard side – Forward and Aft – Draught and Freeboard – Load line marking – Ballasting – Ship painting – Marine pollution act – Six degrees of freedom – surging, swaying, heaving, rolling, pitching and yawing.		9

MR232120	**Basics of Marine Engineering**	L	T	P	C
Theory		3	0	0	3

Unit V	**SHIP ASHORE**	
Harbour – Harbour related activities – Harbour entry – Permit – Pilot officer – Bunkering – Major ports in India. Shipyard – Shipyard related activities – Major shipyards in India – Ship launching – Dry dock – Floating dry dock. Types of cargo – Cargo handling equipments. Ship breaking – Risk factors involved in ship breaking.		9
TOTAL HOURS		**45**

Suggested List of Students Activity

Other than classroom learning, the following are the suggested student related co-curricular activities which can be undertaken to accelerate the attainment of the various outcomes in this course.

- Preparation of different types of ship models may be given as mini project to students.
- Practice may be given in dismantling and assembling of ship machineries.
- Fire drill may be practiced.
- Educational visit may be arranged by travelling in ship.
- Industrial visits may be arranged to ports and shipyards.

Reference

- Introduction to Marine Engineering by D.A.Taylor.
- Seamanship Primer by Capt. J.Dinger, Bhandarkar Publishing.
- Branch's Elements of Shipping by Alan Edward Branch, Michael Robarts.
- Reeds Vol 5: Ship Construction for Marine Engineers by Paul Anthony Russell, E.A.Stokoe.
- Marine Engineering by Roy L.Harrington.
- Fuels, Furnaces & Refractories – Tarapir Senguptha, IIF Study Material,, Kolkata.

Web-based / Online Resources

- https://www.marineinsight.com
- https://www.imo.org
- https://www.ship-technology.com

MT232120	**Basics of Allied Engineering**	L	T	P	C
Theory		3	0	0	3

Introduction

Various metallurgical fundamental aspects of fuels, Furnaces and refractories has to be thoroughly understood, which helps in selection of right type of fuel that will not interact with and impair the metals and alloys manufactured using the above. This subject provides various types of furnaces based on the process to be performed like Melting, Heat Treatment, holding etc., and the right selection of refractory for successful processing route helps in obtaining the sound components, free from defects and so on. A basic fundamental knowledge about various branches of other engineering fields also is a must to understand the Engineering concepts related with Metallurgy.

Course Objectives

The objective of this course is to enable the students to

- Know about various types of fuels and its terms.
- Study about the properties of fuels.
- Learn about the production of metallurgical coke.
- Understands the properties and uses of solid, liquid, gaseous fuels.
- Study about the production of gaseous fuels.
- Learn about the Storage and handling of fuels.
- Various types of furnaces & their operating principles will be understood.
- Understanding the efficiency of the furnaces will impart the effective utilization of energy.
- Gives an introduction to Various types of Refractories, their Properties & testing procedures will be understood
- Know how to select proper refractory for specific application.
- Understand the basic knowledge in Electrical aspects, which will be beneficial to the student in relation to Metallurgy.
- Understand the principles and operation of lathe, other machineries.
- Various Non-conventional energy sources are exposed to them.

MT232120	**Basics of Allied Engineering**	L	T	P	C
Theory		3	0	0	3

Course Outcomes

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

CO1: Explain the types of fuels, its properties, its production methods. Also, able to analyze it according to standard procedures.
CO2: Comprehend the basic concepts of various types of furnaces and their working principles.
CO3: Understand the properties of different types of Refractories and their manufacturing methods and proper usage at right place.
CO4: Understand the basics of electrical aspects related to Metallurgical needs.
CO5: Familiarize the basic operating principles of Lathe and grinding. Also understand various non-conventional energy sources.

Pre-requisites

Knowledge of basic science.

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	1	-	-	1
CO2	3	2	2	2	-	-	1
CO3	3	2	2	2	2	-	3
CO4	3	2	1	-	2	-	2
CO5	3	1	1	2	1	-	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

● Engage and Motivate: Instructors should actively engage students to boost their learning confidence.

MT232120	**Basics of Allied Engineering**	L	T	P	C
Theory		3	0	0	3

- Real-World Relevance: Incorporate relatable, real-life examples and engineering applications to help students understand and appreciate course concepts.
- Interactive Learning: Utilize demonstrations and plan interactive student activities for an engaging learning experience.
- Application-Based Learning: Employ a theory-demonstrate-practice-activity strategy throughout the course to ensure outcome-driven learning and employability.
- Simulation and Real-World Practice: Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real-world scenarios when possible.
- Encourage Critical Analysis: Foster an environment where students can honestly assess experiment outcomes and analyze potential sources of error in case of discrepancies.

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III & IV)	Quiz/MCQ	Written Model Exam (All units)	Written Examination
Duration	2 hours	2 hours	1 hour	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Marks	40				60

Note:

- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for 20 Marks.
- CA3 Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 Marks for the internal assessment.
- CA4 Model examination should be conducted as per end semester question pattern. The marks should be converted to 10 marks for the internal assessment.

MT232120	**Basics of Allied Engineering**	L	T	P	C
Theory		3	0	0	3

Unit I	FUELS	
Fuels: Introduction, Classification, Calorific value and other properties, Combustion. **Solid Fuels:** Wood, Varieties of coal, Manufacture of metallurgical coke – Bee Hive Oven. **Liquid Fuels:** Petroleum and its derivatives, Properties of liquid fuels. **Gaseous Fuels:** Production, properties and uses of water gas, Producer gas, liquefied petroleum gas, coal gas. Storage and Handling of fuels.		9
Unit II	**FURNACES**	
Classification of furnaces, Construction and operation of Cupola, Induction furnace, Electric Arc furnace, Open-Hearth type furnaces.		9
Unit III	**REFRACTORIES**	
Definition–Criteria for selecting refractory- Classification of refractories. Properties: Refractoriness, RUL, Specific gravity, Compression strength (CCS & HCS), Spalling resistance, Porosity, Modulus of Rupture strength, Abrasion resistance & their testing methods. Shapes of Refractory bricks. General Manufacturing method of refractory bricks. Properties & Manufacture of Silica bricks, Alumina & Magnesite bricks.		9
Unit IV	**BASICS OF ELECTRICAL ENGINEERING**	
Basic Electricity-definition of voltage, current, power, Energy - Ohm's law, laws of resistance and temperature co-efficient of resistance. Generation of A.C. fundamentals, cycle, frequency, Time period. Faraday's law's of electro-magnetic induction. Electric heating: Principle types of heating like direct resistance heating, indirect resistance heating.		9
Unit V	**BASICS OF MECHANICAL ENGINEERING**	
Definition, manufacturing process – types of manufacturing process – centre lathe (line diagram with explanation only). Types of grinding Machine: pedestal grinder, bench grinder and portable grinder. Power Plant-solar power plant, windmill, geo-thermal power plant, Hydel power plant (line diagram with explanation only).		9
TOTAL HOURS		45

Suggested List of Students Activity

- Presentation/Seminars by students on any recent technological developments based on the course.
- Periodic class quizzes conducted on a weekly/fortnightly based on the course.
- Mini project that shall be an extension of any practical lab exercise to real-world application.

Reference Books

- Elements of Fuels, Furnaces and Refractories, 4th Edition, Gupta. O. P, Khanna Publishers, New Delhi, 2000.
- Engineering Chemistry, P.C. Jain &Manica Jain, Dhanpatrai& Sons,Delhi1986.
- Workshop Technology Vol. I & II, HajraChoudry and Basu S. K. Media Promoters Pub, Mumbai.
- Electrical Technology, H. Cotton, CBS Pub,Delhi.
- A Text book of Electrical Engg, S. L. Uppal, Khanna Pub,Delhi
- Mineral Processing Technology, 3rd Edition, Wills. B. A., PergamonPress,1989
- Extraction Metallurgy, 2nd Edition, Gilchrist. J. D., PergamonPress,1980
- Fuels and Furnace Technology, Balusamy. V., LectureNotes,1996.
- Ore Processing, Jain. S. K., Oxford and IBH,1986.
- Fuels, Furnaces & Refractories – TarapirSenguptha, IIF Study Material,, Kolkata.

