

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI 600 086

M.Sc. DEGREE : BRANCH IV-CHEMISTRY

COURSE SCHEDULE

SEMESTER III

Subject Code	Title of Course
23CH/PC/RM34	Research Methodology
23CH/PC/MS34	Molecular Spectroscopy
23CH/PC/SO34	Synthetic Organic Chemistry and Natural Products
23CH/PC/P333	Physical Chemistry Practical
23CH/PE/P433	Analytical Instrumentation Practical
23CH/PE/FN23	Food Chemistry and Nutrition

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN June - November 2024

Department : Chemistry
Name/s of the Faculty : Dr. R. Sripriya & Dr. U. Anto Maria Jeraldin*
Course Title : Research Methodology
Course Code : 23CH/PC/RM34
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Recall the basics of scientific research, basic functions of software like MS EXCEL, Chemdraw and Origin	K1
CO2	Understand the importance of publication, citation, report writing, and interpreting the experimental data using MS EXCEL and properties of molecules using Chemdraw	K2
CO3	Apply the theoretical principles in preparing research proposals, research reports and solve the problems in chemistry using MS EXCEL, Origin, and predict the properties of molecules using Chemdraw.	K3
CO4	Analyse the different forms of research publication and compare the methodology, to be able to use it effectively for presentations	K4
CO5	Evaluate the output of a research proposal and validate the data	K5, K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 19 – 26, 2024 (Day Order 1 - 6)	1	Introduction to Scientific Research and Chemical Literature 1.1 Scientific Research – Types of research- fundamental research vs. applied research	K1- K3	3	CO1-CO3	Presentation, Lecture and Discussion	Group Discussion
	3	Components of MS Excel Spreadsheets, Database, Chart and Building up Workbooks	K1- K6	2*	CO1- CO6	Lecture & demonstration	Quiz
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1	1.2 Chemistry literature survey –Sources of chemical literature – Primary (Research article, Review article, Short communications and Letters), secondary and tertiary 1.3 Online Literature Search- SciFinder, Chem Port and Science Direct	K1-K4	3	CO1-CO5	Presentation, Lecture and Discussion	Assignment
	3	Building Formulae User Mode and Statistical Functions, Formatting Cells	K1- K6	2*	CO1- CO6	Lecture, demonstration & Hands on training	Work sheet

July 5 – 12, 2024 (Day Order 1 - 6)	1	1.4 Citation Index, Impact Factor and h-index 1.5 Steps to publish scientific articles in a journal, Indexing (Scopus and Web of Science)	K1-K5	3	CO1-CO6	Presentation, Lecture and Discussion	Short Test
	3	Managing and Organizing Data-Creating Link, Analysing Data	K1- K6	2*	CO1- CO6	Lecture, demonstration & Hands on training	Work sheet
July 15 – 23, 2024 (Day Order 1 - 6)	2	Research Reports and Thesis Writing 2.1 The Art of Scientific Writing – Forms of Scientific Writing, Research Reports, Theses, Journal Articles and Books	K1-K5	3	CO1-CO6	Presentation, Lecture and Discussion	Quiz
	3	Plotting Data – Evaluation of Analytical Functions, Transferring Data and Graph Interpretation	K1- K6	2*	CO1- CO6	Lecture, demonstration & Hands on training	Work sheet
July 24 – 31, 2024 (Day Order 1 - 6)	2	2.2 Format of Research Report - Abbreviations, symbols, SI units, Chemical Nomenclature, Figures, Tables, Footnotes / Notes, Heading, Pagination, Citations & Bibliography, ACS and RSC formats,	K1-K5	3	CO1-CO6	Presentation, Lecture and Discussion	Work sheet
	3	Solving Problems from Physical and Analytical Chemistry	K1- K6	2*	CO1- CO6	Lecture, demonstration & Hands on training	III Component Work sheet (unit 3.5) 10 marks

