LORDS INSTITUTE OF ENGINEERING & TECHNOLOGY
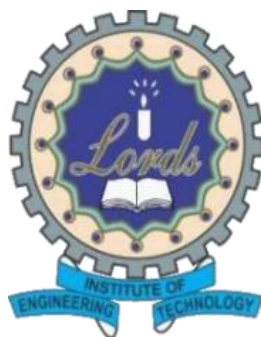
(Autonomous)

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 Computer Science and Engineering

(With effect from the Academic Year 2023-24)

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF COMPUTER SCIENCE AND 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	L	T	P/D	Contact Hours/Week	CIE	SEE	Duration in Hours	CREDITS
								Maximum Marks			
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 CSE, CSD & AIDS)

S. No.	Course Code	Category	Course Title	L	T	P/D	Contact Hours/Week	CIE	SEE	Duration in Hours	CREDITS
								Maximum Marks			
				Scheme of Instructions				Scheme of Examination			
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	U23EE201	ESC	Basic Electrical Engineering	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	U23EE2L1	ESC	Basic Electrical Engineering 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   **SEE**: Semester End Examination
BSC: Basic Science Courses   **ESC**: Engineering Science Courses
MC: Mandatory Course   **MA**: Mathematics
EN: English   **CH**: Chemistry
ME: Mechanical Engineering   **CS**: Computer Science
PH: Physics

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.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-23]
(W.e.f Academic Year 2024-25)
B.E. III-Semester

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	U21EC304	ESC	Digital Electronics and Computer Organization	3	-	-	3	40	60	3	3
2	U21ME307	ESC	Operations Research	3	1	-	4	40	60	3	4
3	U21CS301	PCC	Discrete Mathematics	3	-	-	3	40	60	3	3
4	U21CS302	PCC	Data Structures	3	-	-	3	40	60	3	3
5	U21CM301	PCC	Python Programming	3	-	-	3	40	60	3	3
Practical/ Laboratory Course											
6	U21CM3L1	PCC	Python Programming Lab	0	0	3	3	25	50	3	1.5
7	U21CS3L1	PCC	Data Structures Lab	0	0	3	3	25	50	3	1.5
8	U21EC3L4	ESC	MATLAB	0	0	3	3	25	50	3	1.5
Bridge Course*											
9	U21CS3L2	ESC	C Programming Lab	-	-	2	2	50	-	-	0
10	U21EN3L2	HSMC	Effective Communication Skills Lab	-	-	2	2	50	-	-	0
Total				15	1	9 (*13)	25 (*29)	275 (*375)	450	--	20.5

*** : Bridge Course Only for Lateral Entry admitted Students.**

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:** Program Core Course
ME: Mechanical Engineering.   **PROJ:** Project   **ESC:** Engineering Science course
CM: CSE-AIML   **EC**: Electronics Communication   **CS**: Computer Science
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 COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATION [LR-23]
(W.e.f Academic Year 2024-25)
B.E. IV-Semester

S. No.	Course Code	Category	Course Title	Scheme of Instructions				Scheme of Examination			CREDITS
							Contact Hours/Week	Maximum Marks		Duration in Hours	
				L	T	P/D		CIE	SEE		
Theory Course											
1	U21MA401	BSC	Mathematics-III (Probability and statistics)	3	1	-	4	40	60	3	4
2	U21CS401	PCC	Software Engineering	3	-	-	3	40	60	3	3
3	U21CS401	PCC	Design and Analysis of Algorithms	3	-	-	3	40	60	3	3
4	U21IT402	PCC	Database Management Systems	3	-	-	3	40	60	3	3
5	U21CS402	PCC	JAVA Programming	3	-	-	3	40	60	3	3
Practical/ Laboratory Course											
6	U21CS4L1	PCC	Software Engineering Lab	-	-	3	3	25	50	3	1.5
7	U21IT4L2	PCC	Database Management Systems Lab	-	-	3	3	25	50	3	1.5
8	U21CS4L1	PCC	JAVA Programming Lab	-	-	3	3	25	50	3	1.5
Total				14	1	09	23	275	450	--	19.5

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   **MA:** Mathematics
HSMC: Humanities and Social Sciences including Management Course
PCC: Program Core Course

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 COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATION [LR-23]
(W.e.f Academic Year 2025-26)
B.E. V-Semester (Tentative)

