NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

Department of Chemistry

COURSE PLAN (For EEE B)			
Course Title	**Chemistry I**		
Course Code	**CHIR 11- CHEMISTRY**	**No. of Credits**	**3 (Theory - 2 + Lab - 1)**
Department	**Chemistry**	**Faculty**	**Dr. S. VELMATHI**
Pre-requisites Course Code	**NIL**		
Course Coordinator(s) (if, applicable)	**Dr. V.M.BIJU (Both Theory and Lab)**		
E-mail	**velmathis@nitt.edu**	**Mobile No.**	**+91-9486067404**
Course Type	☑ **Core course**	☐ **Elective course**	

COURSE OVERVIEW

This is a three credit course offered to I year B.Tech Electrical and Electronics Engineering Students (EEE-B section) students. This course is a combination of theory (2 credit) and practicals (1 credit). Two theory classes will be conducted per week and one lab session (3 h) will be held during alternate week. This course provides a thorough understanding of the subject through lectures, tutorials and demonstrations.

COURSE OBJECTIVE

To introduce the basic principles, importance and applications of Chemical bonding, shape and intermolecular interactions, Thermodynamics, water, fuels and lubricants to the I year B.Tech. (EEE) students.

COURSE OUTCOMES (CO)

Students would become familiar with the

- ✓ Basic concepts of chemical bonding.
- ✓ Advantages of shape and intermolecular interactions.
- ✓ Role of Thermodynamics
- ✓ Importance of water, fuel & lubricants.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	**Week**	**Topic**	**Mode of Delivery**
1	II week of August	A brief introduction about the course and syllabus will be discussed. **Unit-I** Sources, hard & soft water, estimation of hardness by EDTA method, softening of water	C&T, PPT
2	III week of August	Zeolite process & demineralization by ion exchangers, boiler feed water, internal treatment methods,	C&T, PPT

3	IV week of August	specifications for drinking water, BIS & WHO standards, treatment of water for domestic use, desalination - reverse osmosis & electro dialysis.	C&T, PPT
4	I week of September	**Unit-II** Basic concepts, Bonding in metals, electron gas theory	C&T, PPT
5	II week of September	physical properties of metals (electrical & thermal conductivity, opaque & lustre, malleability & ductility), Alloy-substitutional alloys, interstitial alloys.	C&T, PPT
6	III week of September	Coordinate bond, EAN rule, 16 & 18 electron rule, crystal field theory, splitting of 'd' orbitals in octahedral, tetrahedral and square planar complexes.	C&T, PPT
7	IV week of September	**Unit-III** Shape-Lewis dot structures, formal charge, VSEPR method, consequences of shape,	C&T, PPT
8	I week of October	dipole moment, valence bond theory; Intermolecular interactions-ion ion interactions, ion-dipole interactions, hydrogen bonding,	C&T, PPT
9	II week of October	dipole-dipole interactions, London / dispersion forces, relative strength of intermolecular forces; Consequences-surface tension.	C&T, PPT
10	III week of October	**Unit-IV** Entropy as a thermodynamic quantity, entropy changes in isothermal expansion of an ideal gas, reversible and irreversible processes	C&T, PPT
11	IV week of October	physical transformations, work & free energy functions, Helmholtz and Gibbs free energy functions, Gibbs-Helmholtz equation,	C&T, PPT
12	I week of November	Gibbs-Duhem equation, Clapeyron-Clausius equation & its applications, Van't Hoff isotherm and applications	C&T, PPT
13	II week of November	**Unit-V** Fuels - Classification, examples, relative merits, types of coal, determination of calorific value of solid fuels	C&T, PPT
14	III week of November	Bomb calorimeter, theoretical oxygen requirement for combustion, proximate & ultimate analysis of coal, manufacture of metallurgical coke, flue gas analysis, problems.	C&T, PPT
15	IV week of November	Lubricants - Definition, theories of lubrication, characteristics of lubricants, viscosity, viscosity index, oiliness, pour point, cloud point, flash point, fire point, additives to lubricants	C&T, PPT

COURSE ASSESSMENT METHODS				
S.No.	**Mode of Assessment**	**Week/Date**	**Duration**	**% Weightage**
Theory				
1	Group Task (Quiz/working model)/Assignment/Surprise test	I week of September	50 minutes	5
2	Mid semester Test	II week of October	90 minutes	25
3	Group Task (Quiz/working model)/Assignment/Surprise test	I week of November	50 minutes	5
4	End semester	II week of December	3 hours	40
Practical				
6	Regular class experiments	All practical classes	3 hours per experiment	--
7	Practical Exam during I week of December	Any one experiment	3 hours per experiment	25
Theory (75) + Practical (25) = Total (100)				

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

Text Books

1. Engineering Chemistry, P.C. Jain, M. Jain, Dhanpat Rai Publishing Company, New Delhi, 2005.
2. Modern Inorganic Chemistry, R.D. Madan, S. Chand & Company Ltd., New Delhi, 2012.

Reference Books

1. Engineering Chemistry, M.J. Shultz, Cenage Learning, New Delhi, 2007.
2. Physical Chemistry, P. Atkins, J.D. Paula, Oxford University Press, 2002.

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 at the end of the semester.

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

1. Mid semester Test will be conducted during assessment period.
2. Proper training will be provided for Each lab experiment.
4. Final assessment for practical (25 % Weightage).
5. One extra class will be conducted for those who missed any experiment due to ill health or any other genuine reasons.
6. Retest will be conducted for students who do not appear for the Mid semester test due to ill health or any other genuine reasons.
7. 75% attendance is compulsory for writing the end semester exam.
8. No formative assessment only Redo if students are absent for examination.

ADDITIONAL COURSE INFORMATION

The faculty will be available for consultation at times as per the intimation by the faculty. Students can get prior permission either through email: velmathis@nitt.edu or mobile no.: +91-9486067404

Faculty-in-charge _____ **CC-Chairperson** _____ **HOD** _____