**SRI VASAVI ENGINEERING COLLEGE (AUTONOMOUS)**
(Sponsored by Sri Vasavi Educational Society)
(Approved by AICTE, New Delhi & Permanently affiliated to JNTUK, Kakinada)
(Accredited by NAAC with 'A' Grade, Recognized by UGC under section 2(f) & 12(B))
Pedatadepalli, **TADEPALLIGUDEM – 534 101.** W.G.Dist. **(A.P)**

Date: 02/06/2018

# Board of Studies, Chemistry

The following members attended the **first meeting of the Board of Studies** held on **02/06/2018.**

| S.No | Name of the Member | Designation & Address | Designation on BOS | Signature |
|---|---|---|---|---|
| 1 | Sri.J Chandra Rao | Assistant.Professor<br>Sri Vasavi Engineering College | Chairman | J. Chandra Rao |
| 2 | Dr.K Anji Reddy | Professor<br>SRKR Engineering College | University Nominee | K. Anji Reddy |
| 3 | Dr.P Nageswara Rao | Professor<br>NIT Warangal | Subject Expert | |
| 4 | Dr.A Ratnakar | Professor<br>VR Siddhartha Engineering College | Subject Expert | |
| 5 | Dr.G Rambabu | Associate.Professor<br>Sri Vidyanikethan Engineering College | Subject Expert | |
| 6 | Sri. A Vamsi Subbarayan | Assistant.Professor<br>Sri Vasavi Engineering College | Member | |
| 7 | Sri.M Durga Prasad | Assistant.Professor<br>Sri Vasavi Engineering College | Member | |
| 8 | Sri.V Jagan Mohan | Assistant.Professor<br>Sri Vasavi Engineering College | Member | |
| 9 | Smt.P Durga Devi | Assistant.Professor<br>Sri Vasavi Engineering College | Member | |
| 10 | Sri.S Prabhakara Rao | Assistant.Professor<br>Sri Vasavi Engineering College | Member | |
| 11 | Smt.S.S.V.Sumalatha | Assistant.Professor<br>Sri Vasavi Engineering College | Member | |
| 12 | Sri J.Suresh Kumar | Assistant.Professor<br>Sri Vasavi Engineering College | Member | |
| 13 | Smt.P.Venkata Ramana | Assistant.Professor<br>Sri Vasavi Engineering College | Member | |
| 14 | Sri.G.N.V.Gangadhar Rao | Assistant.Professor<br>Sri Vasavi Engineering College | Member | |
| 15 | Dr.D Harika | Assistant.Professor<br>Sri Vasavi Engineering College | Member | |

**Minutes of the Meeting of Board of Studies, Chemistry held on 02-06-2018 at 12:00PM in the Chemistry Lab (G-block).**

**Members present:**

| S.No | Name of the Member | Designation & Address | Designation on BOS |
|---|---|---|---|
| 1 | Sri.J Chandra Rao | Assistant.Professor & Section Head<br>Sri Vasavi Engineering College | Chairman |
| 2 | Dr.K Anji Reddy | Professor<br>SRKR Engineering College | University Nominee |
| 3 | Dr.P Nageswara Rao | Professor<br>NIT Warangal | Subject Expert |
| 4 | Dr.A Ratnakar | Professor<br>VR Siddhartha Engineering College | Subject Expert |
| 5 | Sri. A Vamsi Subbarayan | Assistant.Professor<br>Sri Vasavi Engineering College | Member |
| 6 | Sri.M Durga Prasad | Assistant.Professor<br>Sri Vasavi Engineering College | Member |
| 7 | Sri.V Jagan Mohan | Assistant.Professor<br>Sri Vasavi Engineering College | Member |
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| 11 | Sri J.Suresh Kumar | Assistant.Professor<br>Sri Vasavi Engineering College | Member |
| 12 | Smt.P.Venkata Ramana | Assistant.Professor<br>Sri Vasavi Engineering College | Member |
| 13 | Sri.G.N.V.Gangadhar Rao | Assistant.Professor<br>Sri Vasavi Engineering College | Member |
| 14 | Dr.D Harika | Assistant.Professor<br>Sri Vasavi Engineering College | Member |

**The following items are discussed in the meeting:**

**Item No-1: Introducing the members of BOS by Chairman**

The chairman of BOS extended a formal welcome and introduced the members.

**Item No.2:** Course structure for UG Programme. (B.Tech)

The course structure of First year B.Tech has been presented in the joint Board of Studies Meeting. With minor changes it has been approved. The approved course structure of First year B.Tech is given in annexure-I.

