UNION CHRISTIAN COLLEGE
ALUVA-2

SSR 5th CYCLE 2023

Criterion 1

1.1.1 Curriculum Planning and Implementation

COURSE PLAN SAMPLES

The teacher envisions and prepares a plan before every course to be taught. Course plans are made available to the students at the beginning of the course.

Department	**CHEMISTRY**
Name of Faculty	**NELSON JOSEPH P & NEETHUMOL VARGHESE**
Programme Name	**B.Sc. CHEMISTRY**
Level of study	**UG**
Semester	**SIX**
Course Name/Subject Name	**CH6CRT11-PHYSICAL CHEMISTRY –III**
Total Hours	**54**

Course Outcomes

CO Number	Description	CO Evaluation methods
CO1	To learn in detail about the concepts and applications of thermodynamics.	Assignment/Seminar, Test
CO2	To understand the basic concepts of Chemical, Ionic and Phase Equilibria	Assignment/Seminar, Test
CO3	To get brief idea of Chemical Kinetics	Assignment/Seminar, Test

Module 1: Thermodynamics-I
Hours: 15

Syllabus: Basic concepts- system, surroundings, types of systems. Extensive and intensive properties, macroscopic properties. State functions and path functions. Types of Processes, Zeroth law of thermodynamics. Definition of internal energy and enthalpy. Heat capacities at constant volume (Cv) and at constant pressure (Cp), relationship between Cp and Cv.
First law of thermodynamics –Mathematical statement of first law. Reversible process and maximum work. Calculation of work, heat, internal energy change and enthalpy change for the expansion of an ideal gas under reversible isothermal and adiabatic condition.
The Joule-Thomson effect – derivation of the expression for Joule-Thomson coefficient. Sign and magnitude of Joule-Thomson coefficient, inversion temperature. Liquefaction of gases.
Thermochemistry – standard states. Enthalpies of formation, combustion and neutralization. Integral and differential enthalpies of solution. Hess's law and its applications. Kirchoff's equation.

Sl.no	CO Number	Topic /Activity	No of hours	Instructional methods to be used
1	CO1	Basic concepts- system, surroundings, types of systems. Extensive and	5	Lecture

		intensive properties, macroscopic properties. State functions and path functions. Types of Processes, Zeroth law of thermodynamics. Definition of internal energy and enthalpy. Heat capacities at constant volume (Cv) and at constant pressure (Cp), relationship between Cp and Cv.		
2	CO1	First law of thermodynamics – Mathematical statement of first law. Reversible process and maximum work. Calculation of work, heat, internal energy change and enthalpy change for the expansion of an ideal gas under reversible isothermal and adiabatic condition	5	Lecture
3	CO1	The Joule-Thomson effect – derivation of the expression for Joule-Thomson coefficient. Sign and magnitude of Joule-Thomson coefficient, inversion temperature. Liquefaction of gases.	3	Lecture
4	CO1	Thermochemistry – standard states. Enthalpies of formation, combustion and neutralization. Integral and differential enthalpies of solution. Hess's law and its applications. Kirchoff's equation.	2	Lecture, Problems

Module 2: Thermodynamics-II
Hours : 12

Syllabus: Second law: Limitations of first law – Different statements of IInd law, Thermodynamic scale of temperature. Carnot cycle and its efficiency, Carnot theorem.
Concept of entropy – Definition and physical significance. Entropy as a function of volume and temperature, Entropy as a function of pressure and temperature. Entropy as a criteria of spontaneity and equilibrium.
Gibbs and Helmholtz free energies and their significances- criteria of equilibrium and spontaneity. Gibbs-Helmholtz equation, dependence of Gibbs free energy change on temperature, volume and pressure. Third law of thermodynamics-statement and determination of absolute entropies of substances

Sl.no	CO Number	Topic /Activity	No of hours	Instructional methods to be used
1	CO1	Second law: Limitations of first law – Different statements of IInd law, Thermodynamic scale of temperature. Carnot cycle and its efficiency, Carnot theorem.	3	Lecture

