



DEPARTMENT OF CHEMISTRY

COURSE PLAN – PART I			
Name of the programme and specialization	I B.Tech. (Electrical and Electronic Engineering-A)		
Course Title	CHEMISTRY (Theory)		
Course Code	CHIR11	No. of Credits	03
Course Code of Pre-requisite subject(s)	Nil		
Session	January, 2023	Section (if, applicable)	A
Name of Faculty	Dr. Baby Viswambharan	Department	Chemistry
Official Email	babyv@nitt.edu	Telephone No.	8547193736
Name of Course Coordinator(s) (if, applicable)	Dr. Baby Viswambharan		
Official E-mail	babyv@nitt.edu	Telephone No.	8547193736
Course Type (please tick appropriately)	<input type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
Theory (Units):			
Unit 1: Electrochemistry and Corrosion			
Cell EMF-its measurement and applications -concentration cell -electrode electrolyte concentration cell -concentration cell with and without transference -Dry corrosion and wet corrosion, mechanisms, types of corrosion, Differential metal corrosion, differential aeration corrosion, intergranular, Passivity, Pitting, Polarization -Chemical conversion coatings and organic coatings-Paints, enamels.			
Unit 2: Phase rule			
Definition of terms –phase-components-degree of freedom-derivation of Gibbs phase rule –one component system –H ₂ O, CO ₂ , Sulfur –Two-component system –Eutectic systems –reduced phase rule -Pb-Ag system –Compound Formation with congruent melting –Zn-Mg Alloy system-Copper-nickel alloy system -systems with incongruent melting –Na ₂ SO ₄ -H ₂ O system and simple three-component systems.			
Unit 3: Water			
Sources, Hard & soft water, Estimation of hardness by EDTA method, Scale & Sludge-Caustic embrittlement -softening of water, zeolite process & demineralization by ion exchangers, boiler			



feed water, internal treatment methods-specifications for drinking water, BIS & WHO standards, treatment of water for domestic use, desalination -Reverse osmosis & Electrodialysis.

Unit 4: Spectroscopy

Interaction of electromagnetic radiation with matter, Electronic spectroscopy -Theory of electronic transitions, instrumentation, Beers Lambert law, Woodward-Fieser Rule, applications. IR spectroscopy - Fundamentals, Instrumentation, and applications, Raman spectroscopy -Fundamentals and applications.

Unit 5: Polymers and Composites

Concept of macromolecules-Tacticity-Classification of Polymers-Types of Polymerization Mechanism--Ziegler Natta Polymerization -Effect of Polymer structure on properties Important addition and condensation polymers -synthesis and properties - Molecular mass determination of polymers-Static and dynamic methods, Light scattering- Rubbers - Vulcanization -Synthetic rubbers -Conducting polymers-Composite materials.

Reference and Text Books

1. P. C. Jain & M. Jain, Engineering Chemistry, Dhanpat Rai Publishing Company, New Delhi, 2005.
2. P. W. Atkins and J. de Paula, Physical chemistry, Oxford University Press, 2002.
3. B.R. Puri, L. R. Sharma, M.S. Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2008.
4. F.W. Billmeyer, Textbook of Polymer Science, 3rd Edition, Wiley. N.Y. 1991.
5. S.S. Darer, S. S. Umare, A Text Book of Engineering Chemistry, S. Chand Publishing, 2011.

COURSE OBJECTIVES

Objective is to introduce the basic concepts of chemical process that is relevant for engineering students such as Electrochemistry and Corrosion, to know importance of phase rule for different substances, efficiency of water and polymers in our day-to-day life and finally the students will be knowing the application of spectroscopy in academic and industry.

