



# K.S.R.M COLLEGE OF ENGINEERING

UGC-Autonomous  
Kadapa, AP  
[www.ksrmce.ac.in](http://www.ksrmce.ac.in)

Dated: 25-06-2019

Lr./KSRMCE/Principal Office /2019-20/

## Principal Office Orders

As per the decisions of the Academic Council meeting held on 15- 06 -2019 the undersigned members are been appointed as the Board of studies for Chemistry for a period of 2 years.

S.No.	Name	Designation
1.	Dr. I. Sreevani	Asso.Prof., & HOD H&S, KSRMCE
2.	Dr. R. Jajib Biswas	Assistant Prof., IIT ,Tirupati
3.	Dr. C. Suresh Reddy	Prof.,SVU college of sciences, KSRMCE
4.	Prof. G. V. Subba Reddy	Vice Principal, JNTUA Pulivendula
5.	Smt. V. Sudha	Alumni
6.	Smt. M. Mary Jasmine	Assistant Prof., KSRMCE
7.	Dr.K.Venkataramana	Assistant Prof., KSRMCE
8.	Smt.B.Prasanthi	Assistant Prof., KSRMCE
9.	Sri. G. Ashok	Industry Expert

The orders will come in to force for with immediate effect.

V. S. S. Mww/19

Principal

PRINCIPAL

K.S.R.M. COLLEGE OF ENGINEERING  
KADAPA - 516 003. (A.P.)

Cc to:

The Management/ Director for information  
The HoD of H&S for necessary actions  
The Members for Information  
The Website Committee for upload



**K.S.R.M. COLLEGE OF ENGINEERING**  
**AUTONOMOUS**  
Kadapa, Andhra Pradesh, India- 516 003  
Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuram.  
An ISO 14001:2004 & 9001: 2015 Certified Institution



Date: 06.01.2021

Dear Sir / Madam

**Sub:** K.S.R.M. College of Engineering (Autonomous), Kadapa – Online BOS meeting on 10.01.2021 (Sunday) – Intimation – Reg.

00000

Greetings from K.S.R.M. College of Engineering and wish you a very happy and prosperous New Year. Hope you are doing well during this COVID period. I am pleased to inform that we are going to conduct BOS meeting (online - through Google meet) on 10.01.2021. The agenda of the meeting is as follows:

1. Common Board of studies meeting from 10.00 AM– 11.00 AM.
  - a. To discuss about R20 UG Regulations and Curriculum of I and II Semester of B.Tech.
  - b. Feedback from Stakeholders if any.
2. Individual Board meetings from 11.30 AM onwards.

I request you to attend the meeting and give your valuable suggestions and inputs.

With Regards,

PRINCIPAL

Date: 06.01.2021

Dear Sir / Madam

**Sub:**K.S.R.M. College of Engineering (Autonomous), Kadapa – Online BOS meeting on 10.01.2021 (Sunday) – Intimation – Reg.

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Greetings from K.S.R.M. College of Engineering and wish you a very happy and prosperous New Year. Hope you are doing well during this COVID period. I am pleased to inform that we are going to conduct BOS meeting (online - through Google meet) on 10.01.2021. The agenda of the meeting is as follows:

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With Regards,

*V. S. S. Murali*

PRINCIPAL

PRINCIPAL

K.S.R.M. COLLEGE OF ENGINEERING

KADAPA - 516 003. (A.P.)

**Encl.:**Draft copy of B.Tech R20 UG Regulations and Curriculum.

KSRMCE Principal

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**BOARD OF STUDIES MEETING – 2020-21**  
**K.S.R.M COLLEGE OF ENGINEERING**  
**AUTONOMOUS**

**Minutes of the Meeting**

<b>Date</b>	10.01.2021	<b>Day</b>	Sunday
<b>Time</b>	11 AM	<b>Venue</b>	Virtual meeting: <a href="https://meet.google.com/kts-uxuf-hwe">https://meet.google.com/kts-uxuf-hwe</a>
<b>Dept./SS</b>	Humanities and Sciences (Chemistry)	<b>Convener</b>	Dr.I.Sreevani

**Members Present: 07**

				<b>Members Absent: 00</b>		
<b>S.No</b>	<b>Name</b>	<b>Designation</b>	<b>Signature</b>	<b>S.No</b>	<b>Name</b>	<b>Designation</b>
1.	Dr.I.Sreevani	Associate Prof., HOD, Dept. of H&S, KSRMCE		1.	G. Ashok	Representative from Industry, Railway Kodur.
2.	Prof .G. V. Subba Reddy	Vice-Principal, JNTUP				
3.	Prof . C. Suresh Reddy	Prof., of Chemistry, Dept. of Chemistry, SV University				
4.	Dr.Rajib Biswas	Assistant Prof, IIT, Tirupathi.				
5.	Smt. M.Mary Jasmine	Assistant Prof., KSRMCE				
6.	Dr.K.Venkata Ramana	Assistant Prof., KSRMCE				
7.	Smt. B. Prashanti	Assistant Prof., KSRMCE				
8.	V. Sudha	Assistant Prof., KSRMCE (Alumni Member)				





## K.S.R.M. COLLEGE OF ENGINEERING (UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India- 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.


An ISO 14001:2004 & 9001: 2015 Certified Institution




Department of Humanities & Sciences

Certification Courses (2020-2021)

S.No.	Title	Co-ordinate	Resource Person	Date
1	Numerical Methods for Engineers	Sri.G.Sreedhar Assistant Professor	Sri.G.Sreedhar Assistant Professor Sri.Y. Satheesh Kumar Reddy Assistant Professor Dr.V.Rama Chandra Reddy Assistant Professor	22/02/2021 to 13/03/2021 I - Sem ECE,CSE&EEE
2	Complex Analysis	Dr.G.Radha Assistant Professor	Dr.B.Rama Bhupal Reddy Professor Dr.G.Radha Assistant Professor Sri.B.Veera Sankar Assistant Professor	03/03/2021 to 10/04/2021 I - Sem (CE &ME)
3	Self Defence Course for Girls	Dr.I.Sreevani Associate Professor	Master K.Ganesh	17/02/2021 to 08/03/2021 I - Sem
4	Gender Sensitization	Dr.K.Ramesh Rao Assistant Professor	Sri.N.Bhaskara Reddy Assistant Professor Dr.K.Ramesh Rao Assistant Professor	22/02/2021 to 06/03/2021 I - Sem

