

National Commission for Academic Accreditation & Assessment

Course Specification

Institution	KING KHALID UNIVERSITY
College/Department	College of Science/Department of Chemistry

A Course Identification and General Information

1. Course title and code: Graduation research Chem 470
2. Credit hours 3 Hrs
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) BSc of Science in Chemistry
4. Name of faculty member responsible for the course Prof. Dr. Kamel Hussein Shaker Elian
5. Level/year at which this course is offered Level -7, 4 th year
6. Pre-requisites for this course (if any) NO- Pre-requisites
7. Co-requisites for this course (if any) NO- Co-requisites
8. Location if not on main campus --- N A---

B Objectives

<p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <p>Introducing the student with the scientific research approach, and how to perform and write it. Student's knowledge about the library and how to use it to get specific information from periodicals and scientific magazines. Developing the student's special abilities in the scientific research. Help the student to acquire the skills of using the library and dealing with various periodicals and scientific magazines. Developing the student's skills in the scientific and experimental research and training them on operating the instruments, as well as on getting and explaining the results. To help the student to be acquainted with the various scientific experiments that are related to the research and train them on the various laboratory instruments.</p>
<p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Experimental part will be done in Lab. <input type="checkbox"/> E-Learning System is being introduced. <input type="checkbox"/> Students can download course material which can be helpful for the students learning. <input type="checkbox"/> On-line classes are being introduced in the university using E-Learning System (also termed as Blackboard Training System). <input type="checkbox"/> For the research, use internet such as Wikipedia, Googleetc. <input type="checkbox"/> for the research use library online (Depending on the research topic and the type of the course).

C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

1 Topics to be Covered		
List of Topics	No of Weeks	Contact hours
<ul style="list-style-type: none"> • Teach the student a theoretical knowledge about what is the research, its methods, tools and procedures to collect the needed data from its various resources. 	1	1
<ul style="list-style-type: none"> • Developing the skills of the scientific thinking in the students to help them feel the scientific problems that are related to their precise specialization and solve them. 	1	1
<ul style="list-style-type: none"> • Developing the student's skills that are related to using the library and teaching him how to find the information from the various periodicals and scientific magazines. 	1	1
<ul style="list-style-type: none"> • Training students to make a comprehensive library survey about a specific subject/topic and write it properly and discussing it with them. 	3	3

<ul style="list-style-type: none"> • Teaching the students the way to write a research including: <ul style="list-style-type: none"> - The Title: brief and representing the research topic. - The Introduction: serves the research topic. - The Scientific Experiment: should be written in an easy and clear way. - The Results: should be organized, categorized, divided, scheduled and presented by charts if necessary. - The Discussion: all the chemical, physical, and spectroscopic aids should be used to certify the results. - The Conclusion: to clarify the most important findings of the research. - The References: should be written in a scientific way. - The Summary: should be written in Arabic and English. 	9	9
<ul style="list-style-type: none"> • Preparing some of the organic and inorganic compounds, then separating and purifying them: <ul style="list-style-type: none"> ✓ Performing advanced experiments that are related to these compounds, ✓ Training the students on using the advanced scientific instruments and on the ways to prepare and analyze the samples, and how to explain the obtained results, ✓ Making physical measurements for some prepared materials such as thermal analysis, corrosion and adsorption, ✓ Studying the kinetics of some organic and inorganic reaction to assign the mechanisms of these reactions. ✓ Using the available laboratory instruments to define and determine the concentration of some environmental pollutants. ✓ Using all the chemical, physical, analytical and spectroscopic means to support the results of the research. • Or an applied subject, collecting samples, treatments, analyses, discussing of the data, 	60 Practical Contact hours (4 Contact hours every week)	60 Practical Contact hours (4 Contact hours every week)

2 Course components (total contact hours per semester):				
Lecture: 15 supervisor 15 Coordinator	Tutorial: -----	Laboratory -- 60 --	Practical/Field work/Internship -----	Other: -- N A --

3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week)

Approved by the supervisor of the project.

