Student Handbook

MSc. Chemistry Program

(Document prepared by Department of Chemistry)

العنوان البريدي: قسم الكيمياء، كلية العلوم، جامعة الملك خالد، ص ب: 9004، الرمز البريدي: 61413، أبها – المملكة العربية السعودية
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1.مقدمـــــــــــة:

لما كانت الجامعة هي المؤسسة الوطنية المنوط بها سد حاجة المجتمع من الكوادر المدربة والقادرة على فهم ونقل وتوطين العلوم والتقنية الحديثة ، فقد آلت كلية العلوم بجامعة الملك خالد على نفسها حتى وهي في مرحلة بناءها إلى إضافة لبنة إلى هيكلها التعليمي الواعد ألا وهي الدراسات العليا بدءاً باستحداث برنامج للماجستير في العلوم في الكيمياء يساعد خريجي البكالوريوس على الدراسة المتخصصة في تعميق المفاهيم الأساسية والتطبيقية في فروع الكيمياء المختلفة والمرتبطة بفهم التقنيات الحديثة في علوم المواد والعلوم البيولوجية والطبية والصيدلانية والبيئة وغيرها مما سينعكس على فتح آفاق جديدة للدارسين ، ومن ثم تسد حاجة المجتمع من الإبداع والمبدعين في مجالات التقنيات الحديثة.

1.Introduction:

Since the university is the national institution entrusted with fulfilling the society's need of trained cadres capable of understanding, transferring and settling modern science and technology, the College of Science at King Khalid University, even when it is in its construction phase, has decided to add a building block to its promising educational structure, namely, graduate studies, starting with the creation of A Master of Science in Chemistry program that helps bachelor graduates to undertake specialized study in deepening basic and applied concepts in various branches of chemistry related to the understanding of modern technologies in materials science, biological, medical, pharmaceutical and environmental sciences, etc. in the fields of modern technologies.

2.رسالة البرنامج:

تأهيل الطلاب بالمعرفة والمهارات المتقدمة والعميقة والمتخصصة في جميع فروع الكيمياء لتلبية متطلبات المجتمع المعاصرة.

2.Program Mission:

To qualify students with advanced, deep and specialized knowledge and skills in all branches of chemistry to meet the contemporary requirements of the society.

3.أهداف البرنامج:

يهدف هذا البرنامج لتحقيق الأغراض الآتية:

1. الإسهام في إثراء المعرفة الانسانية في مجال الكيمياء عن طريق الدراسات المتخصصة والبحث الجاد للوصول إلى إضافات علمية وتطبيقية مبتكرة والكشف عن حقائق جديدة في هذا المجال.
2. تمكين الطلاب المتميزين من مواصلة دراساتهم العليا للحصول على درجة الماجستير في الكيمياء.
3. اعداد الكفاءات العلمية والمهنية المتخصصة في مجالات الكيمياء المختلفة.
4. إمداد قطاعات المملكة من مصانع ومؤسسات بكفاءات علمية مسايرة للتقدم السريع للعلوم والتقنية مؤهلين للإبداع والابتكار.
5. تطوير البحث العلمي في مجال الكيمياء وتوجيهه لمعالجة قضايا وتنمية المجتمع السعودي.

3.Program Goals:

This program aims to achieve the following purposes:

1. To prepare highly qualified graduates equipped with advanced, deep and specialized knowledge in all branches of chemistry.
2. To enable students to solve the scientific problems and to have research and laboratories skills in chemistry.
3. To enable students in mastering the use of information technology and practicing effective communications to contribute in problem solving and enhancing the community.
4. To earn students the skills of independent and lifelong learning and acquiring new advanced knowledge.
5. To supply all industrial sectors and scientific institutions in the kingdom with excellent competencies.

4.مبررات البرنامج:

1. الزيادة المطردة في أعداد حملة البكالوريوس تخصص الكيمياء في المملكة وعدم توافر فرص دراسية كافية لمواصلة الدراسات العليا في الجامعات الأجنبية المختلفة.
2. حاجة المنطقة الماسة لكفاءات علمية متميزة من حملة الماجستير والدكتوراه لمواكبة التطور العلمي والتقني لمعالجة القضايا المتنوعة في الحياة الجامعية، والبحثية، والصناعية، والبيئية.

3. توافر العدد الكافي من أعضاء هيئة التدريس من الأساتذة والأساتذة المشاركين بالقسم في مجال البرنامج المقترح في الكيمياء.
4. توافر الكثير من الإمكانات البحثية من معامل ومختبرات وتسهيلات الحاسوب وأجهزة علمية ومواد كيميائية التي تضمن نجاح البرنامج.
5. خبرة القسم أربعة وعشرون عاماً في مرحلة البكالوريوس، حيث يقوم بعض أعضاء هيئة التدريس بالقسم بالتدريس في برامج الدراسات العليا في كليات البنات بأبها بالإضافة إلى سابق اشتراكهم بالتدريس في برامج الدراسات العليا من دبلوم وماجستير ودكتوراه في جامعاتهم الأم المعارين منها، ولازالوا يشرفون على رسائل الماجستير والدكتوراه لطلبتهم حتى الآن، كما اشتركوا في تقييم ومناقشة العديد من رسائل الماجستير والدكتوراه في جامعات المملكة.