Aug 1 – 5, 2024 (Day Order 1 - 3)	2	Citation management Software (End note), Mendeley, Proof Reading	K1-K3	2	CO1-CO3	Presentation, Lecture and Discussion	Discussion
Aug 6 – 10, 2024	C.A. Test – I						
Aug 12 – 14, 2024 (Day Order 4-6)	3	Simple Functions and Graphs, Plotting Exercises on Most Useful Functions in Chemistry	K1- K6	2*	CO1- CO6	Lecture & demonstration	Work sheet
Aug 16 – 23, 2024 (Day Order 1-6)	2	2.3 Plagiarism, Plagiarism software, Predatory Journals, Copyright and Patent Laws The Exponential, The Gaussian, Polynomial Functions used in Chemistry	K1-K4	3	CO1-CO4	Presentation, Lecture and Discussion	Component Assignment From (Unit -1.2 to 2.1) Max. marks = 30 Work sheet
	3		K1- K6	2*	CO1- CO6	Lecture, demonstration & Hands on training	
Aug 27 – Sep 3, 2024 (Day Order 1-6)	2	2.4 Research Ethics – Animal ethics (pharmaceutical industry) Components of Origin-Plotting and Customizing Graphs, Batch Plotting graphs, Merging Graphs.	K1- K3	3	CO1- CO4	Presentation, Lecture and Discussion	Group Discussion
	3		K1-K6	2*	CO1- CO6	Lecture, demonstration & Hands on training	Work sheet
Sep 4 – 11, 2024 (Day Order 1-6)	5	5.1 Topics on New Frontiers in Chemistry – Presentation of articles from peer-reviewed Journals ChemDraw - Writing Chemical Equation Schemes using Software, Editing, Transporting Picture to Word Document	K4-K6	3	CO1- CO6	Presentation	Seminar
	4		K1- K6	2*	CO1- CO6	Lecture, demonstration & Hands on training	Work sheet

Sep 12 - 20, 2024 (Day Order 1-6)	5	Topics on New Frontiers in Chemistry – Presentation of articles from peer-reviewed Journals	K4 -eK6	3	CO1-CO6	Presentation	Seminar Component Max. marks 15 Work sheet
	4	Building Molecules, Measurement of Bond Angles, Bond Energy, and Bond Length	K1- K6	2*	CO1- CO6	Lecture, demonstration & Hands on training	
Sep 23 - 26, 2024 (Day Order 1-4)	5	Topics on New Frontiers in Chemistry – Presentation of articles from peer-reviewed Journals	K4-K6	2	CO1-CO6	Presentation	Seminar Component Max. marks 15
Sep 27 – Oct 3, 2024	C.A. Test – II						
Oct 4 – 5, 2024 (Day 5 & 6)	5	Topics on New Frontiers in Chemistry – Presentation of articles from peer-reviewed Journals	K4-K6	1	CO1-CO6	Presentation	Seminar Component Max. marks 15 Assignment
	4	Energy Minimization Techniques- Basic Concepts and Simple Applications to Geometry and Molecular Properties such as Dipole Moments and Thermochemical Properties	K1- K6	2*	CO1- CO6	Lecture, demonstration & Hands on training	

Oct 7 - 15, 2024 (Day Order 1 to 6)	5	Topics on New Frontiers in Chemistry – Presentation of articles from peer-reviewed Journals	K4-K6	3	CO1-CO6	Presentation	Seminar Component Max. marks 15
	4	Use of the Internet in Chemical Research, Data Simulated Results from Web Sources	K1- K6	2*	CO1- CO6	Lecture, demonstration & Hands on training	III Component Assignment (unit 4.4) 10 marks
Oct 16 - 22, 2024 (Day Order 1 to 6)	5	Topics on New Frontiers in Chemistry – Presentation of articles from peer-reviewed Journals	K4-K6	3	CO1-CO6	Presentation	Seminar Component Max. marks 15
	4	Introduction to Chem informatics 2D and 3D Molecular Structures- Databases (PubChem, Zinc, Drug Bank) – Chemical file formats–pdb database- Retrieving drug molecules- Chemical structure drawing tools- Pharmaco kinetics - ADME Prediction	K1- K6	2*	CO1- CO6	Lecture, demonstration & Hands on training	Work sheet
Oct 23 - 24, 2024 (Day Order 1 to 2)	REVISION						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN

June - November 2024

Department : Chemistry
Name/s of the Faculty : Dr. R. Sripriya & Dr. U. Anto Maria Jeraldin*
Course Title : Molecular Spectroscopy
Course Code : 23CH/PC/MS34
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Recall the fundamentals of spectroscopy	K1
CO2	Comprehend the principle involved in the spectroscopic techniques	K2
CO3	Solve problems by analyzing the principles involved in various Techniques	K3
CO4	Elucidate the structure of organic and inorganic compounds using Spectral data	K4
CO5	Generate spectra for any given sample based on the knowledge Acquired	K5

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 19 – 26, 2024 (Day Order 1 - 6)	1	Rotational and Vibrational Spectroscopy 1.1 Rotational Spectroscopy: Classification of Rotors Based on Moment of Inertia, Diatomic Molecules as Rigid Rotors and Non-Rigid Rotors - Rotational Energy Levels, Transitions, Selection Rules and Effect of Isotopic Substitution.	K1-K3	3	CO1-CO5	Lecture and Discussion	Group discussion
	2	Principle of UV-Visible Spectroscopy, Electronic Spectra of Diatomic Molecules - Born - Oppenheimer Approximation, Franck Condon Principle, Dissociation and Predissociation Energy.	K1-K5	3*	CO1-CO5	Lecture & discussion	quiz
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1	Intensity of Spectral lines – Boltzmann distribution and degeneracy. Stark Effect – First order. Inversion Phenomena – Ammonia. Rotational Spectra of Linear, Symmetric Polyatomic Molecules	K2-K4	3	CO2-CO5	Presentation, Lecture and Discussion	Short test
	2	Molecular Term Symbols Hydrogen (ground and excited states) Characterisation of Organic Compounds:	K2-K5	3*	CO2-CO5	Lecture & discussion	Snap test