  
Dr. I. SREEVANI M.Sc., Ph.D.  
Head of Humanities & Sciences  
K.S.R.M. College of Engineering  
KADAPA - 516 005

5	Non Conventional Energy Sources	Smt.M.Mary Jasmine Assistant Professor	Dr.I.Sreevani Associate Professor Smt.M.Mary Jasmine Assistant Professor Dr.K.Venkata Raman Assistant Professor	01/02/2021 to 17/02/2021 I - Sem
6	Sustainable Development	Dr.B.Prashanti Assistant Professor	Dr.I.Sreevani Associate Professor Dr.B.Prashanti Assistant Professor Smt.M.Mary Jasmine Assistant Professor	01/02/2021 to 12/02/2021 IV-Sem
7	Nano Materials and its Applications	Dr.K.Venkata Raman Assistant Professor	Dr.I.Sreevani Associate Professor Smt.M.Mary Jasmine Assistant Professor Dr.K.Venkata Raman Assistant Professor	05/ 03/2021 to 25/03/2021 III-Sem
8	Physics of Renewable Energy	Sri.Y.Ramana Reddy Assistant Professor	Sri.Y.Ramana Reddy Assistant Professor Sri. D.Mallikarjuna Reddy Assistant Professor	15/02/2021 to 27/02/2021 II-Sem

  
**HOD H&S**  
**Dr. I. SREEVANI** M.Sc., Ph.D.  
 Head of Humanities & Sciences  
 K.S.R.M. College of Engineering  
 KADAPA - 516 005

Course Title	ENGINEERING CHEMISTRY					B. Tech. ME(I Sem) CE (II Sem)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
20EC102(ME) 20EC202(CE)	BSC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	40	60	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			
<b>Course Objectives:</b>								
<ul style="list-style-type: none"> <li>To familiarize engineering chemistry and its applications</li> <li>To impart the concept of soft and hard waters, softening methods of hard water</li> <li>To train the students on the principles and applications of electrochemistry, polymers, surface chemistry, and cement.</li> </ul>								
<b>Course Outcomes:</b> On successful completion of this course, the students will be able to								
CO 1	Evaluate the amount of hardness and dissolved oxygen present in water sample.							
CO 2	Demonstrate the corrosion prevention methods and factors affecting corrosion.							
CO 3	Explain the preparation, properties, and applications of thermoplastics & thermosetting, Elastomers & conducting polymers							
CO 4	Understand the setting and hardening of cement and concrete phase.							
CO 5	Analyze the concepts of colloids, micelle and nanomaterials.							

### Unit 1: Water Technology (10 hrs)

Introduction –Soft Water and hardness of water, hardness of water by EDTA Method, Estimation of dissolved oxygen (Winkler’s method)-Boiler troubles – Priming, foaming, scale and sludge, Caustic embrittlement, Industrial water treatment – specifications for drinking water, Bureau of Indian Standards(BIS) and World health organization(WHO) standards, ion-exchange processes - desalination of brackish water, reverse osmosis (RO) and electro dialysis.

#### Learning outcomes:

The student will be able to

- List the differences between temporary and permanent hardness of water (L1)
- Explain the principles of reverse osmosis and electro dialysis. (L2)
- Compare quality of drinking water with BIS and WHO standards. (L2)
- Illustrate problems associated with hard water - scale and sludge. (L2)
- Explain the working principles of different Industrial water treatment processes (L2)

## **Unit 2: Electrochemistry and Applications: (10 hrs)**

Introduction to electrodes – concepts, electrochemical cell, Nernst equation, cell potential calculations.

Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad), and lithium ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen, methanol fuel cells – working of the cells.

Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry electrochemical corrosion, Pilling Bed worth ratios and uses, Factors affecting the corrosion, Cathodic and anodic protection, electroplating and electro less plating (Nickel and Copper).

### **Learning Outcomes:**

At the end of this unit, the students will be able to

- Apply Nernst equation for calculating electrode and cell potentials (L3)
- Apply Pilling Bed worth rule for corrosion and corrosion prevention (L3)
- Demonstrate the corrosion prevention methods and factors affecting corrosion (L2)
- Compare different batteries and their applications (L2)

## **Unit 3: Polymers and Fuel Chemistry: (8 hrs)**

Introduction to polymers, Polymer dispersion index, functionality of monomers, Mechanism of chain growth, step growth and coordination polymerization.

Thermoplastics and Thermo-setting plastics-: Preparation, properties and applications of poly styrene. PVC and Bakelite

Elastomers – Preparation, properties and applications of Buna S, Buna N, Thiokol

Fuels – Types of fuels, calorific value, numerical problems based on calorific value; Analysis of coal, **Liquid Fuels** refining of petroleum, fuels for IC engines, knocking and anti-knock agents, Octane and Cetane values, cracking of oils; alternative fuels- propane, methanol and ethanol, bio-fuels.

### **Learning Outcomes:**

At the end of this unit, the students will be able to

- Explain different types of polymers and their applications (L2)
- Solve the numerical problems based on Calorific value(L3)
- Select suitable fuels for IC engines (L3)
- Explain calorific values, octane number, refining of petroleum and cracking of oils (L2)

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#### **UNIT-4 Advanced Engineering Materials (10 hrs)**

Refractories- Classification, Properties, Factors affecting the refractory materials and Applications.

Lubricants- Classification, Functions of lubricants, Mechanism, Properties of lubricating oils – Viscosity, Viscosity Index, Flash point, Fire point, Cloud point.

Building materials- Portland cement, constituents, phases and reactivity of clinker, Setting and Hardening of cement.

#### **Learning Outcomes:**

At the end of this unit, the students will be able to

- Identify the factors affecting the refractory material(L3)
- Illustrate the functions and properties of lubricants (L2)
- Demonstrate the phases and reactivity of concrete formation (L2)
- Identify the constituents of Portland cement (L3)
- Enumerate the reactions at setting and hardening of the cement (L3)

#### **Unit 5: Surface Chemistry and Applications: (10 hrs)**

Introduction to surface chemistry, colloids, micelle formation, synthesis of colloids (Dispersion method), chemical and electrochemical method (chemical vapour deposition) of preparation of nanometals and metal oxides, stabilization of colloids and nanomaterials by stabilizing agents, applications of colloids and nanomaterials –medicine.

