Course Specifications

Course Title:	**Techniques in Chemical Separation**
Course Code:	**643CHEM-2**
Program:	**Master of Science in Chemistry**
Department:	**Chemistry**
College:	**Science**
Institution:	**King Khalid University**

Table of Contents

A. Course Identification

1. Credit hours:	2
2. Course type	
a.	University ☐ College ☐ Department ■ Others ☐
b.	Required ■ Elective ☐
3. Level/year at which this course is offered:	Level 3 / Year 2
4. Pre-requisites for this course (if any)**:**	No prerequisite
5. Co-requisites for this course (if any)**:**	No co-requisite

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	2	100%
2	**Blended**	0	0
3	**E-learning**	0	0
4	**Correspondence**	0	0
5	**Other**	0	0

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	15
2	**Laboratory/Studio**	0
3	**Tutorial**	15
4	**Others** (specify)	0
	Total	30
Other Learning Hours*		
1	**Study**	30
2	**Assignments**	30
3	**Library**	15
4	**Projects/Research Essays/Theses**	15
5	**Others** (specify)	0
	Total	90

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to deliver Chemical Separation Methods. The separation methods include Gas Chromatography (GC), Supercritical fluid chromatography (SFC), Liquid Chromatography (LC), and Capillary Electrophoresis. The course will equip students with critical thinking and developing separation methods by comparing the abovementioned methods.

2. Course Main Objective

The aim of the course is to:

- Enable students to understand the separation methods.
- Help the student to understand the principles and applications of the separation methods.
- Recognize the different between chromatography methods and their applications.
- Know the advantages and disadvantages of these methods.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	To gain the knowledge of the fundamental concepts and principles of separation methods	K1, K2, K3
1.2	To understand the different separation methods and link them with applications	K1, K2, K4
2	**Skills :**	
2.1	To analyze, interpret and explain the separation methods in the course topics.	S1, S2
2.2	To use gained knowledge to develop and/or apply specific sparation method	S1, S2
3	**Competence:**	
3.1	To present an oral explanation for a subject in the aspect of application	C1,C2, C3 and C4
3.2	To interact positively with colleagues in a group work.	C2, C3 and C4
3.3	To contribute with colleagues to prepare and deliver a presentation and report of group work	C2
3.4	To summarize the literature and sources for a specific topic in the course.	C4

C. Course Content

No	List of Topics	Contact Hours
1	Introduction Introduction to Analytical Chemistry Diagram of Analytical Chemistry Planar Chromatography	4
2	Basics of Chromatographic Analysis	4
3	High Performance Liquid Chromatography (HPLC) Gas Chromatography (GC)	6
4	Chromatographic Methods and Electrophoresis Capillary Electrophoresis	4
5	Supercritical Fluid Chromatography	4
6	Solid phase extraction (SPE)	4
7	Liquid-Liquid Extraction (LLE) Different Separations techniques	4
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	To gain the knowledge of the fundamental concepts and principles of chemistry separation methods	Lectures, interactive teaching sessions, Tutorials, problems solving sessions	Written exams, electronic quizzes, Oral discussion and examinations
1.2	To understand principles of separation methods and link them to the applications		
2.0	**Skills**		
2.1	To analyze, interpret and explain the separation methods in Analytical Chemistry	• Lectures • Tutorial	• Written exams • Oral discussion
2.2	To apply the gained knowledge to develop separation methods.		
3.0	**Competence**		
3.1	To demonstrate an oral explanation for a subject in the field.	Demonstration of basic skills through oral presentation.	Oral presentation.
3.2	To interact positively with colleagues in a group work.	• Interactive teaching sessions • Guided reading of books and articles	• Oral presentation on a group report • Discussion within a group • Written Reports and summaries
3.3	To contribute with colleagues to prepare and deliver a presentation and report of group work		
3.4	To summarize and evaluate the literature and sources for a specific topic in the course.		

2. Assessment Tasks for Students

#	*Assessment task	Week Due	Percentage of Total Assessment Score
1	Written Reports and summaries	5th	10
2	Oral quiz	8th	5
3	Presentations and reports	4-7th	5
4	Midterm exam-1	6th	15
5	Midterm exam-2	11th	15
6	Final exam	16th	50

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

10 office hours are offered for students for individual consultations. Communications are available on-site, phone conversations, and chatting by social media.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	1. D. A. Skoog, D. M. West, F. J. Holler, S. R. Crouch, Fundamentals of Analytical Chemistry, 9th ed.,Publisher: Mary Finch, 2004
Essential References Materials	1. G. D. Chastain, J. E. O'Reilly, G. Attard, C. Barnes, Instrumental Analysis, Oxford University Press Oxford, 2004. 2. D. Harris, Quantitative Chemical Analysis, 8th ed., 1982.
Electronic Materials	1- https://pressbooks.bccampus.ca/chem1114langaracollege/chapter/1-3-laboratory-techniques-for-separation-of-mixtures/
Other Learning Materials	No other learning materials.

2. Facilities Required

Item	Resources
Accommodation Classrooms, laboratories, demonstration) (.rooms/labs, etc	Classroom and computer lab
Technology Resources (.AV, data show, Smart Board, software, etc)	Accessible databases
Other Resources Specify, e.g. if specific laboratory equipment is) (required, list requirements or attach a list	-

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course delivery (teaching methods and assessment methods)	Students	Questionnaire
	Departmental Plan and curriculum committee; external reviewers	Reports and workshops
	Program Leader	Meetings
Course contents (update)	Departmental Plan and curriculum committee; external reviewers	Reports and workshops
Quality of learning resources	External reviewers	Reports

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Chemistry Department Council**
Reference No.	**Session number 22**
Date	**27/04/2021M / 15/09/1442H**