S. No.	Course Code	Category	Course Title	Scheme of Instructions			Contact Hours/Week	Scheme of Examination		Duration in Hours	CREDITS
								Maximum Marks			
				L	T	P/D		CIE	SEE		
Theory Course											
1	U21CS501	PCC	Automata Theory, Languages and Computation	3	1	0	4	40	60	3	4
2	U21CS502	PCC	Computer Networks	3	1	0	4	40	60	3	4
3	U21CS503	PCC	Operating Systems	3	0	0	3	40	60	3	3
4	---	PEC	Professional Elective-I	3	0	0	3	40	60	3	3
5	---	OEC	Open Elective-I	3	0	0	3	40	60	3	3
Practical/ Laboratory Course											
6	U21CS5L1	PCC	Operating Systems Lab	0	0	3	3	25	50	3	1.5
7	U21CS5L2	PCC	Computer Networks Lab	0	0	3	3	25	50	3	1.5
Internship											
8	U21CS5P1	PROJ	Internship (During Vacation Period after IV Sem)	-	-	2	2	50	-	-	1
Total				15	2	8	23	300	400	--	21

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

CIE: Continuous Internal Evaluation Examination   **SEE**: Semester End

PCC: Program Core Course Course   **PEC:** Professional Elective

OEC: Open Elective Course   **CS:** Computer Science

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.

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATION [LR-23]
(W.e.f Academic Year 2025-26)
B.E. VI-Semester (Tentative)

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	U21MB601	HSMC	Business Economics and Financial Analysis	3	0	0	3	40	60	3	3
2	U21CS601	PCC	Artificial Intelligence	3	0	0	3	40	60	3	3
3	U21CS602	PCC	Compiler Design	2	1	0	3	40	60	3	3
4	--	PEC	Professional Elective-II	3	0	0	3	40	60	3	3
5	--	OEC	Open Elective II	3	0	0	3	40	60	3	3
Practical/ Laboratory Course											
6	U21CS6L1	PCC	Artificial Intelligence Lab	0	0	3	3	25	50	3	1.5
7	U21CS6L2	PCC	Compiler Design Lab	0	0	3	3	25	50	3	1.5
8	U21EN6L1	PCC	Scripting Languages Lab	-	-	2	2	50	-	-	1
Seminar											
9	U21CS6P1	PROJ	Technical Seminar	-	-	2	2	50	-	-	1
Skill Development Course											
10	U21MA6L1	BSC	Aptitude and Reasoning Lab	-	-	2	2	50	-	-	1
Total				14	1	12	27	400	400	--	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
OEC: Open Elective Course   **PCC**: Program Core Courses
MB: Management Studies   **PROJ**: Project
PEC: Professional Elective Courses   **CS:** Computer Science
HSMC: Humanities and Social Sciences   **MA:** Mathematics
        including Management Course

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 COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATION [LR-23]
(W.e.f Academic Year 2026-27)
B.E. VII-Semester (Tentative)

S. No.	Course Code	Category	Course Title	Scheme of Instructions				Scheme of Examination			CREDITS
				L	T	P/D	Contact Hours/Week	CIE	SEE	Duration in Hours	
Theory Course											
1	U21CS701	PCC	Machine Learning	3	0	0	3	40	60	3	3
2	U21CS702	PCC	Data Mining	3	0	0	3	40	60	3	3
3	---	PEC	Professional Elective – III	3	0	0	3	40	60	3	3
4	---	PEC	Professional Elective – IV	3	0	0	3	40	60	3	3
5	---	OEC	Open Elective-III	3	0	0	3	40	60	3	3
Practical/ Laboratory Course											
6	U21CS7L1	PCC	Machine Learning Lab	-	0	3	3	25	50	3	1.5
7	U21CS7L2	PCC	Data Mining Lab	-	0	3	3	25	50	3	1.5
Project											
8	U21CS7P1	PROJ	Mini Project	-	-	6	6	50	50	--	3
Total				15	0	12	27	300	450	--	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
OEC: Open Elective Course   **PCC**: Program Core Courses
PEC: Professional Elective Course   **CS:** Computer Science
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.