#### **Learning Outcomes:**

At the end of this unit, the students will be able to

- Summarize the concepts of colloids, micelle and nanomaterials (L2)
- Explain the synthesis of colloids with examples (L2)
- Outline the preparation of nanomaterials and metal oxides (L2)
- Identify the application of colloids and nanomaterials in medicine.(L2)

#### **Text Books:**

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

#### **Reference Books:**

1. G.V.Subba Reddy, K.N.Jayaveera and C. Ramachandraiah, Engineering Chemistry, Mc GrawHill, 2020.
2. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
3. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
4. D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman, 1992.



Course Title	CHEMISTRY					B. Tech. CSE (I Sem) ECE & EEE (II Sem)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
2023102(I Sem) 2023202(II Sem)	BSC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	40	60	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			
<b>Course Objectives:</b>								
<ul style="list-style-type: none"> <li>To familiarize engineering chemistry and its applications.</li> <li>To train the students on the principles and applications of electrochemistry and polymers.</li> <li>To introduce instrumental methods, molecular machines and switches.</li> </ul>								
<b>Course Outcomes:</b> On successful completion of this course, the students will be able to								
CO 1	Understand the basic quantum approach of Molecular orbital theory and calculation of bond order							
CO 2	Remember the principle of Band diagrams in application of conductors and semiconductors.							
CO 3	Compare the materials of construction for battery and electrochemical sensors.							
CO 4	Explain the preparation, properties, and applications of thermoplastics & thermosetting, Elastomers & conducting polymers							
CO 5	Analyze the principles of spectroscopy and different application of analytical instruments.							

### Unit 1: Structure and Bonding Models: (10 hrs)

Planck's quantum theory, dual nature of matter, Schrodinger equation, significance of  $\Psi$  and  $\Psi^2$ , applications to hydrogen, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O<sub>2</sub>, NO and CO, etc., calculation of bond order.

#### Learning Outcomes:

At the end of this unit, the students will be able to

- **apply** Schrodinger wave equation to hydrogen atom (L3)
- **illustrate** the molecular orbital energy level diagram of different molecular species (L2)
- **explain** the calculation of bond order of O<sub>2</sub>, NO and CO molecules (L2)
- **discuss** the basic concept of molecular orbital theory (L3)

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## Unit 2: Modern Engineering materials: (10 hrs)

- i). Understanding of materials: Crystal field theory – salient features – splitting in octahedral, tetrahedral and square planar geometry. Properties of coordination compounds-Oxidation state, coordination, magnetic properties and colour.
- ii). Semiconductor materials, super conductors- basic concept, band diagrams for conductors, semiconductors and insulators, Effect of doping on band structures.
- iii). Nanochemistry: Introduction, classification of nanomaterials, properties and applications of Fullerenes, carbon nano tubes and Graphines nanoparticles.

### Learning Outcomes:

At the end of this unit, the students will be able to

- Explain splitting in octahedral and tetrahedral geometry of complexes (L2).
- Discuss the magnetic behaviour and colour of coordination compounds (L3).
- Explain the band theory of solids for conductors, semiconductors and insulators (L2)
- Demonstrate the application of Fullerenes, carbon nano tubes and Graphines nanoparticles (L2).

## Unit 3: Electrochemistry and Applications: (10 hrs)

Introduction to Electrodes – concepts, reference electrodes (Calomel electrode, Ag/AgCl electrode and glass electrode); Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, Potentiometry- Potentiometry titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations), pH metric concepts. Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad), and lithium ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen, methanol fuel cells – working of the cells.

### Learning Outcomes:

At the end of this unit, the students will be able to

- Apply Nernst equation for calculating electrode and cell potentials (L3)
- Differentiate between ph metry, potentiometric and conductometric titrations (L2)
- Explain the theory of construction of battery and fuel cells (L2)
- Solve problems based on cell potential (L3)



#### **Unit 4: Polymer Chemistry: (10 hrs)**

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation.

Plastics - Thermoplastics and Thermosettings, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6.

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylenes,– mechanism of conduction and applications.

#### **Learning Outcomes:**

At the end of this unit, the students will be able to

- explain the different types of polymers and their applications (L2)
- explain the preparation, properties and applications of Bakelite, Nylon-6,6, (L2)
- describe the mechanism of conduction in conducting polymers (L2)
- discuss Buna-S and Buna-N elastomers and their applications (L2)

#### **Unit 5: Instrumental Methods and Applications (10 hrs)**

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. Regions of Electromagnetic radiation. UV-Visible, IR Spectroscopes'- (selection rules, principles and applications). Solid-Liquid Chromatography–TLC, retardation factor.

#### **Learning outcomes:**

After completion of Unit IV, students will be able to:

- Explain the different types of spectral series in electromagnetic spectrum (L2)
- Understand the principles of different analytical instruments (L2)
- Explain the different applications of analytical instruments (L2)

#### **Text Books:**

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

#### **Reference Books:**

1. G.V.Subba Reddy, K.N.Jayaveera and C. Ramachandraiah, Engineering Chemistry, Mc Graw Hill, 2020.
2. D. Lee, Concise Inorganic Chemistry, 5/e, Oxford University Press, 2008.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
4. J.M.Lehn, Supra Molecular Chemistry, VCH Publications.



Course Title	CHEMISTRY LAB				B. Tech. CSE(I Sem) EEE, ECE(II Sem)			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
2023107 (I Sem) 2023207 (II Sem)	BSC	L	T	P	C	Continuous Internal Assessment	End lab Exams	Total
		0	0	3	1.5	40	60	100
					<b>End Exam Duration: 3Hrs</b>			
<b>Course Objectives:</b>								
<ul style="list-style-type: none"> <li>To verify the fundamental concepts with experiments.</li> </ul>								
<b>Course Outcomes :</b> At the end of the course, the students will be able to								
CO 1	<b>Determine</b> the cell constant and conductance of solutions.							
CO 2	<b>Synthesis</b> of advanced polymer Bakelite.							
CO 3	<b>Calculate</b> the strength of an acid present in secondary batteries.							
CO 4	<b>Illustrate</b> the IR of some organic compounds							
CO 5	<b>Explain</b> acid-base titrations using pH metry.							

#### List of Experiments:

1. Conductometric titration of strong acid vs. strong base.
2. Conductometric titration of weak acid vs. strong base
3. pH metric titration of strong acid vs. strong base.
4. pH metric titration of weak acid vs. strong base
5. Determination of cell constant and conductance of solutions
6. Potentiometry - determination of redox potentials and emfs
7. Determination of Strength of an acid in Pb-Acid battery
8. Preparation of Bakelite.
9. Verify Lambert-Beer's law
10. Thin layer chromatography
11. Identification of simple organic compounds by IR.
12. Preparation of nanomaterials by precipitation
13. Estimation of Ferrous Iron by Dichrometry.