**Item No.3: Syllabi for the courses offered in I and II semesters of B.Tech Programme.**

The detailed syllabi for the course Engineering Chemistry, Engineering Chemistry Laboratory and Environmental Studies along with prescribed text books have been presented with minor changes, the syllabi for the courses mentioned above have been approved. The approved syllabi for the courses are given in annexure-II.

T. Chandra Rao 2/6/18

**Chairman**

**Board of Studies, Chemistry**

I Year – I/II Semester

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# ENGINEERING CHEMISTRY

**(Common to all branches)**

**Subject Code: V18CHT01**

**Course Outcomes:**

At the end of the course, the student should be able to:

CO1: Apply different plastics and rubbers for various engineering applications.

CO2: Assess the quality of fuels and apply the knowledge of fuels for the preservation of natural fuels.

CO3: Understand relevant concepts of Electro Chemistry to apply them in designing electrochemical energy systems.

CO4: Analyse boiler troubles arising due to poor water quality and suggest suitable water treatment methods for different industrial applications.

CO5: Analyse the causes for practical corrosion problems and apply corrosion principles for protection of metallic structures from corrosion.

CO6: Identify the important applications of advanced engineering materials.

## UNIT I: HIGH POLYMERS

Polymerisation: Introduction- Mechanism of Free radical addition polymerization – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication techniques (Compression, Injection, Transfer and Extrusion) - Preparation, properties and applications of Polythene (HDPE and LDPE), PVC, Bakelite, and Teflon.

Elastomers: Natural rubber – Vulcanization of rubber – Synthetic Rubbers: Preparation, properties and applications of Buna S, Buna N, and Thiokol.

## UNIT II: FUEL TECHNOLOGY

Fuels – Characterstics of good fuel – Classification – Calorific value - HCV and LCV – Dulong's formula, Numerical problems – Bomb calorimeter – Numerical problems.

Solid fuels - Coal — Proximate and ultimate analysis – Significance of the analyses, Numerical problems.

Liquid fuels –Petroleum- Refining – Cracking – Synthetic petrol (Fischer Tropsch and Bergius process) – Knocking - Octane and Cetane ratings – Anti-knocking agents.

Gaseous fuels – Natural gas, LPG and CNG – Biofuels.

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|---|---|---|---|
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| | | Dr. G. Rambabu (Subject Expert) | Mr. A.VamsiSubbarayan (Member -BOS) |

## UNIT III: ELECTROCHEMICAL CELLS

Single electrode potential – Electrochemical series and its significance - Standard electrodes (Hydrogen, Calomel and, Glass electrodes)– Conductometric titrations (Acid – Base).
Batteries: Primary battery (Dry Cell) – Secondary batteries (Lead acid cell, Ni-Cd cells).
Fuel cells: $H_2$-$O_2$ fuel cell, $H_2$-methanol fuel cell.

## UNIT IV: WATER TECHNOLOGY

Hard water - Types of Hardness – Units of hardness - Determination of hardness and alkalinity - Boiler troubles: Priming and foaming, sludge and scale formation, Boiler corrosion, Caustic embrittlement - Softening of hard water: Zeolite process, Lime – Soda process, and Ion exchange process - Water for drinking purposes - Purification – Sterilization and disinfection: Chlorination, Break point chlorination – Desalination - Reverse Osmosis and Electrodialysis.

## UNIT V: CORROSION

Definition – Theories of Corrosion (Chemical & Electrochemical) – Types of electrochemical corrosion (Galvanic corrosion, Concentration cell corrosion,Stress corrosion Pitting corrosionand Intergranular corrosion) - Galvanic series - Factors which influence the rate of corrosion - Protection from corrosion:Metallic coatings (Cathodic and Anodic), Cathodic protection, Protective coatings –Methods of application of coatings on metals (Galvanizing, Tinning, &Electroplating) – Paints.

## UNIT VI: CHEMISTRY OF ADVANCED MATERIALS

Nano materials: Introduction – Carbon nanotubes - Types, preparation (Arc discharge, Laser ablation and CVD Method) - Properties and applications of Nano materials.
Liquid crystals: Introduction – Types – Applications.
Biodegradable polymers – Conducting polymers.
Green Chemistry:Principles, Need for green Chemistry.

**Text Books:**


1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publications & Co.
2. A Text book of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd.


**Reference Books:**


1. Engineering Chemistry of Willey India Pvt. Ltd., Vajiram and others.
2. Engineering Chemistry by PrasanthRath, Cengage Learning.
3. Engineering Chemistry by Shikha Agarwal; Cambridge University Press.
4. B. Sivasankar, Engineering Chemistry, McGraw-Hill.