2	CO1	Concept of entropy – Definition and physical significance. Entropy as a function of volume and temperature, Entropy as a function of pressure and temperature. Entropy as a criteria of spontaneity and equilibrium.	4	Lecture
3	CO1	Gibbs and Helmholtz free energies and their significances- criteria of equilibrium and spontaneity. Gibbs-Helmholtz equation, dependence of Gibbs free energy change on temperature, volume and pressure. Third law of thermodynamics- statement and determination of absolute entropies of substances	5	Lecture
Module 3: Chemical Equilibria **Hours: 3**				
Syllabus: Law of mass action-equilibrium constant – Relation between Kp, Kc and Kx – Thermodynamic treatment of the law of mass action – Vant Hoff reaction isotherm – Temperature dependence of the equilibrium constant – The Van't Hoffs equation –Pressure dependence of the equilibrium constant Kp.				
Sl.no	CO Number	Topic /Activity	No of hours	Instructional methods to be used
1	CO1, CO2	Law of mass action-equilibrium constant – Relation between Kp, Kc and Kx – Thermodynamic treatment of the law of mass action – Vant Hoff reaction isotherm – Temperature dependence of the equilibrium constant – The Van't Hoffs equation –Pressure dependence of the equilibrium constant Kp.	3	Lecture
Module 4: Ionic Equilibria **Hours: 8**				
Syllabus: Introduction – Concepts of acids and bases, relative strength of acid-base pairs, influence of solvents, Dissociation constants – acids, bases, and polyprotic acids. Ostwald's dilution law. Degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water-pH. Effects of solvents on ionic strength.. Buffer solutions – Mechanism of buffer action, Henderson equation. Hydrolysis of salts – degree of hydrolysis and hydrolysis constant, determination of degree of hydrolysis, pH of salt solutions.				
Sl.no	CO Number	Topic /Activity	No of hours	Instructional methods to be used

1	CO2	Introduction – Concepts of acids and bases, relative strength of acid-base pairs, influence of solvents, Dissociation constants – acids, bases, and polyprotic acids. Ostwald's dilution law.	3	Lecture
2	CO2	Degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water-pH. Effects of solvents on ionic strength..	2	Lecture, Problems
3	CO2	Buffer solutions – Mechanism of buffer action, Henderson equation. Hydrolysis of salts – degree of hydrolysis and hydrolysis constant, determination of degree of hydrolysis, pH of salt solutions.	3	Lecture, Problems

Module 5: Phase equilibria **Hours: 6**

Syllabus: The phase rule-derivation, equilibrium between phases – conditions. One component system – water system, sulphur system. Two component systems – solid-liquid equilibrium – Simple Eutectic, Lead- Silver system, Formation of compounds with Congruent Melting Point; Ferric chloride–Water system, Formation of compounds with Incongruent Melting Point Sodium sulphate–Water system

Role of alkali and alkaline earth metals in biological systems, Na/K pump. Importance of Ca and Mg. Biological functions and toxicity of metals – Fe, Cu, Zn, Cr, Mn, Ni, Co, Cd, Hg and Pb. Metalloenzymes of zinc and copper, nitrogenase. Treatment of metal toxicity by chelation therapy. Anti-cancer drugs – cis platin and carboplatin– Structure and significance.

Sl.no	CO Number	Topic/Activity	No of hours	Instructional methods to be used
1	CO2	The phase rule-derivation, equilibrium between phases – conditions. One component system – water system, sulphur system. Two component systems – solid-liquid equilibrium – Simple Eutectic, Lead- Silver system	4	Lecture
2	CO2	Formation of compounds with Congruent Melting Point; Ferric chloride–Water system, Formation of compounds with Incongruent Melting Point Sodium sulphate–Water system.	2	Lecture

Module 6: Chemical Kinetics **Hours: 10**

Syllabus: Rate of reaction, rate equation, order and molecularity of reactions, determination of order of a reaction. Integrated rate expressions for first and second order reactions (2A→ P and A + B → P). Zero order reactions, pseudo order reactions, half life.