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATION [LR-23]
(W.e.f Academic Year 2026-27)
B.E. VIII-Semester (Tentative)

S. No.	Course Code	Category	Course Title	L	T	P/D	Contact Hours/Week	Maximum Marks CIE	Maximum Marks SEE	Duration in Hours	CREDITS
theory											
Theory Course											
1	U21CS801	PCC	Distributed Systems and Cloud Computing	3	0	0	3	40	60	3	3
2	---	PEC	Professional Elective-V	3	0	0	3	40	60	3	3
3	---	OEC	Open Elective-IV	3	0	0	3	40	60	3	3
Project											
4	U21CS8P2	PROJ	Major Project	0	0	16	16	50	150	--	8
5	U21CS8P1	PROJ	Comprehensive Viva	0	0	4	4	100	--	--	2
Total				**9**	**0**	**20**	**29**	**270**	**330**	**--**	**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
PCC: Program Core Courses   **PEC:** Professional Elective Course
OEC: Open Elective Course   **PROJ:** Project
CS: Computer Science

Note:
1. Each contact hour is a Clock Hour.

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS
(w.e.f Academic Year 2023-24)
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		Duration in Hours	
								CIE	SEE		
Theory Course											
1	U21CS504	PEC-I	Software Testing Methodologies	3	0	0	3	40	60	3	3
	U21CS505		Advanced Computer Architecture	3	0	0	3	40	60	3	3
	U21CS506		Neural Networks	3	0	0	3	40	60	3	3
	U21CS507		Cyber Security, Ethics & Laws	3	0	0	3	40	60	3	3
2	U21CS603	PEC-II	Software Project Management	3	0	0	3	40	60	3	3
	U21CS604		Web and Internet Technologies	3	0	0	3	40	60	3	3
	U21CS605		Deep Learning	3	0	0	3	40	60	3	3
	U21CS606		Fundamentals of Cryptography	3	0	0	3	40	60	3	3
3	U21CS703	PEC-III	Software Architecture and Design Patterns	3	0	0	3	40	60	3	3
	U21CS704		Information Retrieval Systems	3	0	0	3	40	60	3	3
	U21CS705		Computer Vision	3	0	0	3	40	60	3	3
	U21CS706		Block Chain Technologies	3	0	0	3	40	60	3	3
4	U21CS707	PEC-IV	Software Quality Management	3	0	0	3	40	60	3	3
	U21CS708		Internet Of Things	3	0	0	3	40	60	3	3
	U21CS709		Data Science	3	0	0	3	40	60	3	3
	U21CS710		Digital Forensics	3	0	0	3	40	60	3	3
5	U21CS802	PEC-V	Agile Methodologies	3	0	0	3	40	60	3	3
	U21CS803		Human Computer Interaction	3	0	0	3	40	60	3	3
	U21CS804		Natural Language Processing	3	0	0	3	40	60	3	3
	U21CS805		Mobile Computing	3	0	0	3	40	60	3	3

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATIONS
(w.e.f Academic Year 2023-24) (Tentative)

PROFESSIONAL ELECTIVES – IV THREADS

S. No.	PE-I	PE-II	PE-III	PE-IV	PE-V
1	Software Testing Methodologies	Software Project Management	Software Architecture and Design Patterns	Software Quality Management	Agile Methodologies
2	Advanced Computer Architecture	Web and Internet Technologies	Information Retrieval Systems	Internet of Things	Human Computer Interaction
3	Neural Networks	Deep Learning	Computer Vision	Data Science	Natural Language Processing
4	Cyber Security, Ethics & Laws	Fundamentals of Cryptography	Block Chain Technologies	Digital Forensics	Mobile Computing

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTIONS & EXAMINATION [LR23]
(W.e.f Academic Year 2023-24)
OPEN ELECTIVE COURSES OFFERED

S. No.	Course Code	Category	Course Title
1	U21EE508	OEC 1	Non-Conventional Energy Systems
	U21EE509		Energy Conservation and Management
	U21CS508		Fundamentals of Data Base Management Systems*
	U21IT506		Data Structures*
	U21ME509		Basics of Mechanical Engineering
	U21ME510		Modern Manufacturing Processes
	U21CE509		Disaster Preparedness and Management
	U21CE510		Green Building Technologies
	U21EC507		Principles of Communication Theory
	U21EC508		Basic Electronics
	U21MB501		Managerial Communication
	U21MB503		Managerial Science and Theory

