STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI 600 086

B.Sc. DEGREE : BRANCH IV-CHEMISTRY

COURSE SCHEDULE

SEMESTER I

Subject Code	Title of Course
23CH/MC/GC14	General Chemistry
23CH/MC/P112	VOLUMETRIC ANALYSIS PRACTICAL
23CH/SS/HC13	LIFE SKILLS- HEALTH, ENERGY AND COMPUTER BASICS

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STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN

June - November 2024

Department : **Chemistry**
Name/s of the Faculty : **Dr.Mary George**
Course Title : **General Chemistry**
Course Code : **23CH/MC/GC14**
Shift : **I**

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Recollect the fundamentals of periodicity of elements, atomic structure, acids and bases, nuclear chemistry and organic chemistry	**K1, K2**
CO2	Calculate eigen values and eigen functions, categorize periodic properties of s, p and d elements, compare radioactive disintegration series and differentiate the types of reactive intermediates in organic chemistry	**K3**
CO3	Apply the concepts of periodicity of elements, dual nature of light, electromagnetic spectrum, quantum numbers, acid-base theories, half-life of disintegration, nomenclature and classification of organic compounds to solve problems	**K4**
CO4	Analyze elements based on their atomic structure and periodic properties, classify radioactive elements based on their stability, binding energy and mass defect and develop mechanisms based on organic reagents and reactions.	**K5**
CO5	Evaluate the effect of electronic displacements in covalent bonds on molecular stability and chemical reactivity, investigate the applications of nuclear chemistry, explain the chemical behavior of elements from their periodic properties and solve problems in atomic structure	**K6**

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 24 – 26, 2024 (Day Order 4 - 6)	1.1 1.2	Rutherford's nuclear model of the atom. Planck's quantum theory of radiation. Photoelectric effect. Bohr's theory, its limitations and atomic spectrum of hydrogenatom. Wave mechanics: de Broglie equation, Davisson - Germer experiment. Heisenberg's principle of uncertainty. ComptonEffect.	K1-4	5	CO1-4	lecture and discussion	Short questions
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1.3	Postulates of Quantum mechanics; operators-Hermitian operators, Laplacian and Hamiltonian operators, Eigen functions and Eigen values of operators. Conditions for a well-behaved function, Schrodinger wave equation (no derivation). Significance of ψ and ψ^2	K3,K4	5	CO3	lecture and discussion	Problem solving

July 5 – 12, 2024 (Day Order 1 - 6)	1.4 2.1	Quantum numbers and their significance. Normalized and orthogonal wave functions. Sign of wave functions. Shapes of orbitals Periodic Table, horizontal, vertical and diagonal relationships in the periodic table – Li-Mg, Be-Al, B-Si	K4	5	CO3	Lecture and Discussion	Worksheet-Quiz
July 15 – 23, 2024 (Day Order 1 - 6)	2.2 2.3	Periodicity of properties of s, p and d – block elements with respect to atomic radii, ionic radii, covalent radii, ionization energy Periodicity of properties of s, p and d - block elements with respect to electronegativity, electron affinity	K1-K4, K6	5	CO1-4	Power point presentation	Short answer questions-Worksheet
July 24 – 31, 2024 (Day Order 1 - 6)	2.4 3.1 3.2	Inert pair effect, effective nuclear charge – screening effect, Slater rules Concepts: Bronsted-Lowry, Lux-Flood, Solvent -system and Lewis Relative strength of acids and bases: Effect of solvent, levelling effect, polarity and substituents	K1-K4	5	CO1-4	Lecture &Discussion	**Component MCQ TEST (20 marks) UNIT 1 and UNIT 2** Worksheet