4.Program Justifications:

1. The steady increase in the number of bachelor holders majoring in chemistry in the Kingdom and the lack of full study opportunities to continue postgraduate studies in various foreign universities.
2. The region's urgent need for distinguished scientific competencies from master's and doctoral holders to keep pace with scientific and technical development to address various issues in university, research, industrial, and environmental life.
3. Availability of a sufficient number of faculty members, including professors and professors participating in the department, in the field of the proposed program in chemistry.
4. Availability of a lot of research capabilities in laboratories, laboratories, computer facilities, scientific devices and chemicals that ensure the success of the program.
5. The department has twenty-four years of experience at the undergraduate level, where some of the faculty members teach in the graduate studies programs at the Women’s College in Abha, in addition to their previous participation in teaching in the postgraduate programs of diploma, master’s and doctorate at their mother university on loan from them, and they are still supervising Master's and doctoral

theses for their students so far, and they have also participated in the evaluation and discussion of many master's and doctoral theses at universities in the Kingdom.

5.شروط القبول لمرحلة الماجستير:

بالإضافة إلى ماورد في بنود اللائحة الموحدة للدراسات العليا يشترط القسم ما يلي:

1- أن يكون المتقدم حاصلً على درجة البكالوريوس في تخصص الكيمياء.
2- إجراء المقابلة الشخصية والاختبارات التي يحددها القسم.
3- اجتياز جميع المقررات التكميلية التي يقترحها القسم.
4- الحصول على أحد اختبارات اللغة الإنجليزية حسب الدرجات التالية كحد أدنى:
   - التوفل (IBT – TOEFL) = 53
   - الكفايات (STEP) = 75
   - إيليتس (IELTS) = 4.5

ويقبل خريجو الكليات الأخرى من ذوي التخصص بناء على:

أ- توصية مجلسي القسم والكلية وموافقة مجلس عمادة الدراسات العليا.
ب- يحدد القسم المقررات التكميلية من مرحلة البكالوريوس بناء على السجل الأكاديمي للطالب، على أن يجتاز الطالب المقرر التكميلي بتقدير لا يقل عن "جيد".
ت- لا تحتسب المدة الزمنية لاجتياز المقررات التكميلية ضمن المدة المحددة للحصول على الدرجة.

5.Admission requirements for the master's stage: In addition to the provisions of the unified regulations for postgraduate studies, the values require the following:

1- The applicant must have a bachelor's degree in chemistry.
2- Conducting the personal interview and the tests specified by the department.
3- Pass all supplementary courses specified by the department.
4- Obtaining one of the English language tests according to the following scores as a minimum:

• TOEFL (IBT-TOEFL) = 53

• Competencies (STEP) = 75

• IELTS = 4.5

Graduates of other colleges with specializations are accepted based on:

1- The recommendation of the department and college councils and the approval of the Council of the Dean of Graduate Studies.

2- The department determines the supplementary courses from the bachelor's level based on the student's academic record, provided that the student passes the supplementary course at least with a grade of "good".

3-The time period for passing the supplementary courses is not counted within the period specified for obtaining the degree.

6.متطلبات الحصول على درجة الماجستير:

1. أن ينهي الطالب اثنان وثلاثون وحدة دراسية.
2. يقدم الطالب مشروع رسالة وتعادل بست وحدات دراسية.
3. تكتب رسالة الماجستير باللغة الانجليزية على أن تحتوي على ملخص وافٍ باللغة العربية.

6.Master's Degree Requirements:

1. The student must complete thirty-two academic units.
2. The student must submit a thesis project, which is equivalent to six credits.
3. The master's thesis should be written in English and should contain an adequate summary in Arabic.

7.الوظائف المتاحة لخريجي برنامج الماجستير:

1- باحثون في مركز الأبحاث في القطاعين العام والخاص، .... الخ

2- أعضاء هيئة تدريس في مؤسسات التعليم العالي.

3- مستشارون في القطاعين العام والخاص.

7.Jobs available for graduates of the master's program:

1. Researchers in the research center in the public and private sectors .... etc.
2. Board members and their role in higher education institutions.
3. Consultants in the public and private sectors.