Web-based / Online Resources

- https://steeluniversity.org/courses/met0102ta-fuel-furnace-refractory/
- https://archive.nptel.ac.in/courses/113/104/113104008/

PC232120	**Basics of Petrochemical Engineering**	L	T	P	C
Theory		3	0	0	3

Introduction

Basics of Petrochemical Engineering deals with preparation properties, and reactions of crude oil. It is a highly creative science. Chemists can create new materials never before proposed which, if carefully designed, may have important properties for the betterment of the human experience.

Course Objectives

The objective of this course is to enable the students to

- Understand the Origin and occurrence of Crude Oil –
- Know the Classification of Crude Oil and its properties and the Composition of Crude Oil.
- Comprehend the principle of Mining of Petroleum.
- Understand the Refining, Properties and applications of Petroleum products
- Recognize the Nomenclature and Importance of IUPAC nomenclature
- Know the General Methods for preparation and properties of Alkanes, Alkenes, Alcohol, Aldehyde, Acids and Aromatis - Benzene
- Understand various Purification methods
- Know different estimation methods of Nitrogen, Oxygen, Carbon, Hydrogen, Halogens and Sulphur.
- Appreciate the corrosion and its types.
- Understand how to combat against corrosion.

Course Objectives

The objective of this course is to enable the students to

- To describe about origin and composition of crude oil
- To clarify the principle of mining and refining of crude oil
- To articulate about the IUPAC nomenclature of the organic compounds.

And understand the methods of preparation properties and uses of Alkanes, Alkenes, Alcohol, Aldehyde, Acids and Aromatics - Benzene.

- To elucidate the Purification and Estimation of Organic compounds and its elements.
- To know about the corrosion and its control measures.

Course Outcomes

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

CO1	To narrate about origin and composition of crude oil
CO2	To explain the principle of mining and refining of crude oil
CO3	To describe about the IUPAC nomenclature of the organic compounds. And understand the methods of preparation properties and uses of Alkanes, Alkenes, Alcohol, Aldehyde, Acids and Aromatics - Benzene.
CO4	To explain the Purification and Estimation of Organic compounds and its elements.
CO5	To discuss about the corrosion and its control measures.

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	-	-	-	2	3
CO2	3	2	-	-	-	2	3
CO3	3	2	-	-	-	2	3
CO4	3	2	-	-	-	2	3
CO5	3	2	-	-	-	2	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each

area, teachers should provide examples from daily life, realistic situations and real-world engineering and technological applications.

- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome-based and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).
-

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Unit I & II	Written Unit III & IV	Written Model Exam	Quiz/MCQ/ Activity/ Assignment	Written Examination
Duration	2Hours	2Hours	3 Hours	2Hours	3 Hours
Exam Marks	60	60	100	100	100
Converted to	20	20	10	10	60
Marks	20		20		60

Note:
- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for   20 Marks
- CA3 Model examination should be conducted as per the question pattern.
- CA4 Online quiz examination (MCQ)/ Activity/ Assignment should be conducted covering the complete syllabus

PC232120	**Basics of Petrochemical Engineering**	L	T	P	C
Theory		3	0	0	3

Unit I	**ORIGIN AND COMPOSITION OF CRUDE OIL**	
Introduction of Crude Oil. Origin of Crude Oil - Organic Theory, Inorganic Theory. Occurrence of Crude Oil by Biological method. Classification of Crude Oil and its properties (Paraffin's, Olefins, Naphthenes and Aromatics). Inorganic impurities (Nitrogen, Oxygen, Sulphur, Metals and etc.). Composition of Crude Oil.		9
Unit II	**MINING AND REFINING OF CRUDE OIL**	
Mining of Petroleum. Refining of Petroleum - Separation of water, Removal of harmful impurities, Fractional distillation and its products. Properties and applications of Petroleum products - Natural Gas, LPG, Naphtha, Petrol, Diesel, Kerosene and Asphalt.		9
Unit III	**NOMENCLATURE AND IUPAC NAMES OF ORGANIC COMPOUNDS**	
Nomenclature - Importance, IUPAC rules for naming Alkanes, Alkenes, Alcohol, Aldehyde, Acids and Aromatis - Benzene. General Methods for preparation and properties of Alkanes, Alkenes, Alcohol, Aldehyde, Acids and Aromatis - Benzene.		9
Unit IV	**PURIFICATION AND ESTIMATION OF ORGANIC COMPOUNDS IN CRUDE OIL**	
Introduction - Importance of Organic compounds, Purification methods - Sublimation, Crystallization, Distillation and Extraction. Estimation methods of Nitrogen, Oxygen, Carbon, Hydrogen, Halogens and Sulphur.		9
Unit V	**CORROSION AND ITS CONTROL MEASURES**	
Corrosion - Definition - General effects - Different types of Corrosion - Uniform corrosion - Galvanic corrosion - Crevice corrosion - Pitting corrosion - Inter granular corrosion - Galvanic series - Factors affecting corrosion. Corrosion control - cathodic and anodic protection. Use of corrosion inhibitor.		9
TOTAL HOURS		**45**

Pre-requisites

High School Chemistry

References

1. "B.K.Bhaskara Rao" "Modern Petroleum Refining Process", 4th Edition, OXFORD & IBH Publishing Co. Pvt. Limited.
2. "Dr.B.K.Bhaskara Rao" "A Text on Petrochemicals", 1st Edition, Khanna Publishers.
3. "Dr.Ram Prasad" "Petroleum Refining Technology", 1st Edition, Khanna Publishers.
4. "Shashi Chawla" "A Text Book of Engineering Chemistry" 3rd Edition, Dhanpat Rai & Co. (Pvt.) Ltd.
5. "S.S.Dara" "A Text Book of Engineering Chemistry" 1st Edition, S.Chand & Company Ltd.
6. "Jain Jain" "Engineering Chemistry" 15th Edition, Dhanpat Rai & Co. (Pvt.) Ltd.
7. "Bhagan Sahay" "Petroleum Exploration and Exploitation Practices", Allied Publishers Limited.
8. "W.L.Nelson" "Petroleum Refinery Engineering", 4th Edition, Tata McGraw Hill.
9. "G.D.Hobson and W.Rohi" "Modern Petroleum Technology", Applied Sciences.
10. "Howard B.Bradley" "Petroleum Engineering Handbook", Society of Petroleum Engineers.
11. "Shay B" Well site Geological Techniques for Petroleum Exploration", Allied Publishers Limited.

Web-based/Online Resources

1. https://archive.nptel.ac.in/courses/103/102/103102022/
2. https://www.educrib.com/dehradun/colleges/indian-institute-of-technology-iit-roorkee
3. https://nptel.ac.in/courses/103102022
4. https://nptel.ac.in/courses/103103029

PH232441	**Applied Physics – I**	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	2	2

Rationale

This course will give the outline and applications of some important physics principles which are relevant for non-circuit polytechnic branches.

Course Objectives

The objective of this course is to

1. Discuss the basics of rigid body dynamics
2. Explain the properties of fluids and its relevance to technological fields
3. Outline the relevance of acoustic principles, doppler effects & its technological applications
4. Give basics of current, voltage and ohm's law and its applications in engineering field

Course Outcomes

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

CO1: Calculate the moment of inertia, center of mass, center gravity of various objects
CO2: Compare the surface tension and viscosity of various engineering materials
CO3: Formulate acoustic guidelines for buildings and mechanical structures
CO4: Construct simple DC circuits

Pre-requisites

10th Standard Physics

PH232441	Applied Physics – I	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	2	2

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	1	1	1	3
CO2	3	3	2	1	1	1	3
CO3	3	3	2	1	1	1	3
CO4	3	3	2	1	1	1	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where they could be the source of error, if any.