#### Textbooks:

1. Laboratory Manual Engg. Chemistry, Anupama Rajput, Dhanpat Rai & Co.

#### Reference Books

1. Vogel's Text book of Quantitative Chemical Analysis, J. Mendham et.al., Pearson Education, Sixth Edition, 2012
2. Essentials of Experimental Engineering Chemistry, Shashichawla, Dhanpat Rai & Co Publications.

Course Title	ENGINEERING CHEMISTRY LAB					B. Tech. ME(I Sem) CE (II Sem)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
20EC107 (I Sem) 20EC207 (II Sem)	BSC	L	T	P	C	Continuous Internal Assessment	End lab Exams	Total
		0	0	3	1.5	40	60	100
					End Exam Duration: 3Hrs			
<b>Course Objectives:</b>								
<ul style="list-style-type: none"> <li>To verify the fundamental concepts with experiments.</li> </ul>								
<b>Course Outcomes:</b> At the end of the course, the students will be able to								
CO 1	Determine the cell constant and conductance of solutions.							
CO 2	Synthesis of advanced polymer materials.							
CO 3	Compare the physical properties like adsorption and viscosity.							
CO 4	Evaluate the Iron and Calcium in cement.							
CO 5	Estimate the hardness & dissolved oxygen content in water.							

#### List of Experiments:

- Determination of Hardness of a groundwater sample.
- Estimation of dissolved oxygen by Winkler's method
- pH metric titration of strong acid vs. strong base.
- pH metric titration of weak acid vs. strong base
- Determination of cell constant and conductance of solutions
- Potentiometry - determination of redox potentials and emfs
- Determination of Strength of an acid in Pb-Acid battery
- Preparation of a polymer (Bakelite).
- Determination of percentage of Iron in Cement sample by colorimetry
- Estimation of Calcium in port land Cement
- Preparation of nanomaterials by precipitation.
- Adsorption of acetic acid by charcoal
- Determination of percentage Moisture content in a coal sample
- Determination of Viscosity of lubricating oil by Redwood Viscometer 1.
- Determination of Viscosity of lubricating oil by Redwood Viscometer 2.

#### Textbooks:

- Laboratory Manual Engg. Chemistry, Anupama Rajput, Dhanpat Rai & Co.

#### Reference Books

- Vogel's Text book of Quantitative Chemical Analysis, J. Mendham et al., Pearson Education, Sixth Edition, 2012
- Essentials of Experimental Engineering Chemistry, Shashi chawla, Dhanpat Rai & Co Publications.

Course Title	Basics of Nanotechnology					B. Tech. (Open Elective-1)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
18OE2603	Open Elective	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			
<b>Course Objectives:</b>								
<ul style="list-style-type: none"> <li>To make the students acquire an understanding the Nanoscience and Application</li> <li>Student will be able to understand and control matter at the nanoscale leads to revolution in technology and industry that benefits society.</li> </ul>								
<b>Course Outcomes:</b> On successful completion of this course, the students will be able to								
CO 1	Acquire knowledge about structure and properties of nano materials							
CO 2	Synthesize and deposit nanomaterials by various methods.							
CO 3	Identify and understand various top-down and bottom-up approaches for nanomaterial synthesis							
CO 4	Correlate properties of nanostructures with their size, shape							
CO 5	Appreciate enhanced sensitivity of nanomaterial-based sensors and their novel applications in industry							

### Unit-I: Introduction

History and Scope, Introduction to nanomaterials, Classification of nanomaterials with suitable examples, Structure of different nanomaterials- Graphines, CNT's, Fullerence, Properties of nanomaterials.

### Unit-2: Synthesis of Nanomaterials

Chemical precipitation and Co-precipitation, Sol-gel synthesis, Electrochemical synthesis, Photochemical synthesis, Evaporation method

### Unit-3: Fabrication of Nanomaterials

Top-Down method (Ball milling), Bottom-up method (chemical vapour deposition method, Sol gel method), Self- assembly method, Electric arc method.

### Unit-4: Properties of Nanomaterials

Importance of nano particle, effect of Size on optical, electronic, photonic, mechanical, magnetic and catalytic properties.

### Unit-5: Applications of Nanomaterials

Nano particles and Nanocomposites; Nanotubes, Fullerenes, Nano sensors, Nano-electronics, Nano-medical applications, Textiles, paints, Defence & Space applications

**Textbooks:**

1. Text Book of Engineering Chemistry, Shashi Chawla, Dhanapath Rai Publications, New Delhi, 4th Edition, 2011.
2. Textbook of Nanoscience and Nanotechnology in Engineering, Vijay K Varadan, World Scientific

**Reference Books:**

1. Textbook of Nanoscience & Nanotechnology, B.S. Murthy p. Shankar Baldev, University Press-IIM
2. Nanotechnology- A future technology with Visions-BPB Publications

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Course Title	Corrosion and Control					B. Tech. (Open Elective-2)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
18OE2608	Open Elective	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			
<b>Course Objectives:</b>								
<ul style="list-style-type: none"> <li>To review the fundamental aspects of electrochemistry.</li> <li>It also focuses on various forms of corrosion, and their impact on life of metallurgical components, means and ways to engineer corrosion</li> </ul>								
<b>Course Outcomes:</b> On successful completion of this course, the students will be able to								
CO 1	Recall the concepts of corrosion and its mechanism.							
CO 2	Explore different forms of corrosion and its mechanisms							
CO 3	Analyze different factors of environment which influence corrosion in different medium							
CO 4	Identify different control methods for efficient electrodeposition							
CO 5	Discuss corrosion aspects which will enable them to engineer corrosion							

### Unit-1: Introduction

Introduction to corrosion, definition and types of Corrosion (Dry & Wet Corrosion) & its mechanisms, Galvanic series, Factors influencing corrosion.

### Unit-2: Corrosion & Various phenomenon

Uniform Corrosion (definition, mechanism & prevention), Galvanic (Two-metal) Corrosion (Definition, mechanism & prevention), Pitting corrosion (Definition, mechanism & prevention), Concentration Cell Corrosion (Definition, mechanism & prevention).

### Unit-3: Environmental Factors on Corrosion

Various factors that influence Corrosion- Corrosion in water and aqueous solution, microbiologically induced corrosion, corrosion in acidic and alkaline medium.