8.المقررات الدراسية لمرحلة الماجستير

8.MSc. Chemistry Courses

المســـتوى الأول Level 1					
رمز المقرر	اسم المقرر ع	Eاسم المقرر	س	سنوي	المتطلب السابق
511 كيم-2	الكيمياء الحلقية غير المتجانسة	Heterocyclic Chemistry	□		
521 كيم-2	نظرية المجموعات وتطبيقاتها	Group Theory and Applications	□		
531 كيم-2	كيمياء فيزيائية متقدمة	Advanced Physical Chemistry	□		
541 كيم-2	كيمياء تحليلية متقدمة	Advanced Analytical Chemistry	□		
Total المجـمـــوع					□

المســـتوى الثانـــي Level 2					
رمز المقرر	اسم المقرر ع	Eاسم المقـــــرر	س	سنوي	المتطلب السابق
512 كيم-2	أطياف المركبات العضوية	Spectroscopy of Organic Compounds	□		
522 كيم-2	طرق فيزيائية في المركبات غير العضوية	Physical Methods in Inorganic Chemistry	□		
532 كيم-2	كيمياء الكم وتطبيقاتها	Quantum Chemistry and Applications	□		
542 كيم-2	طرق التحليل الطيفي	Methods of Spectroscopic Analysis	□		
570 كيم-2	مناهج البحث العلمي في الكيمياء	Research Methodologies; Guidance for Postgraduates	□		
Total المجـمـــوع					□□

المســـــتوى الثالـــث Level 3					
رمز المقرر	اسم المقرر ع	اسم المقـــــــرر E	س	سنوي	المتطلب السابق
613 كيم-2	مواضيع مختارة في الكيمياء العضوية	Selected Topics in Organic Chemistry	□		
623 كيم-2	مواضيع مختارة في الكيمياء غير العضوية	Selected Topics in Inorganic Chemistry	□		
633 كيم-2	مواضيع مختارة في الكيمياء الفيزيائية	Selected Topics in Physical Chemistry	□		
643 كيم-2	طرق الفصل الكيميائي	Separation Techniques in Chemistry	□		
المجـمـــــوع Total					8

المســـــتوى الرابـــع					
رمز المقرر	اسم المقرر ع	اسم المقـــــــرر E	س	سنوي	المتطلب السابق
680 كيم-6	رسالة الماجستير	Dissertation	□		
المجـمـــــوع Total					□

الإجمالي:(32) وحدة دراسيــة Total: (32 credit hours

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9.وصف موجز للمقررات الدراسية

9.Brief description of courses

رقم المقرر ورمزه: 511 كيم.	Chem511
اسم المقـــــرر: الكيمياء الحلقية غير المتجانسة	**Heterocyclic Chemistry**
عدد الوحـــدات: 2	
المستوى/السنة: الأول / الأولى.	

أهدف المقـــــرر:

1- التعريف بالحلقات غير المتجانسة الثلاثية والرباعية

2- دراسة المركبات غير متجانسة الحلقة الخماسية والسداسية المحتوية على ذرتين غير متجانستين أو أكثر ومشتقاتها ذات النظام الحلقي المندمج.

Course Objectives:

1- Definitions of three and four membered heterocyclic rings.

2- Study of five- and six-heterocyclic compounds containing two heteroatoms or more and their condensed system.

وصف موجز للمقـــــرر:

يتعرف الطالب في هذا المقرر على الحلقات غير المتجانسة ثم يدرس الطالب تحضير وتفاعلات المركبات غير متجانسة الحلقة الخماسية والسداسية المحتوية على ذرتين غير متجانستين أو أكثر ومشتقاتها ذات النظام الحلقي المندمج.

Brief Course Description:

The student studies in this course the synthesis and chemical reactivity of five and six heterocyclic compounds containing two or more heteroatoms and their condensed analogues.

مفردات المقـــرر:

- الحلقات غير المتجانسة المناظرة للسيكلوبروبان، والسيكلوبيوتان.
- المركبات غير متجانسة الحلقة الخماسية المحتوية على ذرتين غير متجانستين أو أكثر

- المركبات غير متجانسة الحلقة السداسية المحتوية على ذرتين غير متجانستين أو أكثر
- المركبات غير متجانسة الحلقة الخماسية والسداسية المحتوية على ذرتين غير متجانستين أو أكثر ذات النظام الحلقي المندمج.
- وجود المركبات غير متجانسة الحلقة في الطبيعة وتطبيقاتها في المجال الطبي.

Contents:

Nomenclature, structure, properties and reactions of:

- Heterocyclic analogues of cyclopropane and cyclobutane.
- Compounds with two or more hetero atoms in a five-membered ring.
- Compounds with two or more hetero atoms in a six-membered ring.
- Fused ring systems of five- and six-membered rings containing two or more hetero atoms.
- Occurrence of heterocyclic compounds in nature and their applications in medicine.

الكتب والمراجع: Textbooks & References

1. A. R. Katritzky; *Advances in Heterocyclic Chemistry*, Academic Press (1999).
2. D. H .R. Barton, et. a.l, *Comprehensive Organic Chemistry: Heterocyclic Compounds*; Kluwer Academic Publishing (2001).
3. E. G. Brown and R. P. Brown; *Ring Nitrogen: Key Bio-molecules*; Kluwer Academic Publishing (2001).

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رقم المقرر ورمـزه: 521 كيم	**Chem521**
اسم المقـرر: نظرية المجموعة وتطبيقاتها Group Theory and Some Applications	
عدد الوحـــدات: 2	
المستوى /السنــة: الأول / الأولى	

أهداف المقرر:

1- دراسة نظرية المجموعة.

