

ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

**The National Commission for Academic Accreditation &
Assessment**

**Course Specifications
(CS)**

chem 342N : Instrumental chemical analysis(1)

Course Specifications

Institution University of Dammam

Date

College/Department **College of Science Girls in Dammam**

A. Course Identification and General Information

1. Course title and code: Instrumental chemical analysis(1)chem 342N	
2. Credit hours 3 hours per week	
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	
5. Level/year at which this course is offered major 6/ third year	
6. Pre-requisites for this course (if any) Chem 241	
7. Co-requisites for this course (if any) Chem 443	
8. Location if not on main campus College of Science Girls in Dammam	
9. Mode of Instruction (mark all that apply)	
a. traditional classroom	What percentage?
60 b. blended (traditional and online)	What percentage?
30 c. e-learning	What percentage?
10 d. correspondence	What percentage?
f. other	What
	<input type="text"/>
percentage? Comments:	<input type="text"/>

B Objectives

1. What is the main purpose for this course?

that the student understands the nature of electromagnetic radiation and their properties and methods of their impact on the material.

to understand of the techniques used in chemical analysis devices and applications in the field of quantitative analysis.

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)

Use of information technology and Internet references to identify the developments taking place on the automated analysis methods

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

Course Description: This course covers about a half a semester of instrumental analysis which is a standard part of the undergraduate chemistry curriculum. Most often chemists do this using instruments of some sort. Machines like mass spectrometers or gas chromatographs can indicate both what's in a sample (qualitative) as well as how much of something there is (quantitative). Students who complete this class will understand that analytical instruments are not black

boxes, but rather complex tools whose utility depends in detail on how analysts both configure and apply them. students will learn facts about major classes of instruments commonly used in chemical analysis

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours

Electromagnetic radiation - the interaction of radiation with the material - the absorption and emission of radiation by atoms and molecules - types of spectrum + solvent extraction	1	3
Components of a spectrum + continued solvent extraction + Exercises	2	3
Methods of molecular absorption in the visible and ultraviolet – Beer’s law and deviations from Beer's law + continued solvent extraction	3	3
Methods of calibration - the relationship between the absorption UV-visible region and the molecular structure + Introduction to chromatographic methods + Exercises	4	3
Solvents used + quantitative analysis + spectral calibrations + Ways distracting scan + continued introduction to chromatographic methods	5	3
Molecular emission and luminescence (fluorescence and phosphorescence) + liquid-solid chromatography + Exercises	6	3
Flame atomic emission + liquid chromatography (HPLC) + examples and exercises	7	3
Flame molecular emission + exclusion size chromatography and ion exchange	8	3
Atomic Absorption + ion exchange chromatography	9	3

Interactions in atomic absorption and emission + planar chromatography	10	3
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Electrothermal atomization + sparkle atomic + gas chromatography	11	3				
Plasma atomic emission + continued gas chromatography	12	3				
Offers search	13	3				
2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other office	Total
Contact Hours	39				52	91
Credit						

3. Additional private study/learning hours expected for students per week.



4office hours per week + 3 hours per week x13 = 91

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	Course Teaching	Course Assessment
1.0	Knowledge		
1.1	Describe the basic principles and the instrumental design of a variety of analytical techniques, including: spectrochemical (molecular and atomic), chromatographical, of analysis	In class lecturing where current topics are interrelated the past and future topics. Basic principles	In-class short exams, majors and final exams <ul style="list-style-type: none"> • Homework assignments • Presenting the

6. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination,	Week Due	Proportion of Total
1	Class activities (in-class quizzes, homework)	Weekly	15
2	Case study (including written and oral presentations)	Week 14	5
3	Major Exam I	Week 6	20
4	Major Exam II	Week 11	20
5	Final Exam	Week 16	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 (4 hours per week + appointments)

- Help session (problem solving): 1 hour per week
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E Learning Resources

1. List Required Textbooks

Analytical Chemistry Instrumental Analysis by Ibrahim Al-Zamil. Khuraiji House Publishing

2. List Essential References Materials (Journals, Reports, etc.)

- D.A. Skoog, F.J. Holler, T.A. Niemann “Principles of Instrumental Analysis” , 6th Ed.,

2006, Brooks/Cole Thomson Learning, London.

□ Instrumental Analysis. Henry H. Bauer, Gary D. Christian, and James E. O'Reilly. Allyn and Bacon, Inc

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

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4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

www.chemistryonline.com

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

Power point presentations and other handouts posted on the WebCT for the students enrolled in the course.

F. Facilities Required

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.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

A classroom containing at least 50 seats

2. Computing resources (AV, data show, Smart Board, software, etc.)

- Scientific calculator

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

Not applicable

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Course evaluation by students
 - Faculty – students general gathering

2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department

- **Peer consultation on teaching**
- **Departmental council discussions**
- **Discussions with the group of faculty teaching both the lab and lecture portions of the course.**

3 Processes for Improvement of Teaching

- **Conducting workshops presented by experts on the teaching methodologies**
- **Periodical departmental revisions on its methods of teaching**
- **Monitoring of teaching activities by senior faculty members**

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)

- **Providing samples of all kind of assessment in the departmental course portfolio of the course**
- **Assigning group of faculty members teaching the same course to grade same questions for various students. Faculty from other institutions are invited to review the accuracy of the grading policy**
- **Conducting standard exams such as the American Chemical Society exams or others.**

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

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- **The course material and learning outcome are periodically reviewed and the changes to be taken are in the departmental and higher councils.**
 - **The chairman of the department and faculty members take the responsibi**

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