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#### **Unit-4: Prevention & Control**

Basic principle & concepts of prevention of corrosion-Cathodic protection (Sacrificial anodic protection, Impressed current Cathodic protection), Electroplating & Electroless plating with examples- Alternation of Environment.

#### **Unit-5: Modern theory and applications of corrosion:**

Introduction, Gibb's free energy, cell potentials, emf series, Corrosion rate expressions, applications in modern technology

#### **Textbooks:**

1. A Text Book of Engineering Chemistry, Jain and Jain, Dhanapath Rai Publishing Company, New Delhi, 15th Edition, 2010.
2. Engineering Chemistry by Jayaveera, G.V. Subba Reddy, Tata McGraHill Publications, Edition 2013.
3. Text Book of Engineering Chemistry, Shashi Chawla, Dhanapath Rai Publications, New Delhi, 4th Edition, 2011.

#### **REFERENCES:**

1. Corrosion engineering, Fontana Mars G, Mc Graw Hill publications
2. Engineering materials properties & Applications of metals & Alloys, Sharma C P, Dhanapat Rai Publications
3. Metallic Corrosion Principles And Control by Khanna, A.K., Malhotra, S.N., Santhanam, K.V.S., Totlani, M.K., New Age International (P) Ltd



Course Title	Fuel Technology					B. Tech. (Open elective-3)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
180E2613	Open Elective	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			
<b>Course Objectives:</b>								
<ul style="list-style-type: none"> <li>The students will have the general knowledge of Fuels in the context of clean power, sustainability and alternative fuels</li> <li>To build up knowledge of concepts and theories of fuel combustion &amp; control process</li> </ul>								
<b>Course Outcomes:</b> On successful completion of this course, the students will be able to								
CO 1	<b>Recall</b> the Characteristics & properties of a fuel.							
CO 2	<b>Analyze</b> the concept of solid fuels and evaluate the calorific value of solid fuels							
CO 3	<b>Explore</b> the process of Refining of petroleum and uses of various byproducts							
CO 4	<b>Identify</b> various types of gaseous fuels that reduces exhaust gas emissions							
CO 5	<b>Discuss</b> about the purpose of different alternative fuels, merits & advanced applications of alternative fuels							

### UNIT-I-Introduction

Fuels-Introduction, Classification of Fuels, Characteristics of a Good fuel, Calorific Value of Fuels-Gross calorific value & Net calorific Value- definition, units & their relation.

### UNIT-2-Solid Fuels

Introduction, Types of Coal, Coal formation, Properties, Advantage & disadvantages of solid fuels, manufacture of metallurgical Coke, Determination of Calorific value of solid fuel by Bomb calorimeter




### **UNIT-3-Liquid Fuels**

Introduction, Properties, Advantages & disadvantages of Liquid fuels, Classification of petroleum, refining of petroleum-Refining of petroleum, uses of various petroleum products, Synthetic Petrol-Synthesis methods-Fischer-Tropsch method and Bergius process.

### **UNIT-4-Gaseous Fuels**

Introduction, Properties, Advantages & disadvantages Of Gaseous fuels - Preparation, properties & uses of Natural gas, producer gas, water gas. Determination of calorific value of gaseous fuels by Junker's Gas Calorimeter.

### **Unit-5-Need for Alternate Fuels**

Need for alternate fuels- Effects of Exhaust gas emissions on environment & Humans( $\text{NO}$ ,  $\text{NO}_2$ ,  $\text{CO}_2$ ,  $\text{CO}$ ,  $\text{SO}_x$ ).

Introduction to alternate fuels- General uses of alternate fuels like Hydrogen, LPG, CNG, Biogas, Biofuels-Types of Biofuels, Applications of Biofuels, Merits & demerits of alternate fuels.

#### **Textbooks:**

1. A Text Book of Engineering Chemistry, Jain and Jain, Dhanapath Rai Publishing Company, New Delhi, 15th Edition, 2010.
2. Engineering Chemistry by Jayaveera, G.V. Subba Reddy, Tata McGraHill Publications, Edition 2013.
3. Text Book of Engineering Chemistry, Shashi Chawla, Dhanapath Rai Publications, New Delhi, 4th Edition, 2011.

#### **REFERENCES:**

1. Fuels and Combustion, Sharma S P Chandar Mohan, Westland Publications
2. Alternative Liquid fuels, Desai Ashok V, Willey Publications
3. Introduction to Combustion, Turns Stephen R, Mc GrawHill Publications

Course Title	Green Chemistry and Technology					B. Tech. (Open Elective-4)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
180E2618	Open Elective	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			
<b>Course Objectives:</b>								
<ul style="list-style-type: none"> <li>• To make students aware of how chemical processes can be designed, developed and run in a sustainable way.</li> <li>○ Students acquire the competence to think of chemistry as a sustainable activity</li> </ul>								
<b>Course Outcomes:</b> On successful completion of this course, the students will be able to								
CO 1	Understand the Principles of Green Chemistry							
CO 2	Knowledge of applications of green routes for synthesis of chemicals							
CO 3	Synthesis of biocatalysts using different techniques							
CO 4	Analyze about trends of sustainable development and its integration with Green practices.							
CO 5	Better realization about reflections of Green Chemistry on sustainable development initiatives.							

### Unit-1: Fundamentals of Green Chemistry:

Discussion of the current state of chemistry and the environment and the definition of green chemistry. An introduction to the tools of green chemistry and its fundamental principles.

### Unit-2: Principles of Green Chemistry:

Prevention of waste / by-products , Hazardous products Designing of safer chemicals-Selection of appropriate solvents and starting materials- Use of protecting groups and catalysis- Designing of biodegradable products.

### UNIT-3:Catalysis for Green Chemistry:

Use of biocatalysts- Biochemical Oxidation, Biochemical Reduction, Modified biocatalysts- transition metal catalysis-Simmons-Smith reaction, Heck reaction, Ullmann's coupling.

**UNIT-4: Solvent Free Reactions:**

Solvent free techniques- Reactions on solid mineral supports, Phase Transfer Catalysis- C-alkylation, N-alkylation.

**UNIT-5: Ultrasound assisted green synthesis:**

Introduction to ultrasound assisted green synthesis, Oxidation, Reduction, Hydroboration, Bouveault reaction.

**Textbooks:**

1. A Text Book of Engineering Chemistry, Jain and Jain, Dhanapath Rai Publishing Company, New Delhi, 15th Edition, 2010.
2. Text Book of Engineering Chemistry, Shashi Chawla, Dhanapath Rai Publications, New Delhi, 4th Edition, 2011.