July 5 – 12, 2024 (Day Order 1 - 6)	1	1.2 Vibrational Spectroscopy: Diatomic Molecules as Harmonic and Anharmonic Oscillators – Energy Levels and Vibrational Transitions. Vibrations of Polyatomic Molecules – Fundamental Vibrations, Overtones, Combination Bands	K1-K5	3	CO1-CO5	Presentation, Lecture and Discussion	Assignment
	2	Application of Woodward-Fieser Rules to Conjugated Dienes, α , β - Unsaturated Carbonyl Compounds, Benzene and its Substituted Derivatives and Polycyclic Aromatic Hydrocarbons	K2-K5	3*	CO2-CO5	presentation	III Component Assignment (unit 2.3) 10 marks
July 15 – 23, 2024 (Day Order 1 - 6)	1	1.3 Vibrational - Rotational Spectroscopy- Diatomic Vibrating Rotator- Energy Levels, Transitions and Selection Rules. Parallel and Perpendicular Vibrations of Linear Poly Atomic Molecules and Symmetric Top Molecules.	K2-K4	3	CO2-CO5	Lecture & discussion	Short test
	2	Fieser-Kuhn Equation – Study of Polyene Systems- Factors Affecting Absorption Spectra	K2-K5	3*	CO2-CO5	Lecture & discussion	Quiz

July 24 – 31, 2024 (Day Order 1 - 6)	3	1.4 Interpretation of IR Spectra: Group Frequencies of various Functional Groups. Factors affecting Group Frequencies	K4-K5	3	CO2-CO5	Presentation, Lecture and Discussion	Work sheet
		NMR Phenomena, Nuclear Spin, Bloch Equations and Types of Relaxation Processes	K2-K5	3*	CO2-CO5	Lecture & discussion	Short question and answer
Aug 1 – 5, 2024 (Day Order 1 - 3)	3	1.5 Raman Spectroscopy- Classical and Quantum theory of Raman effect,	K1-K3	2	CO1-CO3	Presentation	Group discussion
		Parameters of ¹ H-NMR: Chemical Shift, Shielding and Deshielding, Factors affecting δ	K2-K5	1*	CO2-CO5	Lecture & discussion	Test
Aug 6 – 10, 2024	C.A. Test – I						
Aug 12 – 14, 2024 (Day Order 4-6)	1	Rotational Raman Spectra: Linear and, Symmetric molecules.	K1-K5	1	CO1-CO3	Lecture	Component test Unit 1.3, 1.4 Max. marks =25
	3	Chemical Structure, Correlations of δ , Chemical and Magnetic Equivalence of Spins	K2-K5	2*	CO2-CO5	Lecture & discussion	Work sheet

Aug 16 – 23, 2024 (Day Order 1-6)		Vibrational Raman spectra: symmetry and Raman active vibrations, Rule of Mutual Exclusion, Effect of Nuclear Spin – hydrogen and carbon dioxide.	K2-K5	3	CO2-CO5	Presentation, Lecture and Discussion	Work sheet
	3	1.6 Raman as Complementary to IR. Structure Determination of CO ₂ , N ₂ O, SO ₂ , NO ₃ ⁻ , ClO ₃ ⁻ and ClF ₃ ¹ H NMR: Spin-Spin Splitting, Application of Spin-Spin Splitting to Structure Determination.	K2-K5	3*	CO2-CO5	Lecture & discussion	Class test
Aug 27 – Sep 3, 2024 (Day Order 1-6)	4	Mass Spectrometry 4.1 Basic Principles, Fragmentation Types and Rules. Interpretation of Mass Spectra Molecular Ion Peak, Isotope Peaks, Base Peak, Metastable Peak, Nitrogen Rule.	K1-K3	3	CO1-CO4	Presentation, Lecture and Discussion	Short test
	3	Effect of Coupling Constants – Geminal Coupling, Vicinal Coupling and Long-Range Coupling	K2-K5	3	CO2-CO5	Lecture & discussion	Seminar