Depend on the research topic and the type of the course.

Assignments 4 Hrs

Homework's 4 Hrs

Tutorials 4 Hrs

Blackboard 8 Hrs

Total 20Hrs

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop
- A description of the teaching strategies to be used in the course to develop that knowledge or skill
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned

a. Knowledge

(i) Description of the knowledge to be acquired

After completion of the course students should be able to:

- Teach the student a theoretical knowledge about what is the research, its methods, tools and procedures to collect the needed data from its various resources.
- Developing the skills of the scientific thinking in the students to help them feel the scientific problems that are related to their precise specialization and solve them.
- Developing the student's skills that are related to using the library and teaching him how to find the information from the various periodicals and scientific magazines.
- Training students to make a comprehensive library survey about a specific subject/topic and write it properly and discussing it with them.
- Teaching the students the way to write a research
- Preparing some of the organic and inorganic compounds, then separating and purifying them in Lab.
- Using all the chemical, physical, analytical and spectroscopic means to support the results of the research.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures
- Discussions
- Familiarity with the library

<ul style="list-style-type: none"> - Solve problems - Practical works - Dealing with the Internet and Blackboard <p><input type="checkbox"/> Class room lectures</p> <p>Introductory lecture gives an overview of the content and significance of the course and of its relationship to students' existing knowledge. Each subsequent lecture begins with a similar overview linking the particular content of the presentation to the general overview.</p> <p><input type="checkbox"/> Assignments</p> <p>Individual handwritten assignments require use of library reference material and web sites to identify information required to complete tasks.</p> <p><input type="checkbox"/> E-learning</p> <p>E-learning is a planned teaching/learning experience that uses a wide spectrum of technologies, mainly about Internet or computer-based, to reach learners</p> <p><input type="checkbox"/> For the research, use internet such as Wikipedia, Googleetc.</p> <p><input type="checkbox"/> Familiarity with the library and also online using.</p>
<p>(iii) Methods of assessment of knowledge acquired</p> <p><input type="checkbox"/> 30 % supervisor Include:</p> <ul style="list-style-type: none"> - Student follow-up and punctuality 10% - Commitment to the tasks and duties 20% <p><input type="checkbox"/> 20% for both internal examiners Presentation and discussion of research For every examiner 10%</p> <p><input type="checkbox"/> 20% for committee of Graduation research Distributed:</p> <ul style="list-style-type: none"> 8 % volume of work 5% references 5% discussion and conclusion 2% Final form of the research <p><input type="checkbox"/> two external referees assessment 10% Depend on presentation and thesis</p> <p><input type="checkbox"/> Exam and duties 20%</p> <ul style="list-style-type: none"> ✓ Final theoretical exam 10% ✓ Poster 5 % ✓ Follow up and home works on black board 5 %
<p>b. Cognitive Skills</p>
<p>(i) Cognitive skills to be developed</p> <p><input type="checkbox"/> The ability to use the Internet for more information specially youtube.</p> <p><input type="checkbox"/> The ability to deal with the Internet and Blackboard</p> <p><input type="checkbox"/> Demonstrate good understanding and retention of basic and advanced chemical principles and factual knowledge in the core areas of organic chemistry and instrumentation, biochemistry, inorganic chemistry, physical chemistry and analytical chemistry.</p> <p><input type="checkbox"/> Demonstrate the ability to apply basic mathematics (arithmetic and algebra) and basic chemical principles to find solutions to simple quantitative problems and situations.</p>

