



ESTD : 2007

# Sri Indu Institute of Engineering and Technology (Autonomous)

(Formerly RVR Institute of Engineering & Technology )

**An Autonomous Institution Under UGC**

NAAC Accredited. Recognized Under 2(f) of UGC Act 1956

EAMCET CODE: INDI

Approved by AICTE, New Delhi, & Affiliated to JNTUH, Hyderabad.

JNTUH CODE: X3



## COURSE FILE

ON

## ENGINEERING CHEMISTRY

**Course Code - CH203BS**

**I B. Tech Semester-II**

**A.Y. 2022-2023**

Prepared by

**O.SUBHASHINI**

**Asst. Professor**

  
Head of the Department  
Department of H&S  
SRI INDU INSTITUTE OF ENGG & TECH  
Sheriguda(VIII) Ibrahimpatnam (M) R.R. Dist-501 510

  
PRINCIPAL  
Sri Indu Institute of Engineering & Techno.  
Sheriguda(VIII), Ibrahimpatnam  
R.R. Dist. Telangana-501 510.



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## INSTITUTE VISION & MISSION

### Vision:

To become a premier institute of academic excellence by providing the world class education that transforms individuals into high intellectuals, by evolving them as empathetic and responsible citizens through continuous improvement.

### Mission:

- **IM1:** To offer outcome-based education and enhancement of technical and practical skills.
- **IM2:** To Continuous assess of teaching-learning process through institute-industry collaboration.
- **IM3:** To be a centre of excellence for innovative and emerging fields in technology development with state-of-art facilities to faculty and students' fraternity.
- **IM4:** To Create an enterprising environment to ensure culture, ethics and social responsibility among the stakeholders.

  
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# **SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**(UGC AUTONOMOUS INSTITUTION)**

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**Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510**

## **PROGRAM OUTCOMES**

**PO1: ENGINEERING KNOWLEDGE:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2: PROBLEM ANALYSIS:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3: DESIGN/DEVELOPMENT OF SOLUTIONS:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4: CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5: MODERN TOOL USAGE:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

**PO6: THE ENGINEER AND SOCIETY:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7: ENVIRONMENT AND SUSTAINABILITY:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: ETHICS:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9: INDIVIDUAL AND TEAM WORK:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: COMMUNICATION:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.

**PO11: PROJECT MANAGEMENT AND FINANCE:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: LIFE-LONG LEARNING:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

  
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# SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

## B.Tech. in ELECTRONICS AND COMMUNICATION ENGINEERING

### COURSE STRUCTURE

#### I YEAR SYLLABUS (BR22 Regulations)

Applicable from Academic Year: 2022-23 Batch

#### I Year I Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	MA101BS	Matrices and Calculus	3	1	0	4
2.	AP102BS	Applied Physics	3	1	0	4
3.	CS102ES	C Programming for Engineers	3	0	0	3
4.	ME102ES	Engineering Workshop	0	1	3	2.5
5.	EN104HS	English for Skill Enhancement	2	0	0	2
6.	EC101ES	Elements of Electronics & Communication Engineering	0	0	2	1
7.	AP105BS	Applied Physics Laboratory	0	0	3	1.5
8.	EN107HS	English Language and Communication Skills Laboratory	0	0	2	1
9.	CS105ES	C Programming for Engineers Laboratory	0	0	2	1
10.	*MC101ES	Environmental Science	3	0	0	0
11.		Induction Programme				
		<b>Total</b>	<b>14</b>	<b>3</b>	<b>12</b>	<b>20</b>

#### I Year II Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2.	CH203BS	Engineering Chemistry	3	1	0	4
3.	ME201ES	Computer Aided Engineering Graphics	1	0	4	3
4.	EE201ES	Basic Electrical Engineering	2	0	0	2
5.	EC201ES	Electronic Devices and Circuits	2	0	0	2
6.	CS202ES	Applied Python Programming Laboratory	0	1	2	2
7.	CH206BS	Engineering Chemistry Laboratory	0	0	2	1
8.	EE202ES	Basic Electrical Engineering Laboratory	0	0	2	1
9.	EC202ES	Electronic Devices and Circuits Laboratory	0	0	2	1
		<b>Total</b>	<b>11</b>	<b>3</b>	<b>12</b>	<b>20</b>

# ENGINEERING CHEMISTRY

(Course Code: CH203BS)

B.Tech. I Year II Sem.

L T P C  
3 1 0 4

## Course Objectives:

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
3. To imbibe the basic concepts of petroleum and its products.
4. To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

## Course Outcomes:

1. Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They can learn the fundamentals and general properties of polymers and other engineering materials.
4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

## UNIT - I: Water and its treatment: [8]

Introduction to hardness of water – Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation - Determination of F- ion by ion- selective electrode method.

Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis.

## UNIT – II Battery Chemistry & Corrosion [8]

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

**Corrosion:** Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods

## UNIT - III: Polymeric materials: [8]

Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene  
**Plastics:** Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP).

**Rubbers:** Natural rubber and its vulcanization.

**Elastomers:** Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

**Conducting polymers:** Characteristics and Classification with examples-mechanism of conduction in

trans-polyacetylene and applications of conducting polymers.

**Biodegradable polymers:** Concept and advantages - Polylactic acid and poly vinyl alcohol and their Applications.

#### **UNIT - IV: Energy Sources: [8]**

Introduction, Calorific value of fuel – HCV, LCV- Dulong's formula. Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Transesterification, advantages.

#### **UNIT - V: Engineering Materials: [8]**

**Cement:** Portland cement, its composition, setting and hardening.

##### **Smart materials and their engineering applications**

Shape memory materials- Poly L- Lactic acid. Thermoresponsive materials- Polyacryl amides, Poly vinyl amides

**Lubricants:** Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point

#### **TEXT BOOKS:**

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications

#### **REFERENCE BOOKS:**

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)



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**Course: Engineering Chemistry(C122)**

**Class: I-B. TECH ECE**

## **Course Outcomes**

After completing this course the student will be able to:

**C122.1:** Student can explain the basic properties of water& usage in domestic, industrial purpose, preventive measures to water related problems and water purification methods (**Understanding**)L2

**C122.2:** Student can acquire the knowledge of construction of electrochemical cells used in various batteries, fuel cells and their applications (**Knowledge**)L1

**C122.3:** Student can able to understand the mechanism, control measures of the types of corrosion and their applications (**Applying**)L3

**C122.4:** Student can learn the fundamentals & general properties of types of polymers, preparation & applications in various fields (**Applying**)L3

**C122.5:** Student can learn the basic knowledge on analysis of fuels and composition of the gaseous fuels (**Analysing**)L4

**C122.6:** Student can acquire the knowledge on engineering materials like cement, smart materials lubricants and their applications in constructions & health benefits (**Understanding**)L2



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## CO's Mapping with PO/PSO

### Mapping of course outcomes with program outcomes:

High -3      Medium -2      Low-1

PO/CO	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12	PS O1	PS O2
C122.1	2	2	-	-	-	1	1	-	-	-	-	2	-	-
C122.2	2	2	-	-	1	1	1	-	-	-	-	1	-	-
C122.3	2	2	-	-	-	-	1	-	-	-	-	-	-	-
C122.4	2	-	-	-	-	1	1	-	-	-	-	1	-	-
C122.5	2	2	-	-	-	-	1	-	-	-	-	-	-	-
C122.6	2	1	-	-	1	1	1	-	-	-	-	1	-	-
C122	2.00	1.8	-	-	1.0	1.0	1.0					1.0	-	-



### CO-PO mapping Justification

**PO1. ENGINEERING KNOWLEDGE:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2. PROBLEM ANALYSIS:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO5. MODERN TOOL USAGE:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

**PO6. THE ENGINEER AND SOCIETY:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7. ENVIRONMENT AND SUSTAINABILITY:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO12. LIFE-LONG LEARNING:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**C122.1:** Student can explain the basic properties of water & usage in domestic, industrial purpose, preventive measures to water related problems and water purification methods (understanding)L2