Sep 4 – 11, 2024 (Day Order 1-6)		Calculation of Isotopic Distributions – Carbon and Halogen Isotopes using Binomial Expressions 4.2 Fragmentation Patterns: Cleavage of Sigma Bond-Even Electron Rule, Cleavage- Stevenson’s Rule, Benzylic Bond Cleavage, Inductive Cleavage,	K2-K5	3	CO2-CO5	Presentation, Lecture and Discussion	Assignment
	3	¹³ C NMR: Comparison of ¹³ C and ¹ H NMR, Spin Decoupling, Nuclear Overhauser Effect, Peak Intensity, Chemical Classes, Chemical Shifts,	K2-K5	3	CO2-CO5	Lecture & discussion	III Component Work Sheet (unit 3.4) 10 marks
Sep 12 - 20, 2024 (Day Order 1-6)	4	Retro Diels-Alder Cleavage and McLafferty Rearrangement 4.3 Structure Determination of Organic Compounds and Inorganic Compounds	K2-K5	3	CO2-CO5	Presentation, Lecture and Discussion	Work Sheet
	3	¹³ C ¹ H and ¹³ C ¹³ C spin Coupling - DEPT. Structure Determination of simple Aliphatic and Aromatic Compounds	K2-K5	3*	CO2-CO5	Lecture & discussion	Work sheet

Sep 23 - 26, 2024 (Day Order 1-4)	4	Inorganic Compounds - Metal Halide Salts and Coordination Complexes	K2 -K5	2	CO2-CO5	Lecture and Discussion	Work Sheet
	3	An Introduction to NMR in Solid State, Free induction Decay	K2-K5	2	CO2-CO5	Lecture & discussion	quiz
Sep 27 – Oct 3, 2024	C.A. Test – II						
Oct 4 – 5, 2024 (Day 5 & 6)	3	2D and 3D NMR. ¹⁵ N Spectra of Simple Inorganic Compounds	K2-K5	1*	CO2-CO5	Presentation	III Component Snap test (unit 3.5) 5 marks
Oct 7 - 15, 2024 (Day Order 1 to 6)	5	Structural Elucidation using spectral data -Determination of structure of organic compounds by comprehensive (UV, IR, NMR and Mass) spectral data	K2 -K5	3	CO2-CO5	Lecture and Discussion	Component test Max. marks 15 Unit 5
	3&5	³¹ P and ¹⁹ F NMR–Spectra of Simple Inorganic Compounds, Structural Elucidation using spectral data -Determination of structure of organic and inorganic compounds by comprehensive UV	K2-K5	3*	CO2-CO5	Presentation	Work sheet

Oct 16 - 22, 2024 (Day Order 1 to 6)	5	Structural Elucidation using spectral data - Determination of structure of organic and inorganic compounds by comprehensive UV, NMR spectral data	K2-K5	3 + 3*	CO2-CO5	Lecture & discussion	Work sheet
Oct 23 - 24, 2024 (Day Order 1 to 2)	REVISION						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN June - November 2024

Department : Chemistry
Name/s of the Faculty : Dr Mary Teresita V and Dr K. Vidya*
Course Title : SYNTHETIC ORGANIC CHEMISTRY AND NATURAL PRODUCTS
Course Code : 23CH/PC/SO34
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Recall the fundamentals of Organic Chemistry to synthesis and structures	K1
CO2	Grasp the principle of organic synthesis, reagents used and structural elucidation	K2
CO3	Analyse the strategies involved in synthesis, employ the reagents appropriately and examine them for natural products.	K3
CO4	Evaluate methods of synthesis by employing the principle of organic synthesis.	K4
CO5	Design and develop synthetic methods to find structure of organic compounds.	K5

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 19 – 26, 2024 (Day Order 1 - 6)	1 1.1	Strategies for Synthesis: Definitions, Synthons and Synthetic Equivalents, Guidelines, Functional Group Interconversion and Planning for Synthesis of Organic Compounds	K1 -K5	3	1-5	Lecture and Discussion	Worksheet
	2*	Reagents in Organic Synthesis Organic Reagents for functional group transformations-I –2,3-Dichloro-5,6-dicyano-	K1 -K5	3	1-5	Chalk and Talk	Discussion
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1.1	Disconnection Approach – One Group C-X, Two Group C-X, One Group C-C and Two Group C-C Disconnections	K1 -K5	3	1-5	Lecture and Discussion	Worksheet & Test
	2*	Organic Reagents for functional group transformations-I – benzoquinone (DDQ). Organic Reagents for functional group transformations-II Iodoxy Benzoic acid (IDX),	K1 -K5	3	1-5	Chalk and Talk and Power point presentation	Quiz