Theories of chemical kinetics: Effect of temperature on the rate of reaction: Arrhenius equation, concept of activation energy, Collision theory, Transition state theory. Thermodynamic parameters for activation – Eyring equation (no derivation needed),enthalpy and entropy of activation. Theory of unimolecular reactions – Lindemann Theory.
Kinetics of complex (composite) reactions: Opposing reactions, consecutive reactions, and parallel (simultaneous) reactions. Chain reactions – steady state treatment, Hydrogen– Bromine reaction- derivation of rate expression.
Catalysis: Homogeneous catalysis, enzyme catalysis – Michaelis–Menten equation (no derivation needed). Heterogeneous catalysis – Surface catalysis, Elementary idea about Autocatalysis.

Sl.no	CO Number	Topic/Activity	No of hours	Instructional methods to be used
1	CO3	Rate of reaction, rate equation, order and molecularity of reactions, determination of order of a reaction. Integrated rate expressions for first and second order reactions (2A→ P and A + B → P). Zero order reactions, pseudo order reactions, half life.	3	Lecture
2	CO3	Theories of chemical kinetics: Effect of temperature on the rate of reaction: Arrhenius equation, concept of activation energy, Collision theory, Transition state theory. Thermodynamic parameters for activation – Eyring equation (no derivation needed),enthalpy and entropy of activation. Theory of unimolecular reactions – Lindemann Theory	3	Lecture
3	CO3	Kinetics of complex (composite) reactions: Opposing reactions, consecutive reactions, and parallel (simultaneous) reactions. Chain reactions – steady state treatment, Hydrogen– Bromine reaction-derivation of rate expression.	2	Lecture
4	CO3	Catalysis: Homogeneous catalysis, enzyme catalysis – Michaelis–Menten equation (no derivation needed). Heterogeneous catalysis – Surface catalysis, Elementary idea about Autocatalysis.	2	Lecture

Department	English
Name of Faculty	Dr. Cheri Jacob K, Dr Akhila Narayanan

Programme Name	MA English
Level of study	PG
Semester	1
Course Name/Subject Name	EN010101- Up Until Chaucer: Early Literatures in English
Total Hours	90

Course Outcomes

CO Number	Description	CO Evaluation methods
CO1	The learner will be able to make sense of the major themes in Ancient and Medieval English literature as an expression of Anglo-Saxon culture and society as it emerges into a British-consciousness	Test, Seminar, Assignment, Viva
CO2	The learner will understand the historical and cultural context of Old and Middle English literature	Test, Seminar, Assignment, Viva
CO3	The learner will acquire knowledge of major Old and MIddle English literary works and authors such as Chaucer, Gower and Langland	Test, Seminar, Assignment, Viva
CO4	The learner will understand the literary style of Old and Middle English, including its poetic forms	Test, Seminar, Assignment, Viva
CO5	The learner will under the social, religious and political themes that are explored in Old and Middle English literature	Test, Seminar, Assignment, Viva

Module 1 - Early Poetry Hours : 18

Syllabus:
Exeter Book Riddles:
Riddle 11 - ‘Wine’, Riddle 25 - ‘Onion’, Riddle 45 - ‘Dough’, ‘The Dream of the Rood’
‘Deor’s Lament’
‘The Husband’s Message’
‘The Wanderer’
‘The Seafarer’
‘The Wife’s Lament’

Slno	CO Number	Topic /Activity	No of hours	Instructional methods to be used
1	CO4	Riddle 11 - ‘Wine’	1	lecture, discussion
2	CO4	Riddle 25 - ‘Onion’	1	lecture, discussion
3	CO4	Riddle 45 - ‘Dough’.	1	lecture, discussion
4	CO4	‘The Dream of the Rood’	3	lecture, discussion
5	CO4	‘Deor’s Lament’	2	lecture, discussion
6	CO4	‘The Husband’s Message’	2	lecture, discussion
7	CO4	‘The Wanderer’	3	lecture, discussion