**REFERENCES:**

1. Text Book of Engineering Chemistry - C. Parameswara Murthy, C.V. Agarwal and Andra Naidu, BS Publications, Hyderabad, 3rd Edition, 2008.
2. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi, 2006.



MM



# Non-Conventional Energy Sources

## Certification Course

(30 Hrs)

### Course Objective:

- To understand the need of energy resources due to degradation of convention sources
- Familiarize the use of non-conventional resources
- To establish sustainable growth

### Course Outcomes:

1. Understand the need of energy sources and advantages of renewable energy resources over conventional resources
2. Estimate the solar energy utilization and Principles involved in solar energy collection and conversion of it to electricity generation
3. Explore the concepts involved in Wind energy conversion
4. Explain the operational methods of utilization of Tidal energy
5. Demonstrate the biogas production and its applications

### Module-1- Introduction to Energy resources

Introduction, Differences between Renewable and Non-renewable Energy resources, Advantages and Disadvantages of Renewable Energy resources over Conventional Energy Resources, Need for alternate source of Energy, Types of Renewable Energy resources

### Module-2-Solar Energy

Advantages and Limitations of Solar energy, Solar Radiation, Measurement of Solar Radiation, Solar Conversion, Solar Collectors, Photovoltaic cells, Solar Energy Storage, Solar Energy Applications

### Module-3-Wind Energy

Introduction, Wind Mills-Basic components in wind mills, Classification, Horizontal Axis wind mills, Vertical Axis wind mills, Advantages and Limitations of Wind energy

### Module-4-Tidal Energy

Introduction, Tidal power generation, Components of Tidal power plant, Operating methods of utilization of tidal energy, Advantages and Disadvantages of Tidal power

## Module-5-Bio Energy

Introduction, Biogas generation, Different sources of biomass production Biomass conversion, materials used for Biogas generation, Advantages and disadvantages of Bio energy

### Textbooks:

1. Fundamentals of non-Conventional Energy Sources, Inamdar KH Dr, Electrotech Publications
2. Renewable Energy Sources and their Environmental Impact, Abbasi S Anaseenaa, Dhanapat Rai publications

### Reference books:

1. Non-Conventional Energy Sources, Rai G.D, Cambridge, Printed Books publications
2. Hand book of Energy Conservations Vol-1, Basics Concepts of energy, Robert H M Collins, Cengage
3. Renewable Energy Sources & Engineering Technologies, Kothari D P, Singal K.C, Ranjan Rakesh, PHI Publications

MM



# CERTIFICATE COURSE ON SUSTAINABLE ENGINEERING

## Course Objectives:

- ☛ To have increased awareness among engineering students on sustainability
- ☛ To know the environment & key lifestyles and their influencing factors
- ☛ To understand the various types of environmental pollutions and their sustainable solutions
- ☛ To have a better perception of life cycle assessment and environmental risk assessment.
- ☛ To develop sustainable practices by utilizing the engineering knowledge and principles
- ☛ To become critical and proactive thinkers and, with this, successful engineers in the field

**UNIT-I: Sustainability:** Introduction – Concepts – Need to promote sustainability – Three pillars of sustainability – Nexus between technology and sustainable development – Challenges for sustainable development -Benefits of sustainable living.

**UNIT-II: The Environment and Key Life Styles:** Food – Housing – Mobility – Consumer goods – Leisure time. Factors influencing consumption and lifestyles – Determinants – Driving factors – Motivating factors.

**UNIT-III: Natural Resources and their Pollution:** Air pollution – effects of air pollution – Clean development mechanism – Water pollution – Sustainable waste water treatment – Solid waste – sources – Impacts of solid waste – Zero waste concepts – 3R concept – Global environmental issues – Resource degradation - Climate change – Global warming - Ozone layer depletion. Carbon credits and carbon trading – Carbon foot prints.

**UNIT-IV: Life Cycle Assessment (LCA):** Introduction – LCA & Sustainability – LCA and Environmental system – LCA and Water, Food & Energy – Environmental risk assessment – Environmental data collection and LCA methods – ISO 14040 – Key points of good LCA with examples.

**UNIT-V: Design for Sustainability:** Green engineering – Sustainable engineering principles – Green sustainable materials - Sustainable urbanization – Industrial ecology – Industrial symbiosis – Case Studies.

## Reference Books:

- Alleng, D.T. and Shonnard, D.R., *Sustainability Engineering: Concepts, Design and Case studies*, Prentice Hall
- Bradley. A.S., Adebayo, A.O., Maria, P. *Engineering Applications in Sustainable Design and Development*, Cengage learning.
- Ni Bin Chang, *Systems Analysis for Sustainable Engineering: Theory and Applications*, Tata McGraw-Hill Publications.
- Purohit, S.S., *Green Technology: An Approach for Sustainable Environment*, Agrobios Publications.



**K.S.R.M College of Engineering (Autonomous),Kadapa**

**Engineering Chemistry**

**Bridge Course**

**Module 1 on Coordination Chemistry**

**1<sup>st</sup> Lecture:** Importance of coordination chemistry, Types of complexes, Classification of Ligands.

**2<sup>nd</sup> Lecture:** Crystal Field Theory to explain nature of bonding in octahedral complexes.

**3<sup>rd</sup> Lecture:** Crystal Field Theory to explain nature of bonding in tetrahedral, tetragonally distorted octahedral and square planar complexes.

**4<sup>th</sup> Lecture:** Magnetic properties of all types of complexes.

**5<sup>th</sup> Lecture:** Color of complexes, Interpretation of Intensity of absorption bands in various complexes.

**Module 2 on Organic Chemistry**

**Lecture 1**

Introduction to Reaction Intermediates: Carbocations: Generation, stability, reactions and applications in synthetic organic chemistry, Exercise

**Lecture 2**

Free Radicals: Generation, stability, examples and applications in synthetic organic chemistry, Exercise.