2- دراسة تطبيقات نظرية المجموعة في فهم نظريات الترابط الكيميائي في المركبات الكيميائية البسيطة والمعقدة.

Course Objectives:

1- Study group theory.

2- Studying group theory applications in understanding chemical bonding theories in simple and complex chemical compounds.

وصف موجز للمقرر:

يشمل هذا المقرر مقدمة نظرية المجموعة – التماثل وتطبيقاتها على نظريات الترابط الكيميائي في المركبات البسيطة والمعقدة مثل اطياف الامتصاص الالكتروني واطياف الاشعة تحت الحمراء وأشعة رامان.

Brief Course Description:

This course includes an introduction to group theory- symmetry and its applications to chemical bonding theories in simple and complex compounds- Electron absorption spectra – Infrared spectra – Raman spectra.

مفردات المقرر:

- مقدمة نظرية المجموعة
- التماثل وتطبيقاته على نظريات الترابط الكيميائي في المركبات البسيطة والتناسقية
- أطياف الامتصاص الإلكتروني وأطياف الأشعة تحت الحمراء وأشعة رامان.

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Contents:

- Introduction to group theory.
- Symmetry in chemistry.
- Application of symmetry to theories of bonding in simple and coordination compounds.
- Electronic absorption spectra.
- Vibrations and Raman spectroscopy.

الكتب والمراجع:Textbooks & References

1 - نظرية الزمر للكيميائيين، تأليف د. جورج ديفدسون ، ترجمة د. معتصم إبراهيم خليل، جامعة الملك سعود. النشر العلمي (1998م).

2. R. S. Drago; *Physical Methods for Chemist*, International Thomson Publishing; 2nd Edn. (1992).
3. B. E. Douglas, D. H. Mc Daniel and J. J. Alexander; *Concepts and Models of Inorganic Chemistry*, John Wiley & Sons, New York, 3 rd Edn. (1994).
4. F. A. Kettle; *Symmetry and Structure: Readable Group Theory for Chemistry*, John Wiley & Sons, New York, 2nd Edn. (1995).
5. J. E. Huheey, E. A. Keiter and R. L. Keiter; *Inorganic Chemistry: Principle of Structures and Reactivity*, Harper Collins College, 4th Edn. (1993).

رقم المقرر ورمزه: **531 كيم**	**Chem531**
ا سم المقـــــرر: كيمياء فيزيائية متقدمة	**Advanced Physical Chemistry**
عدد الوحـــدات: 2	
المستوى/السنـــة: الأول / الأولى	

أهداف المقرر:

1- التعريف بالمفاهيم الأساسية المتطورة في الكيمياء الحركية وتفاعلات الكيمياء الضوئية.

2- دراسة الموضوعات الحديثة المتقدمة واستخدامها في تفسير ميكانيكية التفاعلات المختلفة.

Course Objectives:

1- Introducing the basic advanced concepts in kinetic chemistry and photochemical reactions.

2- Studying advanced modern topics and using them in explaning the mechanism of different chemical reactions.

وصف موجز للمقرر:

يناقش المقرر المعادلات والنظريات المختلفة في الكيمياء الحركية مع التركيز على تطبيق تلك المعادلات والنظريات في دراسة ميكانيكية التفاعلات بالإضافة إلى دراسة حركية التفاعلات السريعة مثل تبادل فلز مع فلز آخر وتبادل ليجاند مع ليجاند آخر ويتطرق المقرر إلى دراسة تفاعلات الكيمياء الضوئية الأولية والثانوية.

Brief Course Description:

This course discusses the different equations and theories in kinetic chemistry with a focus on the applications of theses equations and theories in studying the mechanism of chemical reactions. In addition, to studying the kinetics of fast reactions such as chemical exchange reaction of a metal with another metal, exchange of a ligand with another ligand. The course deals also with the study of the primary and secondary photochemical reactions.

مفردات المقرر:

- مراجعة ما تم دراسته في مقرر حركية التفاعلات. تعيين ميكانيكية التفاعلات المحفزة وغير المحفزة. العلاقة الخطية للطاقة الحرة للتفاعل. معادلة Hammett ومعادلة Taft وتطبيقاتهما. تأثير إضافة الأملاح على سرعة ورتبة التفاعل. تأثير الأيون المزدوج في الأوساط المختلفة على ميكانيكية وسرعة التفاعلات.

- دراسة حركية التفاعلات السريعة (تبادل فلز مع فلز آخر وتبادل ليجاند مع ليجاند آخر).
- دراسة تفاعلات الكيمياء الضوئية الأولية والثانوية. احتمالات الامتصاص والانبعاث وحاصل الكم. حركية التفاعلات الضوئية. تفاعلات الاختزال الضوئي. تفاعلات الأكسدة والإتحاد بالأوكسجين ضوئيا. تفاعلات الإضافة الحلقية. العمليات الفيزيائية الضوئية داخل الجزيئات عديدة الذرات والعمليات الفيزيائية الضوئية بين الجزيئات وتثبيط الحالات المثارة.

