

UNIVERSITY OF MADRAS
M.Sc., DEGREE PROGRAMME IN CHEMISTRY
SYLLABUS WITH EFFECT FROM 2023-2024

Title of the Course	CHROMATOGRAPHIC SEPARATIONS					
Category	SEC		Credits	2	Course Code	SKILL-D
Instructional hours per week	Lecture	Tutorial	Lab Practice		Total	
	1		1		2	
Prerequisites	Basic knowledge of chemistry					
Objectives of the course	<p>To understand the role of separation techniques</p> <p>To identify the suitable chromatographic technique to separate samples</p> <p>To study the separations of anions and cations using chromatography</p> <p>To differentiate, isolate and characterize the various types of compounds present in liquids using HPLC</p> <p>To understand the principle of GC</p>					
Course Outline	<p>UNIT-I: Separation methods Distillation, Solvent Extraction, Flootation, Dialysis – Principle – theoretical concepts, operation and applications.</p> <p>UNIT-II: Chromatographic Methods General aspects of chromatography, classification, mechanism, Band broadening and column efficiency. Column chromatography – Construction and operation of column, choice of adsorbents, eluents and applications.</p> <p>UNIT-III: Paper and TLC Paper chromatography – Mechanism of separation, qualitative and quantitative applications. Thin layer Chromatography – Choice of adsorbent, solvents and applications. High performance thinlayer chromatography (HPTLC).</p> <p>UNIT-IV: Ion-exchange Ion-exchange chromatography – principle and techniques. Applications- Separation of Zn and Mg / Cd and Zn with amberlite resin.</p> <p>UNIT-V: GD & HPLC Gas chromatography – Principle, instrumentation – columns and detectors, applications. High Performance Liquid Chromatography – Theory, columns, detectors and applications</p>					
Extended Professional Component (is apart of internal component only, Not to be included in the external examination question paper)	<p>Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC-CSIR/GATE/TNPSC others to be solved (To be discussed during the Tutorial hours)</p>					
Skills acquired from this course	<p>Knowledge, Problem solving, Analytical ability, Professional Competency, Professional Communication and Transferable skills.</p>					

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Recommended Text	<ol style="list-style-type: none"> 1. Thin Layer Chromatograph – Egon Stahl, Toppan Printing Co., Pvt, Ltd., II Edn., 1969 2. 2 Physical and Chemical Methods of Separation – E.W. Beg. McGraw Hill, 1963. 3. 3 Gas Chromatography (Analytical Chemistry by Open Learning) – John Willet, John Wiley & Sons, 1991 4. Sons, 1991 5. Instrumental Methods of Analysis – Willard, Merrit, Dean and Settle, VI Edition, CBS Publishers and Distributors, 1986. 7. Principles of Instrumental Analysis – Skoog, Holler & Nieman, Saunders College Publishing, V Edition, 2000
Reference Books	<ol style="list-style-type: none"> 1. Treatise on Analytical Chemistry – Kolthoff and Elwing (all series). 2. Quantitative Analysis – Day and Underwood 3. Comprehensive Analytical Chemistry – Wilson and Wilson (all series). 4. Physico – Chemical Techniques of Analysis – P.B. Janardhan, Vol. I & II. 5. Modern Analytical Chemistry – W.F. Pickering, Maroel Dec, 1971. 6. Gas Analysis and Testing of Gaseous Materials – Alteri, Mmer. Gas Asso. 1965. 7. Quantitative Analysis Using Chromatographic Techniques – E.Katz, John Wiley & Sons Ltd, 1987
Website and e-learning source	<ol style="list-style-type: none"> 1. https://www.youtube.com/watch?v=qdmKGskCyh8-UinYU 2. https://www.youtube.com/watch?v=23W5Z_redfs-3pYU 3. https://www.youtube.com/watch?v=N96JaRnE7n0-ExtractionMethods 4. https://www.youtube.com/watch?v=8Q0VfIbhEmM-Ion Exchange Chromatography