PH232441	**Applied Physics – I**	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	2	2

Assessment Methodology

	Continuous Assessment (40 marks)					End Semester Examination (60 marks)
	CA1		CA2		CA3	
Mode	Written Test (Unit – I)	Practical Test (4 expts)	Written Test (Unit – II)	Practical Test (4 expts)	Model Practical Exam (Ex: 1 to 8)	Practical Exam
Duration	1 hour	2 hours	1 hour	2 hours	3 hours	3 hours
Exam Marks	20	60	20	60	100	100
Converted to	20		20		20	60
Final Marks	20				20	60

Note:

- Average of CA 1 and CA 2 should be considered for the internal assessment of 20 marks
- CA 3 Model examination should be conducted as per the End Semester guidelines. The same should be considered for the internal assessment of 20 marks

PH232441	**Applied Physics – I**	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	2	2

Unit I	**PROPERTIES OF RIGID BODY AND FLUIDS**	
Rigid body – Centre of mass – Centre of gravity – Examples – Torque-Moment of inertia of a rigid body about an axis – Expression – radius of gyration – Moment of inertia of symmetric objects (thin rod, disc, ring, hollow and solid cylinder) – parallel and perpendicular axis theorem (no derivation)- Examples. Fluids – streamline flow, turbulent flow – Critical Velocity - Surface tension - application of capillarity - Viscosity – Definition and SI units-coefficient of viscosity – Reynolds number		6

Ex.No	Name of the Experiment	
1	Determination of moment of inertia of disc using torsional pendulum.	
2	Determination of moment of inertia of rigid rod about center of mass - compound pendulum	12
3	Determination of Surface tension of a liquid by Capillary rise method	
4	Determination of coefficient of Viscosity of highly viscous liquid by Stokes method	

Unit II	**BASICS OF SOUND AND ELECTRICITY**	
Wave motion – audible range – infrasonic and ultrasonic – longitudinal, transverse and progressive waves – standing waves – free and forced vibration – laws of transverse vibration -Sonometer – acoustics of buildings – echo – reverberation – reverberation time – Sabine formula (no derivation) – Noise pollution - Doppler effect – applications. Current – Voltage - Ohm's law – resistance – resistivity - effective resistance - Kirchhoff current and voltage law – Wheatstone bridge - Joule's law of heating –applications of heating effect of electric current		6

Ex.No	Name of the Experiment	
5	Determination of frequency of tuning fork using Sonometer	
6	Determination of resistance & resistivity of a given coil using Wheatstone bridge.	12
7	Verification of laws of resistance - Ohm's law	
8	Determination of specific heat capacity of a liquid using Joule's calorimeter.	
	Test & Assessment	9
TOTAL HOURS		**45**

PH232441	**Applied Physics – I**	L	T	P	C
Practicum	(Non-Circuit Branches)	1	0	2	2

Suggested List of Students Activity

- Presentation/Seminars by students on any recent technological developments based on the course
- Periodic class quizzes conducted on a weekly/fortnightly based on the course
- Micro project that shall be an extension of any practical lab exercise to real-world application

Reference

- XI and XII standard Tamilnadu State Board Physics Text Book, 2023 edition, Textbook Corporation Tamil Nadu
- H.C.Verma, Concepts of Physics Vol 1 & Vol 2, Bharathi Bhavan Publishers, 1st edition, 2021

Web-based/Online Resources

- https://youtu.be/Jtud5iwTd_I?si=zTGcQdimzT0FXtzY
- https://www.youtube.com/watch?v=nVPrWz8Jfgo&list=PLqwfRVlgGdFBVn3o5AmfJGhSv9NXM_XKc&ab_channel=khanacademymedicine
- https://www.youtube.com/watch?v=ZcZQsj6YAgU&list=PLqwfRVlgGdFBHGEZdkmGzKGufuV5I3z0v&ab_channel=KhanAcademyPhysics
- https://www.youtube.com/watch?v=F_vLWkkOETI&list=PLqwfRVlgGdFC7HLoajCVjUk23cqy4QvRL&ab_channel=KhanAcademy

PH232441	Applied Physics – I	L	T	P	C
Practicum	**(Non-Circuit Branches)**	1	0	2	2

Allocation of Marks for End Semester Practical and Model Practical Examination

Part	Description	Marks
A	Aim	5
B	Apparatus Required	5
C	Formulas, Explanations, Tabular Column and Schematic Diagram	10
D	Observations & Reading Taken	50
E	Calculations	20
F	Result	5
G	Viva voce	5
TOTAL MARKS		**100**

Note:

- Practical observation note book is sufficient and no need of separate practical record note book. Submission of Practical observation note book to model practical exam and end semester practical exam is mandatory.

Allocation of Marks for CA1 & CA2 Practical Tests

Part	Description	Marks
A	Aim	2
B	Apparatus Required	2
C	Formulas, Explanations, Tabular Column and Schematic Diagram	6
D	Observations & Reading Taken	25
E	Calculations	10
F	Result	5
G	Observation note book	10
TOTAL MARKS		**60**

PH232441	Applied Physics – I	L	T	P	C
Practicum	(Non-Circuit Branches)	1	0	2	2

Allocation of Marks for CA1 & CA2 Theory Tests

Part – A	5 questions to be answered out of 7 questions	5 x 2 marks	10 marks
Part – B	2 questions to be answered	2 x 5 marks	10 marks
TOTAL			**20 marks**

PH232442	**Applied Physics – II**	L	T	P	C
Practicum	(Circuit Branches)	1	0	2	2

Introduction

This course will give the outline and applications of some important physics principles which are relevant for circuit polytechnic branches

Course Objectives

The objective of this course is to

- Outline the relevance of acoustic principles and doppler effect
- Discuss the properties of light, refractive index, optoelectronic devices
- Define Current, voltage, ohm's law and simple DC circuit
- Introduces the basics of magnetism and Faraday law of Electromagnetic induction and its applications in engineering field

Course Outcomes

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

CO1: Design building structures with safe acoustic guidelines
CO2: Apply optics principles properly to understand the working of technological gadgets and computer and device interfacing
CO3: Construct simple DC circuit and troubleshoot problems in the circuits
CO4: Calculate the effective resistance in series and parallel circuits, classify the materials based on magnetic properties

Pre-requisites

10th Standard physics

PH232442	**Applied Physics – II** (Circuit Branches)	L	T	P	C
Practicum		1	0	2	2

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	1	1	1	3
CO2	3	3	2	1	1	1	3
CO3	3	3	2	1	1	1	3
CO4	3	3	2	1	1	1	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where they could be the source of error, if any.

PH232442	Applied Physics – II	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	2	2

Assessment Methodology

	Continuous Assessment (40 marks)					End Semester Examination (60 marks)
	CA1		CA2		CA3	
Mode	Written Test (Unit – I)	Practical Test (4 expts)	Written Test (Unit – II)	Practical Test (4 expts)	Model Practical Exam (Ex: 1 to 8)	Practical Examination
Duration	1 hour	2 hours	1 hour	2 hours	3 hours	3 hours
Exam Marks	20	60	20	60	100	100
Converted to	20		20		20	60
Final Marks	20				20	60

Note:

- The average of CA 1 and CA 2 should be considered for the internal assessment of 20 marks
- The model examination should be conducted as per the End Semester guidelines. The same should be considered for the internal assessment of 20 marks

PH232442	Applied Physics – II	L	T	P	C
Practicum	(Circuit Branches)	1	0	2	2

Unit I	SOUND & OPTICS	
Wave motion – audible range – infrasonic and ultrasonic – longitudinal, transverse and progressive waves – standing waves – free and forced vibration – Sonometer – acoustics of buildings – echo – reverberation – reverberation time – Sabine formula (no derivation) – Noise pollution – Doppler effect – applications. Reflection - Refraction – laws of reflection and refraction – refractive index of a medium – Total internal reflection – fiber optics – applications – Laser – Principle – applications – point lasers – remote sensing – RADAR – principle and applications – Sensors – Basics – various types – applications – Optoelectronic devices		6
Ex.No	Name of the Experiment	
1	Determination of Refractive index of the glass plate using pin and paper	
2	Determination of Refractive index of water using travelling microscope	9
3	Determination of frequency of tuning fork using Sonometer.	
Unit II	BASICS OF ELECTRICITY AND MAGNETISM	
Current- Voltage - Ohm's law – resistance – effective resistance - Kirchhoff current and voltage law - Internal resistance of the cell - Joule's law of heating – applications of heating effect of electric current Faraday law of electromagnetic induction – applications - Inductor - Self & Mutual inductance - – bar magnets - Pole strength – Magnetic moment –intensity of magnetization – magnetic field - types of magnetic materials and applications		6
Ex.No	Name of the Experiment	
4	Verification of laws of resistance - Ohm's law	
5	Determination of the internal resistance of the cell using potentiometer	
6	Experimental determination of specific heat capacity of a liquid using Joule's calorimeter.	15
7	Draw the V-I characteristics of solar cell and find the efficiency	
8	Comparison of magnetic moments of two small bar magnets - deflection magnetometer Tan A position by equal distance method	
	Test & Assessment	9
	TOTAL HOURS	**45**

PH232442	Applied Physics – II	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	2	2

Suggested List of Students Activity

Other than classroom learning, the following are the suggested student related co-curricular activities which can be undertaken to accelerate the attainment of the various outcomes in this course.

