



Course Specifications

Course Title:	Computer Applications in Chemistry
Course Code:	CHEM 310
Program:	Bachelor of Science in Chemistry
Department:	Chemistry
College:	Science
Institution:	King Saud University

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A. Course Identification

1. Credit hours: 2 (2+0+0)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
3. Level/year at which this course is offered: 3 rd year, 5 th or 6 th level
4. Pre-requisites for this course (if any):
5. Co-requisites for this course (if any):

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	15	50%
2	Blended		
3	E-learning	15	50%
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	15
2	Laboratory/Studio	
3	Tutorial	15
4	Others (specify)	
	Total	30

B. Course Objectives and Learning Outcomes

1. Course Description Nowadays, computers are used in many cases in all fields including chemistry. This course introduces the applications of computers in chemistry. Topics of this course include three main arenas to solve chemical problems and present the scientific information; applications of computer in data analysis and statistics, applications of computer in chemical structure drawing and molecular modeling, and applications of computer in literature searching and chemical databases. The content of this course should be evaluated and periodically updated based on the recent developments and the learning outcomes of the labor market.
2. Course Main Objective The main objective of this course is to develop the competencies of the students in using the computer to treat the problems related to chemistry.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	To outline the basic tools of computer in relation with chemistry	K3
1.2	To describe the main applications of computer in terms of statistical data analysis, chemical structures drawing, and literature searching databases	K3
2	Skills	
2.1	To recognize the applications of computer in the areas of data analysis, statistics, molecular drawing, and literature searching	S2
2.2	To predict the proper software for specific problems in chemistry	S4
2.3	To carry out statistical analysis of scientific data	S2
2.4	To research using suitable literature websites and the chemical databases	S2
2.5	To represent of molecular structures using certain computer programs in chemistry	S2
3	Values	
3.1	To use of computer programs and software's such as Microsoft excel, OriginLab, ChemOffice, ... etc. to deal with various problems related to chemistry	V1
3.2	To demonstrate chemistry problems using computer tools independently and with group	V2
3.3	To communicate the results of scientific work in electronic formats	V2

C. Course Content

No	List of Topics	Contact Hours
1	An overview of the applications of computer in chemistry	2
2	Applications of computer in data analysis and statistics	2
3	Software for statistical analysis (e.g., Microsoft excel and OriginLab)	6
4	Applications of computer in chemical structure drawing and molecular modeling	2
5	Software for molecular modeling and drawing (e.g., ChemOffice and HyperChem)	8
6	Applications of computer in literature searching and the chemical databases	2
7	Literature searching websites and the chemical databases (e.g., Chemical Abstracts Service)	8
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 and Understanding		
1.1	To outline the basic tools of computer in relation with chemistry	-Lectures -Internet websites	Assignments Homeworks

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.2	To describe the main applications of computer in terms of statistical data analysis, chemical structures drawing, and literature searching databases		Midterm exam Final exam
2.0	Skills		
2.1	To recognize the applications of computer in the areas of data analysis, statistics, molecular drawing, and literature searching	-Lectures -Internet websites	Assignments Homeworks Group project Midterm exam Final exam
2.2	To predict the proper software for specific problems in chemistry	-Chemical structure drawing software	
2.3	To carry out statistical analysis of scientific data	-Statistical data analysis software	
2.4	To research using suitable literature websites and the chemical databases	-Literature searching and the chemical databases	
2.5	To represent of molecular structures using certain computer programs in chemistry		
3.0	Values		
3.1	To use of computer programs and software's such as Microsoft excel, OriginLab, ChemOffice, ... etc. to deal with various problems related to chemistry	-Lectures -Internet websites -Chemical structure drawing software	Assignments Homeworks Group project Midterm exam Final exam
3.2	To demonstrate chemistry problems using computer tools independently and with group	-Statistical data analysis software	
3.3	To communicate the results of scientific work in electronic formats	-Literature searching and the chemical databases	

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homeworks and assignments	Weekly	20
2	Midterm exam	7	20
3	Group project and presentation	14	20
4	Final exam	16	40

*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:
Office hours (5 h/week)

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	
Essential References Materials	-Computer Applications in Chemistry, Kishor Arora, 2005, Anmol Publications Pvt Ltd. -Excel for Chemists: A Comprehensive Guide, 3 rd ed, E. Joseph Billo, 2011, John Wiley & Sons, Inc.
Electronic Materials	-Chemical structure drawing software -Statistical data analysis software -Literature searching and the related data bases
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Regular classroom
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart board, data show system, connection to the internet, chemical structure drawing software, and statistical data analysis software
Other Resources (Specify, e.g., if specific laboratory equipment is required, list requirements or attach a list)	Personal Computer

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Colleagues and staff	Periodical department revisions on methods of teaching and course content by experts on the teaching
Extent of achievement of course learning outcomes	Colleagues and staff	
Quality of learning resources	Departmental council	

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	
Reference No.	
Date	