Aug 1 – 5, 2024 (Day Order 1 - 3)	3.2	HSAB - Principle and its applications	K1-K4	2	CO1-4	Demonstration experiment	Worksheet
Aug 6 – 10, 2024	**C.A. Test – I Unit 1,2&3**						
Aug 12 – 14, 2024 (Day Order 4-6)	4.1	Elementary Particles - Concept of Nuclides, representation of isobars, isotones, isotopes with examples. Nucleus structure – Liquid Drop and Shell Model. Nuclear stability – *n/p r*atio, binding energy, mass defect and magic numbers	K1-K4	3	CO1-4	Lecture &Discussion	Worksheet
Aug 16 – 23, 2024 (Day Order 1-6)	4.2	Radioactive elements, modes of decay – Neutron, Positron Theory of α, β and γ emission, characteristics of α, β and γ particles, K-electron capture and positron emission. Half-life period, Geiger – Nuttall rule	K1-K4	5	CO1-4	Lecture &Discussion	Short answer
Aug 27 – Sep 3, 2024 (Day Order 1-6)	4.2	Radioactive displacement laws – Soddy, Fajan and Russel. Radioactive decay series 4n, 4n+1, 4n+2 and 4n+3	K4	5	CO2-3	Lecture &Discussion Field Visit	Short answers

Sep 4 – 11, 2024 (Day Order 1-6)	4.3	Detection and measurement of radioactivity - Ionization chamber, Geiger- Muller counter and Scintillation counter. Artificial radioactivity - Artificial transmutation of elements, nuclear reactions – nuclear fusion andfission	K1-K5	5	CO4-6	Discussion Field Visit	**Component Presentation/ Assignment (10 marks) Unit 4.2 &4.3**
Sep 12 - 20, 2024 (Day Order 1-6)	5.1	IUPAC nomenclature of organic compounds Types of organic reaction and reagents: Nature of bond fission – Homolytic and Heterolytic	K1-K4	5	CO1-3	Lecture &Discussion	Problem solving-Worksheet
Sep 23 - 26, 2024 (Day Order 1-4)	5.2 5.3	Types of reagents – Electrophiles and Nucleophiles. Substitution, Addition, Elimination and Rearrangement reactions (definition with anexample) Reactive intermediates with examples – Carbocations, Carbanions and Free Radicals - Conditions favouring their formation, stability and structure, their reactions with example	K1-K5	3	CO1-5	Lecture &Discussion	**Component MCQ TEST (20 marks) UNIT 4 and UNIT 5.1**
Sep 27 – Oct 3, 2024	**C.A. Test – II Unit 4&5.1-5.3**						

Oct 4 – 5, 2024 (Day 5 & 6)	5.3 5.4	Electron displacement effects - Inductive, Electromeric, Mesomeric, Resonance, Hyperconjugation Steric effects, Tautomerism Concept of Aromaticity – Definition, H*ü*ckel's Rule	K4-K6	2	CO1-3	Lecture &Discussion	Worksheet
Oct 7 - 15, 2024 (Day Order 1 to 6)	5.4	Application to benzenoid and non-benzenoid compounds Benzene, naphthalene,	K4-K6	5	CO3-5	Lecture &Discussion	Worksheet
Oct 16 - 22, 2024 (Day Order 1 to 6)	5.4	cyclopropenyl cation, cyclopentadienyl anion and tropyliumcation	K4-K6	5	CO3-5	Lecture &Discussion	Worksheet
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* & DR. JANET SABINA X**

