STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI Course Schedule: June - November 2024

Department	: BOTANY/CHEMISTRY
Name/s of the Faculty	: Dr. Janet Sabina X/Dr.H.Shakila*
Course Title	: Bioanalytical Techniques
Course Code	: 19ID/IC/BA55
Shift	: I

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
Jun 19 – 26, 2024 (Day Order 1 - 6) 3* 3	*UNIT:1 Microscopy: Principle, Construction 1.1 Light microscopes – Compound, Phase Contrast Unit 5 Spectroscopic Techniques and Spectrochemical Methods 5.1 Introduction to Spectroscopy, Beer Lambert's law-statement and deviation;	Lecture, PPT and video presentations Students given hands on experience with the microscopes	Steven, E Ruzin, Plant <i>Microtechnique</i> and <i>Microscopy</i> , USA: Oxford University, 1999. Skoog, D.A, West, D.M. <i>Fundamentals of</i> <i>Analytical</i> <i>Chemistry</i> . Thomson Asia, 2014. Vogel, A.I. Vogel's <i>Textbook of</i> <i>Quantitative</i> <i>Chemical Analysis</i> . Prentice Hall, Science, 2000.	Group Discussion
Jun 27 – July 4, 2024 (Day Order 1 - 6) 3* 3	 * 1.1 Differential Interference Contrast and Confocal Microscopes. 1.2 Preparation of Specimen for Light Microscopy 5.1 UV- Visible- instrumentation and applications-estimation of Mn2+ 	Lecture, PPT and video presentations Students given hands on training for specimen preparation with light microscopy	Wilson,K,Wilson,K,Walker,J,PrinciplesAndTechniquesofBiochemistryandMolecularBiology.6theditionCambridgeUniversity Press,2007Skoog,D.A,West,D.M.FundamentalsofAnalyticalChemistry.Thomson Asia,2014.Vogel,A.I.Vogel's Textbook ofQuantitativeChemical Analysis.Prentice Hall,Science,2000.	MCQ test on Microscopy (10 Marks)

July 5 – 12, 2024 (Day Order 1 - 6) 3*	 *1.2 Paraffin Techniques Fixatives: FAA, Carnoy's, Dehydration and Infiltration, Embedding and Sectioning (Paraffin Blocks), Staining and Mounting 1.3 Electron Microscopes TEM, specimen preparation for TEM. 5.2 Nephelometry and 	Lecture through chalk and blackboard and video presentations Students given hands on training for specimen preparation using paraffin blocks with light microscopy	Srivastava, T.N & P.C.Kamboj. Systematic Analytical Chemistry. New Delhi: Shobanlal Nagin Chand, 1999 Skoog, D.A, West, D.M. Fundamentals of Analytical Chemistry. Thomson Asia,	Assignment on general topics (10 Marks)
3	Turbidimetry Principle, Instrumentation and Applications- determination of TDS of water sample		2014. Vogel, A.I. Vogel's <i>Textbook of</i> <i>Quantitative</i> <i>Chemical Analysis.</i> Prentice Hall, Science, 2000.	
July 15 – 23,	UNIT 2	Lecture through chalk and	Wilson, K,	MCQ test
2024 (Day Order 1	Centrifugation:	black board and practical	Walker,J,	on unit 5 Other
(Day Order 1 - 6)	Principle, Instrumentation and	exposure	Principles And Techniques of	Other Component
3*	Application		Biochemistry	(15 Marks)
3	 2.1 Bench, Ultracentrifuge 5.3 Principle, Instrumentation and Applications of Flame photometry (estimation of K/Na) 		and Molecular Biology. 6 th edition Cambridge University Press, 2007	
July 24 – 31, 2024	*2.1 Refrigerated,	Lecture through chalk and blackboard and practical	Skoog, D.A, West,D.M.	Quiz
(Day Order 1	Continuous	exposure	Fundamentals	
- 6)	flow centrifuge	· r · · · · ·	ofAnalytical	
3*	and Microfuge.		<i>Chemistry.</i> Thomson Asia, 2014.	
3	5.3 Principle, Instrumentation and Applications of Fluorimetry (estimation of Fluorescein)			
Aug 1 – 5, 2024 (Day Order 1 - 3)	Revision			
Aug 6 – 10, 2024		C.A. Test – I	1	