Justification	
<b>PO1</b>	Student get the knowledge on the water treatment methods (level 2)
<b>PO2</b>	Classify the types of hardness of water (level 2)
<b>PO6</b>	Student can able to know the importance of purification methods(level1)
<b>PO7</b>	Student can understand the impact of water treatment methods in industrial and domestic usage (level1)
<b>PO12</b>	Student can attain the knowledge in life –long practice (level 2)

**C122.2:** Student can acquire the knowledge of construction of electrochemical cells used in various batteries, fuel cells and their applications (Knowledge)L1

Justification	
<b>PO1</b>	Student can get the knowledge on construction of electrochemical cell(level2)
<b>PO2</b>	Student can able to understand the usage of batteries (level 2)
<b>PO5</b>	Student can able to understand the types of battery cells & fuel cells(level1)
<b>PO6</b>	Student can able to get the knowledge on applications of fuel cells(level1)
<b>PO7</b>	Student can understand the usage of eco-friendly fuels (level1)
<b>PO12</b>	Student can attain the knowledge in life –long practice (level 1)

**C122.3:** Student can able to understand the mechanism, control measures of the types of corrosion and their applications (Applying)L3

Justification	
<b>PO1</b>	Student get the knowledge of corrosion (level 2)
<b>PO2</b>	Student can understand the different types of corrosion(level2)
<b>PO7</b>	Student can understand the corrosion control methods (level 1)

**C122.4:** Student can learn the fundamentals & general properties of types of polymers, preparation& applications in various fields (Applying)L3

Justification	
<b>PO1</b>	Student can understand the fundamentals of the polymers(level2)
<b>PO6</b>	Student can able to know the wide range of applications of the polymers(level1)
<b>PO7</b>	Student can utilize the concept of bio-degradable polymers(level1)
<b>PO12</b>	Student can attain the knowledge in life –long practice (level 1)

**C122.5:** Student can learn the basic knowledge on analysis of fuels and composition of the gaseous fuels (Analysing)L4

Justification	
<b>PO1</b>	Student can classify the different types of fuels(level2)
<b>PO2</b>	Student can understand the extraction of the fuels (level2)
<b>PO7</b>	Student can able to get knowledge about composition of eco-friendly fuels(level1)

**C122.6:** Student can acquire the knowledge on engineering materials like cement, smart materials, lubricants and their applications in constructions & health benefits (Understanding)L2

	Justification
<b>PO1</b>	Student can get the knowledge on the composition of engineering materials(level2)
<b>PO2</b>	Student can able to get the composition and applications of engineering materials(level1)
<b>PO5</b>	Student can understand the usage in the medical applications(level1)
<b>PO6</b>	Student can contribute the application for further applications(level1)
<b>PO7</b>	Student can understand the promotion for the sustainable environment (level1)
<b>PO12</b>	Student can attain the knowledge in life –long practice (level 1)



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<https://siiet.ac.in/>

Lr. No. SIJET/BR22/Academic Calendar/2022/02

Date: 15.12.2022

## REVISED ACADEMIC CALENDAR I B.TECH FOR THE ACADEMIC YEAR 2022-23 (BR22-REGULATIONS)

Dr. I. Satyanarayana,  
Principal.

**X3**

To,  
All the HOD's  
Sir,

Sub: SIJET (Autonomous)-Academic & Evaluation-Revised Academic Calendar for I B.Tech - I & II Semesters for the academic year 2022-2023-Reg.

\*\*\*\*\*

The approved Academic Calendar for I B.Tech - I & II Semesters for the academic year 2022-23 is given below.

### **I-SEMESTER**

S. NO	Description	Period		Duration
		From	To	
1.	Commencement of I Semester class work (including Induction programme)	03.11.2022		
2.	1 <sup>st</sup> Spell of Instructions	03.11.2022	28.12.2022	8 Weeks
3.	I Mid Examinations	29.12.2022	04.01.2023	1 Week
4.	Submission of First Mid Term Exam Marks to the Autonomous Section on or before	10.01.2023		
5.	2 <sup>nd</sup> Spell of Instructions	05.01.2023	02.03.2023	8 Weeks
6.	Second Mid Term Examinations	03.03.2023	09.03.2023	1 Week
7.	Preparation & Practical Examinations	10.03.2023	16.03.2023	1 Week
8.	Submission of Second Mid Term Exam Marks to the Autonomous Section on or before	16.03.2023		
9.	I Semester End Examinations	17.03.2023	01.04.2023	2 Weeks

### **II-SEMESTER**

S. NO	Description	Period		Duration
		From	To	
1.	Commencement of II Semester class work	03.04.2023		
2.	1 <sup>st</sup> Spell of Instructions (including Summer Vacation)	03.04.2023	10.06.2023	10 Weeks
	Summer Vacation	15.05.2023	27.05.2023	2 Weeks
3.	I Mid Examinations	12.06.2023	17.06.2023	1 Week
4.	Submission of First Mid Term Exam Marks to the Autonomous Section on or before	23.06.2023		
5.	2 <sup>nd</sup> Spell of Instructions	19.06.2023	12.08.2023	8 Weeks
6.	II Mid Term Examinations	14.08.2023	19.08.2023	1 Week
7.	Preparation & Practical Examinations	21.08.2023	26.08.2023	1 Week
8.	Submission of Second Mid Term Exam Marks to the Autonomous Section on or before	26.08.2023		
9.	II Semester End Examinations	28.08.2023	09.09.2023	2 Weeks

**Commencement of Class Work for II B.Tech I Semester - 11.09.2023**

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**Class: ECE**

**Semester: II W.E.F-03-04-2023**

**LH:-D-209**

	I 9:40- 10:30	II 10:30 - 11:20	III 11:20- 12:10	12:10- 12.45	IV 12.45- 1.35	V 1.35- 2.25	VI 2.25- 3.15	VII 3.15-4.00
MON	EC	BEE	ODE	<b>L U N C H</b>	EDC LAB			EC(T) ODE(T)
TUE	ODE	EC	EDC		CAEG PRACTICE			LIBRARY
WED	EC/BEE LAB				EDC	BEE	ODE	BEE(T)/EDC(T)
THU	APPLIED PYTHON LAB				ODE	BEE	EC	APPLIED PYTHON(T)
FRI	ODE	EC	EDC		EC/BEE LAB			ODE(T) EC(T)
SAT	CAEG PRACTICE				EDC	BEE	BEE	EDC(T)/ BEE(T)

Course Code	Course Name	Name of the Faculty	Course Code	Course Name	Name of the Faculty
MA201BS	ODE- Ordinary Differential Equations & Vector Calculus	T.THIRUPATHI REDDY	CH206BS	EC LAB- Engineering Chemistry Lab	O.SHUBHASHINI/K.MO UNIKA
CH203BS	EC- Engineering Chemistry	O.SHUBHASHINI	EE202ES	BEE LAB- Basic Electrical Engineering	MP.REENA/G.BHARGA VI
ME201ES	CAEG- Computer Aided	MVB.KALYAN	CS202ES	APPLIED PYTHON Programming	B.RAJASHWARI/D.SWAPNA
EE201ES	BEE-Basic Electrical Engineering	MP.REENA	EC202ES	EDC LAB- Electronic Devices & Circuits Laboratory	G.ANUSHA/P.RAJENDR A
EC201ES	EDC- Electronic Devices & Circuits	G.ANUSHA			

*[Signature]*  
**Class In-Charge**

*[Signature]*  
**Time Table Coordinator**

*[Signature]*  
**Head of The Department**  
 Sri Indu Institute of Engg. & Tech  
 Main Road, Sheriguda(V)  
 Ibrahimpatnam(M), R.R. Dist.  
 Telangana-501 510



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## Engineering Chemistry : Lesson Plan

