LORDS INSTITUTE OF ENGINEERING & TECHNOLOGY

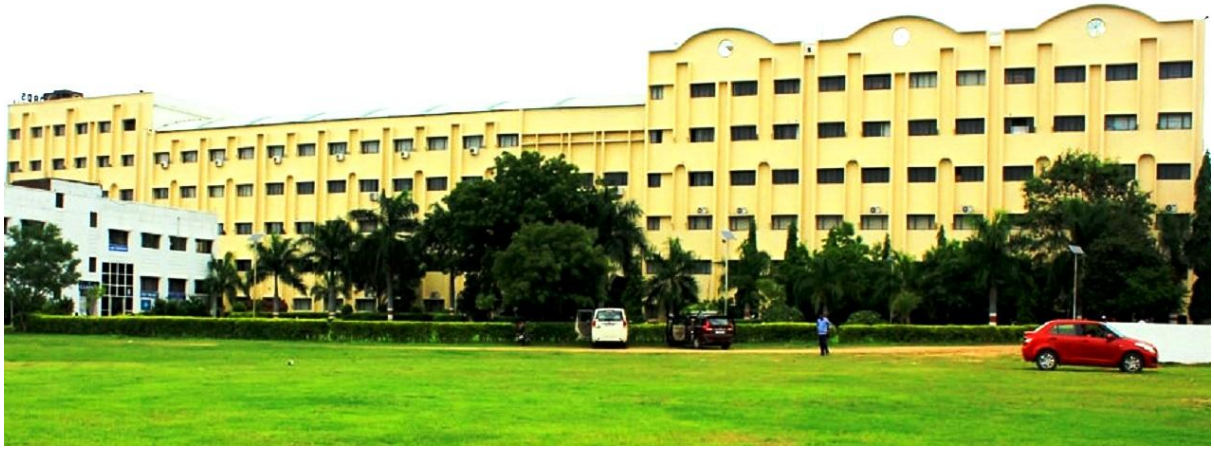
(Autonomous)

Approved by AICTE | Recognized by Government of Telangana | Affiliated to Osmania University
Accredited by NBA | Accredited with 'A' grade by NAAC | Accredited by NABL

Four Year Course Structure and First Year Syllabus

Department of Mechanical Engineering

(With effect from the Academic Year 2023-24)



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LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF MECHANICAL ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-23]
(w.e.f. Academic Year 2023-24)

B.E. I-Semester (Group-B)
(Common to CIVIL, MECH, CSE, CSD & AIDS)

S. No.	Course Code	Category	Course Title	Scheme of Instructions				Scheme of Examination			CREDITS
				L	T	P/D	Contact Hours/Week	Maximum Marks		Duration in Hours	
								CIE	SEE		
Theory Course											
1	U23CH101	MC	Environmental Science	2	-	-	2	40	60	3	0
2	U23EN101	HMSC	Universal Human Values	2	-	-	2	40	60	3	2
3	U23MA101	BSC	Mathematics-I	3	-	-	3	40	60	3	3
4	U23PH101	BSC	Engineering Physics	3	-	-	3	40	60	3	3
5	U23CS101	ESC	Programming for Problem Solving	3	-	-	3	40	60	3	3
Practical/ Laboratory Course											
6	U23PH1L1	BSC	Engineering Physics Lab	-	-	3	3	25	50	3	1.5
7	U23CS1L1	ESC	Programming for Problem Solving Lab.	-	-	4	4	25	50	3	2
8	U23ME1L1	ESC	Engineering Graphics & Design Lab	1	-	4	5	50	50	3	3
9	U23EN1L1	HSMC	Design Thinking Lab	-	-	2	2	25	50	3	1
Total				**14**	**-**	**13**	**28**	**325**	**500**	**27**	**18.5**

L: Lecture (Hrs/Wk/Sem) **T**: Tutorial (Hrs/Wk/Sem) **P**: Practical **D**: Drawing (Hrs/Wk/Sem)

CIE: Continuous Internal Evaluation **SEE**: Semester End Examination
BSC: Basic Science Course **ESC**: Engineering Science Course
HSMC: Humanities & Social Sciences Including Management Courses
MA: Mathematics **MC**: Mandatory Course
CH: Chemistry **ME**: Mechanical Engineering
EE: Electrical Engineering **EN:** English

Note:

1. Each contact hour is a Clock Hour.
2. The duration of the practical class is three hours, however it can be extended wherever necessary, to enable the student to complete the experiment.

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF MECHANICAL ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-23]
(w.e.f. Academic Year 2023-24)
B.E. II-Semester
(Common to CIVIL, MECH)

S. No.	Course Code	Category	Course Title	Scheme of Instructions				Scheme of Examination			CREDITS
				L	T	P/D	Contact Hours/Week	Maximum Marks		Duration in Hours	
								CIE	SEE		
MC: Three Week Induction Programme											
Theory Course											
1	U23EN202	MC	Indian Constitution	2	-	-	2	40	60	3	0
2	U23MA201	BSC	Mathematics-II	3	1	-	4	40	60	3	4
3	U23CH201	BSC	Engineering Chemistry	3	-	-	3	40	60	3	3
4	U23ME201	ESC	Engineering Mechanics	3	-	-	3	40	60	3	3
5	U23EN201	HMSC	English for Professional Communication	2	-	-	2	40	60	3	2
Practical/ Laboratory Course											
6	U23CH2L1	BSC	Engineering Chemistry Lab	-	-	3	3	25	50	3	1.5
7	U23ME2L3	ESC	Engineering Mechanics Lab	-	-	3	3	25	50	3	1.5
8	U23EN2L1	HSMC	Effective Communication Skills Lab	-	-	3	3	25	50	3	1.5
9	U23ME2L2	ESC	Workshop / Manufacturing Practice Lab	1	-	4	5	50	50	3	3
Total				**14**	**1**	**13**	**28**	**325**	**500**	**27**	**19.5**

L: Lecture(Hrs/Wk/Sem) **T**: Tutorial (Hrs/Wk/Sem) **P**: Practical **D**: Drawing (Hrs/Wk/Sem)

CIE: Continuous Internal Evaluation
BSC: Basic Science Courses
MC: Mandatory Course
EN: English
ME: Mechanical Engineering
PH: Physics
SEE: Semester End Examination
ESC: Engineering Science Courses
MA: Mathematics
CH: Chemistry
CS: Computer Science

Note:
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LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF MECHANICAL ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-23]
(w.e.f. Academic Year 2024-25)
B.E. III-Semester (Tentative)

S. No.	Course Code	Category	Course Title	Scheme of Instruction				Scheme of Examination			Credits
				L	T	P/D	Contact Hours/ Week	Maximum Marks		Duration in Hours	
								CIE	SEE		
Theory Course											
1	U23MA302	BSC	Mathematics-III (PDE & PS)	3	1	-	4	40	60	3	4
2	U23EE308	ESC	Basic Electrical Engineering	3	-	-	3	40	60	3	3
3	U23ME301	PCC	Metallurgy and Material Science	3	-	-	3	40	60	3	3
4	U23ME302	PCC	Mechanics of Solids	3	-	-	3	40	60	3	3
5	U23ME303	PCC	Thermodynamics	3	-	-	3	40	60	3	3
Practical / Laboratory Course											
6	U23ME4L1	PCC	Metallurgy and Material Testing Lab	-	-	4	4	25	50	3	2
7	U23ME3L2	PCC	Machine Drawing and Modelling Lab	-	-	3	3	25	50	3	1.5
8	U23EE2L4	ESC	Basic Electrical Engineering Lab	-	-	3	3	25	50	3	1.5
Skill Development Course											
9	U23CS3L1	ESC	Programming Language-I	-	-	2	2	25	50	3	1
Bridge Course*											
10	U23CS3L2	ESC	C Programming Lab	-	-	2	2	50	-	-	-
11	U23EN3L2	HMSC	Effective Communication Skills Lab	-	-	2	2	50	-	-	-
Total				**15**	**1**	**12 (*16)**	**28 (*32)**	**300 (*400)**	**500**	**27**	**22**

*** Bridge Course for Lateral Entry Students only.**

L: Lecture (Hrs/Wk/Sem) **T**: Tutorial (Hrs/Wk/Sem) **P**: Practical **D**: Drawing (Hrs/Wk/Sem)

CIE: Continuous Internal Evaluation
SEE: Semester End Examination
BSC: Basic Science Course
ESC: Engineering Science Course
MA: Mathematics
EN: English
PCC: Professional Core Courses
ME: Mechanical Engineering
CS: Computer Science
HSMC: Humanities & Social Sciences Including Management Courses

Note:

1. Each contact hour is a Clock Hour.
2. The duration of the practical class is three hours, however it can be extended wherever necessary, to enable the student to complete the experiment.

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF MECHANICAL ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-23]
(w.e.f. Academic Year 2024-25)
B.E. IV-Semester (Tentative)

S. No.	Course Code	Category	Course Title	Scheme of Instruction				Scheme of Examination			Credits
				L	T	P/D	Contact Hours/Week	Maximum Marks		Duration in Hours	
								CIE	SEE		
Theory Course											
1	U23MB401	HSMC	Business Economics and Financial Analysis	3	-	-	3	40	60	3	3
2	U23EN401	HSMC	English for Technical Communication	2	-	-	2	40	60	3	2
3	U23ME401	PCC	Manufacturing Processes	3	-	-	3	40	60	3	3
4	U23ME402	PCC	Applied Thermodynamics	3	-	-	3	40	60	3	3
5	U23ME403	PCC	Kinematics of Machines	3	1	-	4	40	60	3	4
Practical / Laboratory Course											
6	U23EN3L1	HSMC	Advanced Communication Skills Lab	-	-	3	3	25	50	3	1.5
7	U23ME4L1	PCC	Manufacturing Processes Lab	-	-	3	3	25	50	3	1.5
8	U23ME4L2	PCC	Thermal Engineering Lab	-	-	3	3	25	50	3	1.5
Skill Development Course											
9	U23CS4L3	ESC	Programming Language-II	-	-	2	2	25	50	3	1
Total				**17**	**1**	**9**	**27**	**315**	**510**	**30**	**20.5**

L: Lecture (Hrs/Wk/Sem) **T**: Tutorial (Hrs/Wk/Sem) **P**: Practical **D**: Drawing (Hrs/Wk/Sem)

CIE: Continuous Internal Evaluation **SEE**: Semester End Examination
ESC: Engineering Science Courses **PCC:** Professional Core Courses
EN: English **ME**: Mechanical Engineering
HSMC: Humanities & Social Sciences Including Management Courses
CS: Computer Science **MB:** Management Studies

Note:

1. Each contact hour is a Clock Hour.
2. The duration of the practical class is three hours, however it can be extended wherever necessary, to enable the student to complete the experiment.
3. At the end of IV semester students should undergo summer Industrial Internship of two-week duration- Credits for Summer Internship will be awarded in V semester.