<input type="checkbox"/> The skill or the ability to identify concepts and terminology to your research. <input type="checkbox"/> The skill or the ability to obtain certain information from periodicals journals and databases. <input type="checkbox"/> The skill of using practical techniques in the laboratory according to the kind of the research.
<p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <input type="checkbox"/> Lectures, discussions and presentations with supervisor and also Coordinator. <input type="checkbox"/> Provide experimental evidence and theoretical interpretations of the properties and characterization of inorganic or organic compounds. <input type="checkbox"/> Introduce concepts relating to the bonding forces that underlie molecular structure.
<p>(iii) Methods of assessment of students cognitive skills</p> <input type="checkbox"/> 30 % supervisor Include: - Student follow-up and punctuality 10% - Commitment to the tasks and duties 20% <input type="checkbox"/> 20% for both internal examiners Presentation and discussion of research For every examiner 10% <input type="checkbox"/> 20% for committee of Graduation research Distributed: 8 % volume of work 5% references 5% discussion and conclusion 2% Final form of the research <input type="checkbox"/> two external referees assessment 10% Depend on presentation and thesis <input type="checkbox"/> Exam and duties 20% <input checked="" type="checkbox"/> Final theoretical exam 10% <input checked="" type="checkbox"/> Poster 5 % <input checked="" type="checkbox"/> Follow up and home works on black board 5 %
<p>c. Interpersonal Skills and Responsibility</p>
<p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <input type="checkbox"/> Provide experimental evidence and theoretical interpretations of the properties and characterization of compounds. <input type="checkbox"/> The ability to work with the others in the Lab. <input type="checkbox"/> The ability to work with the computers and by using the Internet. <input type="checkbox"/> The ability to use the library for research purposes.

<input type="checkbox"/> Self-reliance in the testing results and conclusion
<p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <input type="checkbox"/> One group assignment in which 25% of assessment is based on individual's contribution to the group task. (Instructor meets with each group part way through project to discuss and advise on approach to the task)
<input type="checkbox"/> Two individual assignments requiring investigation using internet and library resources as a means of developing self-study skills. <input type="checkbox"/> Collaborative learning <input type="checkbox"/> Team work
<p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <input type="checkbox"/> Assignments and reports. <input type="checkbox"/> Evaluation Form to the coordinator <input type="checkbox"/> Assessment of group assignment includes component for individual contribution. <input type="checkbox"/> Capacity for independent study assessed in individual assignments.
<p>d. Communication, Information Technology and Numerical Skills</p>
<p>(i) Description of the skills to be developed in this domain.</p> <input type="checkbox"/> The ability to deal with computers. <input type="checkbox"/> The ability to deal with laboratory equipment's and tools. <input type="checkbox"/> The ability to calculate the results of experiments. <input type="checkbox"/> What relation of Data, Information, and Knowledge. <input type="checkbox"/> Concept of inorganic and organic chemistry. <input type="checkbox"/> Develop inorganic and organic chemistry Skills as well as physical and analytical chemistry skills.
<p>(ii) Teaching strategies to be used to develop these skills</p> <input type="checkbox"/> Student assignments for all about chemistry skills. <input type="checkbox"/> Student assignments for writing and presenting skills for thesis <input type="checkbox"/> Use computers and Presentation and Demonstration.
<p>(iii) Methods of assessment of students numerical and communication skills</p> <input type="checkbox"/> Assessment models for examiners and supervisor
<p>e. Psychomotor Skills (if applicable)</p>
<p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p>Drawing the modelling of molecules structure- Molecular modelling</p>
<p>(ii) Teaching strategies to be used to develop these skills.</p> <p>Modelling Drawing –drawing represent the compounds.</p>
<p>(iii) Methods of assessment of student's psychomotor skills.</p> <input type="checkbox"/> Main parts of the questions depend on drawing.

Only the good or bad decision on the basis of morality.

5. Schedule of Assessment Tasks for Students During the Semester

Assessment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	<input type="checkbox"/> 30 % supervisor Include: - Student follow-up and punctuality 10% - Commitment to the tasks and duties 20%	15	30%
2	<input type="checkbox"/> Internal examiners 20% - Presentation and discussion of research For every examiner 10%	16	20%
3	<input type="checkbox"/> 20% for committee of Graduation research Distributed: 8 % volume of work 5% references 5% discussion and conclusion 2% Final form of the research	16	20%
4	<input type="checkbox"/> Two external referees assessment 10% Depend on presentation and thesis	16	10%
5	Exam and duties 20% Ten marks as a final theoretical exam on the basics of scientific research acquired by the student through a number of lectures. Five marks follow-up and duties on Blackboard. Five marks for a poster presentation showing the work done in a special celebration determined by the department at the end of the first term.	16	20%

D. Student Support

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

- Total 10 hrs of office hours for individual student consultations and academic advice per week.
- Blackboard as mentioned before.