Contents:

- Determination of reaction mechanism of the catalyzed and non-catalyzed reaction. Linear relationships of free energy. Hammett equation, Taft equation and their applications. Secondary salt effect on the rate and the order of reaction. Effect of ion pairing and medium on reaction rate and mechanism.
- Kinetics of fast reactions (metal-metal exchange and ligand-ligand exchange).
- Study of photochemical reaction (primary and secondary processes). Absorption and emission probabilities. Quantum yield. Kinetics of photo-reactions. Photoreduction reaction. Photooxidation reaction with oxygen. Intramolecular photophysical processes of polyatomic molecules.
- Intermolecular photophysical processes and quenching the excited state.

الكتب والمراجع:Textbooks & References

1. I. S. Jeffery, *Chemical Kinetics and Dynamics*, Pearson Education (1998).
2. J. Keith, *Chemical Kinetics*, Addison-Wesley Pub. Co., (1987).
3. C. E. Wayne and R. P. Wayne, *Photochemistry*, Oxford Univ. Press. (1997).

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رقم المقرر ورمزه: 541 كيـم Chem541
اسم المقـــــرر: كيمياء تحليلية متقدمة *Advanced Analytical Chemistry*
عدد الوحـــدات: 2
المستوى/السـنة: الأول / الأولى

أهداف المقـــــرر:

1- يقدم المقرر موضوعات ذات أفاق تطبيقية متقدمة في الكيمياء التحليلية.

2- التعامل مع التركيزات الضئيلة للغاية من العينات مرورا بالطرق المختلفة للتحليل حتى عرض النتائج ومقارنتها إحصائيا بالطرق القياسية.

Course Objectives:

1- The course presents topics with advanced applied prospects in analytical chemistry.

2- Dealing with very small concentrations of samples through the different methods of analysis until displaying the results and comparing them statistically with the standard methods.

وصف موجز للمقـرر:

يعرض المقرر كيفية التعامل مع التراكيز الدقيقة للغاية من العينات المجهولة والأدوات المستخدمة وطرق التحليل العادية والأتوماتيكية ومعالجة النتائج إحصائيا بالإضافة إلى سبل تلافى الأخطاء المحتملة عند تحليل مثل هذه العينات.

Brief Course Description:

The course presents how to deal with extremely accurate concentrations of unknown samples, the tools used, the normal and automatic methods of analysis, and the statistical treatment of the results, in addition to ways to avoid potential errors when analyzing such samples.

مفردات المقـرر:

- التعامل مع التراكيز الدقيقة للغاية.

- الأدوات الأساسية واستخداماتها في الكيمياء التحليلية.
- تطبيقات الطرق الأتوماتيكية في التحاليل الكيميائية.
- التعامل مع نتائج التحاليل بصورة إحصائية سليمة والتطبيقات المختلفة للإحصـــاء الرياضـي في الكيمياء التحليلية.
- المصاعب والأخطاء المحتملة عند تحليل العينات الحقيقية بدءا من جمع وتجهيز وتحضير وحفظ العينات مرورا باختيار وتوثيق أمثل الطرق للتحليل وحتى تقديم النتائج.

Contents:

- Basic tools and operation in analytical chemistry.
- Handling of very dilute solutions.
- Automation in analytical laboratory.
- Statistical analysis of data (expression of results; experimental design and optimization techniques; the theory of signal detection, filtering, smoothing and curve fitting; uni- and multi-component calibration techniques; resolution and pattern recognition).
- Analysis of real samples (sampling and preservation, preparing sample for analysis, decomposing and dissolution of samples, elimination of interferences, selection of proper analytical technique, choice of analytical method and its validation).

الكتب والمراجـع: Textbooks & References

1. G. D. Christian, *Analytical Chemistry*, John Wiley, New York, 5th Edn. (1994).
2. D. A. Skoog, D. M. West and F. J. Holler, *Fundamentals of Analytical Chemistry*, Saunders College Publishing, Philadelphia, 7th edn. (1998).
3. J. Miller and J. N. Miller, *Statistics and Chemometric For Analytical chemistry*, Prentice Hall, New York, 4th Edn. (2000).

رقم المقرر ورمزه: 512 **كيم.**	**Chem512**
اسم المقـــــرر: أطياف المركبات العضوية	**Spectroscopy of Organic Compounds**
عدد الوحـــدات: 2	
المستوى/السنة: الثاني / الأولى.	

أهداف المقرر:

1- التعريف باستخدام الطرق الطيفية المختلفة لدراسة المركبات العضوية

2- كيفية استنتاج وإثبات تركيب هذه المركبات.

Course Objectives:

1- Introducing the use of different spectroscopic methods to study organic compounds.

2- How to infer and prove the chemical structure of these compounds.

وصف موجز للمقرر:

يناقش هذا المقرر الطرق الطيفية المختلفة للمركبات العضوية من حيث النظريات المتنوعة والتقنيات المختلفة للأجهزة وتطبيقاتها للتوصل الى استنتاج واثبات التركيب البنائي لهذه المركبات.

Brief Course Description:

This course discusses the different spectroscopic methods of organic compounds in terms of various theories and different techniques of devices and their applications in order to conclude and prove the structural structure of these compounds.