8	CO4	'The Seafarer'	3	lecture, discussion
9	CO4	'The Wife's Lament'	2	lecture, discussion

Module 2 Early Prose and Drama
Hours : 18

Syllabus:
Bede: On Caedmon [including Caedmon's hymn...]
Julian of Norwich: *Revelations of Divine Love* [Chapter 60 - "The Kind, Loving, Mother"]
"Noah's Flood" from the *Chester Mystery Cycle*
"The York Play of the Crucifixion"
King Alfred: Preface to *Pastoral Care*
The Robin Hood Play-fragments – Knight; Potter; Frair [3]

Slno	CO Number	Topic /Activity	No of hours	Instructional methods to be used
1	CO2	Bede: On Caedmon	3	lecture, discussion
2	CO2	Julian of Norwich: "The Kind, Loving, Mother"	3	lecture, discussion
3	CO2	"Noah's Flood"	3	lecture, discussion
4	CO2	"The York Play of the Crucifixion"	3	lecture, discussion
5	CO2	King Alfred: Preface to *Pastoral Care*	3	lecture, discussion
6	CO2	The Robin Hood Play-fragments – Knight; Potter; Frair [3]	3	lecture, discussion

Module 3 - Epic, Romance and Lyric
Hours : 18

Syllabus:
Selection from *Beowulf* [Parts 11 to 18 – Grendel's Battle With Beowulf]
Sir Thomas Malory: *Le Morte D'arthur* [Book 5 – King Arthur defeats Roman Emperor Lucius]
Sir Orfeo
'The Cuckoo Song,'
'Sunset on Calvary,'
'I Sing of a Maiden,'
'Maiden in the mor lay'

Slno	CO Number	Topic /Activity	No of hours	Instructional methods to be used
1	CO5	Grendel's Battle With Beowulf	5	lecture, discussion
2	CO5	*Le Morte D'arthur* [Book 5 – King Arthur defeats Roman Emperor Lucius	5	lecture, discussion
3	CO5	*Sir Orfeo*	4	lecture, discussion
4	CO5	'The Cuckoo Song,'	1	lecture, discussion

5	CO5	'Sunset on Calvary,'	1	lecture, discussion
6	CO5	'I Sing of a Maiden,'	1	lecture, discussion
7	CO5	'Maiden in the mor lay'	1	lecture, discussion

Module 4: Geoffrey Chaucer Hours : 18

Syllabus:
4.1 General Prologue to Canterbury Tales: Introduction
4.2 General Prologue to Canterbury Tales: Wife of Bath [Thumbnail Profile] 4.3 From The Canterbury Tales: 'The Wife of Bath Prologue and Tale.'
Seminar:
4.4 Troilus and Criseyde by Geoffrey Chaucer

Slno	CO Number	Topic /Activity	No of hours	Instructional methods to be used
1	CO1, CO3, CO4, CO5	General Prologue to Canterbury Tales: Introduction	7	lecture, discussion
2	CO1, CO3, CO4, CO5	General Prologue to Canterbury Tales: Wife of Bath [Thumbnail Profile] 4.3 From The Canterbury Tales: 'The Wife of Bath Prologue and Tale.'	7	lecture, discussion
3	CO1, CO3, CO4, CO5	Troilus and Criseyde by Geoffrey Chaucer	4	seminar, discussion

Module 5 Hours : 18

Syllabus:
5.1 John Gower: Confessio Amantis – The Tale of Narcissus: Book 1. Lines 2275-2380
5.2 Thomas Hoccleve: 'Lament for Chaucer'
Seminar:
5.3 William Langland's *Piers Plowman* – Prologue

Slno	CO Number	Topic/Activity	No of hours	Instructional methods to be used
1	CO1, CO3, CO4, CO5	John Gower: Confessio Amantis – The Tale of Narcissus: Book 1. Lines 2275-2380	7	lecture, discussion
2	CO1, CO3, CO4, CO5	Thomas Hoccleve: 'Lament for Chaucer'	4	lecture, discussion
3	CO1, CO3, CO4, CO5	William Langland's *Piers Plowman* – Prologue	7	seminar, discussion

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