- Presentation/Seminars by students on any recent technological developments based on the course
- Periodic class quizzes conducted on a weekly/fortnightly based on the course
- Micro project that shall be an extension of any practical lab exercise to real-world application

Reference

- XI and XII standard Tamilnadu State Board Physics Text Book, 2023 edition, Textbook Corporation Tamil Nadu
- H.C.Verma, Concepts of Physics Vol 1 & Vol 2, Bharathi Bhavan Publishers, 1st edition, 2021

Web-based/Online Resources

- https://www.youtube.com/watch?v=nVPrWz8Jfgo&list=PLqwfRVlgGdFB Vn3o5AmfJGhSv9NXM_XKc&ab_channel=khanacademymedicine
- https://www.youtube.com/watch?v=ZcZQsj6YAgU&list=PLqwfRVlgGdF BHGEZdkmGzKGufuV5I3z0v&ab_channel=KhanAcademyPhysics
- https://www.youtube.com/watch?v=F_vLWkkOETI&list=PLqwfRVlgGdF C7HLoajCVjUk23cqy4QvRL&ab_channel=KhanAcademy

PH232442	Applied Physics – II	L	T	P	C
Practicum	(Circuit Branches)	1	0	2	2

Allocation of Marks for End Semester Practical and Model Practical Examination

Part	Description	Marks
A	Aim	5
B	Apparatus Required	5
C	Formulas, Explanations, Tabular Column and Schematic Diagram	10
D	Observations & Reading Taken	50
E	Calculations	20
F	Result	5
G	Viva voce	5
TOTAL MARKS		**100**

Note:

- Practical observation note book is sufficient and no need of separate practical record note book. Submission of Practical observation note book to model practical exam and end semester practical exam is mandatory.

Allocation of Marks for CA1 & CA2 Practical Tests

Part	Description	Marks
A	Aim	2
B	Apparatus Required	2
C	Formulas, Explanations, Tabular Column and Schematic Diagram	6
D	Observations & Reading Taken	25
E	Calculations	10
F	Result	5
G	Observation note book	10
TOTAL MARKS		**60**

PH232442	**Applied Physics – II**	L	T	P	C
Practicum	**(Circuit Branches)**	1	0	2	2

Allocation of Marks for CA1 & CA2 Theory Tests

Part – A	5 questions to be answered out of 7 questions	5 x 2 marks	10 marks
Part – B	2 questions to be answered	2 x 5 marks	10 marks
TOTAL			**20 marks**

PL232120	**Basic Organic Chemistry**	L	T	P	C
Theory		3	0	0	3

Introduction

Organic chemistry is the branch of chemistry that deals with the structure, properties, and reactions of compounds that contain carbon. It is a highly creative science. Chemists in general and organic chemists in particular can create new molecules never before proposed which, if carefully designed, may have important properties for the betterment of the human experience.

Beyond our bodies' DNA, peptides, proteins, and enzymes, organic compounds are all around us and in industries such as the rubber, plastics, fuel, pharmaceutical, cosmetics, and detergent, coatings, dyestuffs, and agrichemicals industries. Clearly, organic chemistry is critically important to our high standard of living.

There is tremendous excitement and challenge in synthesizing a molecule never before made synthetically or found in nature. Tailoring the properties of that molecule via chemical synthesis to produce beneficial effects to meet the needs of the present and future human existence is both challenging and rewarding.

Course Objectives

The objective of this course is to enable the students to

- To learn about the IUPAC nomenclature of the organic compounds.
- To know about the different methods of purification of the organic compound.
- To understand the different types of isomerism. Free radical, initiators and inhibitors.
- To know about the methods of preparation properties and uses of ethylene, methanol, ethanol, ethylene glycol and glycerol.
- To study the different methods of preparation properties and uses of formaldehyde, acetaldehyde, acetic acid, and amines and to distinguish

between 1º, 2º&3º amines from their chemical properties. To learn the Hoffmann method of separation of primary, Secondary and tertiary amines.

- To learn about the fractional distillation of coal tar and the various fractions.
- To study about the methods of preparation of properties and uses of Benzene, nitrobenzene, aniline and phenol.

Course Outcomes

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

CO1	To narrate about the IUPAC nomenclature and different methods of purification of the organic compounds.
CO2	To explain the different types of isomerism and different types of reactions.
CO3	To describe about the methods of preparation properties and uses of ethylene, methanol, ethanol, ethylene glycol and glycerol.
CO4	To explain the different methods of preparation properties and uses of formaldehyde, acetic acid and amines.
CO5	To discuss about the fractional distillation of coal tar and the various fractions. To study about the methods of preparation of properties and uses of Benzene, nitrobenzene, aniline and phenol

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	-	-	-	2	3
CO2	3	1	-	-	-	2	3
CO3	3	1	-	-	-	2	3
CO4	3	1	-	-	-	2	3
CO5	3	1	-	-	-	2	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their

learning confidence.

- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome-based and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Unit I & II	Written Unit III & IV	Written Model Exam	Quiz/MCQ/ Activity/ Assignment	Written Examination
Duration	2Hours	2Hours	3 Hours	2Hours	3 Hours
Exam Marks	60	60	100	100	100
Converted to	20	20	10	10	60
Marks	20		20		60

Note:

- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for   20 Marks
- CA3 Model examination should be conducted as per the question pattern.

- CA4 Online quiz examination (MCQ)/ Activity/ Assignment should be conducted covering the complete syllabus

PL232120	Basic Organic Chemistry	L	T	P	C
Theory		3	0	0	3

Unit I	CLASSIFICATION, NOMENCLATURE AND PURIFICATION OF ORGANIC COMPOUNDS	
Classification of organic compounds - IUPAC nomenclature - Alkane, Alkene, Alkyne, alcohol, ether, aldehyde, ketone, carboxylic acid and amines. Purification of organic compounds - Principles of crystallization, sublimation, fractional distillation and column chromatography.		9
Unit II	ISOMERISM AND TYPES OF ORGANIC REACTIONS	
Isomerism - structural isomerism - chain isomerism, position isomerism, functional isomerism, metamerism and tautomerism (Keto- enol tautomerism only). Stereoisomerism - optical isomerism (Lactic acid only)-Geometrical isomerism (Maleic acid and Fumaric acid only). Types of organic reactions (Definition and an example only) - Substitution reaction - Addition reaction - Elimination reaction - Isomerisation reaction - condensation reaction - Polymerisation - Addition Polymerisation (Preparation of Polyethylene by free radical mechanism only) - Condensation polymerization (Preparation of Nylon- 6,6)		9
Unit III	HYDROCARBONS, ALCOHOLS AND ETHER	
General methods of preparation, properties and uses of ethylene, Methanol (from water gas and by oxidation of CH4). Ethanol (from ethylene, molasses), Ethylene glycol (from ethylene), Glycerol (from fats and oils)		9
Unit IV	CARBONYL COMPOUNDS AND AMINES	
General methods of preparation, properties and uses of Formaldehyde, Acetic acid, and Amines (Primary secondary and tertiary amine). Separation of primary, secondary and tertiary amines by Hoffmann method - Difference between primary, Secondary and tertiary amines.		9
Unit V	AROMATIC COMPOUNDS	
Coal tar - Fractional distillation of coal tar - Different products and their uses - Commercial preparation of benzene from (i) coal tar and (ii) Petroleum - Properties of benzene. General methods of preparation properties and uses of		9

Nitrobenzene, Aniline and Phenol	
TOTAL HOURS	**45**

Pre-requisites

High School Chemistry

References

1. B.S. Bahl and Arun Bahl - Text book of organic Chemistry

2. P.L. Soni and H.M. Chawla - Text book of organic Chemistry

3. K.S. Tewari S.N. Mehrotra and N.K. Vishnoi - Text book of organic chemistry

4. B.K. Sharma, G.P. Pokhariyal and S.K.Sharma.- Organic Chemistry - Vol-I and II

5. S.P. Shukla and G.L. Trivedi - Modern Organic Chemistry

6. +1 and +2 Chemistry - Tamil Nadu Textbook Corporation.