July 5 – 12, 2024 (Day Order 1 - 6)	1.3	Chemoselectivity, Reversal Polarity (Umpolung) and Ammine Synthesis	K1-K5	3	1-5	Lecture and Discussion	Worksheet & Test
	1.4	Protection and Deprotection – Alcohols, Carbonyls, Carboxylic Acids and Amino Functional Groups				Group Presentation	Other Component Group Assignment & Worksheet 25 Marks
	2*	Organic Reagents for functional group transformations-II Iodoxy Benzoic acid (IDX), Perbenzoic Acid, N-bromosuccinamide (NBS), Phenylisothiocyanate, N,N'-Dicyclohexylcarbodiimide (DCC)	K1 -K5	3	1-5	Chalk and Talk and Power point presentation	Worksheet
July 15 – 23, 2024 (Day Order 1 - 6)	1.4	Retrosynthetic Analysis-Alternate Synthetic Routes. Synthesis of Organic Mono and Bifunctional Compounds Via Disconnection Approach	K1-K5	3	1-5	Lecture and Discussion	Problem Solving
	3.1*	Modern Synthetic and Organometallic Reagents in Organic Synthesis Kulinkovich reaction, Brook rearrangement,	K1 -K5	3	1-5	Chalk and Talk and Power point presentation	Quiz

July 24 – 31, 2024 (Day Order 1 - 6)	1.5	Stereochemical Control of Products-Selective Aldol and Michael Reactions	K1-K5	3	1-5	Lecture and Discussion	Test
	3.1*	Metal mediated C-C and C-X coupling reaction- Heck, Suzuki coupling,	K1 -K5	3	1-5	Chalk and Talk and Power point presentation	Test
Aug 1 – 5, 2024 (Day Order 1 - 3)	2	Organic Reagents for functional group transformations-I – chiral diboranes (asymmetric synthesis), 9-BBN	K1 -K5	1	1-5	Lecture and Discussion	Problem solving
	3.1*	Sonagashira coupling, Nozaki-Hiyami, Buchwald-Hartwig,	K1 -K5	1	1-5	Chalk and Talk and Power point presentation	Other Component Test- 25 Marks
Aug 6 – 10, 2024	C.A. Test - I						
Aug 12 – 14, 2024 (Day Order 4-6)	5	Natural Pigments:	K1 -K5	1	1 - 5	Lecture and Discussion	Quiz
	5.1	Natural Pigments – Classification based on source and structure					
	3.1*	Noyori asymmetric hydrogenation, Click reaction.	K1 -K5	2	1-5	Chalk and Talk and Power point presentation	III Component test (Unit 3.1) 25 marks

Aug 16 – 23, 2024 (Day Order 1-6)	5.2	Anthocyanins– Introduction, Isolation, Determination of Structure of Anthocyanins and general methods for the synthesis of Anthocyanidins. Structural elucidation of Cyanin (Anthocyanin)	K1 -K5	3	1 - 5	Lecture and Discussion	Test
	3.2*	Organometallic reagents of Li, Al, Zn	K1 -K5	3	1-5	Chalk and Talk and Power point presentation	Discussion
Aug 27 – Sep 3, 2024 (Day Order 1-6)	5.3	Flavones and Flavonols: Introduction, Classification, Isolation, General Properties, Basic Structure of Flavones and Flavonols,	K1-K5	3	1-5	Lecture and Discussion	Quiz & Test
	3.2*	Organometallic reagents of Cu. LDA, Lombardo, Gillman reagent, Ullmann Reaction	K1 -K5	3	1-5	Chalk and Talk and Power point presentation	Worksheet
Sep 4 – 11, 2024 (Day Order 1-6)	5.4	General Methods for Determination of the Structure of Flavones	K1-K5	3	1 - 5	Lecture and Discussion	Quiz & Test
	4*	Alkaloids, Terpenoids and Steroids Classification - General Methods of Structure Determination	K1 -K5	3	1-5	Chalk and Talk	Assignment

Sep 12 - 20, 2024 (Day Order 1-6)	5.4	Structural Elucidation of Apigenin (Flavones),	K1-K5	3	1-5	Lecture and Discussion	Quiz & Test
	4*	General Methods of Structure Determination of Alkaloids, Terpenoids	K1 -K5	3	1-5	Chalk and Talk and Power point presentation	Problem Solving
Sep 23 - 26, 2024 (Day Order 1-4)	5.4	Structural Elucidation of Apigenin (Flavones),	K1-K5	1	1 - 5	Lecture and Discussion	Quiz & Test
	4*	General Methods of Structure Determination of Steroids	K1 -K5	2	1-5	Chalk and Talk	Quiz
Sep 27 – Oct 3, 2024	C.A. Test - II						
Oct 4 – 5, 2024 (Day 5 & 6)	5.4	Structural Elucidation of Quercetin (Flavonols) and Daidzein (Isoflavones)	K1 -K5	1	1-5	Lecture and Discussion	Quiz
	4*	Structural Elucidation of Papaverine	K1 -K5	1	1-5	Chalk and Talk and Power point presentation	Worksheet