مفردات المقرر:

- دراسة نظريات أطياف الأشعة فوق البنفسجية والمرئية والأشعة تحت الحمراء والرنين النووي المغناطيس وأطياف الكتلة.
- دراسة التقنيات المختلفة لأجهزة الطيف.
- تطبيقات على استخدام هذه الأطياف في معرفة تركيب المركبات العضوية.

Contents:

- UV, IR, NMR and Mass Spectra.
- Techniques and devices, basic principles, sample preparation.
- Application on structure elucidation of organic compounds.

الكتب والمراجـع: Textbooks & References

1. R. M. Silverstein, *Spectrometric Identification of Organic Compounds*, John Wiley & Sons, New York, 7 th Edn. (2003).
2. L. D. Field and S. Sternhell; *Organic Structures From Spectra*, John Wiley & Sons, New York, 3 rd. Edn. (2002).
3. J. B. Lambert; *Organic Structural Spectroscopy*, Prentice Hall (1997).

رقم المقرر ورمزه: 522 كيم	**Chem522**
اسم المقـرر: طرق فيزيائية في الكيمياء غير العضويةPhysical Methods in Inorganic Chemistry	
عدد الوحـــدات: 2	
المستوى/السنة: الثاني/ الأولى	

أهداف المقرر:

1- تعريف الطالب بالطرق الفيزيائية الطيفية المختلفة

2- استخدام الطرق الطيفية في معرفة التركيب الجزيئي والفراغي للمركبات غير العضوية والعضو فلزية والمعقدات.

Course Objectives:

1- Introducing the student to the different physical spectroscopic methods. 2- Using spectroscopic methods to know the molecular and stereo structure of inorganic and organometallic compounds and complexes.

وصف موجز للمقرر:

يعالج هذا المقرر الأسس الكيميائية للطرق الفيزيائية الطيفية المستخدمة في مجال الكيمياء التركيبية للمركبات غير العضوية مثل المغناطيسية –الطيف الإلكتروني – طيف الأشعة تحت الحمراء – الرنين النووي المغناطيسي – الرنين الإلكتروني البارامغناطيسى–الرنين النووي الرباعي الأقطاب – طيف موسبور – طيف الكتلة – تحليل حيود الأشعة السينية.

Brief Course Description:

This course deals with the chemical bases of physical spectroscopic methods used in the field of synthetic chemistry for inorganic compounds such as magnetism, electron spectrometry, infrared spectrum, nuclear magnetic resonance, paramagnetic electron resonance, quadruple nuclear resonance, Mosspor spectrum, mass spectrometry, and X-ray diffraction analysis.

مفردات المقرر:

- المغناطيسية
- الطيف الإلكتروني وطيف الأشعة تحت الحمراء

- الرنين النووي المغناطيسي والرنين الإلكتروني البارامغناطيسي
- الرنين النووي الرباعي الأقطاب
- طيف موسبور وطيف الكتلة
- تحليل حيود الأشعة السينية

Contents:

- Magnetism
- Electronic absorption spectra
- Infrared spectra
- Nuclear magnetic resonance
- Electron paramagnetic resonance
- Nuclear quadrupole and Mossbauer spectroscopy
- Mass spectra
- X-ray diffraction and Crystallography.

الكتب والمراجع:Textbooks & References

1. R. S. Drago; *Physical Methods for Chemist*, International Thomson Publishing; 2nd Edn. (1992).
2. E. A. V. Ebsworth, D. W. H. Rankinn and S. Cradock; *Structural Methods in Inorganic Chemistry*, Blackwell, 2 nd Edn. (1994).

رقم المقرر ورمزه:532 كيم	**Chem531**
أسم المقـــرر: كيمياء الكم وتطبيقاتها	***Quantum Chemistry and its Applications***
عدد الوحـــدات:2	
المستوى / السنة: الثاني / الأولى	

أهدف المقـرر:

1- التعرف على المفاهيم الكمية الحديثة ومدى اختلافها عن المفاهيم التقليدية.

2- دراسة الموضوعات المتقدمة في كيمياء الكم وتطبيقاتها في مجال الأطياف الجزيئية.

Course Objectives:

1- Learn about modern quantitative concepts and how they differ from traditional concepts.

2- Studying advanced topics in quantum chemistry and their applications in the field of molecular spectra**.**

وصف موجز للمقـــرر:

يقدم هذا المقرر تطبيق معادلة شرودنجر في حالة الإلكترونات وفى الجزيئات ودراسة نظرياتها المختلفة بالإضافة إلى تطبيقات كيمياء الكم في مجال الأطياف الذرية والجزيئية.

Brief Course Description:

This course introduces the application of the Schrödinger equation in the case of electrons and molecules and the study of its various theories in addition to the applications of quantum chemistry in the field of atomic and molecular spectra.

