

# *National Commission for Academic Accreditation & Assessment*

## **Course Specification**

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| Institution: King Khalid University.                           |
| College/Department: College Of Science / Chemistry Department. |

### **A Course Identification and General Information**

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| 1. Course title and code: Organic Chemistry 418 (Organometallic compounds).  |
| 2. Credit hours: 2 hours.  |
| 3. Program(s) in which the course is offered. B.Sc. Organic Chemistry.<br>(If general elective available in many programs indicate this rather than list programs) |
| 4. Name of faculty member responsible for the course:<br>Prof. Dr. Ahmed Youssef El-Kady   |
| 5. Level/year at which this course is offered: M. SC. Forth year courses/ eighth semester  |
| 6. Pre-requisites for this course: Organic Chemistry 3(313 chem.).   |
| 7. Co-requisites for this course (if any) : NA   |
| 8. Location if not on main campus: Chemistry Department/<br>College Of Science. King Khaled University.  |

### **B Objectives**

**1. Summary of the main learning outcomes for students enrolled in the course.**

- The main objectives of this course are that to ensure the ability of the students to know the importance of the organometallic compounds.
- To know the different methods used for organometallic compounds preparation and their properties.
- To recognize the conditions that should be satisfied for the preparation of organometallic compounds
- To recognize and to know the usages of organometallic compounds in the preparation of other organic compounds.
- To know the factors those affect the activity of organometallic compounds.
- To acquire the student's capability to make decisions in different professional contexts in organometallic compounds.
- To develop the student ability to behave in a manner reflecting commitment to integrity and credibility.

**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)**

- Class lectures using board.
- Electronic learning using computer.
- Drawing structures & using some models.
- Training on represented solved problems.
- Work effectively both in a team, and independently on solving the problems to get the right pathway for reaction.
- Communicate effectively with his teacher and colleagues.

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

| <b>1 Topics to be Covered</b>   |             |               |
|---|-------------|---------------|
| List of Topics  | No of Weeks | Contact hours |
| Basic information: (introduction, chemical bonds, electronegativity of some elements and groups, inductive effect, polar and nonpolar groups, acidity constant $K_a$ , the definition of organometallic compounds). | 2           | 4             |
| Different methods for organometallic compounds preparations.  | 2           | 4             |

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|--|-----------|-----------|
| Using organometallic compounds of the main group in organic preparations.                      | 1         | 2         |
| The general usages of organolithium and organomagnesium compounds. First mid-term exam.        | 2         | 4         |
| The general usages of organoboron and organoaluminum.  | 1         | 2         |
| The general usages of organosilicon. General discussion of the reports (9 <sup>th</sup> week). | 1         | 2         |
| The properties and importance of organometallic compounds of the transition elements.          | 1         | 2         |
| The properties and importance of organocopper and organozinc compounds. Second mid-term exam.  | 2         | 4         |
| The properties and importance of organocadmium and organomercury compounds.                    | 1         | 2         |
| Reactions and applications of the organometallic compounds.                                    | 2         | 4         |
| <b>Total</b>   | <b>15</b> | <b>30</b> |

|  |             |               |                                    |          |
|--|-------------|---------------|------------------------------------|----------|
| <b>2 Course components (total contact hours per semester):</b> |             |               |                                    |          |
| Lecture: 30  | Tutorial: 0 | Laboratory: 0 | Practical/Field work/Internship: 0 | Other: 0 |

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| <b>3. Additional private study/learning hours expected for students per week.</b> (This should be an average: for the semester not a specific requirement in each week):<br><br>Nothing. |
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#### **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**

###### **(ii) Description of the knowledge to be acquired:**

- Understanding the basic principles of organometallic compounds.
- Identification the physical and chemical properties of different organometallic compounds.
- Acquire the skills of preparation of different types of organometallic compounds.
- Recognize the basics and ethics of scientific research in the field of study.

###### **(ii) Teaching strategies to be used to develop that knowledge:**

- Lectures.
- Problem solving.
- Professional reports.
- Discussions.

###### **(iii) Methods of assessment of knowledge acquired**

- Reports, homework and discussions (10%).
- First mid-term exam (20%).
- Second mid-term exam (20%).
- Final written examination (50%).

##### **b. Cognitive Skills**

###### **(i) Description of cognitive skills to be developed:**

- Use the organometallic compounds as reducing agents, for example, lithium,

aluminum and boron compounds.

- Know how to prepare the organometallic reagents, for examples, Grignard's reagents.
- Analyze and evaluate relevant information and use it in problem-solving.
- Solve specific problems even in the absence of some necessary data.
- Correlate different knowledge to solve professional problems.
- Perform a research study and/or write scientific report on a research problem.
- Assess the risks associated with practice in professional contexts.
- Construct an ambitious plan to raise performance in the field of study.
- Make professional decisions in various specialties

**(ii) Teaching strategies to be used to develop these cognitive skills**

- Write and evaluate professional reports.
- Evaluate the available methods and tools in the field of study.
- Theoretical presentation by demonstrator under supervision of the course responsible.
- Theoretical presentation by students under supervision of the course responsible.

**(iii) Methods of assessment of students cognitive skills**

- Two mid-term exams.
- Continuous assessment and solving problems.
- Final written examination.

**c. Interpersonal Skills and Responsibility**

**(i) Description of the interpersonal skills and capacity to carry responsibility to be developed**

- Communicate effectively using different ways.
- Use knowledge and information technology in professional practices.
- Identify personal learning needs and self-assessment.
- Use different resources to gain knowledge and information.
- Establish rules and indicators to assess performance of others.