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF MECHANICAL ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-23]
(w.e.f. Academic Year 2025-26)
B.E. V-Semester(Tentative)

S. No.	Course Code	Category	Course Title	Scheme of Instruction				Scheme of Examination			Credits
				L	T	P/D	Contact Hours/Week	Maximum Marks		Duration in Hours	
								CIE	SEE		
Theory Course											
1	U23ME501	PCC	Mechanics of Fluids and Hydraulic Machinery	3	-	-	3	40	60	3	3
2	U23ME502	PCC	Dynamics of Machines	3	-	-	3	40	60	3	3
3	U23ME503	PCC	Design of Machine Elements-I	2	-	-	2	40	60	3	2
4	-	OEC	Open Elective Course -I	3	-	-	3	40	60	3	3
5	-	PEC	Professional Elective Course-I	3	-	-	3	40	60	3	3
Practical/ Laboratory Course											
6	U23ME5L1	PCC	Mechanics of Fluids and Hydraulic Machinery Lab	-	-	3	3	25	50	3	1.5
7	U23ME5L2	PCC	Dynamics of Machines Lab	-	-	3	3	25	50	3	1.5
8	U23EN5L2	HSMC	Research Writing	-	-	2	2	50	-	-	1
Internship											
8	U23ME5P1	PROJ	Internship (During Vacations after IV Semester)	-	-	-	-	50	-	-	1
Total				**14**	**-**	**8**	**22**	**350**	**400**	**21**	**19**

L: Lecture (Hrs/Wk/Sem) **T**: Tutorial (Hrs/Wk/Sem) **P**: Practical **D**: Drawing (Hrs/Wk/Sem)

CIE: Continuous Internal Evaluation
ESC: Engineering Science Course
OEC: Open Elective Course
ME: Mechanical Engineering
CS: Computer Science
SEE: Semester End Examination
PCC: Professional Core Courses
PEC: Professional Elective Courses
PROJ: Project

Note:
1. Each contact hour is a Clock Hour.
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LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF MECHANICAL ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-23]
(w.e.f. Academic Year 2025-26)
B.E. VI-Semester(Tentative)

S. No.	Course Code	Category	Course Title	Scheme of Instruction				Scheme of Examination			Credits
								Maximum Marks		Duration in Hours	
				L	T	P/D	Contact Hours/Week	CIE	SEE		
Theory Course											
1	U23ME601	PCC	Metal Cutting and Machine Tools	2	-	-	2	40	60	3	2
2	U23ME602	PCC	Design of Machine Elements-II	3	-	-	3	40	60	3	3
3	U23ME603	PCC	Heat Transfer	3	-	-	3	40	60	3	3
4	U23ME604	PCC	CAD/ CAM/CAE	2	-	-	2	40	60	3	2
5	-	OEC	Open Elective Course-II	3	-	-	3	40	60	3	3
Practical/ Laboratory Course											
6	U23ME6L1	PCC	Metal Cutting and Machine Tools Lab	-	-	3	3	25	50	3	1.5
7	U23ME6L2	PCC	Heat Transfer Lab	-	-	3	3	25	50	3	1.5
8	U23ME6L3	PCC	CAD/CAM/CAE Lab	-	-	3	3	25	50	3	1.5
Project											
9	U23ME6P1	PROJ	Mini Project	-	-	6	6	50	50	-	3
Total				**13**	**-**	**15**	**28**	**325**	**500**	**24**	**20.5**

L: Lecture (Hrs/Wk/Sem) **T**: Tutorial (Hrs/Wk/Sem) **P**: Practical **D**: Drawing (Hrs/Wk/Sem)

CIE: Continuous Internal Evaluation
SEE: Semester End Examination
PCC: Professional Core Courses
OEC: Open Elective Courses
EN: English
ME: Mechanical Engineering
HSMC: Humanities & Social Sciences Including Management Courses
PROJ: Project

Note:
1. Each contact hour is a Clock Hour.
2. The duration of the practical class is three hours, however it can be extended wherever necessary, to enable the student to complete the experiment.
3. At the end of VI semester students should undergo summer Industrial Internship of four-week duration- Credits for Summer Internship will be awarded in VII semester.

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF MECHANICAL ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-23]
(w.e.f. Academic Year 2026-27)
B.E. VII-Semester (Tentative)

S. No.	Course Code	Category	Course Title	Scheme of Instruction				Scheme of Examination			Credits
				L	T	P/D	Contact Hours/Week	Maximum Marks		Duration in Hours	
								CIE	SEE		
Theory Course											
1	U23MB706	HSMC	Operations Research	3	-	-	3	40	60	3	3
2	U23ME701	PCC	Metrology and Instrumentation	2	-	-	2	40	60	3	2
3	U23ME702	PCC	Refrigeration and Air Conditioning	3	-	-	3	40	60	3	3
4	-	OEC	Open Elective Course-III	3	-	-	3	40	60	3	3
5	-	PEC	Professional Elective Course II	3	-	-	3	40	60	3	3
6	-	PEC	Professional Elective Course- III	3	-	-	3	40	60	3	3
Practical/ Laboratory Course											
7	U23ME7L1	PCC	Metrology and Instrumentation Lab	-	-	2	2	25	50	3	1
Seminar											
8	U23ME7P2	PROJ	Technical Seminar	-	-	2	2	50	-	-	1
Skill Development Course											
9	U23MA7L1	BSC	Aptitude and Reasoning	-	-	2	2	25	50	3	1
Internship											
10	U23ME7P1	PROJ	Internship (During Vacation after VI Semester)	-	-	-	-	50	-	-	1
Total				**17**	**0**	**6**	**23**	**390**	**460**	**24**	**21**

L: Lecture (Hrs/Wk/Sem) **T**: Tutorial (Hrs/Wk/Sem) **P**: Practical **D**: Drawing (Hrs/Wk/Sem)

CIE: Continuous Internal Evaluation
SEE: Semester End Examination
BSC: Basic Science Courses
PCC: Professional Core Courses
OEC: Open Elective Courses
PEC: Professional Elective Courses
PROJ: Project
MA: Mathematics
ME: Mechanical Engineering
MB: Management Studies
HSMC: Humanities & Social Sciences Including Management Courses

Note:
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2. The duration of the practical class is three hours, however it can be extended wherever necessary, to enable the student to complete the experiment.

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF MECHANICAL ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-23]
(w.e.f. Academic Year 2026-27)
B.E. VIII-Semester (Tentative)

S. No.	Course Code	Category	Course Title	Scheme of Instruction				Scheme of Examination			CREDITS
				L	T	P/D	Contact Hours/Week	Maximum Marks		Duration in Hours	
								CIE	SEE		
Theory Course											
1	-	OEC	Open Elective Course IV	3	-	-	3	40	60	3	3
2	-	PEC	Professional Elective Course IV	3	-	-	3	40	60	3	3
3	-	PEC	Professional Elective Course V	3	-	-	3	40	60	3	3
Project											
4	U23ME8P1	PROJ	Comprehensive Viva	-	-	4	4	100	-	-	2
5	U23ME8P2	PROJ	Major Project	-	-	16	16	50	150	-	8
Total				**9**	**-**	**20**	**29**	**270**	**330**	**9**	**19**

L: Lecture (Hrs/Wk/Sem) **T**: Tutorial (Hrs/Wk/Sem) **P**: Practical **D**: Drawing (Hrs/Wk/Sem)

CIE: Continuous Internal Evaluation
SEE: Semester End Examination
OEC: Open Elective Courses
PEC: Professional Elective Courses
PROJ: Project
ME: Mechanical Engineering

Note:

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LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF MECHANICAL ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-23]
PROFESSIONAL ELECTIVE COURSES

S. No.	Course Code	Category	Course Title	Scheme of Instructions				Scheme of Examination			CREDITS
				L	T	P/D	Contact Hours/Week	Maximum Marks CIE	Maximum Marks SEE	Duration in Hours	
Theory Course											
1	U23ME504	**PEC 1** *(Common Group)*	Non-destructive Testing	3	0	0	3	40	60	3	3
	U23ME505		Composite Materials	3	0	0	3	40	60	3	3
	U23ME506		Supply Chain Management	3	0	0	3	40	60	3	3
	U23ME507		Quality and Reliability Engineering	3	0	0	3	40	60	3	3
2	U23ME703	**PEC 2** *(Technology Group)*	Refrigeration & Air Conditioning	3	0	0	3	40	60	3	3
	U23ME704		Power Plant Engineering	3	0	0	3	40	60	3	3
	U23ME705		Renewable Energy Engineering	3	0	0	3	40	60	3	3
	U23ME706		Finite Element Analysis	3	0	0	3	40	60	3	3
3	U23ME707	**PEC 3** *(Industry Sector Group)*	Automobile Engineering	3	0	0	3	40	60	3	3
	U23ME708		Aerospace Engineering	3	0	0	3	40	60	3	3
	U23ME709		Agricultural Engineering	3	0	0	3	40	60	3	3
	U23ME710		Biomedical Engineering	3	0	0	3	40	60	3	3
4	U23ME801	**PEC 4** *(Technology Group)*	Computational Fluid Dynamics	3	0	0	3	40	60	3	3
	U23ME802		Design for Manufacturing & Assembly	3	0	0	3	40	60	3	3
	U23ME803		Additive Manufacturing	3	0	0	3	40	60	3	3
	U23ME804		Die, Mould and Tool Engineering	3	0	0	3	40	60	3	3
5	U23ME805	**PEC 5** *(Industry Sector Group)*	Food Technology	3	0	0	3	40	60	3	3
	U23ME806		Marine Engineering	3	0	0	3	40	60	3	3
	U23ME807		Nuclear Engineering	3	0	0	3	40	60	3	3
	U23ME808		Textile Engineering	3	0	0	3	40	60	3	3