مفردات المقـرر:

- تطبيق معادلة شرودنجر في حالة الإلكترونات في الجزيئات ويشمل:

نظرية المدارات الجزيئية -الجزيئات ثنائية الذرة المتجانسة - الجزيئات ثنائية الذرة غير المتجانسة -الدالة الموجية الكلية للجزيء-تقريب هيكل للمدارات الجزيئية (H M O) - نظرية التشويش- نظرية رابطة التكافؤ.

- تطبيقات كيمياء الكم في مجال الأطياف الذرية والجزيئية:

الأطياف الإلكترونية الذرية-الأطياف الإلكترونية الجزيئية-الأطياف الإهتزازية- الأطياف الدورانية - أطياف الرنين الإلكتروني المغزلي- أطياف الرنين النووي المغناطيسي.

Contents:

-Applying Schrödinger equation on molecular electrons:

Molecular oribital theory - homonuclear diatomic molecules – heteronuclear diatomic molecules - total wave functions of molecules - Hückel theory - perturbation theory - valence bond theory

- Application of quantum chemistry in spectroscopy:

Electronic spectroscopy of atoms - electronic spectroscopy of molecules - vibrational spectroscopy - rotational spectroscopy - electron spin resonance spectroscopy - nuclear magnetic resonance spectroscopy -

الكتب والمراجع:Textbooks & References

1. C. S. George, *Quantum Mechanics in Chemistry*, Dover Pub. (2002).
2. C. M. Philips, *Quantum Chemistry of Atoms and Molecules*, Cambridge University Press (1987).

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رقم المقرر ورمزه: 542 كيـم	**Chem542**
اسـم المقـــرر: طـرق التحليـل الطيفـى والكهروكيميـائى & Methods of Spectrochemical & Electrochemical Analysis	
عدد الوحـــدات: 2	
المستوى / الســنـــة: الثاني/ الأولى	

أهداف المقـــرر:

1- تقديم معالجة متقدمة للتقنيات والطرق المختلفة للتحاليل الطيفية والكهروكيميائية

2- التركيز على الأسس النظرية وتركيب الأجهزة والتطبيقات المختلفة لهذه الطرق في الكيمياء التحليلية.

Course Objectives:

1- Providing advanced treatment of different techniques and methods for spectroscopic and electrochemical analyzes

2- Focusing on the theoretical foundations, installation of devices and the various applications of these methods in analytical chemistry.

وصف موجز للمقـــرر:

يعرض المقرر الطرق المختلفة للتحليل الطيفي والكهروكيميائي مثل طرق الامتصاص والانبعاث والتألق للجزيئات والذرات بالإضافة إلى طرق التحليل باستخدام أشعة إكس وأشعة جاما وطرق التحليل الكهروكيميائى مثل الطرق الجهدية والفولتاميترية والأمبيروميترية وطرق التوصيل الكهربى.

Brief Course Description:

The course presents the various methods of spectroscopy and electrochemical analysis such as absorption, emission and fluorescence methods for molecules and atoms in addition to methods of analysis using X-rays and gamma rays, methods of electrochemical analysis such as voltammetric, amperometric and electrical conduction methods.

مفردات المقـــرر:

- أطياف امتصاص الجزيئات في مناطق الأشعة تحت الحمراء وفوق البنفسجية والضوء المرئي.
- أطياف الانبعاث الفلوريسينى والفوسفورى والوميض الكيميائى والوميض البيولوجى.
- الأطياف الذرية للامتصاصي والانبعاث والوميض.
- أشعة اكس وأشعة جاما.
- الطرق الجهدية وطرق التوصيل الكهربى.
- الطرق الكهربية الوزنية والكولوميترية.
- الطرق الفولتاميترية والبولاروجرافية والأمبيروميترية.

Contents:

Advanced treatment of spectroscopic and electrochemical techniques with emphasize on theoretical bases, instrumentation and analytical applications of various technique such as :

- Molecular absorption spectroscopy (UV-Vis. and IR).
- Molecular fluorescence, phosphorescence and chemi-and bio-luminscence, spectroscopy.
- Atomic spectrometric methods based on absorption,
- emission and fluorescence.
- X-ray and γ-ray spectroscopy.
- Potentiometry.
- Conductometry
- Electrogravimetry
- Coulometry
- Voltammetric, pulse polarographic and stripping methods.
- Amperometry.

الكتب والمـراجــع: Textbooks & References

1. G. D. Christian, *Analytical Chemistry*, John Wiley, New York, 5th Edn. (1994).
2. D. A. Skoog, D. M. West and F. J. Holler, *Fundamentals of Analytical Chemistry*, Saunders College Publishing, Philadelphia, 7th edn. (1998).

3. J. Miller and J. N. Miller, *Statistics and Chemometric For Analytical chemistry*, Prentice Hall, New York, 4th Edn. (2000).
4. D. A. Skoog, *Principles of Instrumental Analysis*, Saunders College Publishing, Philadiphia, 3rd Edn. (1985).

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رقم المقرر ورمزه: 570 كيم.	Chem570
اسم المقـرر: مناهج البحث العلمي في الكيمياء **Scientific Methodology in Chemical Research**	
عدد الوحـــدات: 2	
المستوى/السنة: الثاني/الأولى.	