S. No.	Course Code	Category	Course Title
2	U21EE608	OEC 2	Fundamental of Power Electronics
	U21EE609		Electrical Installation and Safety
	U21CS607		Introduction to Programming in JAVA*
	U21IT606		Operating Systems*
	U21ME608		Basics Of 3-D Printing
	U21ME609		Optimization Methods for Engineers
	U21CE608		Construction Materials
	U21CE609		Road Safety Engineering
	U21EC607		Principles of Data Communication and Network
	U21EC608		Embedded Systems
	U21MB602		Total Quality Management
	U21MB603		Innovation Management

S. No.	Course Code	Category	Course Title
3	U21EE711	OEC 3	Introduction to Electrical Vehicles
	U21EE712		Design estimation and Costing of Electrical Systems
	U21CS711		Data Sciences*
	U21IT705		Basics of Artificial Intelligence*
	U21ME711		Renewable Energy Resources
	U21ME712		Cooling of Electronic Components
	U21CE711		Environmental Systems
	U21CE712		Urban Transportation System
	U21EC703		IOT and its protocols
	U21EC704		Television and Video Engineering
	U21MB702		Logistics Management
	U21MB703		Management of Start Up's

S. No.	Course Code	Category	Course Title
4	U21EE804	OEC 4	Smart Building Systems
	U21EE805		Industrial Automation
	U21CS806		Basics of Machine Learning*
	U21IT802		Cloud computing*
	U21ME806		Hybrid Vehicle Technology
	U21ME807		Power Plant Engineering
	U21CE806		Green Building Technology
	U21CE807		Environmental Impact Assessment
	U21EC805		Fundamentals of Wireless Communication
	U21EC806		Fundamental Digital Design using Verilog HDL
	U21MB802		Entrepreneurship
	U21MB803		E - Marketing

Note:

    *Open Elective subjects are not offered to the students of CSE and Allied departments.

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
DEPARTMENT OF COMPUTER SCIENCE AND 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			Contact Hours/Week	Scheme of Examination		Duration in Hours	CREDITS
				L	T	P/D		Maximum Marks			
								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:

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
U23CH102	**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, UniversitiesPress.
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
U23EN103	**Universal Human Values** **(Common to all Branches)**		**Core**
Pre-requisites	Contact Hours Per Week	CIE	SEE	Credits

Pre-requisites	L	T	D	P	CIE	SEE	Credits
--	3	-	-	-	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 and profession
4. To highlight plausible implications of such a holistic understanding in terms of conduct, 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 their life and profession
2. Distinguish between values and skills, happiness and accumulation of physical facilities, the 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
1. Human Being is more than just the Body.
2. Harmony of the Self ('I') with the Body.
3. Understanding Myself as Co-existence of the Self and the Body.
4. Understanding Needs of the Self and the needs of the Body.
5. 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
1. Family as a basic unit of Human Interaction and Values in Relationships.
2. The Basics for Respect and today's Crisis: Affection, Guidance, Reverence, Glory, Gratitude and Love.
3. Comprehensive Human Goal: The Five Dimensions of Human Endeavour.
4. Harmony in Nature: The Four Orders in Nature.
5. The Holistic Perception of Harmony in Existence

UNIT IV: Social Ethics
1. The Basics for Ethical Human Conduct.
2. Defects in Ethical Human Conduct.
3. Holistic Alternative and Universal Order.
4. Universal Human Order and Ethical Conduct.
5. Human Rights violation and Social Disparities.

UNIT V: Professional Ethics
1. Value based Life and Profession.
2. Professional Ethics and Right Understanding.

3. Competence in Professional Ethics.
4. Issues in Professional Ethics – The Current Scenario.
5. 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	1	-	-	40	60	3

Course Objectives:
To enable the students to apply the knowledge of Mathematics in various engineering fields by making 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,44thedition,2016.
2. Erwin Kreyszig, "Advanced Engineering Mathematics, Wiley,9thedition,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**
Pre-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 in Engineering
2. Demonstrate the use of crystal structure in device applications and find the solutions of 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 electronic 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
U21CS101	**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 management and 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, notionof 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,2^{nd}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

Pre-requisites	L	T	D	P	CIE	SEE	Credits
--	-	-	-	3	25	50	1.5

Course Objectives:
6. Enhance the experience of fundamental functioning, analyzing and characterization of different experiments.
7. Develop skills in the design and development of various electronic devices.
8. Create interest in working with lasers and semiconductor devices.
9. To gain the knowledge on mechanical properties.
10. Acquire the knowledge of communication through optical fiber.