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SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-23]
OPEN ELECTIVE COURSES

S. No.	Course Code	Category	Course Title
1	U23EE508	OEC 1	Non-Conventional Energy Systems
	U23EE509		Energy Conservation and Management
	U23CS508		Data Base Management Systems
	U23IT506		Data Structures
	U23ME509		Basics of Mechanical Engineering**
	U23ME510		Modern Manufacturing Processes**
	U23CE510		Disaster Preparedness and Management
	U23CE511		Civil Engineering Principles and Practices
	U23EC507		Principles of Electronic Communication
	U23EC508		Semi-Conductor Devices
	U23MB501		Business Communication
	U23MB502		Managerial Science and Theory

S. No.	Course Code	Category	Course Title
2	U23EE608	OEC 2	Fundamental of Power Electronics
	U23EE609		Electrical Installation and Safety
	U23CS607		Java Programming
	U23IT606		Operating Systems
	U23ME608		Basics Of 3-D Printing**
	U23ME609		Optimization Methods for Engineers**
	U23CE607		Construction Materials
	U23CE608		Engineering Geology
	U23EC607		Principles of Data Communication and Network
	U23EC608		Embedded Systems
	U23MB602		Total Quality Management
	U23MB603		Innovation Management

S. No.	Course Code	Category	Course Title
3	U23EE711	OEC 3	Introduction to Electrical Vehicles
	U23EE712		Design estimation and Costing of Electrical Systems
	U23CS711		Data Sciences
	U23IT705		Basics of Artificial Intelligence
	U23ME711		Renewable Energy Resources**
	U23ME712		Cooling of Electronic Components**
	U23CE711		Environmental Systems
	U23CE712		Urban Transportation System
	U23EC703		IOT and its protocols
	U23EC704		Television and Video Engineering
	U23MB702		Supply Chain Management
	U23MB703		Start Up Management

S. No.	Course Code	Category	Course Title
4	U23EE804	OEC 4	Smart Building Systems
	U23EE805		Industrial Automation
	U23CS806		Basics of Machine Learning
	U23IT802		Cloud computing
	U23ME806		Automobile Engineering**
	U23ME807		Power Plant Engineering**
	U23CE806		Green Building Technology
	U23CE807		Environmental Impact Assessment
	U23EC805		Fundamentals of Wireless Communication
	U23EC806		Fundamental Digital Design using Verilog HDL
	U23MB802		Entrepreneurship
	U23MB803		Digital Marketing

Note: **Subject is not offered to the students of Mechanical Engineering Department.

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(w.e.f. Academic Year 2023-24)

B.E. I-Semester (Group-B)
(Common to CIVIL, MECH, CSE, CSD & AIDS)

S. No.	Course Code	Category	Course Title	Scheme of Instructions				Scheme of Examination			CREDITS
				L	T	P/D	Contact Hours/Week	Maximum Marks: CIE	Maximum Marks: SEE	Duration in Hours	
Theory Course											
1	U23CH101	MC	Environmental Science	2	-	-	2	40	60	3	0
2	U23EN101	HMSC	Universal Human Values	2	-	-	2	40	60	3	2
3	U23MA101	BSC	Mathematics-I	3	-	-	3	40	60	3	3
4	U23PH101	BSC	Engineering Physics	3	-	-	3	40	60	3	3
5	U23CS101	ESC	Programming for Problem Solving	3	-	-	3	40	60	3	3
Practical/ Laboratory Course											
6	U23PH1L1	BSC	Engineering Physics Lab	-	-	3	3	25	50	3	1.5
7	U23CS1L1	ESC	Programming for Problem Solving Lab.	-	-	4	4	25	50	3	2
8	U23ME1L1	ESC	Engineering Graphics & Design Lab	1	-	4	5	50	50	3	3
9	U23EN1L1	HSMC	Design Thinking Lab	-	-	2	2	25	50	3	1
Total				**14**	**-**	**13**	**28**	**325**	**500**	**27**	**18.5**

L: Lecture (Hrs/Wk/Sem) **T**: Tutorial (Hrs/Wk/Sem) **P**: Practical **D**: Drawing (Hrs/Wk/Sem)

CIE: Continuous Internal Evaluation **SEE**: Semester End Examination
BSC: Basic Science Course **ESC**: Engineering Science Course
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3. Each contact hour is a Clock Hour.
4. The duration of the practical class is three hours, however it can be extended wherever necessary, to enable the student to complete the experiment.

Course Code	Course Title						Core / Elective
U23CH101	ENVIRONMENTAL SCIENCES (Common to all Branches)						Core
Prerequisite	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
-	2	-	-	-	40	60	-

Course Objectives:

1. To create awareness and impart basic knowledge about the various types of natural resources.
2. To know the functions of ecosystems.
3. To understand importance of biological diversity.
4. To study different pollutions and the impact on environment.
5. To know social and environment related issues and their preventive measures.

Course Outcomes:

After completing this course, the student will be able to:

1. Describe various natural resources.
2. To understand various biotic and abiotic components of ecosystem.
3. Learn the different conservation techniques of biological diversity.
4. Illustrate the causes, effects and control measures of various types of environmental
5. pollutions.
6. Explain the methods of water conservation, understand the current global environmental issues.

UNIT-I

The Multidisciplinary Nature of Environmental Studies: Definition, scope and importance, need for public awareness.

Natural Resources: Water Resources – Use and over utilization of surface and ground water, flood, drought **Dams:** Benefits and Problems. Food Resources –effects of modern agriculture, fertilizer-pesticides. Forest Resources –Use and overexploitation Land Resources–Land Degradation, environmental effect of mining, soil erosion and desertification**.** Energy Resources– Renewable and Non-renewable energy resources.

UNIT-II

Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in ecosystem, food chains, ecological pyramids, ecological succession, types of ecosystems (marine, river, forest, grassland).

UNIT-III

Biodiversity: Levels of Biodiversity, Bio-geographical classification of India, Value of biodiversity, Threats to biodiversity, endangered and endemic species of India, Conservation of biodiversity.

UNIT-IV

Environmental Pollution: Definition, Causes, effects and control measures of air pollution, water pollution, soil pollution, solid waste management.

Environment Protection Act: Air, water, forest and wildlife Acts, issues in the enforcement of environmental legislation.

UNIT-V

Social Issues and the Environment: Watershed management and environmental ethics. Climate change, global warming, acid rain, ozone layer depletion.

Environmental Disaster Management: Types of disasters, impact of disasters on environment, infrastructure, and development. Basic principles of disaster mitigation, disaster management, and methodology. Disaster management cycle and disaster management in India.

Field Work:

- Visit to a local area to document environmental issues – agricultural area/ lake /terrestrial ecosystem.
- Visit to a local polluted area-market/slum area/Industrial area/traffic area.

Textbooks

1. Erach Bharucha, Environmental Studies for undergraduate courses, third edition, Universities Press.
2. R. Rajagopalan, Environmental Studies from crisis to cure, oxford Publication.

Reference Books:

1. A.K. De, Environmental Chemistry, Wiley Eastern Ltd.
2. E. P. Odum, Fundamentals of Ecology, W. B. Sunders Co., USA.
3. M.N. Rao and A.K. Datta, Waste Water Treatment, Oxford and IBK Publications.
4. Benny Joseph, Environmental Studies, Tata McGraw Hill, 2018.
5. V.K. Sharma, Disaster Management, National Centre for Disaster Management, IIPE, 2013.

Course code	Course title						Core/Elective
U23EN101	**Universal Human Values (Common to all Branches)**						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
--	2	-	-	-	40	60	2

Course Objectives:

Students are able

1. To help the students appreciate the essential complementarily between values and Skills
2. To ensure sustained happiness and prosperity among all human beings
3. To facilitate the development of a holistic perspective among students towards life an profession
4. To highlight plausible implications of such a holistic understanding in terms of conduc trustful and mutually fulfilling human behavior
5. To create an awareness on Engineering ethics and human values

Course Outcomes:

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

1. Understand the significance of value inputs in a classroom and start applying them in the life and profession
2. Distinguish between values and skills, happiness and accumulation of physical facilities, th self and the body, intention and competence of an individual, etc.
3. Understand the role of a human being in ensuring harmony in society and nature
4. Compare and contrast between ethical and unethical conduct within the society
5. Grasp the right utilization of their knowledge in their streams of Technology

UNIT I: Introduction to Value Education

1. Value Education, Definition, Concept and Need for Value Education.
2. The Content and Process of Value Education.
3. Basic Guidelines for Value Education.
4. Self-exploration as a means of Value Education.
5. Happiness and Prosperity as parts of Value Education.

UNIT II: Harmony in the Human Being

6. Human Being is more than just the Body.
7. Harmony of the Self ('I') with the Body.
8. Understanding Myself as Co-existence of the Self and the Body.
9. Understanding Needs of the Self and the needs of the Body.
10. Understanding the activities in the Self and the activities in the Body.