L/H	TOPIC TO BE COVERED	TEACHING AIDS	BOOKS
<b>UNIT-1: WATER &amp; ITS TREATMENT</b>			
1	Introduction to hardness of water, types of hardness.	Black Board	T1,R1
2	Units of hardness, Estimation of hardness of water by complexometric method.	Black Board	T1,R1
3	Related numerical problems.	Black Board	T1,R1
4	Potable water and its specifications - Steps involved in the treatment of potable water	Black Board, PPT	T1,R1
5	Disinfection of potable water by chlorination and break - Point chlorination.	Black Board	T1,R1
6	Defluoridation- Determination of F- ion by ion- selective electrode method .Boiler troubles: Sludges, Scales	Black Board	T1,R1,W1
7	Caustic embrittlement. Internal treatment of Boiler feed water -Calgon conditioning - Phosphate conditioning - Colloidal conditioning.	Black Board, PPT	T1,R1
8	External treatment methods -Softening of water by ion- exchange process.	Black Board, PPT	T1,R1, V1
9	Desalination of water – Reverse osmosis.	Black Board	T1,R1
<b>UNIT-I1: BATTERY CHEMISTRY AND CORROSION</b>			
10	Introduction - Classification of batteries- primary, secondary and reserve batteries with examples.	Black Board	T1,R1
11	Basic requirements for commercial batteries. Construction, working and applications of: Zn-air battery.	Black Board	T1,R1

12	Lithium-ion battery, Applications of Li-ion battery to electrical vehicles.	Black Board	T1,R1
13	Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell.	Black Board	T1,R1,W2
14	Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.	Black Board	T1,R1
15	<b>Corrosion:</b> Causes and effects of corrosion.	Black Board, PPT	T1,R1
16	Theories of chemical Corrosion and mechanism of chemical corrosion.	Black Board, PPT	T1,R1 V2
17	Electrochemical corrosion –mechanism of electrochemical corrosion.	Black Board PPT	T1,R1,
18	Types of corrosion: Galvanic, water-line and pitting corrosion	Black Board	T1,R1
19	Factors affecting rate of corrosion	Black Board	T1,R1
20	Corrosion control methods.	Black Board	T1,R1
21	Cathodic protection-sacrificial and impressed current methods	Black Board	T1,R1

### UNIT–III POLYMERIC MATERIALS

22	Definition – Classification of polymers with examples.	Black Board	T1,R1
23	Types of polymerization –addition (free radical addition) .	Black Board	T1,R1
24	Condensation polymerization with examples – Nylon 6:6, Terylene	Black Board	T1,R1
25	Definition and characteristics thermoplastic and thermosetting plastics.	Black Board	T1,R1
26	Bakelite, Teflon, Fiber reinforced plastics (FRP).	Black Board	T1,R1
27	Natural rubber and its vulcanization.	Black Board	T1,R1
28	Elastomers, Characteristics –preparation – properties and applications of Buna-S rubber.	Black Board	T1,R1



29	Butyl rubber, and Thiokol rubber.	Black Board	T1,R1
30	Characteristics and Classification of conducting polymers with examples.	Black Board	T1,R1 W3,V3
31	Mechanism of conduction intrans-poly acetylene and applications of conducting polymers.	Black Board	T1, R1
32	Biodegradable polymers, Concept and advantages – Polylacticacid and poly vinyl alcohol and their applications.	Black Board	T1, R1
<b>UNIT-IV ENERGY SOURCES</b>			
33	Introduction, calorific value of fuel- HCV,LCV.Units of calorific value	Black Board	T1, R1
34	Dulong's formula. Classification- solid fuels.	Black Board	T1,R1
35	Coal –analysis of coal – proximate analysis and their significance.	Black Board	T1,R1,W4
36	Ultimate analysis of coal and their significance.	Black Board, PPT	T1,R1
37	Liquid fuels – petroleum and its refining.	Black Board, PPT	T1,R1
38	Cracking types – moving bed catalytic cracking.	Black Board ,PPT	T1,R,V4
39	Knocking – octane and cetane rating.	Black Board	T1,R1
40	Synthetic petrol - Fischer-Tropsch's process.	Black Board	T1,R1
41	Gaseous fuels – composition and uses of natural gas, LPG.	Black Board	T1, R1
42	CNG, Biodiesel – Transesterification, advantages.	Black Board	T1, R1
<b>UNIT –V: ENGINEERING MATERIALS</b>			
43	Introduction of Portland cement &its composition,	Black Board	T1,R1
44	Setting and hardening of Portland cement.	Black Board	T1, R1
45	Smart materials and their engineering applications.	Black Board	T1, R1,W5

46	Shape memory materials- Poly L- Lactic acid.	Black Board	T1, R1, V5
47	Thermoresponse materials- Polyacryl amides, Polyvinyl amides	Black Board	T1, R1
48	Introduction of lubricants. Classification of lubricants with examples.	Black Board	T1, R1
49	Characteristics of a good lubricants, mechanism of lubrication -thick film, thin film and extreme pressure	Black Board	T1, R1
50	Properties of lubricants: viscosity, cloud point, pour point, flash point and fire point	Black Board	T1, R1

**Text books:**

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016.
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

**Reference books:**

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015).
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011).



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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana-501510

## GAP WITHIN THE SYLLABUS – MAPPING TO CO, PO

Galvanic cell construction and functioning and preparation of cement

### Course outcome;

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

1. The required principles and concepts of electrochemistry, to know the different types of batteries and applications (Analysis) L3
2. The basic principle involved in the preparation of cement. (Knowledge) L1

### Mapping of course outcomes with program outcomes:

High -3

Medium -2

Low-1

PO/ CO	PO1	PO2	PO 3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
1	2	2	-	-	1	-	-	-	-	-	-	1	-	-
2	2	-	-	-	1	-	-	-	-	-	-	1	-	-



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## GAP BEYOND THE SYLLABUS-MAPPING TO PO/PSO

Chemical analysis of water, corrosion control methods and utilization of smart materials in medical field.

### Course outcome:

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

1. The basic principle involved in the concept of chemical analysis of brackish water.
2. The process involved in the application of the corrosion control methods involving electrochemical process.
3. The mechanism involved in the application of smart materials in the medical field

### Mapping to PO/PSO:

High -3

Medium -2

Low-1

PO/ CO	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
1	2	2	-	-	-	-	-	-	-	-	-	1	-	-
2	2	2	-	-	-	-	-	-	-	-	-	1	-	-
3	2	2	-	-	-	-	-	-	-	-	-	1	-	-



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## **WEB REFERENCES :**

**W-1** <https://www.thermodyneboilers.com/boiler-problems/>

**W-2**

[https://chem.libretexts.org/Bookshelves/General\\_Chemistry/Chemistry\\_1e\\_\(OpenStax\)/17%3A\\_Electrochemistry/17.5%3A\\_Batteries\\_and\\_Fuel\\_Cells](https://chem.libretexts.org/Bookshelves/General_Chemistry/Chemistry_1e_(OpenStax)/17%3A_Electrochemistry/17.5%3A_Batteries_and_Fuel_Cells)

**W-3** <https://www.sciencedoze.com/2022/03/conducting-polymers-definition-examples.html>

**W-4:** <https://www.scribd.com/presentation/497847401/Analysis-of-Coal>

<https://www.atriainnovation.com/en/what-are-shape-memory-materials/>

## **VIDEO REFERENCES :**

1. <https://youtu.be/ctlHNf1s6RM?si=FnrLSa3uXqzPZtDR> –Ion exchange process
2. <https://www.youtube.com/live/rPv35HuWLW0?si=8pIqwhWd8IWYHOZZ> – Corrosion
3. <https://youtu.be/1dG0PmKFsQA?si=u83MUinL3KQs4mKd> –Conducting polymers
4. <https://youtu.be/SayZyTMROxk?si=CCB22VarIU6SIygw> –moving bed catalytic cracking
5. <https://youtu.be/I7doX1zWGdw?si=NhhkbRfuJ24j0QvM> –shape memory materials



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## **POWERPOINT PRESENTATION**