Web-based/Online Resources

1. http://www.masterorganicchemistry.com/
2. https://www.khanacademy.org/science/organic-chemistry
3. https://nptel.ac.in/courses/104103071
4. https://www.organic-chemistry.org/
5. https://archive.nptel.ac.in/courses/104/106/10410619/

PT232120	BASICS OF PRINTING & PAPER TECHNOLOGY	L	T	P	C
Theory		3	0	0	3

Introduction:

Fundamental knowledge in the field of Printing Technology & Paper is essential for the Printing & Paper Technologists. They must thoroughly study the various printing and paper processes, structure of the printing industry and various print & paper finishing processes. This foundational subject is crucial for a comprehensive grasp of the principles. To develop the necessary psychomotor skills in this area, students should not only understand the concepts but also apply them effectively.

Course Objectives:

The objective of this course is to enable the student to

1. Impart fundamental knowledge and skills regarding basics of printing & paper technology, which diploma holders will come across in their professional life.
2. Learn the basic concepts and overview of Printing and Paper Technology to understand the importance of a printing and paper technologist.
3. Learn about various printing and paper making processes.
4. Develop a comprehensive understanding of structure of the printing and paper industry.
5. Gain knowledge about various print and paper finishing processes.

Course Outcomes:

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

CO1: Recognize the importance of basic principles of printing processes.

CO2: Classify the structure of printing industry and digital prepress.

CO3: Illustrate the various print finishing processes and materials used in binding.

CO4: Acquire basic knowledge about paper making processes.

CO5: Understand the stock preparation and process of paper making machine.

Pre-requisites:

Knowledge of basic Science

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	-	-	-	-
CO2	1	2	3	-	-	-	-
CO3	-	-	3	-	-	-	-
CO4	3	2	2	-	-	-	-

	3	2	2	-	-	-	-
CO5							

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- Engage and Motivate: Instructors should actively engage students to boost their learning confidence.

- Real-World Relevance: Incorporate relatable, real-life examples and engineering applications to help students understand and appreciate course concepts.

- Interactive Learning: Utilize demonstrations and plan interactive student activities for an engaging learning experience.

- Application-Based Learning: Employ a theory-demonstrate-practice-activity strategy throughout the course to ensure outcome-driven learning and employability.

- Simulation and Real-World Practice: Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real-world scenarios when possible.

- Encourage Critical Analysis: Foster an environment where students can honestly assess experiment outcomes and analyze potential sources of error in case of discrepancies

Assessment Methodology:

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Unit I & II	Written Unit III & IV	Written Model Exam	Quiz	Written Examination
Duration	2	2	3	2	3 hours
Exam Marks	60	60	100	100	100
Converted to	20	20	10	10	60
Marks	**20**		**20**		**60**

Note:

● CA1 and CA2 Assessment test should be conducted. Best of one will be considered for 20 Marks.

● CA3 Model examination should be conducted as per the question pattern.

● CA4 Online quiz examination (MCQ) should be conducted covering the complete syllabus.

PT232120	BASICS OF PRINTING AND PAPER TECHNOLOGY	L	T	P	C
Theory		3	0	0	3

Unit I	**Introduction to Printing Processes**	
1.1 Basic principles of Printing Processes – Letterpress - Lithography – Offset Printing – Intaglio – Gravure –Flexography - Screen Printing – Digital Printing.		9 Hrs.
Unit II	**Structure of Printing Industry**	
2.1 Structure of Printing Industry – Prepress – Press – Postpress and Workflow of Printing Industry, 2.2 Different stages in Prepress – Desktop Publishing – Components of DTP.		9 Hrs.
Unit III	**Print Finishing and Converting**	
3.1 Classification of Book Binding – Binding and Finishing Tools. 3.2 Materials used in binding – Stitching and Sewing – Varnishing – Lamination.		9 Hrs.
Unit IV	**Introduction to Paper making**	
4.1 History of pulp and paper making-flow chart of pulp and paper industry. 4.2 Selection of pulp and paper making raw materials (i) wood based raw material (ii) agriculture residue (iii) recycled fibre (iv) synthetic fibre. 4.3 Classification of Pulping Methods, Processing of pulp, Washing of pulp-screening and cleaning of pulp-bleaching of pulp.		9 Hrs.
Unit V	**Stock Preparation**	
5.1 Flow chart of stock preparation process - Blending of different pulps, Theory of beating and refining-addition of non-fibrous additives. 5.2 Importance of sizing chemical - role of filler –introduction of strength additives - theory of retention- dyeing of paper. 5.3 Process Diagram of Paper machine - Approach Flow System-Head box and its types-single wire fourdrinier machine 5.4 Reason for calendaring of paper –paper rewinding-sheet cutting equipment-paper finishing and packing.		9 Hrs.
Total Hours		**45 Hrs.**

Suggested List of Students Activity:

- Presentation/Seminars by students on any recent technological developments based on the course.
- Periodic class quizzes conducted on a weekly/fortnightly based on the course.
- Mini project that shall be an extension of any practical lab exercise to real-world application.

Reference:

1. Hand Book of Print Media – Helmut Kipphan – Springer.
2. Introduction to Printing and Finishing – Hugh M Speirs – PIRA.
3. Printing Materials - Science and Technology - Thompson, Bob - PIRA.
4. Printing Paper and Ink - Charles Finley.
5. The Print Production Manual - J. Peacock, C. Berril and M. Barnard - PIRA.
6. Sheetfed Offset Press Operating – Lloyd P Dejidas and Thomas M Destree – GATF Press.
7. Desk Top Publishing - by Ron Strutt and Kirty Wilson Davis
8. Flexography Primer – GATF Press
9. Gravure Primer – GATF Press
10. Screen Printing primer – GATF Press

Web-based/Online Resources:

1. NPTEL (Website): The National Programme on Technology Enhanced Learning (NPTEL) offers free online courses on printing and paper making processes and other Printing and Paper Technology topics.
2. www.labelandnarrowweb.com
3. www.inkworldmagazine.com
4. https:/www.paperandpackaging.org
5. https:/www.asiapulpandpaper.com
6. https:/www.sciencedirect.com
7. https:/www.designpackagingandtapes.co.za
8. https:/www.internationalpaper.com
9. www.flexotechmag.com
10. www.taga.org
11. www.heidelberg.com
12. www.manrolandsheetfed.com
13. www.koenig-bauer.com

SU232120	BASIC ENGINEERING FOR SUGAR INDUSTRY	L	T	P	C
Theory		3	-	-	3

INTRODUCTION:

The subject allows the students to gain knowledge in understanding the various mechanical properties of materials, steam generation systems, Boiler function and the important components of a boiler, steam turbines, pumps and its types, electrical distribution systems and electrical transmissions.

COURSE OBJECTIVES:

On completion of this subject, the students can able to understand the following concepts:
- Various mechanical properties of the materials and types of stresses.
- Comparison of thin and thick cylindrical shell.
- Understand the properties of steam and the function of boiler.
- Function of boiler accessories and boiler mountings.
- Understand the importance of steam turbines.
- Understand the importance of pumps.
- Importance of electrical distribution system.
- Importance of electrical emergency systems.
- Importance of electric motor and its working principle.
- Importance of D.C generator and its working principle

COURSE OUTCOMES:

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

CO1: Recognize the properties of different materials.

CO2: Acquire basic knowledge about steam generation and boilers.

CO3: Study about basic knowledge of turbine and pumps.

CO4: Understand the basics of electrical definition and working principles.