Course Title : **VOLUMETRIC ANALYSIS PRACTICAL**

Course Code : **23CH/MC/P112**

Shift : **I**

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Recollect the principles of different titrations and calibration, concepts of molarity, normality and equivalent weight	K1, K2
CO2	Differentiate between acids/bases and oxidising/reducing agents	K2
CO3	Calculate the molarity, normality and equivalent weights of acids, bases, oxidising and reducing agents	K3
CO4	Categorize indicators based on the type of titration and pH	K4
CO5	Estimate the amount of a metal ion/acid/base present in the whole of the given solution	K5,K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 24 – 26, 2024 (Day Order 4 - 6)		No Class					
Jun 27 – July 4, 2024 (Day Order 1 - 6)	2	Volumetric Analysis Theory and Principle behind the different titrations, equivalent weight calculations, concentration terms-normality, molarity and molality	K1-K4	3	1-4	Lecture and Discussion	Quiz/Test/Group Discussion
July 5 – 12, 2024 (Day Order 1 - 6)	1	Calibration of Burettes / Pipettes	K1-K2	3	1-2	Demonstration & Hands on training	-
July 15 – 23, 2024 (Day Order 1 - 6)	3	Estimation of Na_2CO_3 / HCl	K1-K6	3	1-6	Hands on experiment	Principle & Procedure = 10 marks Experiment (40 marks) Up to 2% error - 40 marks 2.1 – 3.0% error - 35 marks 3.1 – 4.0% error - 25 marks 4.1 – 5% error - 20 marks Above 5% - 15 marks **Total = 50 Marks**
July 24 – 31, 2024 (Day Order 1 - 6)	3	Estimation of Na_2CO_3 / HCl	K1-K6	3	1-6	Hands on experiment	Principle & Procedure = 10 marks Experiment (40 marks) Up to 2% error - 40 marks 2.1 – 3.0% error - 35 marks 3.1 – 4.0% error - 25 marks 4.1 – 5% error - 20 marks Above 5% - 15 marks **Total = 50 Marks**

Aug 1 – 5, 2024 (Day Order 1 - 3)	3	Estimation of Oxalic Acid (Permanganimetry)	K1-K6	3	1-6	Hands on experiment	Principle & Procedure = 10 marks Experiment (40 marks) Up to 2% error - 40 marks 2.1 – 3.0% error - 35 marks 3.1 – 4.0% error - 25 marks 4.1 – 5% error - 20 marks Above 5% - 15 marks **Total = 50 Marks**
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)	3	Estimation of Oxalic Acid (Permanganimetry)	K1-K6	3	1-6	Hands on experiment	Principle & Procedure = 10 marks Experiment (40 marks) Up to 2% error - 40 marks 2.1 – 3.0% error - 35 marks 3.1 – 4.0% error - 25 marks 4.1 – 5% error - 20 marks Above 5% - 15 marks **Total = 50 Marks**
Aug 27 – Sep 3, 2024 (Day Order 1-6)	3	Estimation of Dichromate (Iodometry)	K1-K6	3	1-6	Hands on experiment	Principle & Procedure = 10 marks Experiment (40 marks) Up to 2% error - 40 marks 2.1 – 3.0% error - 35 marks 3.1 – 4.0% error - 25 marks 4.1 – 5% error - 20 marks Above 5% - 15 marks **Total = 50 Marks**

Sep 4 – 11, 2024 (Day Order 1-6)	3	Estimation of Iron (Dichrometry / Permanganimetry)	K1-K6	3	1-6	Hands on experiment	Principle & Procedure = 10 marks Experiment (40 marks) Up to 2% error - 40 marks 2.1 – 3.0% error - 35 marks 3.1 – 4.0% error - 25 marks 4.1 – 5% error - 20 marks Above 5% - 15 marks **Total = 50 Marks**
Sep 12 - 20, 2024 (Day Order 1-6)	3	Estimation of Iron (Dichrometry / Permanganimetry)	K1-K6	3	1-6	Hands on experiment	Principle & Procedure = 10 marks Experiment (40 marks) Up to 2% error - 40 marks 2.1 – 3.0% error - 35 marks 3.1 – 4.0% error - 25 marks 4.1 – 5% error - 20 marks Above 5% - 15 marks **Total = 50 Marks**
Sep 23 - 26, 2024 (Day Order 1-4)	3	Estimation of Magnesium / Zinc (Complexometry)	K1-K6	3	1-6	Hands on experiment	Principle & Procedure = 10 marks Experiment (40 marks) Up to 2% error - 40 marks 2.1 – 3.0% error - 35 marks 3.1 – 4.0% error - 25 marks 4.1 – 5% error - 20 marks Above 5% - 15 marks **Total = 50 Marks**
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)	3	Estimation of Magnesium / Zinc (Complexometry)	K1-K6	3	1-6	Hands on experiment	Principle & Procedure = 10 marks Experiment (40 marks) Up to 2% error - 40 marks 2.1 – 3.0% error - 35 marks 3.1 – 4.0% error - 25 marks 4.1 – 5% error - 20 marks Above 5% - 15 marks **Total = 50 Marks**
Oct 16 - 22, 2024 (Day Order 1 to 6)	3	Estimation of Chloride (Argentometry), Estimation of Hardness	K1-K6	3	1-6	Hands on experiment	Principle & Procedure = 10 marks Experiment (40 marks) Up to 2% error - 40 marks 2.1 – 3.0% error - 35 marks 3.1 – 4.0% error - 25 marks 4.1 – 5% error - 20 marks Above 5% - 15 marks **Total = 50 Marks**
Oct 23 - 24, 2024 (Day Order 1 to 2)	**REVISION**						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: June - November 2024