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| <ul style="list-style-type: none"> <li>• Work in and/or lead a team in various professional contexts.</li> <li>• Manage time efficiently.</li> <li>• Acquire the ability for self- and life-long learning.</li> </ul>  |
| <p><b>(ii) Teaching strategies to be used to develop these skills and abilities:</b></p> <ul style="list-style-type: none"> <li>• Cooperative learning</li> <li>• Work in groups</li> <li>• Writing reports alone and in groups.</li> </ul>  |
| <p><b>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</b></p> <p>Tutorial &amp; Reports.</p>   |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p><b>(i) Description of the skills to be developed in this domain.</b></p> <ul style="list-style-type: none"> <li>• Ability to use Computer.</li> <li>• Analyze and evaluate specialized information and use analogies in problem-solving.</li> <li>• Solve specific problems even in the absence of some necessary data.</li> <li>• Correlate different knowledge to solve professional problems.</li> <li>• Perform a research study and/or write a systematic scientific study on a research problem.</li> <li>• Construct an ambitious plan to raise performance in the field of study.</li> <li>• Make professional decisions in various specialties.</li> </ul> |
| <p><b>(ii) Teaching strategies to be used to develop these skills</b></p> <ul style="list-style-type: none"> <li>• Data Show presentation.</li> <li>• Continuous assessment.</li> <li>• Problem Solving.</li> </ul>  |
| <p><b>(iii) Methods of assessment of students numerical and communication skills</b></p> <ul style="list-style-type: none"> <li>• Written and Oral Exams.</li> <li>• Tutorials using Blackboard <i>via</i> electronic learning</li> </ul>  |

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| <b>e. Psychomotor Skills (if applicable)</b>   |
| <b>(i) Description of the psychomotor skills to be developed and the level of performance required</b><br><br>Nothing. |
| <b>(ii) Teaching strategies to be used to develop these skills</b><br><br>Nothing.                                     |
| <b>(iii) Methods of assessment of students psychomotor skills</b><br><br>Nothing.                                      |

| <b>5. Schedule of Assessment Tasks for Students During the Semester</b> |   |          |                                |
|---|---|----------|--------------------------------|
| Assessment  | Assessment task (e.g. essay, test, group project, examination etc.) | Week due | Proportion of Final Assessment |
| 1   | 1 <sup>st</sup> Mid-term  | 6        | 20%                            |
| 2   | 2 <sup>nd</sup> Mid-term  | 12       | 20%                            |
| 3   | Tutorial & Reports  | 9        | 10%                            |
| 4   | Final written exam  | 16       | 50%                            |

## **D. Student Support**

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| <p><b>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)</b></p> <ul style="list-style-type: none"> <li>• Office hours (10 hours per week).</li> <li>• Electronic Learning.</li> </ul> |
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## E Learning Resources

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| <b>1. Required Text(s)</b><br>Organometallic chemistry for organic syntheses, Mohamed I. Alhsan, Alkhrary Library, 1407/1987.                                       |
| <b>2. Essential References</b><br><br>❖ Organic chemistry, Morrison & Boyd, 2008.<br>❖ Organic chemistry, Vol. 1, Finar, sixth edition, 1973.                       |
| <b>3. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)</b><br>❖ Organometallic reagents in synthesis, Jenkin, 1992.                  |
| <b>4. Electronic Materials, Web Sites etc</b><br><br><a href="http://www.chemguide.co.uk/">http://www.chemguide.co.uk/</a>  |
| <b>5. Other learning material such as computer-based programs/CD, professional standards/regulations</b><br><br>• Overhead projector with data show.<br>• CD & DVD. |

## F. Facilities Required

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| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.) |
| <b>1. Accommodation (Lecture rooms, laboratories, etc.)</b><br><br>• Lecturer room contain Data Show.<br>• Blackboard  |
| <b>2. Computing resources</b><br><br>• Hall contains at least 10 computers.<br>• Internet access.  |
| <b>3. Other resources</b> (specify --eg. If specific laboratory equipment is required, list requirements or attach list)<br><br>Nothing.                               |



## **G Course Evaluation and Improvement Processes**

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| <p><b>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</b></p> <ul style="list-style-type: none"><li>• Fill course report and analysis the outcome of leaning (feedback) to improve the learning process.</li><li>• Direct and continuous with the students during lecturer and via blackboard.</li><li>• Follow up the web site of university.</li></ul>  |
| <p><b>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</b></p> <ul style="list-style-type: none"><li>• Revise the course file and course report by the aid of other colleagues in the same field.</li><li>• Revise the course file and course report by the National Commission for Academic Accreditation &amp; Assessment.</li><li>• Participation in workshop concerning Academic Accreditation &amp; Assessment.</li></ul> |
| <p><b>3 Processes for Improvement of Teaching</b></p> <ul style="list-style-type: none"><li>• Participation in workshop dealing with the different method of teaching.</li><li>• Revise the teaching strategy.</li></ul>   |
| <p><b>4. Processes for Verifying Standards of Student Achievement</b> (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> <ul style="list-style-type: none"><li>• Check the correction of exam paper by another partner.</li><li>• Correction of exam paper by more than one person.</li></ul>                      |
| <p><b>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</b></p> <ul style="list-style-type: none"><li>• Course specification to improve the feedback.</li></ul>   |