UNIT III: Harmony in the Family and Society and Harmony in the Nature

11. Family as a basic unit of Human Interaction and Values in Relationships.
12. The Basics for Respect and today's Crisis: Affection, Guidance, Reverence, Glory, Gratitude and Love.
13. Comprehensive Human Goal: The Five Dimensions of Human Endeavour.
14. Harmony in Nature: The Four Orders in Nature.
15. The Holistic Perception of Harmony in Existence

UNIT IV: Social Ethics

16. The Basics for Ethical Human Conduct.
17. Defects in Ethical Human Conduct.
18. Holistic Alternative and Universal Order.

19. Universal Human Order and Ethical Conduct.
20. Human Rights violation and Social Disparities.

UNIT V: Professional Ethics

21. Value based Life and Profession.
22. Professional Ethics and Right Understanding.
23. Competence in Professional Ethics.
24. Issues in Professional Ethics – The Current Scenario.
25. Vision for Holistic Technologies, Production System and Management Models.

Text Books

1. A.N Tripathy, New Age International Publishers, 2003.
2. Bajpai. B. L, New Royal Book Co, Lucknow, Reprinted, 2004
3. Bertrand Russell Human Society in Ethics & Politics

Reference Books

1. Corliss Lamont, Philosophy of Humanism
2. Gaur. R.R., Sangal. R, Bagaria. G.P, A Foundation Course in Value Education, Excel Books, 2009.
3. Gaur. R.R., Sangal. R, Bagaria. G.P, Teachers Manual Excel Books, 2009.
4. I.C. Sharma. Ethical Philosophy of India Nagin & co Julundhar
5. Mortimer. J. Adler, – What man has made of man
6. William Lilly Introduction to Ethic Allied Publisher

Course Code	Course Title						Core/Elective
U23MA101	**MATHEMATICS-I (Common to all Branches)**						**Core**
Prerequisite	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
--	3	-	-	-	40	60	3

Course Objectives:

To enable the students to apply the knowledge of Mathematics in various engineering fields by makin them to learn the following:

1. To introduce the concepts of sequences, series and their properties
2. To introduce the concepts of functions of several variables and multiple integrals
3. To study vector differential and integral calculus

Course Outcomes:

On completion of this course, students will get the ability

1. Solve engineering problems with the help of Mathematics tool
2. Test for the nature of Sequence and series
3. Calculate the problems on single variable, curvature, evolutes and envelopes and different series
4. Determine the limit, continuity, partial derivatives, Jacobi and maxima and minima of function of several variables
5. Evaluate double and triple integration and learn its applications
6. Explain and apply the concepts of Vector differentiation, gradient, curl and divergence and its integration.

Unit-I

Sequence and Series: Sequence, Series, General properties of series of positive terms, Comparison tests, tests of Convergence D'Alembert's ratio test, Cauchy's nth root test, Raabe's test (All tests without proof), Alternating Series, Series of Positive and negative terms, Absolute convergence and Conditional convergence

Unit-II

Calculus of one Variable: Rolle's theorem, Lagrange's, Cauchy's mean value theorems (with proofs), Taylor's series (without proof), Curvature, Radius of curvature, Circle of curvature.

Unit-III

Multivariable Calculus (Differentiation): Functions of two variables, Limits and continuity, Partial derivatives, Total differential and differentiability, Euler's theorem and problems, Jacobian, Taylor's series of functions of two variables, Maximum and minimum values of functions of two variables, Lagrange's method of undetermined multipliers.

Unit-IV

Multivariable Calculus (Integration): Double integrals, change of order of integration, Change of Variables from Cartesian to plane polar coordinates, Triple integrals, change of coordinates in triple Integral-Spherical and cylindrical coordinate system.

Unit-V

Vector Calculus: Scalar and vector fields, Gradient of a scalar field, Directional derivative, Divergence and Curl of a vector field, Line, Surface and Volume integrals, Green's theorem in a plane, Gauss's divergence theorem, stoker's theorem (without proofs) and their verification.

Textbooks:

1. B.S. Grewal, "Higher Engineering Mathematics", Khannapublishers,44th edition,2016.
2. Erwin Kreyszig, "Advanced Engineering Mathematics, Wiley,9th edition,2013.
3. R.K.Jain&S.R.K.lyengar,AdvancedEngineeringMathematics,NarosaPublications,4thEdition,2014.

Reference Books:

1. B.V. Ramana, "HigherEngineeringMathematics",TataMcGraw-Hill,2018
2. N.P. Baliand Manish Goyal, "A text book of Engineering Mathematics", Laxmi Publications, latest edition
3. H. K. Dassand Er. Rajnish Verma, "Higher Engineering Mathematics", S. ChandPublishing

Course code	Course title						Core/Elective
U23PH101	**ENGINEERING PHYSICS (Common to all Branches)**						**Core**
re-requisites	Contact Hours Per Week				CIE	SEE	Credits
--	L	T	D	P			
	3	0	-	-	40	60	3

Course Objectives:

1. Awareness on fundamentals of optical properties, fibers in communication, lasers i Engineering
2. Demonstrate the use of crystal structure in device applications and find the solutions c Quantum mechanical problems.
3. Acquire the knowledge on various properties of semiconductors and nanomaterials.
4. Some fundamental laws related to magnetic as well as dielectric properties of materials.
5. Acquire the knowledge of low temperature physics.

Course Outcomes:

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

1. Classify crystals based on their structure and their appropriate uses.
2. Illustrates working of lasers and optical fibers in high speed communication.
3. To analyze the wave nature and to develop the skills in designing the various electroni devices.
4. Distinguish the materials and can justify their application in divergent fields.
5. To develop the advancement in micro level devices.

UNIT-I

Crystallography: Introduction, Types of crystal systems, Bravais lattices, Lattice planes and Miller indices, Inter planar spacing (Cubic system), Bragg's law, Powder diffraction method.

Crystal defects: Classification of point defects, Concentration of Schottky defects in ionic crystals, Concentration of Frenkel defects.

UNIT-II

Lasers: Introduction, Characteristics of Lasers, Absorption, Spontaneous and stimulated emissions, Pumping process, Population inversion, Einstein's A and B Coefficients, Ruby Laser, Helium Neon Laser, Semi-Conductor Laser, Applications of Lasers.

Fiber Optics: Introduction, Propagation of light through an optical fiber, Acceptance angle, Numerical aperture (NA), Types of Optical fibers and Refractive index profiles, Attenuation Losses in optical fibers, Applications of optical fibers.

UNIT-III

Wave Mechanics: Matter waves –de-Broglie wavelength, Davisson Germer Experiment, Properties and Physical significance of wave function, Schrodinger time dependent and time in-dependent wave equation, Particle in a 1-D box.

Semiconductors and Devices: Bloch's theorem statement, Kronig-Penney model (qualitative treatment), Classification of solids, Intrinsic and Extrinsic semiconductors, Carrier concentration in intrinsic semiconductors, Formation of P-N junction diode and its I–V characteristics, Thermistor and its characteristics, Hall effect and its applications, Solar cell, LED.

UNIT-IV

Magnetic Materials: Classification of magnetic materials, Domain theory (qualitative), Hysteresis on the basic of domain theory, soft and hard magnetic materials, Applications of ferrites.

Superconductivity: Introduction, General properties of super conductors, Meissner effect, Type I and Type II superconductors, BCS theory (qualitative), Introduction to High Tc superconductors, Applications of superconductors.

UNIT-V

Dielectric Materials: Introduction to Dielectrics, Types of polarizations, Electronic, Ionic, Orientational and Space charge polarizations, Expression for Electronic and Ionic polarizability, Ferro electricity, Barium titanate, Applications of Ferroelectrics.

Nanomaterials: Nano scale, Classification of Nano materials, Properties of Nanomaterial: Surface to volume ratio at Nano scale, Quantum Confinement, Nanomaterial Preparation: Bottom-up methods (Sol-gel and CVD) and Top-down method (ball milling), Applications of Nanomaterial.

Text Books:

1. MN Avadhanulu and PG Kshirsagar, "Engineering Physics", S. Chand India Private Limited, 11th Edition, 2019.
2. P. K. Palaniswamy, "Engineering Physics", Scitech India Private Limited, 4th Edition, 2014.

Reference Books:

1. S. Mani Naidu, "Applied Physics", Pearson India Private Limited, 1st Edition, 2010.
2. R. K. Gaur and SL Gupta, "Engineering Physics", Dhanpat Rai India Private Limited, Revised Edition, 2018.
3. S. Vijaya Kumari, "Modern Engineering Physics", S. Chand & Company Limited, 1st Edition, 2010.
4. A. K. Bandopadhyay, Nanomaterials, New Age International, 1st Edition, 2007.

Course Code	Course Title						Core / Elective
U23CS101	**Programming for Problem Solving**						**Core**
Prerequisite	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	-	-	-	40	60	3

Course Objectives:

The Objectives of this Course are:

1. To introduce the basic concepts of Computing environment, Algorithm and Flowchart
2. To familiarize the basic concepts of C language such as data types, operators and expressions.
3. To understand modular and structured programming concepts in C
4. To learn the usage of structured data types and memory management using pointers
5. To learn the concepts of data handling using pointers

Course outcomes:

At the end of this course, the student will able to:

1. Formulate simple algorithms and translate the algorithms to programs using c language.
2. Implement conditional branching & iteration and arrays
3. Apply the function concepts to implement searching and sorting algorithms.
4. Analyze the usage of structures and pointer variable.
5. Apply the concept of pointers for implementing programs on dynamic memory managementar string handling.
6. Design and implement programs to store data in structures and files.

Unit-I

Introduction to Programming: Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.). Idea of Algorithm: steps to solve logical and numerical problems.

Representation of Algorithm: Flowchart / Pseudo code with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

Unit-II

Control Structures: Arithmetic expressions and precedence, Conditional Branching and Loops, Writing and evaluation of conditionals and consequent branching.

Arrays: Arrays (1-D, 2-D), Character arrays and Strings.

Unit-III

Basic Algorithms: Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of Equations.

