



هيئة تقويم التعليم

Education Evaluation Commission

المركز الوطني للتقويم والاعتماد الأكاديمي

National Center for Academic Accreditation and Evaluation

T6. COURSE SPECIFICATIONS (CS)

Course code:	CHEM 451
Course title:	<i>Chemical Separation and Chromatographic Methods</i>
Date:	03/04/1439 H - 21/12/2017 G

Course Specifications

Institution: King Saud University	Date: 03/04/1439 H - 21/12/2017 G
College/Department: College of Science / Department of Chemistry	

A. Course Identification and General Information

1. Course title and code CHEM451 Chemical Separation and Chromatographic Methods			
2. Credit hours 2 Credit hours; (1 Lecture + 1 Practical + 1 Tutorial)			
3. Program(s) in which the course is offered (If general elective available in many programs indicate this rather than list programs) Chemistry			
4. Name of faculty member responsible for the course Prof. Ahmed-Yacine Badjah-Hadj-Ahmed Dr. Ahmad Aqel Ifseisi TA: Ahmad Al-Abdelwahab			
5. Level/year at which this course is offered 7 th or 8 th levels / 4 th year			
6. Pre-requisites for this course (if any) CHEM351 Spectroscopic Analytical Methods & CHEM352 Electroanalytical Methods			
7. Co-requisites for this course (if any) No requests			
8. Location if not on main campus Main campus			
9. Mode of Instruction (mark all that apply)			
a. traditional classroom	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="70%"/>
b. blended (traditional and online)	<input type="checkbox"/>	What percentage?	<input type="text"/>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="text"/>
d. correspondence	<input type="checkbox"/>	What percentage?	<input type="text"/>
f. other (practical in laboratory)	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="30%"/>
Comments: In addition to traditional classroom and practical in laboratory, this course aim to encourage students to collect and demonstrate of the information from the related electronic resources			

B. Objectives

1. What is the main purpose for this course?

The main purpose of this course is to help the students to learn and understand several concepts in extraction and separation science. By the end of this course, students expected to:

- Understand the principles of separation methods
- Be familiar with the separation methods concepts, especially GC and HPLC techniques
- Know the proper separation tool for specific compounds and mixtures
- Learn how to treat with experimental data
- Recognize the specific factors influencing the separation techniques
- To familiarize students with the different chromatographic techniques used in separation of chemical mixtures

To develop the awareness in the students about the solvent extraction methods

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

This course also designed to give students the opportunity to evaluate and develop the contents of this course by using of new technology in teaching, such as using the internet resources for collection of the related information

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description:

This course designed and conducted to the related laboratory experiments to give the students the basic principles of the extraction and separation methods. This course covers several traditional and instrumental techniques in separation and chromatographic methods of analysis

1. Topics to be Covered

List of Topics (Lectures + Tutorial)	No. of Weeks	Contact hours
Introduction for separation methods	1	2
Traditional separation methods	1	2
Extraction methods	2	4
An introduction to chromatographic separations	1	2
Main fundamentals in chromatography methods	1	2
Classification of chromatographic methods	2	4
Chromatographic properties and evaluation	1	2
Applications of chromatography	2	4
Gas chromatography	2	4
High performance liquid chromatography	2	4
Total	15	30

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	25	5	28	---	---	58
Credit	1	---	1	---	---	2

3. Additional private study/learning hours expected for students per week.	3h
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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain).

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Recognize the principles of separation methods	-Lecture	-Quizzes
1.2	Describe the differences between traditional and instrumental separation techniques	-Discussion -Homework	-Direct questions -Homework assignments
1.3	Outline the most important extraction methods and recognize their principles	-Training and demonstration	-Midterm exam -Final exam
1.4	Recall knowledge of the fundamental aspects of the chromatographic techniques	-Laboratory experiments -Real examples	
1.5	Define the most useful separation techniques such as GC and HPLC		
1.6	Describe the mechanism of separation and elution modes		
1.7	Define and describe the most important parameters in the chromatograms resulted from the separation technique		
1.8	List the most important application areas for GC and HPLC		
1.9	Name the most suitable separation method for specific compounds and matrices		
2.0	Cognitive Skills		
2.1	Compare and differentiate between separation techniques	-Discussion -Homework	-Quizzes -Direct questions
2.2	Summarize and diagram the most important	-Solving problems	-Homework assignments