### **Unit-1**

[https://docs.google.com/presentation/d/1Hcj1ip8ap6k\\_h1568J-W3r0h2Aax1hOP/edit?usp=sharing&oid=105720808056246778205&rtpof=true&sd=true](https://docs.google.com/presentation/d/1Hcj1ip8ap6k_h1568J-W3r0h2Aax1hOP/edit?usp=sharing&oid=105720808056246778205&rtpof=true&sd=true)

### **Unit-2**

[https://docs.google.com/presentation/d/1Zihc9ppImK9VfChsvuvuadcse4UT\\_J1K/edit?usp=sharing&oid=105720808056246778205&rtpof=true&sd=true](https://docs.google.com/presentation/d/1Zihc9ppImK9VfChsvuvuadcse4UT_J1K/edit?usp=sharing&oid=105720808056246778205&rtpof=true&sd=true)

### **Unit-4**

<https://docs.google.com/presentation/d/1wiZafPiRaH4xGjQffBYrtEZcWACgbaa/edit?usp=sharing&oid=105720808056246778205&rtpof=true&sd=true>



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**Lecture notes**

**Unit 1 link:**

[https://drive.google.com/file/d/1aOrg6Z\\_XXPGsKHuH\\_JuK7axChExklgQt/view?usp=sharing](https://drive.google.com/file/d/1aOrg6Z_XXPGsKHuH_JuK7axChExklgQt/view?usp=sharing)

**Unit 2 link:**

<https://drive.google.com/file/d/1TMLCoVT2RWRtsH2bM0BVIvJczijYOfDN/view?usp=sharing>

**Unit 3 link:**

<https://drive.google.com/file/d/1QtQUV-imszqWSetKXo-Ym4-n-GDtQBuw/view?usp=sharing>

**Unit 4 link:**

<https://drive.google.com/file/d/1qFliGL1PBVX17zxeqygc2BbHa7cO3RFD/view?usp=sharing>

**Unit 5 link:**

<https://drive.google.com/file/d/1rup7vbaItLmbGa1UX66L36T4DECWIOle/view?usp=sharing>



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**PREVIOUS QUESTION PAPERS**

<https://drive.google.com/file/d/17ykw7LHO8laz-veKgY4xPixSCPcqOSd/view?usp=sharing>





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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501 510

BR22

I B.TECH II SEM I-MID Examinations, June-2023

Set-I

Branch: CIVIL, ECE, CSE (AI&ML), CSE (IOT), AI&DS  
Subject: Engineering chemistry

Marks: 20

Date: 13-06-2023(FN)  
Time: 2 Hours

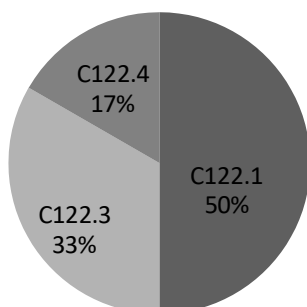
## PART-B

Answer any **FOUR** Questions. All Question carry Equal Marks

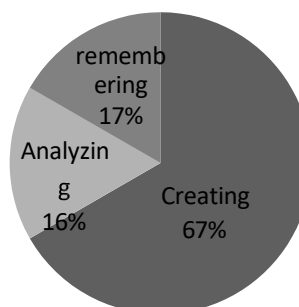
4\*5=20 Marks

1. Discuss demineralization of hard water using ion exchange process with a net diagram? [Creating L6](C122.1)
2. Discuss different methods used for internal treatment of boiler feed water? [Creating L6](C122.1)
3. Distinguish between scales and sludges? [Analyzing L4](C122.1)
4. Write a note on corrosion? [Remembering L1](C122.3)
5. Discuss sacrificial anode and impressed current cathodic protection methods? [Creating L6](C122.3)
6. Discuss the mechanism of addition polymerization? [Creating L6](C122.4)

QUESTION PAPER MAPPING WITH  
CO'S



QUESTION PAPER MAPPING WITH  
BT





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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501 510

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Date:13-06-2023(FN)

Marks: 10

Branch: CIVIL, ECE, CSE (AI&ML),CSE(IOT),AI&DS

Subject: Engineering chemistry

Student name:.....

H.T.NO:

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## PART-A

### Objective/Quiz paper

The objective /quiz paper is set with multiple choice, fill in the blanks and match the following type of question for a total of 10 marks.

#### Multiple choices:

1. Temporary hardness of water can be removed by [     ]  
A) Chlorination    B) Boiling    C) Aeration    D) None
2. The salt used in calgon conditioning is [     ]  
A) Sodium Hexa Meta phosphate    B) Sodium Tri phosphate  
C) Sodium Dihydrogen phosphate    D) Sodium Hydrogen phosphate
3. Chemical formula of Rust [     ]  
A) FeO                      B)Fe<sub>3</sub>O<sub>3</sub>                      C)Fe<sub>3</sub>O<sub>4</sub>                      D)Fe<sub>2</sub>O<sub>3</sub>·x H<sub>2</sub>O
4. PVC is a polymer of repeating units of [     ]  
A) Ethylene            B) Tetrachloroethylene  
C) Acrylonitrile    D) Vinyl chloride

#### Fill in the blanks:

5. Hardness of water can be expressed in terms of equivalents of \_\_\_\_\_
6. A fuel cell converts chemical energy in to \_\_\_\_\_
7. \_\_\_\_\_ is used as electrolyte in methanol oxygen fuel cell
8. Homo polymers are made of \_\_\_\_\_

#### Match the following:

9.  
i. Boiler [     ] A. Electro chemical fuel  
ii. Reverse osmosis [     ] B. Caustic embrittlement  
iii .Zn-Air Battery [     ] C. Cellulose acetate  
iv. Wet corrosion [     ] D. Primary Battery



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I B.TECH II SEM I-MID Examinations, June-2023

BR22

## Answer key

### Descriptive paper key link

<https://drive.google.com/file/d/1H5BLaJ22sLxzBsFtrBHcqnVB4OC4Hun/view?usp=sharing>

### Objective/Quiz Key Paper

#### Multiple choices:

1. B
2. A
3. D
4. D

#### Fill in the blanks:

5.  $\text{CaCO}_3$
6. Electrical energy
7. Methanol
8. Same monomers

#### Match the following:

- 9.I-B
- II-C
- III-D
- IV-A



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I B.TECH II SEM II-MID Examinations, August-2023

BR22

Branch: CIVIL, ECE, CSE (AI&ML), CSE (IOT), AI&DS

Date: 16-08-2023(FN)

Subject: Engineering chemistry

Marks: 20

Time: 2 Hours

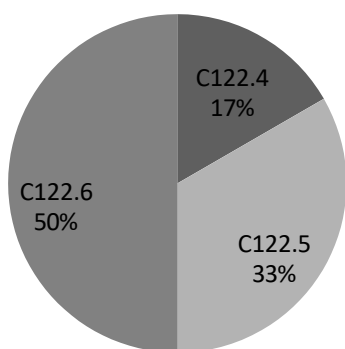
## PART-B

Answer Any FOUR Question Carry Equal Marks

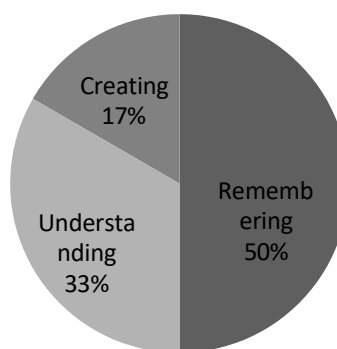
4\*5=20 Marks

1. Define biodegradable polymers taking poly lactic acid as an example?  
(Remembering L1)(C122.4)
2. Explain ultimate analysis of coal?  
(Understanding L2)(C122.5)
3. Define cracking, knocking of petrol, octane number, cetane number?  
(Remembering L1) (C122.5)
4. Give the composition of Portland cement?  
(Remembering L1) (C122.6)
5. Explain the mechanism of lubrication?  
(Understanding L2) (C122.6)
6. Discuss the properties of lubricants?  
(Creating L6) (C122.6)

QUESTION PAPER MAPPING WITH CO'S



QUESTION PAPER MAPPING WITH BT





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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501 510

## I B.TECH II SEM II-MID Examinations, August-2023

Branch: CIVIL, ECE, CSE (AI&ML), CSE (IOT), AI&DS  
Subject: Engineering chemistry

Date: 16-08-2023  
Marks: 10

BR22

Student name:.....