CO5: Having knowledge about electric motors.

CO / PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	-	2	-	-	-
CO2	3	1	3	2	-	-	-

CO3	3	2	2	3	-	-	-
CO4	3	2	2	2	-	-	1
CO5	3	-	3	3	2	-	1

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (unit 1 & 2)	Written Test (unit 3 & 4)	Quiz / MCQ	Model Examination	Written Examination
Duration	2 hours	2 hours	1 hour	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Marks	20		20		60

Note:
- CA1 and CA2: Assessment tests should be conducted. Best of one will be considered for the internal assessment of 20 Marks.
- CA3: Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 Marks for the internal assessment.
- CA4: Model examination should be conducted as per the end semester question pattern. The marks should be converted to 10 Marks for the internal assessment.

SU232120	BASIC ENGINEERING FOR SUGAR INDUSTRY	L	T	P	C
Theory		3	-	-	3

I	**STRENGTH OF MATERIALS** Mechanical properties of materials – Elasticity, Plasticity, Ductility, Malleability, Wear resistance, Toughness, Brittleness, Hardness, Fatigue and Creep. Simple stresses and strains- types of stress-tensile, Compressive and shear stress – Stress -Strain diagram – Hooke's law – Young's modulus – Lateral strain – Poisson's ratio – Volumetric Strain – Bulk modulus- Temperature stress and strains. Cylindrical shells – Definition – Thin and thick cylindrical shell Comparison.	**9 Periods**
II	**STEAM GENERATION SYSTEM AND BOILERS** Steam- Distinguish the wet steam, dry steam, saturated steam and supersaturated steam. Properties of steam- sensible heat, latent heat, total heat of steam, superheat and dryness fraction. Boiler- function of boiler- Distinguish between fire tube boiler and water tube boiler- Distinguish between low pressure boiler and high pressure boiler- Definition of low pressure steam, medium pressure steam and high pressure steam- Describe with line diagram the construction and working of a Simple Vertical Boiler. Function of boiler mountings such as safety valve, water level indicator, pressure gauge, feed check valve, and fusible plug. (Brief descriptions only) Function of Boiler accessories such as Economizer, feed pump, super heater and air pre-heater. (Brief descriptions only)	**9 Periods**
III	**STEAM TURBINE , PUMPS AND COMPRESSOR** Steam turbine- purpose of steam turbine in process industries- common types of steam turbines: Reaction turbine, impulse turbine, condensable steam turbine and non- condensable turbine (Brief description only). Construction and working principle of steam turbine with simple sketch- Turbine efficiency- Explain how lowering the exhaust pressure of steam turbine effects efficiency. Flash point-fire point-pour point-cloud point of different fuels-Pumps-types-reciprocating pump-centrifugal pumps-Gear pump -working – application-Compressor-types	**9 Periods**
IV	**ELECTRICITY AND ELECTRICAL DISTRIBUTION SYSTEM.** Definition the following terms: Electricity- Voltage- Voltmeter- Ampere- Ammeter-watts- wattmeter- Ohm's. Statement of Ohm's Law- simple problems in Ohm's Law. Grounding and the purpose of grounding the motors and equipments. Types of current- AC Current & DC current- comparison of AC & DC	**9 Periods**

	current. Electrical Distribution systems: Transformers- Motor Control Centers (MCC) - Fuses- Circuit breakers- Switch. (Functions of the above with brief description). Electrical power failure and effect of power failure in process units- Electrical Emergency system- Uninterrupted power source (UPS).	
V	**ELECTRICAL TRANSMISSIONS** Electric motor- purpose of electric motor- D.C motor- principle and characteristics of D.C Motor- Synchronous motor and Induction motor- construction and working principle of electric motor. Electric motors and maintenance: Starting the motor, motor vibration, temperature and lubrication, cleaning and ventilation & overload motors. D.C Generator- Principle, construction and working of D.C Generator.	**9 Periods**

Reference Books

1. Theory of Mechanics by R.S Khurmi- Eurasia Publishing House.

2. A text book of power plant engineering by R.K. Rajput, Laxmi Publishers.

3. A text book of refrigeration and air conditioning by R.S. khurmi, S.Chand Publishers.

4. Practical boiler operation engineering and power by MallickRanjan, PHI Publishers.

5. A text book of Electrical technology Vol.1 and Vol.2 by B.L. Theraja, S.Chand publishers.

TA232110	தமிழரும் தொழில்நுட்பமும்	L	T	P	C
Theory	**Tamils and Technology**	2	0	0	2

Introduction

This course provides an opportunity for students who have Tamil as their mother tongue and for students from other states to have multifold outcomes. Learning in the mother tongue is a key factor for inclusion and quality learning, and it also improves learning outcomes and academic performance. This is crucial, for appreciation of Tamil as a language and as a culture. It fosters mutual understanding and respect for one another and helps preserve the wealth of cultural and traditional heritage that is embedded in Tamil language around the world.

Course Objectives

The objective of this course is to enable the student to

- Appreciate weaving and ceramic technology
- Learn the design and construction technology of ancient times
- understand the engineering principles of manufacturing technology
- introduce the methods of irrigation and agricultural technology
- learn the scientific tamil and tamil computing

Course Outcomes

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

CO1: Explain the principles behind weaving and ceramic technology of ancient tamils
CO2: Correlate the present and ancient design and construction technology
CO3: Apply engineering principles to ancient manufacturing technology
CO4: Apply engineering principles to irrigation and agricultural technology
CO5: Develop scientific tamil and new techniques in tamil computing

TA232110	தமிழரும் தொழில்நுட்பமும்	L	T	P	C
Theory	**Tamils and Technology**	2	0	0	2

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III & IV)	Quiz / MCQ	Model Examination	Written Examination
Duration	2 hours	2 hours	1 hour	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Marks	40				60

Note

- CA1 and CA2 Assessment test should be conducted. Best of one will be considered for the internal assessment of 20 Marks.
- CA3 Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 marks for the internal assessment
- CA4 Model examination should be conducted as per the end semester question pattern. The marks should be converted to 10 marks for the internal assessment.

TA232110	தமிழரும் தொழில்நுட்பமும்	L	T	P	C
Theory	**Tamils and Technology**	2	0	0	2

அலகு I	நெசவு மற்றும் பானைத்தொழில்நுட்பம்	
சங்க காலத்தில் நெசவுத்தொழில்- பானைத்தொழில் நூட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்		5

அலகு II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்	
சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம் சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் விற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக் கட்டிடக் கலை.		7

அலகு III	உற்பத்தி தொழில்நுட்பம்	
கப்பல் கட்டும் கலை - உலோகவியல் - இரும்பு தொழிற்சாலை - இரும்பை உருக்குதல், ஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத் துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.		6

அலகு IV	வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்	
அணை, ஏரி, குளங்கள், மதகு – சோழர் காலக் குமுழித் தூம்பின் முக்கியத்துவம் – கால்நடை பராமரிப்பு – காலநடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் – கடல்சார் அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்குளித்தல் – பெருங்கடல் குறித்த பண்டைய அறிவு – அறிவுசார் சமூகம்.		6

TA232110	தமிழரும் தொழில்நுட்பமும்	L	T	P	C
Theory	**Tamils and Technology**	2	0	0	2
அலகு V	அறிவியல் தமிழ் மற்றும் கணித்தமிழ்				

அறிவியல் தமிழின் வளர்ச்சி – கணித்தமிழ் வளர்ச்சி – தமிழ் நூல்கள் மின்பதிப்பு செய்தல் – தமிழ் மென்பொருட்கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்கழகம் – தமிழ் மின் நூலகம் – இணையத்தில் தமிழ் அகராதிகள் – சொற்குவைத்திட்டம்	6
TOTAL HOURS	**30**

References

- தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே.பிள்ளை (வெளியீடுதமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே.பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)

- கணினித் தமிழ் – முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்)

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

- பொருநை – ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)

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

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

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

- The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by International Institute of Tamil Studies.)