J. Chandra Rao
Mr. J. Chandra Rao
(Chairman-BOS)

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I Year – I/II Semester

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# ENGINEERING CHEMISTRY LABORATORY

(Common to all branches)
Subject Code: V18CHL01

**Course Outcomes:**

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

CO1: Analyse quantitatively a variety of samples using volumetric methods and instrumental methods.

CO2: Applying volumetric and instrumental methods for the determination of water quality parameters namely Alkalinity, Hardness and pH.

CO3: Prepare polymeric materials and analyse the given coal samples.

**List of Experiments:**

1. Introduction to chemistry laboratory – Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis etc.,
2. Trial experiment – Estimation of HCl using standard $Na_2CO_3$ solution.
3. Estimation of $KMnO_4$using standard oxalic acid solution.
4. Determination of alkalinity of a sample of water.
5. Determination of total hardness of water using standard EDTA solution.
6. Determination of rate of corrosion of mild steel in acidic environment in the absence and presence of an inhibitor.
7. Estimation of ferrous iron using standard $K_2Cr_2O_7$solution.
8. Estimation of copper using standard EDTA solution.

J Chandra Rao — Mr. J. Chandra Rao (Chairman-BOS)

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9. Estimation of vitamin – C using standard Iodine solution.

10. Estimation of pH of the given sample solution using pH meter.

11. Conductometric titration between strong acid and strong base.

12. Potentiometric titration between strong acid and strong base.

13. Proximate analysis of coal.

14. Preparation of phenol – formaldehyde resin.

**Reference Books:**

1. Practical Engineering Chemistry by K. Mukkanti, B.S. Publications.

2. Vogel's Quantitative Chemical Analysis – V Edition – Longman.

3. A Text Book on experiments and Calculations Engineering by S.S.Dara, S.Chand& Co Ltd.

4. Chemistry Practical Manual, Lorven Publications.

Mr. J. Chandra Rao (Chairman-BOS)

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# ENVIRONMENTAL STUDIES

(Common to all branches)
Subject Code: V18CHT02

**Course Outcomes:**

At the end of the course, the student should be able to:

CO1: Identify the global environmental challenges and the possible means to combat them.
CO2: Examine the natural resources, their availability for the sustenance of the life and conservation.
CO3: Assess the concepts of the ecosystem and the need for protecting various ecosystems.
CO4: Discuss the biodiversity, threats and conservation practices to protect the biodiversity
CO5: Explain various attributes of the pollution and waste management practices.
CO6: Outline the environmental management and environmental legislations in India.

## UNIT I: FUNDAMENTALS OF ENVIRONMENTAL STUDIES

Definition and components of environment, Global Environmental Challenges: Global warming and climate change- Kyoto protocol, Acid rains, Ozone layer depletion -Population explosion and effects.

## UNIT II: NATURAL RESOURCES AND ASSOCIATED PROBLEMS

Forest resources: Use and over exploitation - Deforestation: Timber extraction, Mining, dams and other effects on forest and tribal people.
Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water - Dams: Benefits and problems.
Mineral resources: Use and exploitation - Environmental effects of extracting and using mineral resources.
Energy resources: Renewable and Non-renewable energy sources.
Land resources: Land degradation, Wasteland reclamation.

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Dr. D. Harika (Member -BOS)

**UNIT III: ECOSYSTEMS**

Concept of an ecosystem - Structure and function of an ecosystem: Producers, consumers and decomposers - Energy flow in the ecosystem – Food chains, food webs and Ecological pyramids. Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems -Introduction, types, characteristic features.

**UNIT IV: BIODIVERSITY AND ITS CONSERVATION**

Definition-Values of biodiversity: Consumptive use, Productive use, Social use.
Hot-spots of biodiversity - Threats to biodiversity: Habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity.

**UNIT V: ENVIRONMENTAL POLLUTION**

Definition, Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution and Nuclear Pollution.
Solid Waste Management:Sources, classification, effects and control measures of municipal and industrial solid wastes.

**UNIT VI: ENVIRONMENTAL LEGISLATION AND THE MANAGEMENT**

Human Rights to a clean environment provided by Constitution.
Environmental Protection Act, 1986 - Air (Prevention and Control of Pollution) Act, 1981 - Water(Prevention and Control of Pollution) Act, 1974 -Wildlife (Protection) Act, 1972 -Forest (Conservation) Act, 1980 -Issues involved in enforcement of environmental legislation – Eco-tourism.

**Text books:**


1. Environment Studies, Fourth Edition, Anubha Kaushik, C P Kaushik, New Age International Publishers.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi.
3. Fundamentals of Environment Studies, DD Mishra, S Chand & Co Ltd.
4. Textbook of Environmental Science, M. Anji Reddy, B S Publications, Hyderabad.


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