E Learning Resources

1. Required Text(s)

<p>Approved by the supervisor of the project.</p> <p>Depend on the research topic and the type of the course.</p>
<p>2. Essential References</p> <p>Approved by the supervisor of the project.</p> <p>Depend on the research topic and the type of the course.</p>
<p>3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)</p> <p>Approved by the supervisor of the project.</p> <p>Depend on the research topic and the type of the course.</p>
<p>4-.Electronic Materials, Web Sites etc</p> <p>Approved by the supervisor of the project.</p> <p>Depend on the research topic and the type of the course.</p>
<p>5- Other learning material such as computer-based programs/CD, professional standards/regulations</p> <p>Approved by the supervisor of the project.</p> <p>Depend on the research topic and the type of the course.</p>

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)
<p>1. Accommodation (Lecture rooms, laboratories, etc.)</p> <p>Lecture rooms – 01 Number of seats in each class room – 15 Laboratories - 1 Accessories – Overhead projector 1 Data show -01</p>
<p>2. Computing resources</p> <p>MS-Office Software and Internet connection Library 15 computers</p>
<p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p> <p>Overhead projector Computer for individual students Internet access Networked laboratory systems Isisdraw and Chemdraw and Chemoffice</p>

G Course Evaluation and Improvement Processes

<p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <p><input type="checkbox"/> Confidential completion of standard course evaluation questionnaire. <input type="checkbox"/> Focus group discussion with small groups of students.</p>
<p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <p><input type="checkbox"/> Observations and assistance from colleagues, independent assessment of standards achieved by students, <input type="checkbox"/> Independent advice on assignment tasks, etc.</p>
<p>3 Processes for Improvement of Teaching</p> <p><input type="checkbox"/> Workshops on teaching methods, review of recommended teaching strategies. <input type="checkbox"/> Approved by the supervisor of the project.</p> <p><input type="checkbox"/> Depend on the research topic and the type of the course.</p> <p><input type="checkbox"/> Every student should write proposal with time table. <input type="checkbox"/> Every student should write a poster and will be seen in a conference in a department. <input type="checkbox"/> Every student should write his thesis by using the electronic file model. <input type="checkbox"/> Every student should read course specification of the course <input type="checkbox"/> Every student should write progress report of his work at least two times. <input type="checkbox"/> We must have two laboratories the first one for the chemical work and the 2nd one for computers and</p>

<p>Internet connection.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Confidential completion of standard course evaluation questionnaire. <input type="checkbox"/> Focus group discussion with small groups of students. <p>the ability to deal with computers.</p> <ul style="list-style-type: none"> <input type="checkbox"/> The ability to deal with laboratory equipment's and tools. <input type="checkbox"/> The ability to calculate the results of numerical experiments. <input type="checkbox"/> What relation of Data, Information, and Knowledge. <input type="checkbox"/> Concept of inorganic and organic chemistry. <input type="checkbox"/> Develop inorganic and organic chemistry Skills as well as physical and analytical chemistry skills. <input type="checkbox"/> Student assignments for all about chemistry skills. <input type="checkbox"/> Student assignments for writing and presenting skills for thesis <input type="checkbox"/> Use computers and Presentation and Demonstration.
<p>4. Processes for Verifying Standards of Student Achievement (eg. 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)</p> <p>Check marking of a sample of examination papers or assignment tasks,</p>
<p>5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Revises the course in the next semester by assessing the feedback forms, completion of the course and understanding of the subject by students. <input type="checkbox"/> Follow-up websites in his subject. <input type="checkbox"/> Review of modern periodicals journals and databases in his subject