H.T.NO:

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### PART-A

#### Objective/Quiz paper

The objective /quiz paper is set with multiple choice, fill in the blanks and match the following type of question for a total of 10 marks.

#### Multiple choices:

- Buna-s is prepared by the following polymerization [ ]  
a) Copolymerization    b) Condensation    c) Both a & b    d) None
- Natural gas mainly contains [ ]  
a) CH<sub>4</sub>    b) n-butane    c) n-octane    d) acetylene
- Gross calorific value is also known as [ ]  
a) Highest calorific value    b) Low calorific value    c) Net calorific value    d) None
- Cement contains [ ]  
a) Calcareous material    b) Argillaceous material    c) Both a & b    d) None

#### Fill in the blanks:

- Polymers which can be degraded by microorganisms are known as \_\_\_\_\_
- Petroleum refining is carried out using \_\_\_\_\_ distillation.
- \_\_\_\_\_ is an example of semi solid lubricants.
- Good lubricant viscosity should be \_\_\_\_\_

#### Match the following:

- i. Ultimate analysis [ ] a) Retards initial setting of cement.  
ii. Gypsum [ ] b) cement
- iii. Inorganic building material [ ] c) Fractional distillation.
- iv. Petroleum refining [ ] d) Quantitative



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**I B.TECH II SEM II -MID Examinations, August-2023**

**BR22**

## **Answer key**

### **Descriptive paper key link**

<https://drive.google.com/file/d/1k0XrBzV2B3n1Ow8OODI7wTMtY4uc8grj/view?usp=sharing>

### **Objective/Quiz Key Paper**

#### **Multiple choices:**

1. C
2. A
3. A
4. C

#### **Fill in the blanks:**

5. Bio degradable polymers
6. Fractional distillation
7. Grease
8. High

#### **Match the following:**

- 9.
- I-D
- II-A
- III-B
- IV-C

MID-1 & MID-11 STUDENT ANSWER SCRIPTS:

<https://drive.google.com/file/d/1BMziLJopCs26RR8QhFFF2dsDHNe03OZC/view?usp=sharing>

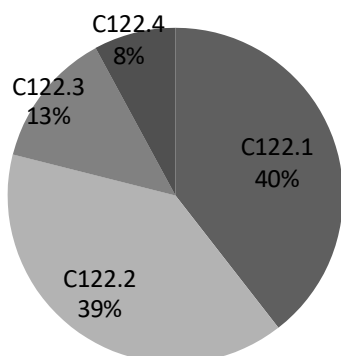
[https://drive.google.com/file/d/1QuVhm5ihFQ-q50p501KW1x4\\_T3C5qZsZ/view?usp=sharing](https://drive.google.com/file/d/1QuVhm5ihFQ-q50p501KW1x4_T3C5qZsZ/view?usp=sharing)



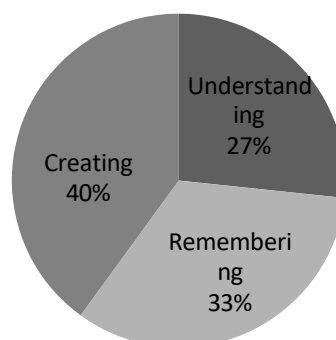
**I-MID ENGINEERING CHEMISTRY ASSIGNMENT**

1. Explain demineralisation of hard water using ion exchange process with a neat diagram?  
**(Understanding L2) (C122.1)**
2. What is reverse osmosis describe with a neat diagram? **(Remembering L1) (C122.1)**
3. Discuss municipal water treatment process? **(Creating L6) (C122.1)**
4. What is a caustic embrittlement? **(Remembering L1) (C122.1)**
5. Discuss different chlorination method? **(Creating L6) (C122.1)**
6. Estimate the hardness of water by complexometric method? **(Creating L6) (C122.1)**
7. Explain the structure and functioning of lithium-ion battery? **(Understanding L2) (C122.2)**
8. What is galvanic corrosion and water corrosion? **(Remembering L1) (C122.3)**
9. Discuss solid oxide fuel cell? **(Creating L6) (C122.2)**
10. Define polymer and discuss type of polymers? **(Remembering L1) (C122.2)**
11. E Discuss about methanol-oxygen fuel cell? **(Creating L6) (C122.2)**
12. Explain preparation, properties and applications of Bakelite? **(Understanding L2) (C122.4)**
13. What is primary battery? Explain Zn –air battery as an example? **(Remembering L1) (C122.2)**
14. Discuss cathodic protection method? **(Creating L6) (C122.3)**
15. Explain solar cell functioning and uses? **(Understanding L2) (C122.2)**

**QUESTION PAPER MAPPING WITH CO**



**QUESTION PAPER MAPPING WITH BT**

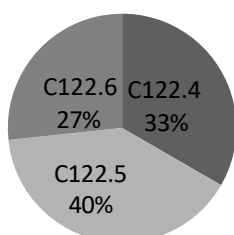




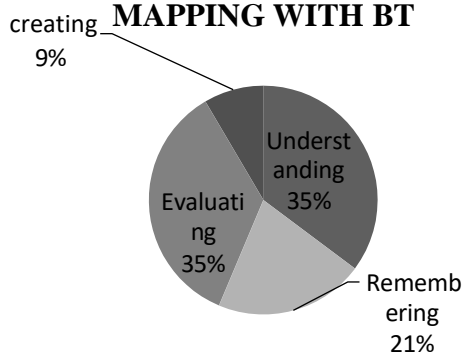
**II-MID ENGINEERING CHEMISTRY ASSIGNMENT**

1. Explain the preparation, properties and engineering applications of PVC, Teflon, Fiber reinforced plastics?  
**(Understanding L2) (C122.4)**
2. Explain the preparation, properties and applications of Buna-S, Butyl rubber, Thiokol rubber?  
**(Understanding L2) (C122.4)**
3. Explain about the characteristics and classification of conducting polymers with examples?  
**(Understanding L2) (C122.4)**
4. Explain about the conduction mechanism in Trans poly acetylene and applications of conducting polymers?  
**(Understanding L2) (C122.4)**
5. What is mean by Bio-degradable polymers concept and advantages and poly vinyl and poly lactic Acids.  
**(Remembering L1) (C122.4)**
6. Define calorific value of fuel –HCV, LCV& Dulong's formula?**(Remembering L1) (C122.5)**
7. Explain the proximate analysis and ultimate analysis of coal and their significance?  
**(Evaluating L5) (C122.5)**
8. Explain about the liquid fuels- Petroleum &its refining? **(Evaluating L5) (C122.5)**
9. Define cracking and explain moving –bed catalytic cracking? **(Evaluating L5) (C122.5)**
10. Define knocking, octane and cetane rating?**(Remembering L1) (C122.5)**
11. Explain about the Natural gas-LPG, CNG, biodiesel trans-esterification and advantages?  
**(Understanding L2) (C122.5)**
12. Explain about Portland cement, its composition and setting &hardening?**(Evaluating L5) (C122.6)**
13. Define lubricants ?Explain about classification of lubricants with complete explanation ?  
**( Evaluating L5) (C122.6)**
14. Discuss about mechanism of lubrication ? **(Creating L6) (C122.6)**
15. Explain the properties of lubricants? **(Understanding L2) (C122.6)**

**QUESTION PAPER  
MAPPING WITH CO'S**



**QUESTION PAPER  
MAPPING WITH BT**





# **SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**(UGC AUTONOMOUS INSTITUTION)**



**Accredited by NAAC A+ Grade, Recognized under 2(f) of UGC Act 1956.**

**(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)**

**Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510**

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## **I-MID & II-MID ENGINEERING CHEMISTRY ASSIGNMENT PROOFS**

<https://drive.google.com/file/d/1LyySkmy7p-cRqA6-6K2wwXHKSPq13iFD/view?usp=sharing> -mid-1