- 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)

- Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)

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

- Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: Roja Muthiah Research Library)

TA232110	தமிழரும் தொழில்நுட்பமும்	L	T	P	C
Theory	**Tamils and Technology**	2	0	0	2

Unit I	**WEAVING AND CERAMIC TECHNOLOGY**	
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.	5

Unit II	**DESIGN AND CONSTRUCTION TECHNOLOGY**

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.	7

Unit III	**MANUFACTURING TECHNOLOGY**

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.	6

Unit IV	**AGRICULTURE AND IRRIGATION TECHNOLOGY**

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.	6

Unit V	**SCIENTIFIC AND TAMIL COMPUTING**

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	6
TOTAL HOURS	**30**

TT232120	**Basics of Textile Technology**	L	T	P	C
Theory		3	0	0	3

Introduction

The basics of Textiles deal with fundamental concept of Textile Technology and also illustrate the basic outline and understand of the fibre science, spinning, weaving, wet processing and applications of textiles.

Course Objectives

- To understand the fibre and classification of textile fibres
- To understand the outline of spinning process for production of cotton and synthetic yarn.
- To understand the outline of the weaving process
- To understand the outline of textile wet processing
- To study the application of textiles in various areas

Course Outcomes

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

CO1: Summarize the natural and synthetic fibres
CO2: Summarize the process of yarn spinning
CO3: Correlate the different process of woven fabric formation
CO4: Illustrate textile wet processing
CO5: Develop applications of textiles in suitable fields

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	-	2	-		1	-
CO2	2	-	2	-	2	1	-
CO3	2	-	2	-	2	1	-
CO4	2	-	2	-	2	1	-
CO5	2	-	-	3	2	1	-

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

TT232120	**Basics of Textile Technology**	L	T	P	C
Theory		3	0	0	3

Instructional Strategy

- It is advised that teachers take steps to attract student's attention and boost their learning confidence.

- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples like daily life, realistic situations, and real-world engineering and technological applications.

- The demonstration can make the subject exciting and foster involvement the students a scientific mindset. Student activities should be observed and planned on all the topics.

- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.

- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit 1 & 2)	Written Test (Unit 3 & 4)	Quiz/ MCQ	Model Examination	Written Examination
Duration	2 hours	2 hours	1 hour	3 hours	3 hours
Exam Marks	60	60	40	100	100
Converted to	20	20	10	10	60
Final Marks	40				60

Note:
- **CA1 and CA2:** Assessment tests should be conducted. Best of one will be considered for the internal assessment of 20 Marks.
- **CA3:** Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 Marks for the internal assessment.
- **CA4**: Model examination should be conducted as per the end semester question pattern. The marks should be converted to 10 Marks for the internal assessment

TT232120	**Basics of Textile Technology**	L	T	P	C
Theory		3	0	0	3

Unit I	**TEXTILE FIBRES**	
Introduction, Definition of staple fibre, filament, Classification of natural and manmade fibres , Natural fibre – cotton, jute, wool & silk, cultivation of cotton, Introduction -Manmade fibres- polyester, nylon, polypropylene, polyethylene, Acrylic , carbon and Kevlar, end use of all textile fibres		9
Unit II	**BASICS OF SPINNING**	
Introduction of spinning, Opening and cleaning of fibre, Name of the opening devices, Sequence of machines for yarn production from 100% cotton fibres, polyester/ cotton blended fibres, 100% polyester staple fibres.		9
Unit III	**BASICS OF WEAVING**	
Introduction -Woven fabric – definition of warp, weft, sequence of preparatory process for weaving, material passage in power loom, types of fabric - plain fabric, stripped fabric, checked fabric, printed fabric and end uses.		9
Unit IV	**BASICS OF WET PROCESSING**	
Definition- dyes, pigments, classification of natural and synthetics dyes, Sequence of preparatory process in dyeing, dyeing of cotton fabric, Definition of printing, Definition of Finishing, Importance of finishing and Types of finishing.		9
Unit V	**APPLICATION OF TEXTILES**	
Major applications of Textiles- Apparels, Industrial applications - Geo Textiles, Medical Textiles, Protective textiles, Agro tech, home tech, mobile tech, Oekotech, Pack tech, and sports textiles		9
TOTAL HOURS		**45**

TT232120	**Basics of Textile Technology**	L	T	P	C
Theory		3	0	0	3

Suggested List of Students Activity (Ungraded)

- Presentation/Seminars by students on any recent technological developments based on recent development of Textile product.
- Periodic class quizzes conducted on a weekly/ fortnightly basis to reinforce the basic textile subject concepts
- Micro project that shall be an extension of practical lab exercise to real-world application
- Instruct to the students that they have to interacted with aluminous of the department to know the current scenario of the textile market
- The students should visit to the nearest industry, to acquire the practical knowledge in their interested area topics.
- Teacher / Lecturer should be motivated to their students to make small scale entrepreneur.
- Students have to develop the good relationship with core company
- The students have to read the latest research journal and upgrade their knowledge and to create the innovative products.

References

1. Wymne, A., The Motivate Textile Series, Macmillan Publishers Limited, 1997.
2. Bernard P. Corbman, Textiles: Fiber to Fabric, McGraw-Hill marketing, Sixth Edition1983.
3. Textile Hand book, The Hong Kong Cotton Spinner Association, First Edition , 2001
4. Horrocks, A.R & Anand, S.C. Handbook of Technical Textiles, Wood Head Publishing Limited, 2000.
5. Sabit Adanur, Handbook of Industrial Textiles, Johnston Industries Group, 1995.
6. Yasir Nawab (Ed), Textile Engineering An Introduction, Walter De Gruyter Oldenbourg,Boston, 2016.

TT232460	Basics of Textile Machineries	L	T	P	C
Practicum		1	0	2	2

Introduction

The basics of Textile machineries deal the machine elements with their functions and its applications in various of spinning, weaving, and wet processing of machines in Textile Industry.

Course Objectives

- To identify the machine elements of textile machines
- To know the function of textile machine prats
- To understand the application of clutch, brake and cam in Textile machines
- To understand the basic concept of various motors
- To understand the role of various sensor using in textile industry

Course Outcomes

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

CO1: Have knowledge of types of belts and their applications
CO2: Have knowledge of types of gear, gear trains and applications
CO3: Have knowledge on Clutch and Brake
CO4: Understand the function of sensors
CO5: Understand the function of motors

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	-	2	2	-	-	1
CO2	1	-	2	2	-	-	1
CO3	1	-	2	2	-	-	1
CO4	1	-	2	2	-	-	1
CO5	1	-	2	2	-	-	1

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to attract student's attention and boost their learning confidence.

- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples like daily life, realistic situations, and real-world engineering and technological applications.

- The demonstration can make the subject exciting and foster involvement the students a scientific mindset. Student activities should be observed and planned on all the topics.

- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.

- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)	
	CA1	CA2	CA3	CA4	Written Examination	Practical Examination
Mode	Written Test	Written Test	Lab Test	Class/ Assignment	Written Examination	Practical Examination
Duration	2 hours	2 hours	3 hours	Record/ Observation & Other Class Activities	1½ hours	1½ hours
Exam Marks	30	30	30	10	50	50
Converted to	15	15	15	10	60	
Marks	Best of CA1 & CA2 15		15	10	60	

TT232460	**Basics of Textile Machineries**	L	T	P	C
Practicum		1	0	2	2

Unit I	**BELT DRIVES**	
Introduction – Drives, Types of drives – Belt drives, Chain drives, Belt drives – Flat belt, V belt, Toothed belt drive and tape drives – Applications, Chain and sprocket – applications		3
Ex. 1	Study of belt drives used in blow room machines.	
Ex. 2	Study of belt drives used in carding machine and draw frame.	6
Ex. 3	Study of belt drives used in Roving frame and ring frame.	
Unit II	**MECHANISM OF GEARS**	
Types of gears – Spur gear, Rack and pinion, helical, Bevel, worm and worm wheel; Gear trains- simple gear train, Compound gear, Epicyclical Gear Trains in Roving frame and comber machine, Types of drafting roller used in draw frame, roving frame and ring frame		3
Ex. 4	Study of gears used in blow room and carding machine.	
Ex. 5	Study of gears used in roving frame and ring frame.	6
Ex. 6	Study of roller used in draw frame, simplex and ring frame	
Unit III	**CLUTCH, BEARING, BRAKE AND CAM**	
Clutch – types of clutches – mechanical lockup clutch and frictional clutch, applications, bearing – Types of bearing –Bush bearing, Ball bearing, roller bearing; cam – Types, applications, brake – types, Applications		3
Ex. 7	Study of clutches used in spinning machines.	
Ex. 8	Study of bearing used in spinning machines.	6
Ex. 9	Study of cams and tappet used in loom.	
Unit IV	**MEASURING INSTRUMENTS AND SENSORS**	
Introduction – Functions of Sensors – Types of sensors – Applications of sensors – Definition of Temperature, Pressure, Infrared sensor– Limit switch, mechanical measuring systems used in auto leveller, Photo sensors – applications.		3

