

CourseNo.	CourseName	L-T-P-Credits	YearofIntroduction
CY100	ENGINEERINGCHEMISTRY	3-1-0-4	2015
CourseObjectives Toenable thestudentsto acquireknowledgeintheconceptsofchemistryforengineeringapplicationsandtofamiliarizethestudentswith differentapplicationorientedtopicslikenewgenerationengineeringmaterials,storeddevices,differentinstr umentalmethodsetc.Andtodevelopabilitiesandskillsthatarerelevanttothestudyandpracticeofchemistry.			
Syllabus Spectroscopy-PrinciplesandApplications,Electrochemistry- Electrodes,Electrochemicalseriesandapplications,NernstEquation,Potentiometrictitrationandapplication ,Cells,InstrumentalMethods- ThermalAnalysis,Chromatography;Conductivity,ChemistryofEngineeringMaterials,Copolymers,Cond uctingPolymers,AdvancedPolymers,Nanomaterials,FuelsandCalorificvalue;Lubricantsandtheirproperi ties,WaterTechnology-Hardness,Watersofteningmethods,SewagewaterTreatment.			
Expectedoutcome Thestudentwillbeabletoapplytheknowledgeofchemistryandwillbeequippedtotakeupchemistryrelatedtopi csaspartoftheirprojectworksduringhighersemesterofthecourse.			
ReferencesBooks: - Ahad,J.,EngineeringChemistry,JaiPublications - Dara,S.S.,EngineeringChemistry,SChandPublishers - Fernandez,A.,EngineeringChemistry,OwlBookPublishers,ISBN9788192863382 - JainandJain,EngineeringChemistry,DhanpatRaiPublishers - Kaurav,EngineeringChemistrywithLaboratoryExperiments.PHI,ISBN9788120341746 - ManjooranK.S.,ModernEngineeringChemistry,KannatheriPublication - Seymour,R.B.,IntroductiontoPolymerChemistry,McGrawHill - Rath,P.,EngineeringChemistry,CengageLearning,ISBN9788131526699 - WileyIndia,EngineeringChemistry,ISBN9788126543205			
CoursePlan			
Module	Contents	Hours	Sem. Exam Marks
I	Spectroscopy:Introduction,BeerLambertsLaw(workedoutexamples)	1	15%
	UV-visible spectroscopy-Principle,Instrumentationandapplications	2	
	IRspectroscopy-Principleandapplications	2	
	¹ HNMRspectroscopy-Principle,chemicalshift-spin-spinsplittingand applicationsincludingMRI	4	
II	Electrochemistry:Differenttypesofelectrodes(general)– SHE,Calomelelectrode,GlasselectrodeanddeterminationofE ⁰ usingSHE&Calo	2	15%

	electrode		
	Electrochemical series and its applications.	1	
	Nernst equation for an electrode-Derivation, application & numericals	2	
	Potentiometric titration-Acid-base and redox titration	2	
	Lithium ion cell and Fuel cell.	1	
FIRST INTERNAL EXAM			
III	Instrumental Methods: Thermal analysis- Principle, instrumentation and application of TGA and DTA.	3	15%
	Chromatographic methods- Basic principles, column, TLC. Instrumentation and principles of GC and HPLC.	4	
	Conductivity-Measurement of conductivity	1	
IV	Chemistry of Engineering Materials: Copolymers-BS, ABS- Structure and Properties.	1	15%
	Conducting Polymers-Polyaniline, Polypyrrole- Preparation, Structure and Properties.	2	
	OLED–An introduction	1	
	Advanced Polymers– Kevlar, Polybutadiene rubber and silicon rubber: Preparation, Structure and Prop	2	
	Nanomaterials–Definition, Classification, chemical methods of preparation -hydrolysis and reduction	2	
	Properties and Applications–Carbon Nano Tubes and fullerenes.	1	
SECOND INTERNAL EXAM			
V	Fuels and Lubricants: Fuels-Calorific Value, HCV and LCV- Determination of calorific value of a solid and liquid fuel by Bomb calorimeter- Dulong's formula and Numericals.	3	20%
	Liquid fuel-Petrol and Diesel-Octane number & Cetane number	1	
	Biodiesel-Natural gas.	2	
	Lubricant-Introduction, solid, semi solid and liquid lubricants.	1	
	Properties of lubricants- Viscosity Index, Flashpoint, Firepoint, Cloudpoint, Pourpoint and Aniline point.	2	
VI	Water Technology: Types of hardness, Unit of hardness, Estimation of Hardness– EDTA method. Numericals based on the above	3	20%
	Water softening methods-Ion exchange process-Principle. Polymer ion exchange.	2	
	Reverse Osmosis-Disinfection method by chlorination and UV	1	
	Dissolved oxygen, BOD and COD.	2	
	Sewage water Treatment-Trickling Filter and UASB process.	1	
END SEMESTER EXAM			

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CY110	ENGINEERINGCHEMISTRYLAB	0-0-2-1	2015
ListofExercises/Experiments(Minimumof8mandatory) 1. EstimationofTotalHardness–EDTAMethod. 2. EstimationofIroninIronore. 3. EstimationofCopperinBrass. 4. EstimationofdissolvedoxygenbyWinklersmethod. 5. Estimationofchlorideinwater. 6. PreparationofUreaformaldehydeandPhenol-formaldehyderesin. 7. DeterminationofFlashpointandFirepointofoilbyPenskyMartinApparatus. 8. DeterminationofwavelengthofabsorptionmaximumandcolorimetricestimationofFe³⁺insolution. 9. Determinationofmolarabsorptivityofa compoundotherthanFe³⁺. 10. AnalysisofIRspectraofanythreeorganiccompounds. 11. Analysisof¹HNMRspectraofanythreeorganiccompounds. 12. CalibrationofpHmeteranddeterminationofpHofasolution. 13. VerificationofNernstequationforelectrochemicalcell. 14. Potentiometrictitrations:acid–baseandredoxitrations 15. Conductivitymeasurementsofsaltsolutions. 16. FlamephotometricestimationofNa⁺tofindoutthesalinityinsand.			
Expectedoutcome ThestudentwillbeabletoapplyanddemonstratetheoreticalconceptsofEngineeringChemistry.			
References: • PracticalEngineeringChemistryLabManual,Owlbookpublishers			