[https://drive.google.com/file/d/1rXF44\\_InGOh1EWw0pkyVTc1mGLSXqoWB/view?usp=sharing](https://drive.google.com/file/d/1rXF44_InGOh1EWw0pkyVTc1mGLSXqoWB/view?usp=sharing) -mid-2

**SCHEME OF EVALUATION WITH CO and BTL MAPPING**

<b>SCHEME OF EVALUATION-ENGINEERING CHEMISTRY(MID-I)(Set-I)</b>		
<b><i>Instructions:</i></b>		
a) Any answer by alternate method should be valued and suitably awarded.		
b) All answers (including extra, stuck off and repeated) should be valued. Answers with maximum marks must be considered.		
<b>Qn No</b>	<b>Description of Answer</b>	<b>Marks</b>
1.	Definition of ion-exchange process and differences b/w cation & anion exchanger (C122.1)(Remembering)	2
	Neat diagram of ion-exchange process and equations (C122.1)(Remembering)	2
	Advantages & disadvantages of ion exchange process (C122.1) (Remembering)	1
2.	Mention the names of different internal treatment methods (C122.1)(Remembering)	1
	Complete explanation of different methods & equations (C122.1)(Remembering)	4
3.	Difference b/w scale & sludge has mention the diagram (C122.1)(Analyzing)	1
	What are the causes of scale and sludge and disadvantages (C122.1)(Analyzing)	2
	Mention the preventive methods (C122.1)(Analyzing)	2
4.	Definition of dry corrosion & mention the different types of dry corrosion names (C122.3)(Understanding)	2
	Explain the oxidation corrosion, corrosion by hydrogen, & liquid metal corrosion with equations and examples (C122.3)(understanding)	3
5	Definitions of sacrificial anode & impressed current cathodic protection methods (C122.3)(understanding)	2
	Neat diagrams and equations of sacrificial anode & impressed current cathodic protection methods (C122.3)(understanding)	3
6	Definition of addition polymerization & mention the steps in the free radical mechanism (C122.4)(Remembering)	2
	Complete explanation of free radical mechanism with equations (C122.4)(Remembering)	3
<b>TOTAL</b>		<b>20</b>

**SCHEME OF EVALUATION WITH CO and BTL MAPPING**

<b>SCHEME OF EVALUATION-ENGINEERING CHEMISTRY (MID-II)(Set-II)</b>		
<b>Instructions:</b>		
a) Any answer by alternate method should be valued and suitably awarded.		
b) All answers (including extra, stuck off and repeated) should be valued. Answers with maximum marks must be considered.		
<b>Qn No</b>	<b>Description of Answer</b>	<b>Marks</b>
1	Definition of bio- degradable polymers (C122.4)(Remembering)	1
	Preparation of poly lactic acid with equation & properties & applications (C122.4)(Remembering)	4
2	What are steps involved in ultimate analysis(C122.5)(Understanding)	1
	Explanation of each steps in ultimate analysis(C122.5)(Understanding)	2
	Formula's of each steps in proximate analysis(C122.5)(Understanding)	2
3	Definitions of cracking ,knocking, octane number, cetane number & equations (C122.5)(Remembering)	5
4	Definition of cement and mention the raw materials of cement (C122.6)(Remembering)	2
	Formulas and chemical composition of raw materials of cement (C122.6)(Remembering)	3
5	Mention the names of mechanism of lubrication(C122.6)(Remembering)	1
	Thin film ,thick film & extreme pressure has definition and diagram and where it is used (C122.6)(Remembering)	4
6	Mention the names of properties of lubrication(C122.6)(Understanding)	1
	Explain the each property has definitions and where it is used (C122.6)(Understanding)	4
<b>TOTAL</b>		<b>20</b>

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## TUTORIAL CLASS

S.NO	TOPIC	Teaching method/Teaching Aid	Session plan	Reference books
1	Hard water, hardness, types of hardness, units of hardness, potable water & its treatment, break point chlorination.	Black Board	1	T1, R1
2	Defluoridation, boiler troubles-sludges, scales, caustic embrittlement, internal treatment method.	Black Board, PPT	1	T1, R1, W1
3	External treatment method ,reverse osmosis	Black Board	1	T1, R1 V1
4	Batteries, types of batteries, construction, working & applications of Zn-air battery.	Black Board	1	T1, R1, W2
5	Lithium –ion battery, fuel cell, methanol –oxygen fuel cell.	Black Board, PPT	1	T1, R1, W2
6	Solid-oxide fuel cell, solar cell, introduction of corrosion.	Black Board	1	T1, R1
7	Theories of corrosion, types of corrosion.	Black Board, PPT	1	T1, R1 V2
8	Corrosion control methods	Black Board	1	T1, R1
9	Polymers, types of polymerization, free radical mechanism.	Black Board	1	T1, R1
10	Preparations of polymers like- Nylon-6,6, Terylene, natural rubber, vulcanization rubber.	Black Board	1	T1, R1
11	Preparations of polymers like- Buna-s, butyl & Thiokol rubber, PVC.	Black Board	1	T1, R1

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12	Classification of conducting polymers, biodegradable polymers.	Black Board	1	T1, R1 W3, V3
13	Calorific value, HCV, LCV, Dulong's formula.	Black Board	1	T1, R1
14	Analysis of coal-proximate & ultimate analysis of coal.	Black Board, PPT	1	T1, R1, W4
15	Petroleum refining –fractional distillation, synthetic petrol-Fischer Tropsch's process	Black Board, PPT	1	T1, R1
16	Cracking-moving bed catalytic cracking, knocking-octane rating & cetane rating.	Black Board, PPT	1	T1, R1 V4
17	Bio diesel- transesterification, CNG, LPG.	Black Board	1	T1, R1
18	Cement-Composition, setting and hardening.	Black Board	1	T1, R1
19	Smart materials – shape memory materials, thermoresponsive materials	Black Board	1	T1, R1 W5, V5
20	Classification of lubricants with examples	Black Board	1	T1, R1
21	Properties of lubricants, mechanism of lubricants	Black Board	1	T1, R1

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## Result Analysis:

ECE

Course Title	ENGINEERING CHEMISTRY
Course Code	CH203BS
Programme	B.Tech
Year & Semester	I year II- semester
Regulation	BR22
Course Faculty	O.Subhashini, Assistant Professor , H&S

## Weak Students:

S No	Roll no	I Sem result	Internal-I Status (35)	Internal-II Status (40)
1	22X31A0401	Failed(1 subject)	26	26
2	22X31A0407	Failed(4 subject)	20	26
3	22X31A0420	Failed(3 subject)	20	23
4	22X31A0424	Failed(3 subject)	20	25
5	22X31A0425	Failed(4 subject)	23	29
6	22X31A0428	Failed(1 subject)	20	29
7	22X31A0430	Failed(4 subject)	19	5
8	22X31A0431	Failed(3 subject)	19	25
9	22X31A0440	Failed(3 subject)	20	24
10	22X31A0446	Failed(1 subject)	27	29