**Lecture 3 & 4**

Carbenes and Nitrenes: Generation, stability, examples and applications in synthetic organic chemistry, Exercise

**Lecture 5**

Ylides: Generation, stability, examples and applications in synthetic organic chemistry, Exercise

**Lecture 6**

Organic Reactions without formation of intermediates: Diels-Alder reaction, S<sub>N</sub>2 and E2 reactions, their applications, Exercise

**Module 3**

Thermodynamics and Equilibrium

3 lectures

**Module 4**

Basics of Electrochemistry

2 lectures

**Module 5**

Chemical Kinetics

4 lectures

Course Title	ENVIRONMENTAL SCIENCE					B. Tech. CE, ECE, EEE (II Sem)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
20MC210	MC1	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	--	--	0	40	--	--
<b>Mid Exam Duration: 2Hrs</b>								
<b>Course Objectives:</b>								
<ul style="list-style-type: none"> <li>To make the students to get awareness on environment.</li> <li>To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life.</li> <li>To save earth from the inventions by the engineers.</li> </ul>								
<b>Course Outcomes:</b> On successful completion of this course, the students will be able to								
CO 1	<b>Explain</b> multidisciplinary nature of environmental studies and various Renewable and Nonrenewable resources.							
CO 2	<b>Understand</b> Energy flow, bio-geo chemical cycles and ecological pyramids							
CO 3	<b>Illustrate</b> various causes of pollution and related preventive measures.							
CO 4	<b>Summarize</b> Solid waste management, Social issues related to environment and their protection acts.							
CO 5	<b>Evaluate</b> Causes of population explosion, value education and welfare programmes.							

## UNIT – I

**Multidisciplinary Nature Of Environmental Studies:** –Scope and Importance – Need for Public Awareness.

**Natural Resources:** Renewable and non-renewable resources – Natural resources and associated problems

Forest resources: deforestation, case studies – Mining, dams and other effects on forest and tribal people

Water resources : Use and over utilization of surface and ground water conflicts over water.

Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

Energy resources: Renewable & Non-Renewable.

## Learning Outcomes

- Explain** the importance of public awareness (L2)
- List** the various natural resources (L1)

## UNIT – II

**Ecosystems:** Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Food chains, food web- Ecological succession and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

- a. Forest ecosystem.
- b. Desert ecosystem
- c. Aquatic ecosystems (lakes, rivers and oceans)

**Biodiversity And Its Conservation :** Introduction, Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

### Learning Outcomes:

- **Understand** different types of eco systems and their characteristics ( L2)
- **Classify** types of biodiversity and its conservation methods (L2)

## UNIT – III

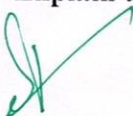
**Environmental Pollution:** Definition, Cause, effects and control measures of:

- a. Air Pollution.
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards

**Solid Waste Management:** Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

### Learning Outcomes:

- **Identify** various sources of pollution and solid waste along with preventive measures(L1)
- **Explain** the different types of disasters and their managerial measures.(L2)



## UNIT – IV

**Social Issues And The Environment:** From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents.

Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act.

### Learning Outcomes:

- **Outline** the social issues related to environment and their protection acts.(L2)
- **To know** about wild life protection , forest conservation act and conservation of natural resources (L2)

## UNIT – V

**Human Population And The Environment:** Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health.

**Field Work:** Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc.

### Learning Outcomes:

- **Illustrate** about the population explosion and family welfare programmes.(L2)
- **To identify** the natural assets and related case studies.(L3)

### TEXT BOOKS:

1. Text book of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press.
2. Palaniswamy, “Environmental Studies”, Pearson education
3. S.Azeem Unnisa, “Environmental Studies” Academic Publishing Company
4. K.Raghavan Nambiar, “Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus”, Scitech Publications (India), Pvt. Ltd.

## REFERENCES:

1. Deeksha Dave and E.Sai Baba Reddy, "Textbook of Environmental Science", Cengage Publications.
2. M. Anji Reddy, "Text book of Environmental Sciences and Technology", BS Publication.
3. J.P.Sharma, Comprehensive Environmental studies, Laxmi publications.
4. J. Glynn Henry and Gary W. Heinke, "Environmental Sciences and Engineering", Prentice hall of India Private limited
5. G.R.Chatwal, "A Text Book of Environmental Studies" Himalaya Publishing House
6. Gilbert M. Masters and Wendell P. Ela, "Introduction to Environmental Engineering and Science, Prentice hall of India Private limited.



# ← About this call

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## IN CALL



Prashanthi Badvel (You)



Dr K Venkata Ra...



HOD H&S



HOD H&S



Mary Jasmine



Prof. G.V. Subba ...



Rajib Biswas



Sudha Vonteru



suresh reddy



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CSE/ECE, EEE 2020-21 (Promoted View) - Word

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**KSRM COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**

**B.Tech - 1 Sem** **L T P C**  
**3 0 0 3**

**(20A5101T) Chemistry**  
(CSE, ECE, EEE and IT)

**Course Objectives**

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce instrumental methods, molecular machines and switches

**Unit 1: Structure and Bonding Models: (10 hrs)**  
Planck's quantum theory, dual nature of matter, Schrodinger equation, significance of  $\Psi$  and  $\Psi^2$ , applications to hydrogen, molecular orbital theory - bonding in homo- and heteronuclear diatomic molecules - energy level diagrams of  $O_2$ ,  $NO$ ,  $CO$ , etc., calculation of bond order.

**Learning Outcomes:**  
At the end of this unit, the students will be able to

- apply Schrodinger wave equation to hydrogen atom (L3)
- illustrate the molecular orbital energy level diagram of different molecular species (L2)
- explain the calculation of bond order of  $O_2$  and  $CO$  molecules (L2)
- discuss the basic concept of molecular orbital theory (L3)

**Unit 2: Modern Engineering materials: (10 hrs)**  
1). Coordination compounds: Crystal field theory - salient features - splitting in octahedral and tetrahedral geometry. Properties of coordination compounds-Oxidation state, coordination, magnetic and colour.

2). Superconductors: superconductors- basic concept, band diagrams for conductors, semiconductors and superconductors, effect of doping on band structures.

3). Nanotechnology: introduction, classification of nanomaterials, properties and applications of fullerene, carbon nanotubes and Graphene nanoparticles.

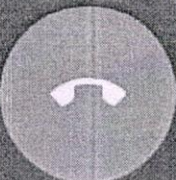
**Learning Outcomes:**



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6 others



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**KSRM COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**

B.Tech - 1 Sem L T P C  
3 0 0 3

(20A51101T) Chemistry  
(CSE, ECE, EEE and IT)

**Course Objectives:**

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce instrumental methods, molecular machines and switches

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**Learning Outcomes:**  
At the end of this unit, the students will be able to

- apply Schrodinger wave equation to hydrogen atom (L3)
- illustrate the molecular orbital energy level diagram of different molecular species (L2)
- explain the calculation of bond order of  $O_2$  and  $CO$  molecules (L2)
- discuss the basic concept of molecular orbital theory (L3)

**Unit 2: Modern Engineering materials: (10 hrs)**  
1). Coordination compounds: Crystal field theory - salient features - splitting in octahedral and tetrahedral geometry. Properties of coordination compounds: Oxidation state, coordination, magnetic and colour.