Oct 7 - 15, 2024 (Day Order 1 to 6)	5.4	Structural Elucidation of Quercetin (Flavonols) and Daidzein (Isoflavones)	K1-K5	3	1-5	Lecture and Discussion	Quiz & Test
	4*	Structural Elucidation of Reserpine (Alkaloids), Zingiberine and Longifolene (Terpenoids)	K1 -K5	3	1-5	Chalk and Talk and Power point presentation	Quiz
Oct 16 - 22, 2024 (Day Order 1 to 6)	5.5	Distinction of Flavonoids by Characteristic Colour Reactions and Absorption Spectra (UV- Visible)	K1-K5	3	1-5	Lecture and Discussion	Group Discussion
	4*	4.3 Constitution of Cholesterol – Structure of the Nucleus, Position of the Hydroxyl Group and Double Bond, nature and position of the side-chain, position of the angular	K1 -K5	3	1-5	Chalk and Talk and Power point presentation	Test
Oct 23 - 24, 2024 (Day Order 1 to 2)	REVISION						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN June - November 2024

Department : CHEMISTRY
Name/s of the Faculty : Dr. R. SRIPRIYA
Course Title : PHYSICAL CHEMISTRY PRACTICAL
Course Code : 23CH/PC/P333
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Retrieve and understand the principles associated with various physical chemistry experiments	K1
CO2	Implement experiments based on theoretical knowledge	K2
CO3	Analyse the results in all the experiments	K3
CO4	Perform calculation and report the data graphically and make comparisons	K4
CO5	Design experiments and evaluate the processes	K5,K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 19 – 26, 2024 (Day Order 1 - 6)	1	Phase Rule 1.1 Three Component system (Water-Chloroform-Acetic Acid)	K1- K6	4	CO1-5	Lab Experiment	Procedure, Viva voce, Reported value
Jun 27 – July 4, 2024 (Day Order 1 - 6)	2	Solubility Product 2.1 Variation of the Solubility of Calcium Sulphate with Ionic Strength Determination of Thermodynamic Solubility Product (Complexometric Titration with EDTA)	K1- K6	4	CO1-5	Lab Experiment	Procedure, Viva voce, Reported value
July 5 – 12, 2024 (Day Order 1 - 6)	3	Chemical Kinetics 3.1 Effect of Ionic Strength on the Reaction Rate: Persulphate and Potassium Iodide Reaction	K1- K6	4	CO1-5	Lab Experiment	Procedure, Viva voce, Reported value

July 15 – 23, 2024 (Day Order 1 - 6)	3	3.2 Study the kinetics of the reaction between acetone and iodine in acidic medium by half-life method and determine the order with respect to iodine and acetone.	K1- K6	4	CO1-5	Lab Experiment	Procedure, Viva voce, Reported value
July 24 – 31, 2024 (Day Order 1 - 6)	3	3.3 Adsorption of oxalic acid on charcoal (Freundlich isotherm only).	K1- K6	4	CO1-5	Lab Experiment	Procedure, Viva voce, Reported value
Aug 1 – 5, 2024 (Day Order 1 - 3)	4	Conductometry 4.1 Determination of Critical Micelle Concentration Conductometrically	K1- K6	4	CO1-5	Lab Experiment	Procedure, Viva voce, Reported value
Aug 6 – 10, 2024	C.A. Test - I						
Aug 12 – 14, 2024 (Day Order 4-6)		NO CLASS	-	-	-	-	-

Aug 16 – 23, 2024 (Day Order 1-6)	4	4.2 Titration of Mixture of Three Acids (Trichloroacetic Acid, Monochloroacetic Acid and Acetic Acid) conductometrically	K1- K6	4	CO1-5	Lab Experiment	Procedure, Viva voce, Reported value
Aug 27 – Sep 3, 2024 (Day Order 1-6)	5	pH metry 5.1 Determination of pKa Values of Phosphoric Acid potentiometrically using Glass Electrode	K1- K6	4	CO1-5	Lab Experiment	Procedure, Viva voce, Reported value
Sep 4 – 11, 2024 (Day Order 1-6)	5	5.2 Potentiometric redox titration of $K_3Fe(CN)_6$ with $Co(II)$ to find out the concentration of the latter in a given solution.	K1- K6	4	CO1-5	Lab Experiment	Procedure, Viva voce, Reported value