## Advanced learners:

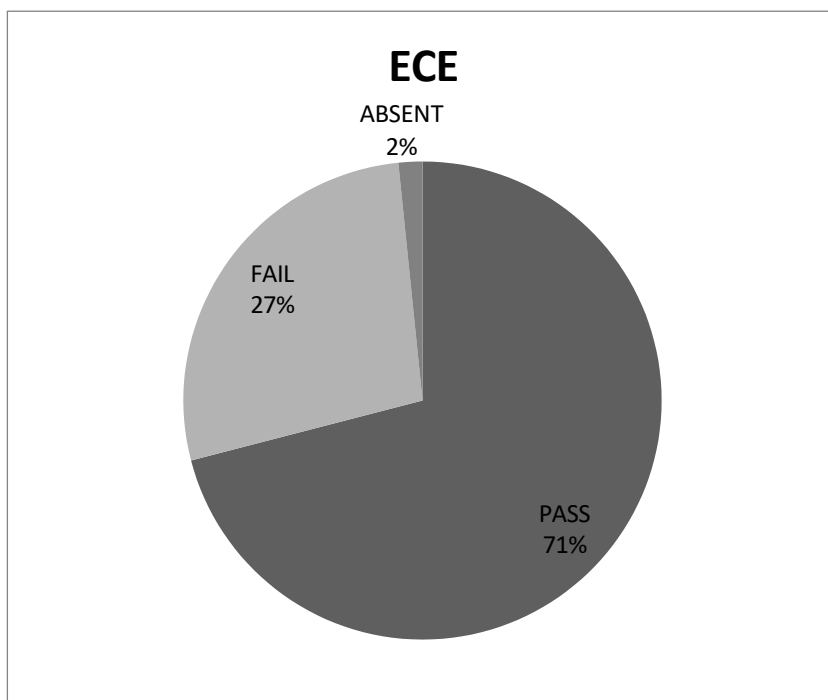
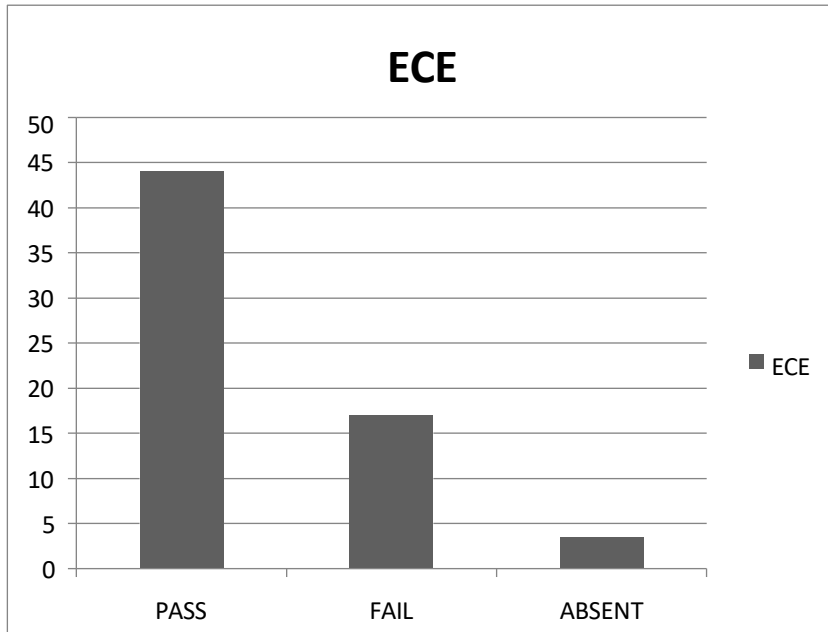
S No	Roll No	I- Sempercentage	Gate Material
1	22X31A0402	83%	Water &its treatment, batteries, fuels&combustion.
2	22X31A0408	82.6%	
3	22X31A0409	82.2%	
4	22X31A0426	80.7%	
5	22X31A0453	83.6%	
6	22X31A0455	90.8%	
7	22X31A0458	80.8%	



## RESULT ANALYSIS AT END OF SEMESTER

Branch : ECE

Subject: ENGINEERING CHEMISTRY





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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510

## DEPARTMENT OF HUMANITIES AND SCIENCE

### REMEDIAL CLASSES TIME TABLE


DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
CSE-A	ODE&VC	ENG	EDC	AP	ODE&VC	AP
CSE-B	AP	EDC	ODE&VC	ENG	EDC	ENG
CSE-C	ENG	AP	EDC	ODE&VC	AP	ODE&VC

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
DS	EDC	AP	ODE&VC	ENG	EDC	ODE&VC
CYBER	ENG	EDC	AP	ODE&VC	AP	ENG

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
AIML-A	ODE&VC	EC	EDC	BEE	EC	ODE&VC
AIML-B	BEE	EDC	ODE&VC	EC	BEE	EDC

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
AI&DS	BEE	EC	ODE&VC	EDC	BEE	EC
IOT	EC	ODE&VC	EDC	BEE	ODE&VC	EDC

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
ECE	ODE&VC	BEE	EC	EDC	BEE	<b>EC</b>
CIVIL	ODE&VC	BEE	EC	AM	BEE	EC

  
 Head of the Department  
 Department of H&S  
 SRI INDU INSTITUTE OF ENGG & TECH  
 Sheriguda(V) Ibrahimpatnam (M) R.R. Dist-501 510

  
 PRINCIPAL  
 Sri Indu Institute of Engineering & Tech  
 Sheriguda(VIII), Ibrahimpatnam  
 R.R. Dist. Telangana-501 510





# SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Humanities & Sciences

## Course Outcome Attainment (Internal Examination-1)

Name of the faculty O.SUBHASHINI  
Branch & Section: ECE

Academic Year:  
Examination:

2022-2023  
I Internal

Course Name: ENGINEERING CHEMISTRY

Year: I

Semester: II

S.No	HT No.	Q1a	Q1b	Q1c	Q2a	Q2b	Q2c	Q3a	Q3b	Q3c	Q4a	Q4b	Q4c	Q5a	Q5b	Q5c	Q6a	Q6b	Q6c	Obj	A1
Max. Marks ==>		5			5			5			5			5			5			10	5
1	22X31A0401	4			5			2			5						0			10	5
2	22X31A0402	4			5			5			3						5			10	5
3	22X31A0403	3			2			1			1						3			9	5
4	22X31A0404	3			2			3			1						5			10	5
5	22X31A0405	5			5			3			3						5			10	5
6	22X31A0406	4			3			5			4						2			10	5
7	22X31A0407				2			3												10	5
8	22X31A0408	5			4			5			3						3			10	5
9	22X31A0409				5			5			5						5			10	5
10	22X31A0410	5			5			5			5			5						10	5
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12	22X31A0412				2			2			3									10	5
13	22X31A0413	3			5			5												10	5
14	22X31A0414	5			5			3			4									10	5
15	22X31A0415	5			4			5			5			4						10	5
16	22X31A0416	4						4			2									10	5
17	22X31A0417	2			3			3						2						10	5
18	22X31A0418				3			5			3									10	5
19	22X31A0419	5			5						3									10	5
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25	22X31A0425	3			1			2			2									10	5
26	22X31A0426	4			4			4			2									10	5
27	22X31A0427	4			0			1			1			0						10	5
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29	22X31A0429	2			31						1			2						10	5
30	22X31A0430	4																		10	5
31	22X31A0431										4									10	5
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34	22X31A0434	3			3			5			1						2			10	5
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38	22X31A0438				5															10	5
39	22X31A0439	3			3			5			3						2			10	5
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42	22X31A0442	4			3			5									3			10	5
43	22X31A0443	3			2			3			1						0			10	5
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45	22X31A0445	4			2			4			3						2			10	5
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47	22X31A0447							3			3						3			10	5
48	22X31A0448	2			2			1						0						10	5
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50	22X31A0450	0			0			5			0			0						10	5
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57	22X31A0457	3			2			5									2			8	5
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59	22X31A0459	5			5			5			5						3			10	5
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61	22X31A0461	1			2						1			1						10	5
62	22X31A0462	5						5									3			10	5
63	22X31A0463	5			3			3												10	5
64	22X31A0464	2			0						1			2						10	5

Target set by the faculty / HoD	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	6.00	3.00
Number of students performed above the target	43	0	0	30	0	0	39	0	0	21	0	0	3	0	0	13	0	0	62	62
Number of students attempted	54	0	0	47	0	0	50	0	0	42	0	0	15	0	0	21	0	0	62	62
Percentage of students scored more than target	80%			64%			78%			50%			20%			62%			100%	100%

**CO Mapping with Exam Questions:**

CO - 1	Y			Y			Y												Y	Y
CO - 2																			Y	Y
CO - 3									Y				Y						Y	Y
CO - 4															Y				Y	Y
CO - 5																				
CO - 6																				