Aug 12 – 14,	2.2 Density gradient	Lecture through	Skoog, D.A, West, D.M.	Group
2024	centrifugation	chalk and	Fundamentals of	Discussion
(Day Order 4-6)		blackboard and	Analytical Chemistry.	
		practical exposure	Thomson Asia, 2014.	
Aug 16 – 23,	*2.2 Differential	Lecture through	Gopalan, R,	Quiz
2024	centrifugation	chalk and	Subramanian, P.S and	
(Day Order 1-6)		blackboard and	Rengarajan,	
3*		practical exposure	K. Elements of	
			Analytical Chemistry.	
	Unit 4		New Delhi: Sultan	
	Purification		Chand, 2004.	
	techniques		Skoog, D.A, West, D.M.	
3	4.1 Desiccants: Types,		Fundamentals of	
	efficiency, regeneration		Analytical Chemistry.	
	and choice of desiccants		Thomson Asia,2014.	
			Vogel, A.I. Vogel's	
			Textbookof Quantitative	
			Chemical Analysis. Prentice	
			Hall, Science, 2000.	
Aug 27 – Sep 3,	*2.3 Isolation of	Lecture through	Wilson, K, Walker,J,	Worksheet
2024	Chloroplast (Practical)	PPT and video	Principles And	
(Day Order 1-6)		presentations	Techniques of	
3*		Practical exposure	Biochemistry and	
			Molecular Biology. 6 th	
			edition	
			Cambridge University	
			Press, 2007	
3	4.2 Technique of drying			
	of solids, Distillation:			
	Types, Theory and		Skoog, D.A, West, D.M.	
	techniques of fractional,		Fundamentals of Analytical	
	Steam and Vacuum		Chemistry.	
	distillation		Thomson Asia, 2014.	
			Vogel, A.I. Vogel's Textbook	
			of Quantitative Chemical	
			Analysis. Prentice Hall,	
			Science, 2000.	

Sep 4 – 11, 2024	*Unit 3 -	Lecture through,	James P. Landers,	MCQ test
(Day Order 1-6)	Separation	PPT andvideo	Handbook of Capillary	on Unit 3
	Techniques:	presentations	and Microchip	Other
3*	3.2 Capillary		Electrophoresis and	Component
	Electrophoresis		Associated	(15 Marks)
	(Capillary Zone		<i>Microtechniques</i> , USA:	
	and Capillary Gel)		CRC, 2008. Skoog, D.A, West, D.M.	
			Fundamentals of	
	4.3 Recrystallisation,		Analytical Chemistry.	
3	Sublimation - Types,		Thomson Asia,2014.	
	techniques and		Vogel, A.I. Vogel's	
	applications		Textbook	
			of Quantitative Chemical	
			<i>Analysis</i> . PrenticeHall, Science, 2000.	
Sep 12 - 20, 2024	*3.2 Gel	Lecture through		Group
(Day Order 1- 6)	Electrophoresis	chalk and		Discussion
3*	– Agarose and	blackboard and		
	Polyacrylamide,	practical exposure		
	Orthogonal-Field-		Separation of DNA by	
	Alternation, Gel		Capillary Electrophoresis	
	Electrophoresis (OFAGE)		by Herb Schwartzand	
	(OFAGE)		Andras Guttman.	
3	4.4 Criteria and test for			
	purity- melting point,			
	boiling point and			
<u> </u>	density	T , , 1 1		
Sep 23 - 26, 2024 (Day Order 1-4)	*3.2 Field Inversion	Lecture through, PPT andvideo	James P. Landers,	Conceptual
(Day Older 1-4)	GelElectrophoresis (FIGE)	presentations	Handbook of Capillary and Microchip	questions test
2*		presentations	Electrophoresis and	
-	Unit 3 Separation		Associated	
	Techniques		Microtechniques, USA:	
	3.1 Separation by		CRC, 2008.	
2	solvent extraction:			
3	Principle, Extraction by		Skoog, D.A, West, D.M.	
	chemicallyactive solvents, Soxhlet		Fundamentals of Analytical Chemistry.	
	extraction, Factors		Thomson Asia,2014.	
	Influencing the			
	Extraction Efficiency.		Vogel, A.I. Vogel's	
			Textbook of Quantitative	
			Chemical Analysis.	
			Prentice	
			Hall, Science, 2000. PrenticeHall, Science,	
			2000.	
Sep 27 – Oct 3, 2024	C.A. Test – II			<u>.</u>
Oct 4 - 5, 2024	*3.2	Lecture through,	Landers, James P.	Conceptual
JUL 1 J, 2024	5.2	Lecture unough,	Lunders, sumes 1.	Conceptual