Functions: Functions (including using built in libraries), Parameter passing in functions, call by value. Passing arrays to functions: idea of call by reference

Unit-IV

Recursion: Recursion, Example programs, such as Finding Factorial, Fibonacci series

Structure: Structures, Defining structures and Array of Structures

Unit-V

Pointers: Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation), Introduction to File Handling.

Suggested Readings:

1. "Theory and practice of Programming with C", Byron Gottfried, Schaum's Outline McGraw-Hill,1996
2. "Computer Fundamentals and Programming in C'', A.K. Sharma UniversitiesPress,2nd Edition, 2018.
3. "Programming in ANSI C‖", E. Balaguruswamy, Tata McGraw-Hill Education, 2008
4. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall ofIndia,1988.

Course code	Course title				Core/Elective		
U23PH1L1	**ENGINEERING PHYSICS LAB (Common to all Branches)**						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
--	-	-	-	3	25	50	1.5

Course Objectives:

1. Enhance the experience of fundamental functioning, analyzing and characterization of differer experiments.
2. Develop skills in the design and development of various electronic devices.
3. Create interest in working with lasers and semiconductor devices.
4. To gain the knowledge on mechanical properties.
5. Acquire the knowledge of communication through optical fiber.

Course Outcomes:

1. Apply the basic principles of lasers and optical fibers to determine wavelength and numerica aperture.
2. Remember the basics of electrical properties and apply to semiconductors.
3. Evaluate the carrier concentration of semiconductor materials by applying Hall effect principle.
4. Apply the basic knowledge of semiconductors and understand the I-V characteristics of p-junction diode, solar cell and LED devices.
5. Analyze the temperature dependence on resistance by Thermistor Experiment.
6. Understand the concept of rigidity modulus through Torsional pendulum.

List of Experiments:

1. Determination of wavelength of a Laser by using diffraction Grating.
2. Determination of Numerical aperture of an optical fiber.
3. To draw the I-V Characteristics of a p-n junction diode.
4. Determination of carrier concentration and Hall Effect of Ge crystal using Hall Effect experiment.
5. To determine the constants of A and B using Thermistor Characteristics.
6. Determine the Energy gap of semiconductor diode.
7. To draw the I-V Solar Cell and to calculate the:

i) Fill factor Efficiency ii) Series resistance

8. Determination of rigidity of modulus of a given wire using Torsional pendulum.
9. Photoelectric Effect: To determine the work function of a given material.
10. Plot the I-V characteristics of LED.
11. To determine the Quality factor of series/parallel LCR circuit.
12. To determine the time constant of RC circuit.

Note: Minimum 8 experiments should be conducted in the semester**.**

Text books:

1. N.K. De, "Basic Electrical Engineering" Universities press, 2015.
2. J.B. Guptha, "Fundamentals of Electrical Engineering and Electronics" S.K. Kataria & Sons Publications 2002.
3. J.B. Guptha, "Utilization of Electric Power and Electric Traction" S.K. Kataria & Sons Publications, 2010.

Course Code	Course Title						Core/Elective
U23CS1L1	**Programming for Problem Solving Lab**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	4	25	50	2

urse Objectives:

The objectives of this course are:

1. To understand the fundamentals of programming in C language.
2. To write, compile and debug programs in C.
3. To formulate solution to problems and implement in C.
4. To effectively choose programming components to solve computing problems.

Course Outcomes:

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

1. Choose appropriate data type for implementing programs in C language.
2. Design and implement modular programs involving input output operations, decision making and looping constructs.
3. Implement search and sort operations on arrays.
4. To decompose a problem into functions and to develop modular reusable code.
5. Apply the concept of pointers for implementing programs on dynamic memory management and string handling.
6. Design and implement programs to store data in structures and files.

List of Experiments

1. Finding maximum and minimum of given set of numbers & finding roots of quadratic equation.
2. Sin x and Cos x values using series expansion.
3. Conversion of Binary to Decimal, Octal, Hexadecimal and vice versa.
4. Generating Pascal Triangle & Pyramid of Numbers
5. Recursion: factorial, Fibonacci ,GCD.
6. Matrix addition and multiplication using arrays, linear search and binary search using recursive and non recursive procedures
7. Bubble Sort and Selection Sort
8. Programs on Pointers: Pointers to Arrays, Pointer to Function
9. Functions for string manipulations.
10. Programs on Structures and Unions
11. Finding the number of characters , words and lines of given text file.
12. File handling programs.

Suggested Readings:

1. "Theory and practice of Programming with C", Byron Gottfried, Schaum's Outline,McGraw-Hill 1996.
2. "Computer Fundamentals and Programming in C", A.K. Sharma, Universities Press, 2nd Edition, 2018.
3. "Programming in ANSI C", E. Balaguruswamy, Tata McGraw-Hill Education,2008.
4. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall of Indian 1988.

Course Code	Course Title						Core/Elective
U23ME1L1	Engineering Graphics & Design Practice (Common to CIVIL, MECH, CSE, CSD & AIDS)						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	1	-	4	-	50	50	3

Course Objectives

The objective of this course is to import knowledge of

1. Design a system, component and process to meet desired needs within realistic constraints such economic, environmental, ethical, health and safety, manufacturability and sustainability.
2. Communication effectively.
3. Techniques, skills and modern engineering tools necessary for engineering practice.
4. Different solids and their section in orthographic projections.
5. Cad package and its utility.

Course Outcomes

After completing this course, the student will be able to:

1. Learn basics of Dimensioning, Detail Drawings and Engineering Design.
2. Demonstrate the projection of point's lines, planes then create virtual drawing by using CA software.
3. Construct the solid projection & Sectioning of the solids and Develop isometric drawing of simp objects Reading the orthographic Projections of these objects.
4. Understanding and visualize. 3D to 2D & 2D to 3D Vice- Versa.
5. Use the knowledge of Engineering Graphics to draw floor drawing, Simple Machine Element, Bas Electrical Drawing, Basic Networking Drawing.

List of Experiments

S No	**Topic / Exercises**
1	**Introduction to Engineering Graphics** Engineering Graphics, Significance, Drawing instrument used in engineering drawing and types of sheet layout and their folding. Types of lines used in engineering drawing, various lettering and dimensioning formats.
2	**Scales :** Scales, Representation, Units, Representative fraction [RF] Types: a) Reducing, Enlarging & True. b) Plain, Diagonal and Vernier Scale
3	**Conic Sections-I :** Conic section, Types, Construction of Ellipse, Parabola & Hyperbola given focus and eccentricity
4	**Conic Sections-II :** Construction of ellipse [given major and minor axis], parabola [given base and height] & rectangular hyperbola
5	**Engineering Curves** Introduction and Construction of Cycloid, Epicycloid along with tangent and normal, Involutes (involute of triangle, square & circle)
6	**Introduction to AutoCAD :** Basic commands and simple drawings. Demonstrating knowledge of the theory of CAD software [such as : The Menu System, Toolbars (standard, object properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Short menus (Button Bars), The Command Line (Where applicable), The Status Bar, Different

	methods of zoom as used in CAD, Select and erase objects]
7	**Various methods of drawing lines and circles :** Setup of drawing page and the printer, including scale settings, setting setup of modules and drawing limits, ISO and ANSI standards for coordinate dimensioning and tolerances, producing drawing by using various coordinates methods for lines and circles, such as absolute coordinate method, relative coordinate method, polar coordinate method, direct distance method, 2-points method, 3-points & tangent method.
8	**Orthographic Projection :** Principles of Orthogonal Projections-Conventions – Projections of points situated in different quadrants.
9	**Projections of straight lines – I :** Line parallel to both the reference planes, line perpendicular or inclined to one reference plane.
10	**Projections of straight lines – II :** Line inclined to both the reference planes.
11	**Projection of Planes – I :** Perpendicular Planes.
12	**Projection of Planes – II :** Oblique Planes.
13	**Projection of Solid – I :** Axis parallel to HP or VP, Projection of regular solids in simple position.
14	**Projection of Solid – II :** Projections of solids axis Inclined to one or both the reference planes.
15	**Section of Solids-I :** When the sectional plane is parallel or perpendicular to one Reference Plane.
16	**Section of Solids – II :** Sectional plane is inclined to one reference plane.
17	**Development of surfaces :** Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone.
18	**Isometric projection-I :** Planes and Principle of isometric projection, Isometric scale, Isometric Views – Conventions lines & Planes.
19	**Isometric projection-II :** Compound solids, isometric Projections of simple solids & compound solids
20	**Conversion of Isometric to Orthographic views.**
21	**Conversion of Orthographic to Isometric views.**
22	**Optional [Any one must be done]** Floor plan windows, doors, and fixtures such as WC, bath, sink, shower, etc. Simple Machine Element Basic Electrical Drawing Basic Networking Drawing

NOTE:

1. At least 20 sheets must be covered.
2. Sheet number 1 to 5 (Graph sheets / drawing sheets)
3. Sheet number 6 to 22 (AutoCAD drawings)

Suggested Readings

1. Bhatt N.D., Panchal V.M. & Ingle P.R, Engineering Drawing, Charotar Publishing House,53rd Edition, (2018).
2. Shah, M.B. &Rana B.C. Engineering Drawing and Computer Graphics, Pearson Education, 2nd Edition, (2018).
3. Agrawal B. &Agrawal C. M., Engineering Graphics, TMH Publication, 2nd Edition, (2016).
4. Narayana, K.L. & P Kannaiah, Text book on Engineering Drawing, Scitech Publishers, (2009).
5. S.N Lal, Engineering Drawing with Introduction to Auto CAD, Cengage Learning India Pvt Lid, New Delhi, (2018).

6. DhananjayAJolhe, Engineering Drawing, Tata Mcgraw Hill Education private Limited, Third print, (2009).
7. K Venkata Reddy, Text Book of Engineering drawing with AUTO CAD, BS Publications, 4th Edition, (2003).
8. (Corresponding set of) CAD Software Theory and User Manuals.

