

Department of Chemistry

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

| COURSE OUTLINE TEMPLATE | | | |
|--|--|--|---------------------------------------|
| Course Title | Chemistry-I | | |
| Course Code | CHIR11 | No. of Credits | 3 (Theory -2 + Lab -1) |
| Department | Chemistry | Faculty | Dr. A. Sreekanth (MME) |
| Course Coordinator (if, applicable) | Dr. V.M. Biju (Theory & Practical) | | |
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| Course Type | <input checked="" type="checkbox"/> Core course <input type="checkbox"/> Elective course | | |
| COURSE OVERVIEW | | | |
| This course is common to all the I year B.Tech. students. This 3 credit course is a combination of theory and practicals. Two theory classes will be conducted per week and one lab class (3 h) will be conducted in alternate week. | | | |
| COURSE OBJECTIVE | | | |
| To introduce water chemistry, bonding concepts, entropy, fuels and lubricants to the I year B.Tech. students. | | | |
| COURSE OUTCOMES (CO) | | | |
| Students will learn about quality of water, bonding theories, entropy change for various processes and basic aspects of fuels and lubricants. | | | |
| COURSE TEACHING AND LEARNING ACTIVITIES | | | |
| S.No. | Week | Topic | Mode of Delivery |
| 1 | II week of Aug | <u>Unit-I</u> Sources, hard & soft water, estimation of hardness | C&T, PPT |
| 2 | III week of August | Processes for softening of water, boiler feed water | C&T, PPT |
| 3 | IV week of August | Internal treatment methods, specifications for drinking water, various standards | C&T, PPT |
| 4 | I week of September | Treatment of water <u>Unit-II</u> Bonding in metals | C&T, PPT |
| 5 | II week of September | Theory and properties – alloy and its types | C&T, PPT |
| 6 | III week of September | Coordinate bond, electron counting methods | C&T, PPT |
| 7 | IV week of September | Crystal field theory | C&T, PPT |
| 8 | I week of October | <u>Unit-III</u> Lewis and VSEPR theories, consequences of shape and dipole moment | C&T, PPT |
| 9 | II week of October | Valence bond theory | C&T, PPT |
| 10 | III week of October | Various intermolecular interactions, relative strength, consequences | C&T, PPT |

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| 11 | IV week of October | Unit-IV Entropy changes for various processes, Work and free energy functions | C&T, PPT |
| 12 | I week of November | Helmholtz and Gibbs free energy functions, Gibbs-Helmholtz and Gibbs-Duhem equation | C&T, PPT |
| 13 | II week of November | Clapeyron Clausius equation with its applications and Van't Hoff isotherm | C&T, PPT |
| 14 | III week of November | Unit-V Classification of fuels with its merits and Coal, calorific value, theoretical oxygen requirement for combustion | C&T, PPT |
| 15 | IV week of November | Analysis of coal, metallurgical coke, flue gas analysis | C&T, PPT |
| 16 | I week of December | Theories of lubrication, characteristics of lubricants, additives, solid lubricants | C&T, PPT |

COURSE ASSESSMENT METHODS

| S.No. | Mode of Assessment | Week/Date | Duration | % Weightage |
|------------------|---------------------------|-----------------------|------------------------|-------------|
| Theory | | | | |
| 1 | Assignment | IV week of Aug | One week | 5 |
| 2 | Test I | IV week of Sep | 50 minutes | 10 |
| 3 | Assignment | III week of Oct | One week | 5 |
| 4 | Test II | III week of Nov | 50 minutes | 10 |
| 5 | Final Assessment | III week of Dec | 3 hours | 40 |
| Practical | | | | |
| 6 | Regular class experiments | All practical classes | 3 hours per experiment | 30 |

Theory (70) + Practical (30) = Total (100)

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

1. Engineering Chemistry, P.C. Jain & M. Jain, Dhanpat Rai Publishing Company, New Delhi, 2012
2. Physical Chemistry, P. Atkins & J.D. Paula, Oxford University Press, 2002.
3. Modern Inorganic Chemistry, R.D. Madan, S. Chand & Company Ltd., New Delhi, 2012.
4. Engineering Chemistry, M.J. Shultz, Cengage Learning, New Delhi, 2007.

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

1. Feedback from students during class committee meetings.
2. Anonymous feedback through questionnaire (as followed previously).


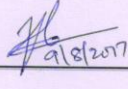
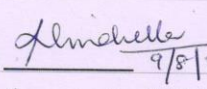
COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

1. 75% attendance is compulsory for both theory and lab components.
2. Lab:
 - a) Each experiment will be evaluated for 6 marks.
 - b) There will be no final assessment for practical.
 - c) One extra class will be conducted for those who missed any experiment due to ill health or OD reasons.
3. Theory:
 - a) Those who have <75% attendance (as on 01st December 2017) have to attend additional evening hour classes during the I week of December 2017 to become eligible to appear for assessment 5 (Final assessment).

b) For those who missed Test I and Test II due to genuine reasons, retest will be conducted during the I week of December 2017.

ADDITIONAL COURSE INFORMATION

The respective faculty will be available for consultation at times as per the intimation by the faculty.

Coordinator  CC-Chairperson  9/8/2017 HOD  9/8/17
(DR. L. CINDRELLA)