Immunoelectrophoresis	PPT and	Handbook of	questions test
3.4 Separation by Precipitation, methods	presentations	<i>Electrophoresis.</i> USA: CRC, 1996.	
Ignition & Incineration		Skoog, D.A,	
of Precipitate,		West, D.M.	
		v	
		-	
		-	
		Vogel's Textbook	
		of Quantitative	
		-	
*3.3 Separation of	Lecture through		Group
Proteins/ DNA using	PPT and video	Walker,J,	Discussion
Gel	Presentations	Principles And	
Electrophoresis	Practical exposure	Techniques of	
(Practical)		2	
3.4 Nucleation. Crystal			
Growth, Solubility		2007	
Product			
		Skoog, D.A,	
		•	
		-	
		-	
		2014.	
		Vogel, A.I.	
		Vogel's Textbook	
		of Quantitative	
		Chemical	
		Chemical Analysis. Prentice Hall, Science,	
	 3.4 Separation by Precipitation, methods of Filtering, Drying- Ignition & Incineration of Precipitate, *3.3 Separation of Proteins/ DNA using Gel Electrophoresis (Practical) 3.4 Nucleation, Crystal Growth, Solubility 	 3.4 Separation by Precipitation, methods of Filtering, Drying- Ignition & Incineration of Precipitate, *3.3 Separation of Proteins/ DNA using Gel Electrophoresis (Practical) *4 Nucleation, Crystal Growth, Solubility video presentations video presentations Video presentations 	3.4Separation by precipitation, methods of Filtering, Drying- Ignition & Incineration of Precipitate,video presentationsCapillary Electrophoresis.3.4Separation of Precipitate,Skoog, D.A, West, D.M. Fundamentals of Analytical Chemistry. Thomson Asia, 2014. Vogel, A.I. Vogel's Textbook of Quantitative Chemistry and Molecular*3.3Separation of Proteins/ DNA using GelLecture through PPT and video PresentationsWilson, K, Walker, J, Principles And Techniques of Biochemistry and Molecular Biology. 6th edition Cambridge University Press, 20073.4Nucleation, Crystal Growth, Solubility ProductSkoog, D.A, West, D.M. Fundamentals of Analytical Chemistry. Thomson Asia, 20073.4Nucleation, Crystal Growth, Solubility ProductSkoog, D.A, West, D.M. Fundamentals of Analytical Chemistry. Thomson Asia, 20073.4Nucleation, Crystal Growth, Solubility ProductSkoog, D.A, West, D.M. Fundamentals of Analytical Chemistry. Thomson Asia, 2014. Vogel's Textbook of Quantitative

Oct 16 - 22, 2024	*3.3 Separation of	Lecture through	Wilson, K,	
(Day Order 1 to	Proteins/ DNA using	PPT and practical	Walker,J,	
6)	Gel	demonstration	Principles And	
3*	Electrophoresis		Techniques of	
	(Practical)		Biochemistry and	
			Molecular	
	3.4 Solubility Product,		Biology. 6th	
	Principle, Factors		edition	Numerical on
3	affecting solubility,		Cambridge	solubility
	Purity of Precipitates,		University Press, 2007	product
	Co-precipitation and			
	Post Precipitation		Skoog, D.A,	
			West, D.M.	
			Fundamentals of	
			Analytical	
			Chemistry.	
Oct 23 - 24, 2024				
(Day Order 1 to	REVISION			
2)				