Department : **CHEMISTRY**

Name/s of the Faculty : **Dr. REVATHY RAJAGOPAL & Dr. Avila Josephine B**

Course Title : **LIFE SKILLS- HEALTH, ENERGY AND COMPUTER BASICS**

Course Code : **23CH/SS/HC13**

Shift : **I**

'eek No. of ours	**Units & Topics**	**Teaching Methodology**	**Text & References**	**Method of Evaluation**

n 19 26, 24)ay der 6)	)od and Health **1 Traditional food and their ealth benefits** 1.1 **Six tastes –** Natural guide ap towards proper nutrition **ood and energy balance** 1 Units of Energy	esentation and group discussion	haya K. T. *The Illustrated Foods of dia*. Oxford Publications, 2009. yton, A.C. *Text Book of Medical ysiology*. (12th ed.). Philadelphia: .B. Saunders & ., 2011.	ESENTATI N (25M) ila & evathy

n 27 luly)24)ay rder 6)	1.2 Nutritional value and gnificance of Navadhanya esame seed, Bengal gram, orse gram **Food and energy balance** 1Components of Total Energy equirement – Basal Metabolic ate,	esentation and group discussion	haya K. T. *The Illustrated ods of India*. Oxford blications, 2009. yton, A.C. *Text Book of edical Physiology*. (12th .). Philadelphia: W.B. unders & ., 2011.	ESENTATI N

ly 5 12, 024)ay rder 6)	1.2 Nutritional value and gnificance of Navadhanya reen gram, Paddy seeds **Food and energy balance** 1energy requirements for vork) physical activity	esentation and group discussion	haya K. T. *The Illustrated ods of India*. Oxford blications, 2009. uyton, A.C. *Text Book of edical Physiology*. (12th .). Philadelphia: W.B. unders & ., 2011.	ESENTATI N

ly – , 024)ay der 6)	1.2 Nutritional value and gnificance of Navadhanya hite beans, Wheat, black gram d Chick pea) **ood and energy balance** 1 energy requirements for ork) physical activity and ermic effect of od	esentation and group discussion	hhaya K. T. *The Illustrated ods of India*. Oxford blications, 2009. yton, A.C. *Text Book of edical Physiology*. (12th .). Philadelphia: W.B. unders & ., 2011.	UIZ
ly – , 024)ay der 6)	1.2 Greens (Vallarai, uthuvalai, Manathakkali, lichakeerai **ood and energy balance** 2 Factors affecting Basal etabolic Rate and Thermic fect of food	esentation and group discussion	hhaya K. T. *The Illustrated Foods India*. Oxford Publications, 2009. yton, A.C. *Text Book of Medical ysiology*. (12th ed.). Philadelphia: .B. Saunders & ., 2011.	UIZ

ıg 1 5,)24)ay rder - 3)	1.2 Agathi Keerai, Murungai erai, Karuveppilai, Puthina and thamalli) **ood and energy balance** 2 Factors affecting Basal etabolic Rate and Thermic fect of food	Presentation and group discussion	ilakshmi, B. *Nutrition Science* (4th vised Edition), New Delhi: New e International (P) d., 2014	MCQ test
ıg 6 10,)24	**C.A. DAYS**			

ıg – , 024)ay der 6)	**1 Energy nservation** 1.1 Needs for ergy nservation – wer nsumption of mestic pliances – ctrical Energy dit – Strategies r Energy nservation **ood and energy lance** 3 Recommended etary Allowances	esentation and group discussion	evor Linsley*, Basic electrical installation ork.* Newnes rint of Elsevier 2011. ilakshmi, B. *Nutrition Science* (4th evised Edition), New Delhi: New Age ternational (P) d., 2014	