Sep 12 - 20, 2024 (Day Order 1-6)	6	Partial Molal Quantities 6.1 Determination of Partial Molal Volume of Methanol in Dilute Aqueous Solutions (Method of intercepts)	K1- K6	4	CO1-5	Lab Experiment	Procedure, Viva voce, Reported value
Sep 23 - 26, 2024 (Day Order 1-4)		CA 1	K1- K6	4	CO1-5	Lab Experiment	Procedure, Viva voce, Reported value
Sep 27 – Oct 3, 2024	C.A. Test - II						
Oct 4 – 5, 2024 (Day 5 & 6)		NO CLASS	-	-	-	-	-
Oct 7 - 15, 2024 (Day Order 1 to 6)		CA 2	K1- K6	4	CO1-5	Lab Experiment	Procedure, Viva voce, Reported value
Oct 16 - 22, 2024 (Day Order 1 to 6)		Viva questions Evaluation	K1- K6	4	CO1-5	Lab Experiment	Group discussion
Oct 23 - 24, 2024 (Day Order 1 to 2)	REVISION						

Guidelines for Practical Assessment for CA I and II

PATTERN OF ASSESSMENT

Continuous Assessment

Total Marks: 50

Duration: 3 hours

Procedure	-	10 marks
Viva voce	-	10 marks
Reported value	-	30 marks

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN June - November 2024

Department	: Chemistry
Name/s of the Faculty	: Dr K. Vidya
Course Title	: ANALYTICAL INSTRUMENTATION PRACTICAL
Course Code	: 23CH/PC/P433
Shift	: II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Recall the simple laws pertaining to analytical chemistry	K1
CO2	Explain the principle and working of different instrumental techniques	K2
CO3	Apply the principles to perform the experiments for the estimation and	K3

	separation of different substances	
CO4	Analyse the results by plotting the graph with the data obtained.	K4
CO5	Estimate the concentration of constituents in the given unknown solutions	K5,K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 19 – 26, 2024 (Day Order 1 - 6)	1	Colorimetry 1.1 Estimation of Vitamin-A / Cholesterol	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1	Colorimetry 1.2 Determination of stability constants of complexes – Job's method	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)
July 5 – 12, 2024 (Day Order 1 - 6)	1	Colorimetry 1.3 Determination of the amount of dichromate and permanganate ions simultaneously	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)
July 15 – 23, 2024 (Day Order 1 - 6)	2	Spectrophotometry 2.1 Estimation of DNA / RNA	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)
July 24 – 31, 2024 (Day Order 1 - 6)	2	Spectrophotometry 2.2 Determination of aspirin from commercial samples	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)
Aug 1 – 5, 2024 (Day Order 1 - 3)	3	Fluorimetry 3.1 Estimation of Riboflavin/Thiamine/ Fluorescein	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)
Aug 6 – 10, 2024	C.A. Test - I						

Aug 12 – 14, 2024 (Day Order 4-6)		No Class					
Aug 16 – 23, 2024 (Day Order 1-6)	4	Flame Photometry 4.1 Estimation of Sodium/Potassium	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)
Aug 27 – Sep 3, 2024 (Day Order 1-6)	5	Chromatography (To be tested internally) 5.1 Rf determination and separation of a mixture of amino acids by thin layer chromatography 5.2 Separation of caffeine and aspartame by HPLC	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)
Sep 4 – 11, 2024 (Day Order 1-6)	5	Chromatography (To be tested internally) 5.3 Separation of KMnO_4 and $\text{K}_2\text{Cr}_2\text{O}_7$ by column chromatography	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)
Sep 12 - 20, 2024 (Day Order 1-6)	6	Spectral Analysis [Demonstration] 6.1 Identification of functional groups using IR spectra	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)

Sep 23 - 26, 2024 (Day Order 1-4)	6	Spectral Analysis [Demonstration] 6.2 Determination of Band gap for ZnO using Diffusive UV technique.	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)
Sep 27 – Oct 3, 2024	C.A. Test - II						
Oct 4 – 5, 2024 (Day 5 & 6)		No class					
Oct 7 - 15, 2024 (Day Order 1 to 6)	6	Spectral Analysis [Demonstration] 6.3 Estimation of Chromium using Atomic absorption spectroscopy.	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)
Oct 16 - 22, 2024 (Day Order 1 to 6)	7	Voltammetry [Demonstration] 7.1 To study the redox behaviour of $K_3[Fe(CN)_6]/K_4[Fe(CN)_6]$ by cyclic voltammetry	K1- K6	4	CO1-5	Lab Experiment	Viva (oral/written)
Oct 23 - 24, 2024 (Day Order 1 to 2)	REVISION						