2). Semiconductors: Intrinsic, extrinsic and p-n junctions - basic concept, band diagrams for conductors, semiconductors and insulators - direct and indirect band structures.

3). Nanomaterials: Introduction to the classification of nanomaterials, properties and applications of fullerenes, carbon nanotubes and Graphene nanoparticles.

**Learning Outcome:** Design and develop a nanomaterial.



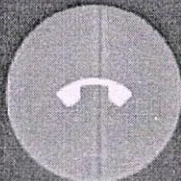
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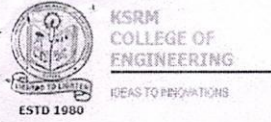


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6 others





HOD H&amp;S &lt;hod.hs@ksrmce.ac.in&gt;

**modified chemistry lab syllabus (CSE, ECE& EEE)-reg**

3 messages


**HOD H&S** <hod.hs@ksrmce.ac.in>

Sat, Jan 16, 2021 at 11:36 AM

To: "Prof. G.V. Subba Reddy" &lt;gopireddy.chemistry@jntua.ac.in&gt;, viceprincipal.cep@jntua.ac.in

Respected Sir,

As per your suggestions, we have modified the chemistry lab experiments (CSE, ECE &amp; EEE) branch. please find the attachment.

Thank you Sir  
Dr. I.Sreevani **CSE&EEE, ECE 2020-21.docx**  
21K**viceprincipal cep** <viceprincipal.cep@jntua.ac.in>

Sun, Jan 17, 2021 at 4:45 PM

To: HOD H&amp;S &lt;hod.hs@ksrmce.ac.in&gt;

Srivani,

It is okay. It is accepted and approved.



Virus-free. www.avast.com

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with best regards  
Prof.G.V.SUBBA REDDY, M.Sc., B.Ed., Ph.D, PGDCS, MISTE  
Head of Chemistry &  
Vice Principal  
JNTUA College of Engineering  
Pulivendula - 516 390  
YSR (Dist), A.P, India  
9000551428 (O), 9441980604(P)**HOD H&S** <hod.hs@ksrmce.ac.in>

Mon, Jan 18, 2021 at 10:44 AM

To: viceprincipal cep &lt;viceprincipal.cep@jntua.ac.in&gt;

Thanks a lot. Sir

Dr I Sreevani

[Quoted text hidden]



## modified chemistry lab syllabus (CSE, ECE& EEE)-reg

3 messages

HOD H&S <hod.hs@ksrmce.ac.in>

Sat, Jan 16, 2021 at 11:36 AM

To: "Prof. G.V. Subba Reddy" <gopireddy.chemistry@jntua.ac.in>, viceprincipal.cep@jntua.ac.in

Respected Sir,

As per your suggestions, we have modified the chemistry lab experiments (CSE, ECE & EEE) branch. please find the attachment.

Thank you Sir

Dr. I.Sreevani



CSE&EEE, ECE 2020-21.docx  
21K

viceprincipal cep <viceprincipal.cep@jntua.ac.in>

Sun, Jan 17, 2021 at 4:45 PM

To: HOD H&S <hod.hs@ksrmce.ac.in>

Srivani,

It is okay. It is accepted and approved.



Virus-free. [www.avast.com](http://www.avast.com)

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with best regards

Prof.G.V.SUBBA REDDY, M.Sc., B.Ed., Ph.D, PGDCS, MISTE

Head of Chemistry &

Vice Principal

JNTUA College of Engineering

Pulivendula - 516 390

YSR (Dist), A.P, India

9000551428 (O), 9441980604(P)

HOD H&S <hod.hs@ksrmce.ac.in>

Mon, Jan 18, 2021 at 10:44 AM

To: viceprincipal cep <viceprincipal.cep@jntua.ac.in>

Thanks a lot. Sir

Dr I Sreevani

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 **Green Chemistry and Technology-open elective.docx**  
12K

**Rajib Biswas** <rajib@iittp.ac.in> Mon, Jan 11, 2021 at 2:05 PM  
To: HOD H&S <hod.hs@ksrmce.ac.in>  
Cc: csrsvu@gmail.com, "Prof. G.V. Subba Reddy" <gopireddy.chemistry@jntua.ac.in>, ibchyd@gmail.com

Dear Madam,

Thanks for your email. This looks fine to me.  
Thanks for involving me in this process. Looking forward to seeing the college in person someday.

With regards,  
**Rajib Biswas**  
*Assistant Professor*  
*Department of Chemistry*  
*Indian Institute of Technology Tirupati*  
*Tirupati – 517506,*  
*Ph. No. (O): 08772503107*  
*Web: <http://iittp.ac.in/dr-rajib-biswas>*  
*Group Homepage: <https://sites.google.com/view/rajibbiswas/>*

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**HOD H&S** <hod.hs@ksrmce.ac.in> Mon, Jan 11, 2021 at 2:43 PM  
To: Rajib Biswas <rajib@iittp.ac.in>  
Cc: csrsvu@gmail.com, "Prof. G.V. Subba Reddy" <gopireddy.chemistry@jntua.ac.in>, ibchyd@gmail.com

Thank you for your response , please send your bank account no and IFSC code ,sir

Dr I Sreevani  
KSRM COLLEGE OF ENGINEERING  
Kadapa

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**suresh reddy** <csrsvu@gmail.com> Mon, Jan 11, 2021 at 2:52 PM  
To: HOD H&S <hod.hs@ksrmce.ac.in>

Dear Dr. Sreevani  
Greetings of the day  
Thank you for your mail. I have gone through the Syllabus. It's fine and OK for me.  
Prof C.Suresh Reddy

Prof. C. Suresh Reddy, FAPAS, MNASc  
Department of Chemistry  
S.V.U. College of Sciences  
Sri Venkateswara University  
Tirupati-517 502, A.P., India  
Mobile: 98496 94958

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**suresh reddy** <csrsvu@gmail.com> Mon, Jan 11, 2021 at 2:56 PM  
To: HOD H&S <hod.hs@ksrmce.ac.in>

Dear Dr .Sreevani  
Thank you for your mail. I have gone through the Syllabus. It's fine and approved.  
With regards  
Prof. C.Suresh Reddy

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