	components of GC and HPLC systems	-Laboratory experiments	-Midterm exam
2.3	Calculate the most important parameters extracted from separation process	-Connect of the knowledge with the real examples	-Laboratory reports
2.4	Interpret and evaluate chromatograms resulted from the separation technique		-Final exam
2.5	Justify the proper separation tool for specific compounds		
3.0	Interpersonal Skills & Responsibility		
3.1	Work independently and in group	-Solving problems with group	-Evaluating individual works
3.2	Demonstrate and analyze separation problems with group	-Discussion	-Homework assignments
3.3	Communicate ideas to other students in the laboratory	-Writing laboratory reports	-Evaluating laboratory reports
3.4	Use standard laboratory equipment and modern instrumentation		
3.5	Show leadership and creativity skills		
4.0	Communication, Information Technology, Numerical		
4.1	Use of computer and internet to search about the required information	-Provide these programs for students	-Observation
4.2	Use of computer programs such as Microsoft Excel or other mathematical tool to deal with the chromatographic parameters and evaluations	-Training the students -Encourage students to collect information through university provided Wi-Fi	-Demonstration -Short problems -Evaluating laboratory reports
5.0	Psychomotor		
5.1	Demonstrate good and safe handling of laboratory chemicals, glassware and equipment during experiments	Perform laboratory experiments individually and in groups	Laboratory reports and practical exams

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment (%)
1	Midterm exam	6-8	20
2	Assignment, discussion and homework's	---	10
3	Laboratory reports, quizzes and practical exams	---	30
4	Final exam	16-17	40

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

Office hours: 6 h/week
Laboratory assistance

E. Learning Resources

<p>1. List Required Textbooks</p> <ul style="list-style-type: none"> -Ibrahim Al-Zamil, “Analytical Chemistry, Instrumental Analysis” 5th Ed., Al-Khrigi Publisher, 2015. -G.D. Christian, P.K. Dasgupta, K.A. Schug, “Analytical Chemistry”, 7th Ed., John Wiley & Sons, 2013. -D.A. Skoog, F.J. Holler, S.R. Crouch, “Principles of Instrumental Analysis”, 6th Ed., Brooks Cole, 2006. -K. Robards, P.R. Hadad, P.E. Jackson, “Principles and Practice of Modern Chromatographic Methods”, Elsevier Academic Press, 2004.
<p>2. List Essential References Materials (Journals, Reports, etc.)</p> <p>Non</p>
<p>3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.</p> <ul style="list-style-type: none"> -All lectures are available on the web site (https://fac.ksu.edu.sa/aifseisi)
<p>4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.</p> <ul style="list-style-type: none"> -Microsoft Excel -Handouts and Power Point Presentations

F. Facilities Required

<p>Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)</p>
<p>1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)</p> <ul style="list-style-type: none"> -Lecture hall for 30 students equipped with modern teaching technology (projector, smart board, computer and internet) -Laboratory should be supplied with the related chemicals, glassware and the required instruments -Laboratory in accordance with the rules of safety and body protection accessories should be available to all students
<p>2. Technology resources (AV, data show, Smart Board, software, etc.)</p> <ul style="list-style-type: none"> -The presence of computer, smart board and internet access in the in classrooms -E-podium & data show available in all lecture rooms
<p>3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)</p> <ul style="list-style-type: none"> -The presence of chemicals and standards used in analytical experiments -The presence of related analytical equipment and instruments such as GC, HPLC, separation columns and accessories, pH meter, analytical balance, ...etc

G. Course Evaluation and Improvement Processes

<p>1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <ul style="list-style-type: none"> -Course evaluation by students -Student faculty meeting -Student questionnaires
<p>2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> -Revision by the analytical chemistry regular committee meeting -Survey of the graduated students

3. Processes for Improvement of Teaching

- Attending workshops and conferences given by experts on the teaching and learning methodologies
- Monitoring of teaching activities by senior faculty members
- Training through Deanship of Skills Development
- Increase the using of modern technology methods in teaching such as learning management system

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

Checking a sample of the student's work, exams and assignments by other staff member in the department

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement

- Collecting all reports and evaluations at the end of the year for a reviewing purpose
- Invite external expert to evaluate the course
- Workshops for the teachers
- Consult teachers with long experience

Name of Instructor: Prof. Ahmed-Yacine Badjah-Hadj-Ahmed

Signature:



Date Report Completed: 03/04/1439 H - 21/12/2017 G

Name of Field Experience Teaching Staff: Separation and chromatographic methods

Program Coordinator: Prof. Zeid A. AlOthman

Signature:



Date Received: 03/04/1439 H - 21/12/2017 G