Course code	Course title						Core/Elective
U23EN1L1	**Design Thinking Lab (Common to all Branches)**						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
--	-	-	-	2	25	50	1

Course Objectives:

1. To provide the new way of creative thinking
2. To learn the innovative cycle of design thinking process
3. To develop an understanding of prototype and testing
4. To encourage the understanding, acceptance and appreciation of individual differences
5. To solve practical Engineering problems through innovative product design and creativ solution

Course Outcomes:

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

1. Compare and classify the various learning styles and memory techniques and apply them i their engineering education
2. Analyze emotional experience and inspect emotional expressions to better understand use while designing innovative products
3. Develop new ways of creative thinking and learn the innovation cycle of design thinkin process for developing innovative products
4. Propose real-time innovative engineering design and choose appropriate framework strategies, techniques during prototype development
5. Perceive individual differences and its impact on everyday decisions and further create a bette customer experience

Unit 1: An Insight to Learning

Understanding the Learning Process, Kolb's Learning Styles, Assessing and Interpreting

Unit 2: Remembering Memory

Understanding the Memory process, Problems in retention, Memory enhancement techniques

Unit 3: Emotions: Experience & Expression

Understanding Emotions: Experience & Expression, Assessing Empathy, Application with Peers

Unit 4: Basics of Design Thinking

Definition of Design Thinking, Need for Design Thinking, Objective of Design Thinking, Concepts& Brainstorming, Stages of Design Thinking Process (explain with examples) – Empathize, Define, Ideate, Prototype, Test

Unit 5: Being Ingenious & Fixing Problem

Understanding Creative thinking process, Understanding Problem Solving, Testing Creative Problem Solving

Unit 6: Process of Product Design

Process of Engineering Product Design, Design Thinking Approach, Stages of Product Design, Examples of best product designs and functions, Assignment – Engineering Product Design

Unit 7: Prototyping & Testing
What is Prototype? Why Prototype? Rapid Prototype Development process, Testing, Sample Example, Test Group Marketing

Unit 8: Celebrating the Difference
Understanding Individual differences & Uniqueness, Group Discussion and Activities to encourage the understanding, acceptance and appreciation of Individual differences

Unit 9: Design Thinking & Customer Centricity
Practical Examples of Customer Challenges, Use of Design Thinking to Enhance Customer Experience, Parameters of Product experience, Alignment of Customer Expectations with Product Design

Unit 10: Feedback, Re-Design & Re-Create
Feedback loop, Focus on User Experience, Address "ergonomic challenges, User focused design, rapid prototyping & testing, final product, Final Presentation – **"Solving Practical Engineering Problem through Innovative Product Design & Creative Solution".**

Text/Reference Books:

1. E Balaguruswamy (2022), Developing Thinking Skills (The way to Success), Khanna Book Publishing Company.

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF MECHANICAL ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-23]
(w.e.f. Academic Year 2023-24)
B.E. II-Semester
(Common to CIVIL, MECH)

S. No.	Course Code	Category	Course Title	Scheme of Instructions				Scheme of Examinati			CREDITS
				L	T	P/D	Contact Hours/Week	aximum Mar		Duration in Hours	
								CIE	SEE		
MC: Three Week Induction Programme											
Theory Course											
1	U23EN202	MC	Indian Constitution	2	-	-	2	40	60	3	0
2	U23MA201	BSC	Mathematics-II	3	1	-	4	40	60	3	4
3	U23CH201	BSC	Engineering Chemistry	3	-	-	3	40	60	3	3
4	U23ME201	ESC	Engineering Mechanics	3	-	-	3	40	60	3	3
5	U23EN201	HMSC	English for Professional Communication	2	-	-	2	40	60	3	2
Practical/ Laboratory Course											
6	U23CH2L1	BSC	Engineering Chemistry Lab	-	-	3	3	25	50	3	1.5
7	U23ME2L3	ESC	Engineering Mechanics Lab	-	-	3	3	25	50	3	1.5
8	U23EN2L1	HSMC	ffective Communication Skill Lab	-	-	3	3	25	50	3	1.5
9	U23ME2L2	ESC	Workshop / Manufacturing Practice Lab	1	-	4	5	50	50	3	3
Total				**14**	**1**	**13**	**28**	**325**	**500**	**27**	**19.5**

L: Lecture(Hrs/Wk/Sem) **T**: Tutorial (Hrs/Wk/Sem) **P**: Practical **D**: Drawing (Hrs/Wk/Sem)

CIE: Continuous Internal Evaluation
BSC: Basic Science Courses
MC: Mandatory Course
EN: English
ME: Mechanical Engineering
PH: Physics
SEE: Semester End Examination
ESC: Engineering Science Courses
MA: Mathematics
CH: Chemistry
CS: Computer Science

Note:
1. Each contact hour is a Clock Hour.
2. The duration of the practical class is three hours, however it can be extended wherever necessary, to enable the student to complete the experiment.

Course Code	Course Title						Core/Elective
U23EN202	**INDIAN CONSTITUTION (Common to all Branches)**						Mandatory Course
Prerequisite	Contact Hours per Week				CIE	SEE	edits
	L	T	D	P			
-	**2**	**-**	**-**	**-**	**40**	**60**	**-**

Course Objectives:

1. To create awareness among students about the Indian Constitution.
2. To acquaint the working conditions of union, state, local levels, the powers and functions.
3. To create consciousness in the students on democratic values and principles articulated in th constitution.
4. To expose the students on the relations between federal and provincial units.
5. To divulge the students about the statutory institutions.

Course Outcomes:

After completing this course, the student will

1. Know the background of the present constitution of India.
2. Understand the working of the union, state and local levels.
3. Gain consciousness on the fundamental rights and duties.
4. Be able to understand the functioning and distribution of financial resources between the centre and states.
5. Be exposed to the reality of hierarchical Indian social structure and the ways the grievances the deprived sections can be addressed to raise human dignity in a democratic way.
6. Discuss the role of Election Commission of India.

UNIT-I

Evolution of the Indian Constitution: 1909Act, 1919Act and 1935Act. Constituent Assembly: Composition and Functions; Fundamental features of the Indian Constitution.

UNIT-II

Union Government: Executive-President, Prime Minister, Council of Minister
State Government: Executive: Governor, Chief Minister, Council of Minister
Local Government: Panchayat Raj Institutions, Urban Government

UNIT-III

Rights and Duties: Fundamental Rights, Fundamental Duties, Directive principles of State Policy.

UNIT-IV

Relation between Federal and Provincial units: Union-State relations, Administrative, legislative and Financial, Inter-State council, NITI Aayog, Finance Commission of India

UNIT-V

Statutory Institutions:
Elections-Election Commission of India, National Human Rights Commission, National Commission for Women

Textbooks:

1. D.D. Basu, Introduction to the constitution of India, Lexis Nexis, New Delhi, 9th Edition, 2016.
2. Subhash Kashyap, Our Parliament, National Book Trust, New Delhi, 2015.

Reference Books:

1. Peu Ghosh, Indian Government & Politics, Prentice Hall of India, New Delhi, 2012
2. B.Z. Fadia & Kuldeep Fadia, Indian Government &Politics, Lexis Nexis, NewDelhi,16th Edition, 2020

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Course Code	Course Title						Core/Elective
U23MA201	**MATHEMATICS-II (Common to all Branches)**						**Core**
Prerequisite	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
--	3	1	-	-	40	60	4

Course Objectives

1. To study matrix algebra and its use in solving system of linear equations and in Solving eigen value problems
2. To provide an over view of ordinary differential equations
3. To study special functions like Legendre and Beta Gamma functions
4. To learn Laplace Transforms and its properties

Course Outcomes

The students will able to

1. Engineering problems through Mathematics knowledge
2. Solve system of linear equations with the help of Matrices and solving eigen value problems.
3. Discuss the methods for solving certain first order differential equations and insight into its applications.
4. Determine solution of certain higher order differential equations and exposure into its applicatior
5. Explain Analyze the basic problems of Gamma, Beta and Legendre's functions.
6. Apply the concept of Laplace Transforms in improper integrals and to the ordinary differential equations.

Unit-I

Matrices: Rank of a matrix, Echelon form, System of linear equations, linearly dependence and independence of vectors, Linear transformation, Orthogonal transformation, Eigen values, Eigen vectors, Properties of eigen values, Diagonalization, Cayley - Hamilton theorem, Quadratic forms, Reduction of quadratic form to canonical form by orthogonal transformation, Nature of quadratic forms.

Unit-II

Differential Equations of First Order: Exact differential equations, integrating factors, Linear differential equations, Bernoulli's differential equation, Orthogonal trajectories of a given family of curves (Cartesian and polar), Newton's Law of Cooling.

Unit-III

Differential Equations of Higher Orders: Solutions of second and higher order linear homogeneous equations with constants coefficients, Method of reduction of order for the linear homogeneous second order differential equations with variable coefficients, Solutions of non-homogeneous linear differential equations, Method of variation of parameters.

Unit-IV

Special Function: Beta Functions and Gamma Functions, Relation Between Beta and Gamma Function. Power Series Method- Bessel's function, problems on basic properties, Generating function (without proof), Legendre's Differential Equation and Legendre's Polynomial $P_n(x)$, Rodrigue's Formula (without proof).

Unit-V

Laplace Transforms: Laplace Transforms, Inverse Laplace Transforms, Properties of Laplace Transforms and inverse Laplace Transforms, Convolution Theorem (without proof). Solution of ordinary Differential Equations using Laplace Transforms.

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Text books:

1. B.S. Grewal, “Higher Engineering Mathematics”, Khanna publishers, 44th edition, 2016.
2. ErwinKreyszig, “Advanced Engineering Mathematics, Wiley, 9th edition, 2013.
3. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 4th Edition, 2014.