Guidelines for Practical Assessment for CA I and II

PATTERN OF ASSESSMENT

Continuous Assessment

Total Marks: 50

Duration: 3 hours

Procedure	-	10 marks
Viva voce	-	10 marks
Reported value	-	30 marks

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN

June - November 2024

Department : CHEMISTRY
Name/s of the Faculty : DR. U. ANTO MARIA JERALDIN
Course Title : FOOD CHEMISTRY AND NUTRITION
Course Code : 23CH/PE/FN23
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Identify the food groups and the organisations that help in fighting malnutrition	K1
CO2	Discuss the food groups and relate the different types of food and diseases	K2
CO3	Classify the food groups and diseases caused by their deficiency and ways to fight the deficiency	K3
CO4	Organize and Analyse carbohydrates, fats, protein, vitamins, and essential nutrients	K4
CO5	Create a personal food guide and evaluate ways of cooking food	K5, K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	Cos	Teaching Learning Methodology	Assessment Methods
Jun 19 – 26, 2024 (Day Order 1 - 6)	1	Food Guide- Basic Five Food Groups, Usage of the Food Guide, reading food labels- Introduction to Nutrition Definition of Nutrition and Nutrients, Interrelationship between Nutrition and Malnutrition.	K1-K5	3	CO1-CO5	Group discussion	Group quiz and data Collection
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1	Basal Metabolism and Determination of BMR. Recommended Dietary Allowances (RDA) Factors affecting RDA	K2-K5	3	CO2-CO5	Lecture and discussion	Class test
July 5 – 12, 2024 (Day Order 1 - 6)	1&2	General Principles of Deriving RDA. Determination of RDA of Different Nutrients, designing a food plate. Sources, Classification of Carbohydrates.	K2-K5	3	CO2-CO5	Lecture and Discussion	Seminar
July 15 – 23, 2024 (Day Order 1 - 6)	2	Functions and Recommended Dietary Allowance of Carbohydrates. Glycemic index. Artificial Sweetening Agent	K2-K5	3	CO2-CO5	Group Discussion	Quiz
July 24 – 31, 2024 (Day Order 1 - 6)	2	Effect of Cooking on Carbohydrates and Storage of Carbohydrates	K2-K5	3	CO2-CO5	Lecture & Demonstration	Experiments

Aug 1 – 5, 2024 (Day Order 1 - 3)	2	Essential Fatty Acids.	K2-K5	1	CO2-CO5	Power Point Presentation	Test
Aug 6 – 10, 2024	C.A. Test – I						
Aug 12 – 14, 2024 (Day Order 4-6)	3	Sources, Functions, Deficiency and Recommended Dietary Allowance of Calcium, Iron, Iodine and Phosphorous.	K2-K5	2	CO2-CO5	Lecture and Discussion	III Component Class room Exhibition having flow charts (unit 3.1) 20 marks
Aug 16 – 23, 2024 (Day Order 1-6)	3	Vitamins-Classification, Sources, Functions and Deficiency of the following Vitamins: Fat Soluble Vitamins- A, D, E and K ,Water Soluble Vitamins- Ascorbic Acid, Thiamine.	K2-K5	3	CO2-CO5	Group discussion	Group quiz
Aug 27 – Sep 3, 2024 (Day Order 1-6)	3	Water Soluble Vitamins- Riboflavin, Niacin, other members of B-Complex such as B6, Folic Acid and B12.Effect of Cooking on Vitamins and Minerals-	K2-K5	3	CO2-CO5	Group Discussion	III Component Assignment (unit 3.2) 10 marks
Sep 4 – 11, 2024 (Day Order 1-6)	4	Sources, Classification, Functions, Nutritional Classification of Proteins.	K2-K5	3	CO2-CO5	Lecture & Discussion	Snap test
Sep 12 - 20, 2024 (Day Order 1-6)	4	Recommended Dietary Allowance of Proteins.- Protein Energy Malnutrition (PEM)	K2-K5	3	CO2-CO5	Discussion & case study	Case study & discussion

Sep 23 - 26, 2024 (Day Order 1-4)	4&5	Marasmus and Kwashiorkor. International Agencies- WHO.	K2-K5	2	CO2-CO5	Lecture and Discussion	Group discussion
Sep 27 – Oct 3, 2024	C.A. Test – II						
Oct 4 – 5, 2024 (Day 5 & 6)	5	International Agencies- Food and Agriculture Organization, United Nations Children’s Fund	K2-K5	1	CO2-CO5	Power point Presentation	Group discussion
Oct 7 - 15, 2024 (Day Order 1 to 6)	5	National Agencies-Indian Council of Agricultural Research (ICAR), Indian Council of Medical Research (ICMR), National Institute of Nutrition, Food and Nutrition Board	K2-K5	3	CO2-CO5	Power Point Presentation	Quiz
Oct 16 - 22, 2024 (Day Order 1 to 6)	5	Nutrition Education- Methods used in Nutrition Education- Reference to Special nutrition programme, Balwadi Nutrition programme, Mid-day meal scheme	K2-K5	3	CO2-CO5	Power Point Presentation	III Component Mini Project (unit 5.3) 20 marks
Oct 23 - 24, 2024 (Day Order 1 to 2)	REVISION						