



राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर  
NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR  
(Institute of National Importance)  
G.E. Road, Raipur – 492010 (C.G.)

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DEPARTMENT OF CHEMISTRY  
TEMPLATE FOR PROPOSING SYLLABUS  
B. TECH. I & II SEMESTER

1.	Department proposing the course	Chemistry
2.	Course Title	Applied Chemistry
3.	L-T-P Structure	3-0-0
4.	Credits	3
5.	Course number (Code)	0020112(CH)
6.	Status (Core/Elective)	Core
7.	Pre-requisites (course no./title)	NA
8.	Frequency of offering	Odd and Even both semester
9.	<b>Course Objectives (CO): At the end of this course learner will be able to</b> 1. Aware of Applied Chemistry knowledge of different industrial materials 2. Utilize the Applied Chemistry knowledge to develop innovative technology in their respective field. 3. Explore new areas of research in allied fields of science and technology. 4. Function as a member of an interdisciplinary problem solving team.	
10.	<b>Course Syllabus:</b> <b>UNIT I: Technology of Water (10hrs)</b> Standards for drinking water, Methods of Treatment of water for domestic and industrial purposes: sedimentation, coagulation, filtration, sterilization, break point chlorination, Determination of alkalinity and hardness of water. Demineralization of water, softening of water: lime-soda process, ion-exchange process, zeolite process. Boiler Troubles: Carry Over, Priming, Foaming, Scale, Sludge, Corrosion, Caustic Embrittlement. Internal treatment of water: Carbonate conditioning, Phosphate conditioning, Colloidal conditioning, Calgon conditioning. Calculations on water softening by Lime-soda process, Zeolite process. <b>UNIT II: Fuels, Combustion &amp; Cement (10hrs)</b> Classification, Calorific value, Types, Determination by Bomb calorimeter, Dulong's Formula, Analysis of Coal, Proximate and Ultimate analysis, Flue gas analysis, Significance, Numericals, Carbonization of Coal, Manufacture of metallurgical coke by Otto Hoffman's byproduct oven, Combustion calculations. <b>Cement:</b> Characteristics of the constitutional compounds of cement, setting and hardening of cement, Additives of the cement, Properties and general composition. <b>UNIT III: Corrosion and Phase Rule (10hrs)</b> <b>Corrosion and it's control:</b> Electrochemical series, Galvanic series, Types of	



	<p>corrosion: dry and wet corrosion, galvanic, concentration cell, pitting, stress, intergranular, waterline.</p> <p>Factors affecting corrosion: Nature of metal and nature of environment, Protective measure against corrosion.</p> <p><b>Phase Rule:</b> Phase Rule, Explanation of terms, Advantages &amp; Limitations of Phase rule, application of Phase rule to one component system; Water system.</p> <p><b>UNIT IV: Lubricants &amp; Polymers (10hrs)</b></p> <p><b>Lubricants:</b> Functions of lubricant, Mechanism of lubrication, Fluid or Hydrodynamic Lubrication, Thin film or Boundary lubrication &amp; Extreme pressure lubrication, Tests of lubricants and their significance.</p> <p><b>Polymers:</b> Types of Polymerization, thermoplastics &amp; thermosetting polymers, preparation, properties and applications of Teflon, PVC, Nylon, Bakelite &amp; Urea-Formaldehyde. Elastomers: Natural rubber, Vulcanization of rubber &amp; Synthetic rubber.</p>
11	<p><b>Text Books:</b></p> <ol style="list-style-type: none"><li>1. A text book of Engineering Chemistry by S. S. Dara, S. Chand &amp; Co. New Delhi.</li><li>2. Engineering Chemistry by M. M. Uppal &amp; S.C. Bhatia, Khanna Publishers. New Delhi.</li><li>3. Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing Company.</li></ol>
12	<p><b>Reference Books:</b></p> <ol style="list-style-type: none"><li>1. Chemistry of Engineering Materials by C.P. Murthy, C. V. Agarwal and A. Naidu B. S. Publication, Hyderabad.</li><li>2. Engineering Chemistry by J. C. Kuriacose and J. Rajaram, Tata McGraw-Hill Co. New-Delhi.</li></ol>



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DEPARTMENT OF CHEMISTRY  
TEMPLATE FOR PROPOSING SYLLABUS  
B. TECH. I & II SEMESTER

1.	Department proposing the course	Chemistry
2.	Course Title	Applied Chemistry Laboratory
3.	L-T-P Structure	0-0-2
4.	Credits	1
5.	Course number (Code)	0020122(CH)
6.	Status (Core/Elective)	Core
7.	Pre-requisites (course no./title)	NA
8.	Frequency of offering	Odd and Even both semester
9.	<b>Course Objectives (CO): At the end of this course learner will be able to</b> 1. Design experiments, and to interpret results for applications in different industries. 2. Develop various chemical processes to meet specified objectives. 3. Solve the scientific problems by critical thinking and analytical reasoning. 4. Understand a working knowledge of chemical process safety, biochemical engineering and advance chemistry.	
10.	<b>Course Syllabus:</b> <b>List of Experiments:</b> Experiment 1 Determination of percentage composition of a mixture of Sodium Hydroxide and Sodium Chloride. Experiment 2 Determination of the type and extent of alkalinity of given water sample. Experiment 3 Redox titration using Potassium Permanganate and Potassium Dichromate as oxidizing agents. Experiment 4 Determination of hardness of given water sample by complexometric titration. Experiment 5 Determination of Chloride Ion by Argentometric titration- Mohr's method. Experiment 6 Determination of Ca and Mg hardness of given water sample. Experiment 7 Determination of Calorific Value of fuel by Bomb Calorimeter. Experiment 8 Determination of Flash Point and Fire Point of lubricant by Pensky Martin apparatus.	



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	Experiment 9 Synthesis of Bakelite. Experiment 10 Flue Gas analysis by Orsat's apparatus.
11	<b>Text Books:</b> 1. A textbook on Experiments and Calculations in Engineering Chemistry by S. S. Dara, S. Chand Publications, New Delhi.
12	<b>Reference Books:</b> 1. Vogel's Textbook of Quantitative Chemical Analysis (Latest ed.), Revised by G. H. Jeffery, J. Bassett, J. Mendham & R. C. Denney.