Reference Books:

1. B.V. Ramana, “Higher Engineering Mathematics”, Tata McGraw-Hill,2018
2. N.P.Bali and Manish Goyal, “A text book of Engineering Mathematics”, Laxmi Publications, latest edition.
3. H.K. Dass and Er. RajnishVerma, “Higher Engineering Mathematics”, S.Chand Publishing,
4. 1st edition,2011

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Course code	Course Title						Core/Elective
U23CH201	**ENGINEERING CHEMISTRY (Common for All)**						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
-	L	T	D	P			
	3	1	-	-	40	60	3

Course Objectives:

1. To understand and apply fundamentals of battery chemistry in Engineering applications.
2. To get acquainted with hard water and corrosion and apply the techniques for softening and corrosion contro method.
3. Correlate the properties of materials with their internal structure and their use for Engineering application
4. Exposed to qualitative and quantitative parameters of chemical fuels.
5. To develop the concept of green chemistry in modern trends in engineering.

Course Outcomes:

1. Understand the basic principle of electrochemistry and batteries and exemplify its uses in daily life.
2. Analyze the problems of hard water and apply softening techniques and corrosion control method.
3. Explain the structure, properties and characteristics of engineering materials used in modern technology.
4. Classify chemical fuels and grade them through qualitative analysis.
5. Apply the concept of Green Chemistry to protect mother nature.

UNIT-I

Electrochemistry And Batteries:

Electrochemistry: Types of cells, cell notation, cell reaction and cell potential. Nernst equation and its derivation. Applications of Nernst equation to electrode potential and EMF of a cell. Numerical problems. Types of electrodes, Calomel, Quinhydrone and Glass electrode. Determination of pH by using Quinhydrone electrode.

Batteries: Secondary battery: lead acid battery and Li-Ion battery. **Flow batteries:** Methanol-Oxygen fuel cells.

UNIT- II

Water Chemistry And Corrosion:

Water Chemistry: Hardness of water its types and units of hardness, estimation of hardness by EDTA method. Softening of water by Ion exchange process, reverse osmosis method. Potable water and its specifications, disinfection of water by chlorination and break point Chlorination. **Corrosion:** Introduction, causes and its effects. Theories of corrosions-wet corrosion and its mechanism. Factors affecting rate of corrosion. **Corrosion Control Methods:** Cathodic Protection, Sacrificial anodic method, impressed current method and Surface coating method-Electroless Ni plating.

UNIT- III

Polymers: Basics terms in polymers, Monomer and its functionality, Polymers and Degree of polymerization. Types of polymerizations, Classification of Polymers – Thermoplastics and Thermosetting resins. **Preparation, Properties and engineering applications of: Plastics-** PVC and Bakelite. **Fibres:** Nylon 6:6, Kevlar. **Elastomers:** Buna-S.

Conducting polymers: classification Mechanism of conduction in Poly-acetylene, Applications of conducting polymers.

Biodegradable polymers: Introduction, preparation, properties and applications of Polylactic acid.

UNIT- IV

Chemical Fuels : Definition and classification of fuels- Primary and secondary fuels. Solid, liquid and gaseous fuels. Requirements of a good fuel. Calorific Value – HCV and LCV. Theoretical calculations of calorific value by Dulong‘s formula – Numerical problems. Solid Fuels: Analysis of

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coal - Proximate and Ultimate analysis. Liquid Fuels: Fractionation of Petroleum. Composition and uses of Gasoline, Diesel and Kerosene. Gaseous Fuels: LPG, CNG -Composition and Uses. Combustion: calculation of air quantities by weight and volume required for combustion of a fuel- Numerical problems

UNIT –V

Green Chemistry & Composites

Green Chemistry: Concept, Principles of green chemistry – Atom Economy, Catalysis and examples of clean technology. **Biodiesel:** Sources, Concept of Trans esterification and carbon neutrality. Properties and significance. **Composites:** Introduction to composites, composition and characteristic properties of composites. Classification of composites and its applications.

Text books:

1. P.C. Jain & M. Jain, Engineering Chemistry, Dhan Patrai and sons Publishing Company, 17th Edn, New Delhi (2019)
2. Rama Devi, Venkata Ramana Reddy and P. Rath, Engineering Chemistry, Cengage Learning, New Delhi (2016)
3. S.S. Dara, S. Chand, A Text Book of Engineering Chemistry, S. Chand Publications, Reprint edition, 2017
4. Puri and Sharma, Principles of Physical Chemistry, Vishal Publications Co.2019
5. Agarwal Shikha, Engineering Chemistry, Cambridge University Publications.

Reference Books:

1. C. V. Agarwal, C. P. Murthy, A. Naidu, "Chemistry of Engineering Materials", Wiley India, 5th Edition, 2013.
2. R. P. Mani, K. N. Mishra, "Chemistry of Engineering Materials", Cengage Learning, 3rd Edition, 2015.
3. Shashi Chawla, Engineering Chemistry, Dhan Patrai and Company Ltd, Delhi (2015)
4. S.S Dara, Dr K Mukkanti, A text book of Engineering Chemistry, S Chand 2010.
5. OG Palanna , Engineering Chemistry, McGraw Hill Education ,second edition 2017.

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Course Code	Course Title						Core/Elective
U23ME201	**Engineering Mechanics**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	p			
-	3	0	0	0	40	60	3

Course Objectives

The objectives of this course is to impart knowledge of

1. Resolution of forces, equilibrium of force systems consisting of static loads
2. Obtaining centroids and moments of inertia for various regular and irregular areas.
3. Various forces in the axial force members, and to analyze the trusses using various methods,
4. Basic concepts of dynamics, their behavior, analysis and motion of bodies
5. Work energy principles and impulse momentum theory and applications to problem solving

Course Outcomes

After completing this course, the student will be able to:

1. Apply the fundamental concepts of forces, equilibrium conditions for static loads.
2. Determine the centroid and moment of inertia for various sections.
3. Determine the mass moment of inertia for solid bodies.
4. Analyze forces in members of a truss using method of joints and method of sectio analyze friction for single and connected bodies.
5. Apply the basic concepts of dynamics, their behavior, analysis and motion of bodies.

UNIT-I

System of Forces: Coplanar Concurrent Forces, Components in Space - Resultant of coplanar and spatial systems, Moment of Force and Couple and its Application to coplanar system

Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium and applications to Coplanar System.

UNIT-II

Centroid & **Centre*s* of Gravity:** Centroid of simple areas (from basic principles), Centroid of Composite areas, Centre of gravity of simple and composite bodies, Theorem of pappus.

Area Moment of Inertia: Definition, Moment of inertia of simple areas (from basic principles), Polar Moment of Inertia, Transfer formula, Moment of Inertia of Composite areas.

UNIT-III

Mass moment of Inertia: Mass moment of inertia of simple bodies (from basic principles).

Friction: Theory of friction, Laws of friction, Friction connected to single and connected bodies. Wedge friction.

UNIT-IV

Analysis of Trusses: (Analytical Method) Types of Frames, Assumptions for forces in members of perfect frame, Method of joints and Method of sections for Cantilever Trusses, simply supported Trusses.

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UNIT-V

Work-Energy Method: Introduction, Equations for Translation, Work-Energy Applications to Particle Motion, Connected System and Fixed Axis Rotation.

Impulse Momentum Method: Linear impulse momentum, law of conservation of momentum, coefficient of restitution, Elastic impact.

Text Book:

1. Engineering Mechanics, S.S Bhavakatti, New age International publishers.
2. A Textbook of Engineering Mechanics, R.S Khurmi, S. Chand Publications

References:

1. Engineering Mechanics, Ferdinand L. Singer, Collins, Singapore, 1975.
2. A Textbook of Engineering Mechanics, R.K Bansal, Laxmi Publications.
3. Applied Mechanics, Junarkar, S.B. and H.J. Shah., Publishers, 2001.
4. Engineering Mechanics, Reddy Vijay Kumar K. and K. Suresh Kumar, Singer's 2010.

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Course code	Course title						Core/Elective
U23EN201	**English For Professional Communication** (Common to all Branches)						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
--	2	-	-	-	40	60	2

Course Objectives:

Students are able

1. To understand the total content and underlying meaning in the context.
2. To comprehend the text to develop language competency
3. To develop vocabulary among the students
4. To practice the grammar skills involved in writing sentences and short paragraphs.
5. To write paragraphs, letters, narrative pieces, reports, etc.

Course Outcomes:

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

6. Read and write the content meaningfully
7. Comprehend the given texts and respond appropriately
8. Improves proficiency in vocabulary relatively
9. Demonstrate grammar structure precisely in writing sentences and paragraphs
10. Undertake various types of writing confidently

UNIT-I

Reading: Ruskin Bond, 'The Thief's Story'
Vocabulary: Word Building – Prefixes, Suffixes, Root words
Grammar: Articles, Prepositions, Concord
Writing: Paragraph Writing

UNIT-II

Reading: Padma Sachdeva, "Sunrise"
Vocabulary: Word Formation –Blending, Synonyms, Antonyms,
Grammar: Punctuation
Writing: Formal/Official Letter Writing

UNIT-III

Reading: Robots that look like Humans-Article
Vocabulary: One Word Substitutes
Grammar: Common Errors in English
Writing: Basics of Report Writing

UNIT-IV

Reading: William Wordsworth, 'Daffodils'
Vocabulary: Idioms, Phrases
Grammar: Narration (Direct – Indirect Speech)
Writing: Statement of Purpose (SOP)

UNIT-V

Reading: Francis Bacon, 'Of Studies'(Essay)
Vocabulary: Standard Abbreviations
Grammar: Tense
Writing: Blog Writing

Suggested Readings:

1. Kumar, S and Lata, P, Communication Skills. Oxford University Press,2018
2. Yule George, Oxford Grammar Practice, Oxford University Press, Oxford 2019
3. Michael Swan, Practical English Usage. Oxford University Press, 2016
4. Ashraf Rizvi, M, Effective Technical Communication, Tata McGraw Hill, 2nd Edition. 2017.
5. Meenakshi Raman and Sangeeta Sharma. Technical Communication: Principles and Practice. OUP, 3rd Edition. 2011
6. McCarthy M.& Felicity O'Dell, English Vocabulary in Use, 2nd edition, Pubs.2010
7. Ludlow R & Panton F., The Essence of Effective Communication, Prentice Hall

Course code	Course Title						Core/Elective
U23CH1L1	**ENGINEERING CHEMISTRY LAB (Common for All)**						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	3	25	50	1.5

Course Objectives:

1. Conduct experiments, take measurements and analyze the data through hands-on experience in order to demonstrate understanding of the theoretical concepts of quantitative analysis while working in small group.
2. Interpret the electro analytical principles with experimental results graphically.
3. Demonstrate writing skills through clear laboratory reports.