Course Outcomes:
1. Apply the basic principles of lasers and optical fibers to determine wavelength an numerical aperture.
2. Remember the basics of electrical properties and apply to semiconductors.
3. Evaluate the carrier concentration of semiconductor materials by applying Hall effe 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
U21CS1L1	**Programming for Problem Solving Lab**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	4	25	50	2

Course 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.
1. (Corresponding set of) CAD Software Theory and User Manuals.

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 as 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 CAD software.
3. Construct the solid projection & Sectioning of the solids and Develop isometric drawing of simple 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, Basic 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
U23EN1L2	**Design Thinking Lab** **(Common to all Branches)**		**Core**
Pre-requisites	Contact Hours Per Week	CIE	SEE	Credits

Pre-requisites	L	T	D	P	CIE	SEE	Credits
--	-	-	-	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 creative 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 in their engineering education
2. Analyze emotional experience and inspect emotional expressions to better understand users while designing innovative products
3. Develop new ways of creative thinking and learn the innovation cycle of design thinking process for developing innovative products
4. Propose real-time innovative engineering design and choose appropriate frameworks, strategies, techniques during prototype development
5. Perceive individual differences and its impact on everyday decisions and further create a better 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 CSE, CSD & AIDS)

S. No.	Course Code	Category	Course Title	Scheme of Instructions				Scheme of Examination			CREDITS
								Maximum Marks		Duration in Hours	
				L	T	P/D	Contact Hours/Week	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	U23EE201	ESC	Basic Electrical Engineering	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	U23EE2L1	ESC	Basic Electrical Engineering 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   **SEE**: Semester End Examination
BSC: Basic Science Courses   **ESC**: Engineering Science Courses
MC: Mandatory Course   **MA**: Mathematics
EN: English   **CH**: Chemistry
ME: Mechanical Engineering   **CS**: Computer Science
PH: Physics

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
U23EN102	**INDIAN CONSTITUTION** **(Common to all Branches)**		Mandatory Course

Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	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 the 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 of 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

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	3

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 applications.
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.

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. 1stedition,2011

Course code	Course Title						Core/Elective
U23CH101	**ENGINEERING CHEMISTRY** **(Common for All)**						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
-	L	T	D	P	40	60	3
	3	1	-	-			

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 control 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 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.

Course code	Course title						Core/Elective
U23EE101	**Basic Electrical Engineering**						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
....	3	-	-	-	40	60	3

Course Objectives

1. To analyze the behavior of different circuit elements R, L and C and the basic concepts of circuit analysis.
2. To understand the concepts of electromagnetism.
3. To analyze the concepts of AC circuits, RMS value, average value phasor analysis etc.
4. To understand the basic principle of operation and construction of DC machines and Transformers.
5. To understand the basic principle of operation and construction of AC machines.

Course Outcomes

On the completion of this course students will be able to

1. To analyze the DC electrical circuits and measures the parameters of electrical energy.
2. To understand the concepts of electromagnetism.
3. To analyze the AC electrical circuits and measures the parameters of electrical energy.
4. To comprehend the working principle and construction of DC machines and transformers.
5. To comprehend the working principle and construction of AC machines namely Induction motor & Synchronous generator.

UNIT-I
DC Circuits

Ohm's Law and Kirchhoff's Laws; Analysis of series, parallel and series-parallel circuits excited by independent voltage sources; Power and energy, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems.

UNIT-II
Electromagnetism

Faradays Laws, Lenz's Law, Fleming's Rules, Statically and dynamically induced EMF, Concepts of self-inductance, Mutual inductance and coefficient of coupling; Energy stored in magnetic fields.

UNIT-III
AC Circuits

Representation of sinusoidal waveforms, peak and rms values, phasor representation, Analysis of single-phase ac circuits consisting of R, L, C, and RL, RC, RLC combinations (series only), Three phase balanced circuits, Voltage and current relations in star and delta connections.