TT232460	Basics of Textile Machineries	L	T	P	C
Practicum		1	0	2	2
Ex. 10	Study of auto leveller used in Carding machine.			6	
Ex. 11	Study of auto leveller used in draw frame.				
Unit V	**MOTORS**				
Construction of Electrical motors and Generators. Induction Motors- Principle of working of single, two, three phase, Induction motors – types of induction motors - Necessity of starter- -Servo motor – definition – uses.				3	
Ex. 12	Study of single phase motor, two phase motor, three phase motor, AC Motors and DC Motors.			6	
TOTAL HOURS				45	

Suggested to student activity

- Presentation/Seminars by students on any recent technological developments based on recent development of Textile product.
- Periodic class quizzes conducted on a weekly/ fortnightly basis to reinforce the basic textile subject concepts
- Micro project that shall be an extension of practical lab exercise to real-world application
- Instruct to the students that they have to interacted with aluminous of the department to know the current technology update
- The students should visit to the nearest industry, to acquire the practical knowledge in their interested area topics.
- Teacher / Lecturer should be motivated to their students to make innovative idea and creation.
- Students have to develop the good relationship with core company
- The students have to read the latest research journal and upgrade their knowledge and to create the innovative products.

References

- Rengasamy, R.S, Mechanics of Spinning Machines Published by NCUTE (National Centre for Upgradation of Textile Education in India, 2002.
- Slater K., Textile Mechanics Vol. 1&2, The Textile Institute, Manchester, 1977.
- Ashok Kumar L and SenthilKumar M, Automation in Textile Machinery Instrumentation and Control System Design Principles, CRC press, 2018.

WD232320	**Basics of Programming Language**	L	T	P	C
Practicum		1	0	2	2

Introduction

This course is designed to provide students with a comprehensive understanding of the fundamentals of programming. Through a structured curriculum, students will delve into the history of programming languages, master algorithmic thinking, learn to represent logic through flowcharts, and gain practical programming skills using the C language.

Course Objectives

The objective of this course is to enable the student to

- Learn the concepts of developing an Algorithm and flowchart
- Know the basics and the fundamentals of C Language such as variables, data types and control structures.
- Use of Controls Statements and Looping Statements.
- Learn about arranging data in Arrays and String manipulations.
- Gain grasp of programming fundamentals such Ability to design programs using functions and structures.

Course Outcomes

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

CO1: Understand about the algorithm and flowchart concepts.
CO2: Store different data types and variables
CO3: Control the program order and repeating sequences of the program
CO4: Implement Arrays and Strings in your C program
CO5: Apply code reusability with functions and storing different Data types using Structures.

Pre-requisites

Nil

WD232320	**Basics of Programming Language**	L	T	P	C
Practicum		1	0	2	2

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	1	1	-	3
CO2	3	1	2	1	1	-	3
CO3	3	3	3	3	2	-	3
CO4	3	3	3	3	2	-	3
CO5	3	3	3	3	2	-	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- Engage and Motivate: Instructors should actively engage students to boost their learning confidence.
- Real-World Relevance: Incorporate relatable, real-life examples and engineering applications to help students understand and appreciate course concepts.
- Interactive Learning: Utilize demonstrations and plan interactive student activities for an engaging learning experience.
- Application-Based Learning: Employ a theory-demonstrate-practice-activity strategy throughout the course to ensure outcome-driven learning and employability.
- Simulation and Real-World Practice: Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real-world scenarios when possible.
- Encourage Critical Analysis: Foster an environment where students can honestly assess experiment outcomes and analyze potential sources of error in case of discrepancies.

WD232320	**Basics of Programming Language**	L	T	P	C
Practicum		1	0	2	2

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test Unit I & III	Written Test	Assignment	Quiz/MCQ/ Activity/ Assignment	Written Examination
Duration	2 hours	2 hours	2 hours	1 hour	3 hours
Exam Marks	30	30	30	10	100
Converted to	15	15	15	10	60
Marks	Best of CA1 & CA2 15 marks		CA3 & CA4 25 marks		60

Note:

- CA1 and CA2 Assessment Test should be conducted. Best of one will be considered for the internal assessment of 20 Marks.
- CA3 Online quiz examination (MCQ) should be conducted covering the complete syllabus. The marks should be converted to 10 marks for the internal assessment.
- CA4 Model examination should be conducted as per the end semester question pattern. The marks should be converted to 10 marks for the internal assessment.

WD232320	**Basics of Programming Language**	L	T	P	C
Practicum		1	0	2	2

Unit I	INTRODUCTION TO PROGRAMMING BASICS	

Introduction to Problem Solving - Algorithm, Properties of Algorithm, Types of algorithms (Concepts only), Benefits of Algorithm, Representation of Algorithm, Examples of Algorithm. Flowcharts, Symbols, Rules of Flowchart, Advantages of Flowcharts, Examples of Flowchart. **Introduction to Programming Language**- Machine Level, Assembly Level and High-Level Programming, Program Development Cycle, Features of Programming Language.	4

Ex. 1	Write the algorithm and draw the flow chart for calculating area and perimeter of a rectangle.	2
Ex. 2	Write the algorithm and draw the flow chart for calculating the largest of three numbers.	

Unit II	BASICS OF C LANGUAGE	

Introduction C- Features of C, Structure of C program, Compiling, link & run a C program. C character set, Tokens, Constants, Key words, Identifiers and Variables, Data types and storage, Data type Qualifiers, Declaration of Variables, Assigning values to variables. **C Operators**, Arithmetic Expression, Evaluation of Expressions. I/O Statements - scanf and printf.	6

Ex. 3	Write a C program to perform addition, subtraction, multiplication and division two numbers.	4
Ex. 4	Write a C Program to calculate sum and average of five numbers.	

Unit III	STATEMENTS	

Branching: Introduction, Simple if statement, if–else, Switch statement, goto statement, Simple Programs. **Looping statement:** While, do-while statements, for loop, break & continue statement, Simple Programs	5

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Practicum		1	0	2	2
Ex. 5	Write a C program to check largest of three numbers.				
Ex. 6	Write a C program to print day name of week using switch case.			6	
Ex. 7	Write a C program to calculate factorial of a given number.				
Unit IV	**ARRAYS AND STRINGS**				
Array: Definition,Declaration, Initialization of one dimension array **Strings:** Introduction, Declaring and Initializing string variables, Reading strings, Writing strings, String handling functions - strlen(), strcpy(), and strrev()				5	
Ex. 8	Write a C program to accept 10 numbers and print them				
Ex. 9	Write a C program to perform string functions strlen, and strrev.			4	
Unit V	**FUNCTIONS AND STRUCTURES**				
Function Definition: Built-in functions, Math Function-pow(), sqrt(), min(), User defined Function: Declaration, Defining and function call. **Structures:** Definition, Initialization (Concepts only).				5	
Ex. 10	Write a C program to find power and square root using Math Functions.				
Ex. 11	Write a C program to perform addition using function.			4	
TOTAL HOURS				45	

Suggested List of Students Activity

- Download and learn the basic code for various C programming.
- Presentation / Seminar by students on any technological development Programming.
- Periodic class quizzes conducted on monthly.

References

- The Complete Reference - Herbert Schildt
- Programming In Ansi C - E Balagurusamy
- Modern C Programming Language - Vinod Yadav

Web-based/Online Resources

https://www.w3schools.com
https://www.programiz.com/c-programming
https://www.javatpoint.com/c-programming-language-tutorial