Course Outcomes:

1. Analyze the hardness and alkalinity of water.
2. Illustrate the mobility of ions in strong acids and weak acids using conducto meter & Determine the electrode potential of a given solutions.
3. Demonstrate the principles of Colorimetry and Estimate the rate constant.
4. Determine the amount of ferrous ions.
5. Calculate the amount of synthesized drug.

LIST OF EXPERIMENTS

(Note: Minimum ten experiments should be conducted in the semester)

Introduction to Chemical Analysis.
Techniques of Weighing.

VOLUMETRIC ANALYSIS:

1. Determination of strength of Ferrous solution by Dichrometry.
2. Determination of strength of Ferrous solution by Permanganometry.
3. Determination of hardness of water by Complexometric method using EDTA.
4. Determination of strength of Carbonates and bicarbonates in a given mixture .

INSTRUMENTAL ANALYSIS:

Conductometer:

5. Determination of strength of given HCl solution
6. Determination of strength of CH3COOH solution
7. Determination of strength of HCl & CH3COOH in given mixture

Potentiometer:

8. Determination of strength of HCl solution
9. Determination of strength of Ferrous solution.

pH Meter:

10. Determination of strength of HCl solution

Colorimeter:

11. Verification of Beer-Lambert‘s law and determination of Permanganate.

CHEMICAL KINETICS:

12. Determination of rate constant of acid catalyzed hydrolysis of methyl acetate.

DRUG SYNTHESIS:

13. Synthesis of Drug (Aspirin / Paracetamol).

Textbooks:

1. B.D. Khosla, A. Gulati and V.Garg, _Senior Practical Physical Chemistry‟, (R. Chand & Co., Delhi)
2. K. K. Sharma and D.S. Sharma, _An Introduction to Practical Chemistry‟, (Vikas publishing,
3. N. Delhi

Course Code	Course Title						Core/Elective
U21ME2L3	**Engineering Mechanics Lab**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	p			
-	0	0	0	3	**25**	**50**	**1.5**

Course Objectives

The objectives of this course is to impart knowledge of

1. Resolution of forces, equilibrium of force systems consisting of static loads
2. Obtaining centroids and moments of inertia for various regular and irregular areas.
3. Various forces in the axial force members, and to analyze the trusses using various methods,
4. Concept of friction for single and connected bodies.
5. Basic concepts of dynamics, their behavior, analysis and motion bodies
6. Work energy principles and impulse momentum theory and applications to problem solving

Course Outcomes

After completing this course, the student will be able to:

1. Apply the fundamental concepts of forces, equilibrium conditions for static loads.
2. Determine the centroid and moment of inertia for various sections.
3. Analyze forces in members of a truss using method of joints and method of sections, analy friction for single and connected bodies.
4. Apply the basic concepts of dynamics, their behavior, analysis and motion bodies.
5. Solve problems involving work energy principles and impulse momentum theory.

S.NO.	NAME OF THE EXPERIMENT
01	Study of Simple Machines
02	Polygon Law of Coplanar Forces
03	Centre of gravity of Irregular Shaped Bodies
04	Bell Crank Lever
05	Support Reactions for Beam
06	Simple/ Compound Pendulum
07	Inclined Plane (To determine coefficient of friction)
08	Moment of Inertia of a Fly Wheel
09	Simple Screw Jack
10	Lami's theorem
11	Application of Spreadsheet Program

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Suggested Readings:

1. *Engineering Mechanics*, S.S Bhavakatti, New age International publishers.
2. *A Textbook of Engineering Mechanics*, R.S Khurmi, S. Chand Publications,
3. *Engineering Mechanics*, Ferdinand L. Singer, Collins, Singapore, 1975.
4. *A Textbook of Engineering Mechanics*, R.K Bansal, Laxmi Publications.
5. *Applied Mechanics*, Junarkar, S.B. and H.J. Shah., Publishers, 2001.
6. *Engineering Mechanics*, Reddy Vijay Kumar K. and K. Suresh Kumar, Singer's 2010.

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Course code	Course title						Core/Elective
U23EN2L1	**EFFECTIVE COMMUNICATION SKILLS LAB (Common to all Branches)**						Core
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
--	L	T	D	P			
	-	-	-	3	25	50	1.5

Course Objectives:

Students are able

1. To enhance listening skill of the students
2. To train the students to use correct pronunciation, stress and intonation
3. To equip students to learn the art of conversation in formal and informal situations
4. To promote critical thinking and build team work among students
5. To foster creativity and boost self confidence among students
6. To prepare students for formal presentations

Course Outcomes:

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

1. Listen and interpret spoken language productively
2. Speak English with neutralized pronunciation, stress and intonation
3. Present themselves confidently in formal and informal situations
4. Expand critical thinking and acknowledge team work effectively
5. Develop creativity and speak confidently in individual and group activity
6. Create formal presentations dynamically

LIST OF ACTIVITIES

1. Listening for comprehension
2. Pronunciation, Intonation, Stress and Rhythm
3. Conversation Skills
4. Introducing Oneself and Others
5. Asking for and Giving information
6. Making Request and Responding to them Appropriately
7. Giving Instructions and Responding to them Appropriately
8. Making Formal Announcement and Emceeing
9. Group Discussion
10. Just A Minute (JAM)
11. Debate
12. Formal Presentations

Suggested Readings:

1. Board of Editors. Language and Life Skills Approach, Orient Black Swan
2. Bala Subramaniam, T.A. Text book of English Phonetics for Indian Students, Macmillan
3. CIEFL, Exercises in Spoken English. PART-III, Oxford University Press.
4. Pillai, Radhakrishna G. Spoken English for You – Level II, Emerald Publisher

Robert. M. Sher field & et al. Developing Soft Skills. Pearson Education.4th Edition.

Ludlow R & Panton F., The Essence of Effective Communication, Prentice Hall.

Course code	Course title						Core/Elective
U23ME2L2	**Workshop/ Manufacturing Practices** (Common to CIVIL, MECH, CSE, CSD & AIDS)						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
-	L	T	D	P			
	1	-	-	4	50	50	3

Course Objectives:

The Objective of this course is to impart knowledge of

1. Engineering Practices & develop holistic understanding of various Engineering materials and Manufacturing processes.
2. Steel, Plastic, Composite and other materials for suitable applications.
3. Hands on practice on techniques of fabrication, welding, casting, manufacturing, metrology, and allied skills.
4. Productivity, create skilled manpower which is cognizant of industrial workshop components and processes and can communicate their work in a technical, clear and effective way.
5. Engineering Skill development with regard to making components, system integration and assembly to form a useful device.

Course Outcomes :

After completing this course, the student will be able to

1. Differentiate the tools and Fabricate components with their own hands.
2. Examine the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
3. Perform the Assembling of different components and will be able to produce small mechanisms/devices of their interest.
4. Demonstrate experiments of black smithy, plumbing, carpentry, tin smithy, fitting, house wiring.
5. Select different Engineering Materials and Manufacturing Methods.
6. Develop different techniques used in Workshop and chooses the best material/ manufacturing process for the application.

A. TRADES FOR EXERCISES

1. **FITTING SHOP**
    1. Square fitting
    2. Dovetail fitting
    3. V- Template fitting
2. **CARPENTRY**
    1. End lap joint
    2. T- Bridle joint
    3. Dovetail lap joint

3. ELECTRICAL & ELECTRONICS /HOUSE WIRING

1. Two lamps in parallel with 5 Pin 6amp socket and switches.
2. Two lamps in series connection with switches.
3. Staircase wiring.

4. **TIN SMITHY**
    1. Square Tin
    2. Rectangular Scoop
    3. Conical funnel
5. **WELDING PRACTICE**

1. Lap Joint
2. V- Butt Joint
3. T-joint

B. TRADES FOR DEMONSTRATION AND EXPOSURE

1. Machining (Lathe & Drilling)
2. Plumbing (Introduction of tools, joints, couplings, and valves etc)
3. Blacksmithy (Introduction, Round to Square, Square to Octogon)

C. PRESENTATIONS AND VIDEO LECTURES

1. Manufacturing Methods
2. Brazing
3. Glass Cutting
4. Additive Manufacturing
5. CNC LATHE
6. Plastic Moulding
7. Casting
8. Gas Welding

Note: At least two exercises from each trade.

Suggested Readings :

1. H S Bawa, "Workshop Practice", Tata Mc Graw Hill Education Private Limited ,New Delhi, Second Edition, 2009.
2. V Ramesh Babu, “Engieering Workshop Practice”, VRB Publishers Pvt Ltd, New Edition, 2009.
3. P. Kannaiah & K. L. Narayana “Workshop manual” 2nd Ed., Scitech publications (I) Pvt. Ltd., Hyderabad.
4. Hajra Choudhury S.K., HajraChoudhury A.K., Nirjar Roy S.K. “Elements of Workshop Technology” Vol-I 2008 &Vol-II 2010 Media Promoters & Publishers Pvt. Limited, Mumbai.
5. B S Raghuwanshi, “A Course In Workshop Technology”, Dhanpat Rai & Co. (P) Ltd, Educational & Technical Publishers, Vol-II, 2011.
6. K Venkata Reddy,”Workshop Practice Manual” Sixth Edition, B S Publications Books Pvt.Ltd, Hyderabad.