UNIT IV

DC Machines

Construction and Principle of operation of DC generator, EMF equation, Types of DC generator and its applications, Principle of operation of DC motor, Back EMF, DC motor types and its applications.

Transformers

Principle of operation and construction of single-phase transformers (core and shell types), EMF equation, Ideal and practical transformers, OC and SC test losses and efficiency.

UNIT V AC machines

Induction Motors

Asynchronous machines, Principle of operation of 3-Φ induction motor, Concepts of slip, Construction, Types and its applications, 1-Φ Induction motor, Principle of operation, Construction, Types and its applications.

Synchronous generators

Construction, Principle of operation, Types and applications, OC and SC characteristics.

Text books:
1. J.B Gupta "Fundamentals of Electrical Engineering And Electronics" S.K Kataria & sons.
2. U.A Bakshi & V.U Bakshi. "Basic Electrical Engineering".
3. B L Theraja, A K Theraja "A Textbook of Electrical Technology Volume II AC And DC Machines".
4. D.P Kothari and I.J Nagarath "Electrical Machines 3rd Edition, Tata McGraw hill Publications.

Course code	Course title						Core/Elective
U23EN101	**English For Professional Communication** (Common to all Branches)						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
--	L	T	D	P	40	60	2
	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
U23CH1L2	**ENGINEERING CHEMISTRY LAB** **(Common for All)**						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
-	L	T	D	P	25	50	1.5
	-	-	-	3			

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, N. Delhi

Course code	Course title						Core/Elective
U23EE1L1	**BASIC ELECTRICAL ENGINEERING LAB** (Common for all branches)						**Core**
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
....	-	-	-	3	25	50	2

Course objectives:
1. Understand the basic concepts of ohms law and theorems with DC excitation.
2. Understand the concepts of self and mutual inductance, coefficient of coupling.
3. Identify Sinusoidal steady state response of R-L, and R-C circuits.
4. Understand the different phenomenon for balanced three phase circuit connected in Star and De
5. Understand the characteristics of DC and AC Machine and performance of Single p transformer.

Course outcomes:
1. Verify the ohms law and theorems by practical and theoretical calculations.
2. Evaluate of self and mutual inductance, coefficient of coupling.
3. Explain the Sinusoidal steady state response of R-L, and R-C circuits.
4. Analyze the different phenomenon for balanced three phase circuit connected in Star and Delta.
5. Identify the different characteristics of DC and AC Machine and perform tests on Single phase transformer.

Demonstration - 1: Basic safety precautions, Introduction and use of measuring instruments, Voltmeter, Ammeter, Multi-meter, Oscilloscope, Real-life resistors, Capacitors and Inductors.

1. Verification of Ohm's Law, KVL and KCL.
2. Verification of Super position theorem (with DC excitation).
3. Verification of Thevenin's and Norton's theorems (with DC Excitation).
4. Determination of self and mutual inductance, co-efficient of coupling.
5. Sinusoidal steady state response of R-L, and R-C circuits.

Demonstration – 2: Demonstration of cut-out sections of Machines: DC Machine (Commutator- brush arrangement), Transformers, Induction Machine (Squirrel cage rotor), Synchronous Machine (Field winging- slip ring arrangement)and Single Phase Induction Machine.

1. Measurement of phase voltage/current, line voltage/current and power in a balanced three-phase circuit connected in star and delta.
2. OCC characteristics of DC Generator.
3. Transformers: Observation of the no-load current wave form on an oscilloscope.
   (Non sinusoidal wave-shape due to B-H curve non linearity should be shown along with a discussion about harmonics).
4. O.C test and S.C test on single phase Transformer.
5. Measurement of primary and secondary voltages, currents and power of a single phase

Transformer.
6. Open circuit and short circuit characteristics of an Alternator.
7. Power factor improvement of Induction Motor using static capacitor.

Note: It is mandatory to conduct any 8 experiments from the above list of experiments.

Suggested Readings:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.
3. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
4. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

Course code	Course title						Core/Elective
U23EN1L1	**EFFECTIVE COMMUNICATION SKILLS LAB** **(Common to all Branches)**						Core
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
--	L	T	D	P	25	50	1.5
	-	-	-	3			

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
5. Robert. M. Sher field & et al. Developing Soft Skills. Pearson Education.4th Edition.
6. 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.