ıg – , 024)ay der 6)	L.1 odern lighting stems– Light hitting diode ED), Compact orescent mps (CFL), Green dicators and verter, Green ilding - Home hting ing Solar cell - lar water aters- Water and aste management iogas ant **ood and energy lance** 3 Recommended etary Allowances	esentation and group discussion	evor Linsley*, Basic electrical stallation work.* Newnes rint of sevier 2011. ilakshmi, B. *Nutrition Science* (4th vised Edition), New Delhi: New Age ternational (P) d., 2014	IERGY AUDIT AT HOME M (Revathy)

ıg – p 3, 024)ay der 6)	1.2 Safety actices in using ectronic gadgets d electricity at me – ecautions - ock- Use of sters to entify leakage ood and ergy balance 3 commended etary owances and lanced Diet	esentation and group discussion	evor Linsley, *Basic electrical installation ork.* Newnes rint of Elsevier 2011. ilakshmi, B. *Nutrition Science* (4th evised Edition), New Delhi: New Age ternational (P) Ltd., 2014	iz

p 4 11, 24)ay der 6)	**)mputer** **ndamentals** 2.1 Essentials of urchasing a ersonal Computer Fundamentals of etworks – Local ea Network, ternet, **Food and energy** **alance** 3 Recommended etary Allowances d Balanced Diet	esentation and group discussion	adeep Sinha, Priti Sinha, *)mputer Fundamentals 6th* *lition*, BPB Publications,)03. ilakshmi, B. *Nutrition* *ience* (4th Revised Edition), ew Delhi: New Age ternational (P) Ltd., 2014	SIGNMENT 10M vila & Revathy)

p - , 024)ay rder 6)	**)mputer** **ndamentals** 2.1Networking in al-time scenario-)mputer Hacking Computer rensics ndamentals – ber Laws - cure Browsing ood and energy lance 3 Food Energy lues- lculation	esentation and group discussion	ilakshmi, B. *Nutrition Science* (4th evised Edition), New Delhi: New Age ternational (P) hn Vacca, *Computer Forensics*:)mputer Crime Scene Investigation, xmi Publications)15.	oup discussion

p - , 24)ay der 4)	2.2 **Configuring** **nail**)nfigure Email ttings – tachments –)mpression – ganizing Emails Manage Folders - uto Reply - ectronic Business ard - Email lters- anage Junk Mail - lendar - Plan eetings,)pointments - heduling nails	esentation and group discussion	adeep Sinha, Priti Sinha, *Computer* *ndamentals 6th Edition*, BPB ublications, 2003.	uiz
p – :t 3, 24	**CA Test Days**			

:t 4 5, 024)ay & 6)	2.2 **Configuring nail** ıto Reply - ectronic siness Card - ıail Filters- anage Junk Mail Calendar - Plan eetings,)ppointments – heduling Emails	esentation and group discussion	adeep Sinha, Priti Sinha, *Computer ndamentals 6th Edition*, BPB blications, 2003.	ıiz
:t 7 - , 024 ay der :o 6)	2.3 Emerging ends in IT - 3D inting, Cloud orage, ood and energy lance 3 Food Energy lues- lculation	esentation and group discussion	lakshmi, B. *Nutrition Science* (4th vised Edition), New Delhi: New Age ternational (P) adeep Sinha, Priti Sinha, *Computer ndamentals 6th Edition*, BPB blications, 2003.	ıiz

t 16 2, 24 ay der o 6)	2.3 Emerging ends in IT - gmented ality, Artificial telligence, ternet of Things T) ood and energy lance 3 Food Energy lues- lculation	esentation and group discussion	hn Vacca, *Computer Forensics*: mputer Crime Scene Investigation, xmi Publications 15. lakshmi, B. *Nutrition Science* (4th vised Edition), New Delhi: New Age ternational (P)	iz	
t 23 4, 24 ay)	**REVISION**				d., 2014