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Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
Students will benefit to learn about the:	1,
1. Basic principles of Electrochemistry, Corrosion and Phase rule.	1, 2, 10
2. They will be streamlined to know the importance of water and polymers and its utilities in industries.	1, 2, 10
3. Introducing spectroscopy to students will be added importance to know the vital importance in academic sector and in industries	1, 2, 10



COURSE PLAN – PART II			
COURSE OVERVIEW			
This is a three credit course offered to I year B.Tech. Electronics and Communication Engineering Students. This course is a theory (3 credit) course. Three theory classes (3 h per week) will be conducted per week. This course provides a thorough understanding of the subject through lectures, tutorials and demonstrations.			
COURSE TEACHING AND LEARNING ACTIVITIES			(Add more rows)
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 19 III week of March	Unit 1: Cell EMF-its measurement and applications -concentration cell - electrode electrolyte concentration cell -concentration cell with and without transference	Chalk board and PPT
2	Week 20 IV week of March	Dry corrosion and wet corrosion, mechanisms, types of corrosion, Differential metal corrosion, differential aeration corrosion, intergranular, Passivity, Pitting, Polarization -Chemical conversion coatings and organic coatings, paints, enamels.	Chalk board and PPT
3	Week 21 I week of April	Unit 2: Definition of terms –phase components-degree of freedom, derivation of Gibbs phase rule –one component system –H ₂ O CO ₂ , Sulfur –Two-component system, Reduced phase rule -Pb-Ag system	Chalk board and PPT
4	Week 22 II week of April	Compound Formation with congruent melting –Zn-Mg Alloy system-Copper-nickel alloy system. Systems with incongruent melting – Na ₂ SO ₄ -H ₂ O system and simple three-component systems.	Chalk board and PPT
5	Week 23 III week of April	Unit 3: Sources, Hard & soft water, Estimation of hardness by EDTA method, Scale & Sludge. Caustic embrittlement -softening of water, zeolite process	Chalk board and PPT
6	Week 24 IV week of April	Demineralization by ion exchangers - Boiler feed water, internal treatment methods- Specifications for drinking water- BIS & WHO standards, treatment of water for domestic use, desalination -Reverse osmosis & Electrodialysis	Chalk board and PPT
7	Week 25 I week of May	Unit 4: Interaction of electromagnetic radiation with matter, Electronic spectroscopy Theory of electronic transitions, instrumentation. Beers	Chalk board and PPT



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		Lambert law, Woodward FIESER rule, applications.	
8	Week 26 II week of May	IR spectroscopy -Fundamentals, Instrumentation and applications, Raman spectroscopy – Fundamentals and applications.	Chalk board and PPT
9	Week 29 III week of May	Unit 5: Concept of macromolecules-Tacticity Classification of Polymers-Types of Polymerization-Mechanism-Ziegler Natta Polymerization	Chalk board and PPT
10	Week 30 IV week of May and I week of June	Effect of Polymer structure on properties- Molecular mass determination of polymers	Chalk board and PPT
11	Week 31 II week of June	Static and dynamic methods, Light scattering--Important addition and condensation polymers – synthesis and properties	Chalk board and PPT
12	Week 32 III week of June	Rubbers –Vulcanization –Synthetic rubbers –Conducting polymers Composite materials	Chalk board and PPT

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment-I	Week 22	One week	5
2	Cycle Test-1	Week 24	60 minutes	20
3	Cycle Test-2	Week of 29	60 minutes	20
4	Assignment-II	Week 30	One week	5
	CPA	Compensation Assessment* III week of June	60 minutes	
5	Final Assessment*	II week of July	3 hours	50

***mandatory; refer to guidelines on page 4**

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

1. Feedback from students during class committee meetings 2. Anonymous feedback through questionnaire at the end of the semester.



COURSE POLICY (including compensation assessment to be specified)

MODE OF CORRESPONDENCE (email/ phone)

E-mail: babyv@nitt.edu / Phone: +918547193736

COMPENSATION ASSESSMENT POLICY

(As per the guideline: One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered. For those students who missed Cycle Test I and Cycle Test II due to genuine reasons (In case of unavoidable emergency prior intimation by the candidate is not mandatory otherwise mandatory for a candidate to inform to concern faculty in-charge), Compensation assessment will be conducted during III week of June, 2023.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

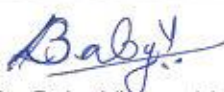
ACADEMIC DISHONESTY & PLAGIARISM

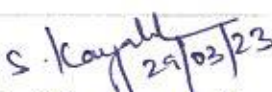
- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.


ADDITIONAL INFORMATION, IF ANY

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

FOR APPROVAL


Dr. Baby Viswambharan
Course Faculty


Dr. S. KAYALVIZHI
CC- Chairperson


HOD
30/03/23



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Guidelines

- a) The number of assessments for any theory course shall range from 4 to 6.
- b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.