>Target %	80%			64%			78%			50%			20%			62%			100%	100%
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**CO Attainment based on Exam Questions:**

CO - 1	80%			64%			64%												100%	100%
CO - 2																			100%	100%
CO - 3									78%			78%							100%	100%
CO - 4															78%				100%	100%
CO - 5																				
CO - 6																				

CO	Subj	obj	Asgn	Overall	Level
CO-1	69%	76%	100%	82%	3.00
CO-2		#####	100%	100%	3.00
CO-3	78%	85%	100%	88%	3.00
CO-4	78%	89%	100%	89%	3.00
CO-5					
CO-6					

Attainment Level	
1	40%
2	50%
3	60%

Attainment (Internal 1 Examination) **3.00**

# SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Humanities & Sciences



## Course Outcome Attainment (Internal Examination-2)

Name of the faculty: O.SUBHASHINI

Academic Year:

2022-2023

Branch & Section: ECE

Examination:

II Internal

Course Name: ENGINEERING CHEMISTRY

Year: I

Semester: II

S.N	HT No.	Q1a	Q1b	Q1c	Q2a	Q2b	Q2c	Q3a	Q3b	Q3c	Q4a	Q4b	Q4c	Q5a	Q5b	Q5c	Q6a	Q6b	Q6c	Obj	A2	viva ppt
Max. Marks ==>		5			5			5			5			5			5			10	5	5
1	22X31A0401	2						2						1			1			10	5	5
2	22X31A0402				5			5			5						5			10	5	5
3	22X31A0403				3			3			2						2			10	5	5
4	22X31A0404				1						3						3			10	5	5
5	22X31A0405				5			5			4			5						10	5	5
6	22X31A0406							5			5			5			5			10	5	5
7	22X31A0407							3									3			10	5	5
8	22X31A0408							5			5			5			4			10	5	5
9	22X31A0409				5			5						5			5			10	5	5
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11	22X31A0411							5			5			5						9	5	5
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25	22X31A0425							4			4			1						10	5	5
26	22X31A0426				5			5			5									10	5	5
27	22X31A0427				2			4			3			4						10	5	5
28	22X31A0428				1			3			3			3						9	5	5
29	22X31A0429																				5	5
30	22X31A0430																				A	A
31	22X31A0431	2			2						1									10	5	5
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35	22X31A0435				3			2												10	5	5
36	22X31A0436							3						2						10	5	5
38	22X31A0438																				5	5
39	22X31A0439				5			5			5			3			5			10	5	5
40	22X31A0440	2												1			1			10	5	5
41	22X31A0441										4			5			5			10	5	5
42	22X31A0442	5			4			4						5			2			10	5	5
43	22X31A0443				4			4			4			3						10	5	5
44	22X31A0444										3			1			1			10	5	5
45	22X31A0445				5			5			5			5						10	5	5
46	22X31A0446				1			1			4						3			10	5	5
47	22X31A0447				2			2						2			2			10	5	5
48	22X31A0448	1						5			3			2						10	5	5
49	22X31A0449							5			4			5			1			10	5	5
50	22X31A0450							4			5			4			2			10	5	5
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52	22X31A0452										4			5			4			10	5	5
53	22X31A0453							5			5			5			5			10	5	5
54	22X31A0454							4			4			1						10	5	5
55	22X31A0455							5			5			5			5			10	5	5
56	22X31A0456							4												10	5	5
57	22X31A0457							5			4			5			5			10	5	5
58	22X31A0458							5			5			5			5			10	5	5
59	22X31A0459							5			5			5			5			10	5	5
60	22X31A0460	2			1			4												10	5	5
61	22X31A0461				2			3						3						10	2	5
62	22X31A0462							4			5			4			4			10	5	5
63	22X31A0463							4			4			4			4			10	5	5
64	22X31A0464	3			3			2												10	5	5

Target set by the faculty / HoD	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	6.00	3.00	3.00
Number of students performed above the target	3	0	0	15	0	0	43	0	0	35	0	0	37	0	0	26	0	0	59	59	60
Number of students attempted	10	0	0	24	0	0	48	0	0	37	0	0	46	0	0	37	0	0	59	62	61
Percentage of students scored more than target	30%			63%			90%			95%			80%			70%			100%	95%	98%

**CO Mapping with Exam Questions:**

CO - 1																					
CO - 2																					
CO - 3																					
CO - 4	Y																		Y	Y	Y
CO - 5				Y			Y												Y	Y	Y
CO - 6										Y			Y			Y			Y	Y	Y

% Students Scored >Target %	30%			63%			90%			95%			80%			70%			100%	95%	98%
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**CO Attainment based on Exam Questions:**

CO - 1																					
CO - 2																					
CO - 3																					
CO - 4	30%																		100%	95%	95%
CO - 5				30%			30%												100%	95%	95%
CO - 6										30%			30%			30%			100%	95%	98%

CO	Subj	obj	aasg	ppt	Overall	Level
CO-1						
CO-2						
CO-3						
CO-4	30%	100%	95%	95%	80%	3.00
CO-5	30%	100%	95%	95%	80%	3.00
CO-6	30%	100%	95%	98%	81%	3.00

Attainment Level	
1	40%
2	50%
3	60%

Attainment (Internal Examination-2) **3.00**





# SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Humanities & Sciences

## Course Outcome Attainment

Name of the faculty O.SUBHASHINI

Academic Year: 2022-2023

Branch & Section: ECE

Examination: I Internal

Course Name: ENGINEERING CHEMISTRY

Year: I

Semester: II

Course Outcomes	1st Internal Exam	2nd Internal Exam	Internal Exam	University Exam	Attainment Level
CO1	3.00		3.00	2.00	2.30
CO2	3.00		3.00	2.00	2.30
CO3	3.00		3.00	2.00	2.30
CO4	3.00	3.00	3.00	2.00	2.30
CO5		3.00	3.00	2.00	2.30
CO6		3.00	3.00	2.00	2.30
<b>Internal &amp; University Attainment:</b>			3.00	2.00	
<b>Weightage</b>			30%	70%	
<b>CO Attainment for the course (Internal, University)</b>			0.90	1.40	
<b>CO Attainment for the course (Direct Method)</b>			2.30		

Overall course attainment level

**2.30**



# SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Humanities & Sciences

## Program Outcome Attainment (from Course)

Name of Faculty: O.SUBHASHINI Academic Year: 2022-2023  
 Branch & Section: ECE Year: I  
 Course Name: ENGINEERING CHEMISTRY Semester: II

### CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	-	-	-	1	1	-	-	-	-	2	-	-
CO2	2	2	-	-	1	1	1	-	-	-	-	1	-	-
CO3	2	2	-	-	-	-	1	-	-	-	-	-	-	-
CO4	2		-	-	-	1	1	-	-	-	-	1	-	-
CO5	2	2	-	-	-	-	1	-	-	-	-	-	-	-
CO6	2	1	-	-	1	1	1	-	-	-	-	1	-	-
<b>Course</b>	<b>2.00</b>	<b>1.80</b>	-	-	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	-	-	-	-	<b>1.00</b>	-	-

CO	Course Outcome Attainment
CO1	2.30
CO2	2.30
CO3	2.30
CO4	2.30
CO5	2.30
CO6	2.30
<b>Overall course attainment level</b>	<b>2.30</b>

### PO-ATTAINMENT

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO Attainment	1.53	1.38	-	-	0.77	0.77	0.77	-	-	-	-	0.77	-	-

CO contribution to PO - 33%, 67%, 100% (Level 1/2/3)



# **SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**(UGC AUTONOMOUS INSTITUTION)**

**Accredited by NAAC A+ Grade, Recognized under 2(f) of UGC Act 1956.**

**(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)**

**Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510**

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## **ATTENDANCE REGISTER**

<https://drive.google.com/file/d/1oNqcfRt1MMK01eVNQIVh9OUjXoX7FqY8/view?usp=sharing>