أهدف المقـــــرر:

1- تنمية ملكة الطالب بمنهج البحث العلمي.

2- إكساب الطالب مهارات عن كيفية استخدام المكتبة والحاسب الآلي للحصول على المعلومات الخاصة بالبحث.

Course Objectives:

1- Developing the student's faculty in the scientific research method.

2- Providing the student with skills on how to use the library and the computer to obtain information related to research.

وصف موجز للمقـــــرر:

يتعرض هذا المقرر لمنهج البحث العلمي وكيفية عمله وكتابته وجمع المعلومات من المكتبة ومن شبكة المعلومات الدولية باستخدام الحاسب الآلي، والتعرف على الوسائل والتقنيات والأجهزة الحديثة التي تخدم البحث.

Brief Course Description:

This course exposes the scientific research method, how it works, writes it, collects information from the library and the international information network using the computer, and learns about the modern means, techniques and devices that serve the research.

مفردات المقـــرر:

- تعريف الطالب بمنهج البحث العلمي وأدواته وأساليب تجميع المعلومات من مصادرها المختلفة.
- توسيع مدارك الطالب بالنسبة للتفكير العلمي وتنمية قدرته على معالجة المشكلات العلمية ذات الصلة بتخصصه الدقيق بما يسهم في حلها.
- تدريب الطالب على عمل مسح مكتبي شامل لموضوع البحث.
- تعليم الطالب كيفية كتابة البحث ويشمل:

العنوان: مختصر ومعبر عن موضوع البحث.

المقدمة: تخدم موضوع البحث من حيث كل ما نشر في هذا الموضوع

التجارب العملية: تكتب بطريقة سهلة وواضحة.

النتائج: تنظم وتصنف وتجدول ويعبر عنها برسوم بيانية عند اللزوم.

المناقشة: تستخدم جميع الوسائل الكيميائية والفيزيائية والطيفية لتفسير النتائج وتدعيمها.

الخلاصة: توضح أهم ما تم التوصل إليه.

المراجع: تكتب بطريقة علمية سليمة.

الملخص: يكتب اللغتين العربية والإنجليزية.

Contents:

- Developing the student skills of scientific thinking to touch the scientific problem and its possible solutions.
- Developing the student skills of collecting the required data from the library using recent periodicals in addition to the electronic resources, especially the internet resources.
- Helping the student to think of the research point, its identity, items, tools and sources of knowledge.
- Training students to make screening of the research point and writing it in a correct way.
- Teaching the student how to write a research paper including: title, introduction, experimental work, results and discussion, conclusion, references, and Arabic and English summaries.

الكتب والمراجـع: Textbooks & References

تعتمد على موضوع البحث ونوع المساق وتقرر في حينه من قبل المشرف على البحث بعد موافقة مجلس القسم.

It depends on the topic of the research and the type of course, and it is decided at the time by the research supervisor after the approval of the department council.

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رقم المقرر ورمزه: 613 كيم. Chem613
اسم المقـــــرر: موضوعات مختارة في الكيمياء العضوية. **Selected Topics in Organic Chemistry**
عدد الوحـــدات: 2
المستوى/الســنة: الثالث / الثانية.

أهدف المقـــــرر:

1- تعريف الطالب بموضوعات مختلفة هامة في مجال الكيمياء العضوية.

2- توسيع مدارك الطالب في الكيمياء الصناعية والتطبيقية.

Brief Course Description:

1- Introducing the student to various important topics in the field of organic chemistry.

2-Expanding the student's awareness of industrial and applied chemistry.

الموضوعات المختارة:

(1) الكيمياء الفراغية. (2) البوليمرات والمنتجات الصناعية.

(3) المنتجات الطبيعية. (4) الكربوهيدرات والسليلوز.

(5) الكيمياء الفيزيائية العضوية. (6) البتروكيماويات والمنظفات.

Selected Topics:

(1) Stereochemistry.

(2) Polymers and industry products.

(3) Natural products.

(4) Chemistry of carbohydrates and cellulose.

(5) Physical organic chemistry.

(6) Petrochemicals and detergents.

الكتب والمراجع:Textbooks & References

يعرض الأستاذ الذي سيقوم بتدريس أحد هذه المقررات المختارة كل المفردات والكتب والمراجع على مجلس القسم لمناقشتها وإقرارها.

It depends on the topic of the research and the type of course, and it is decided at the time by the research supervisor after the approval of the department council.

رقم المقرر ورمزه: 623 كيم	**Chem623**
اسم المقرر: مواضيع مختارة في الكيمياء غير العضويةSelected Topics in Inorganic Chemistry	
عدد الوحـــدات: 2	
المستوى/ السنة: الثالث / الثانية	

أهداف المقرر:

1- تعريف الطالب ببعض المواضيع الهامة في الكيمياء غير العضوية وتطبيقاتها

2- تنمية قدرة الطالب في مجال الكيمياء غير العضوية والتطبيقية.

Brief Course Description:

1- Introducing the student to some important topics in inorganic chemistry and its applications.

2- To develop the student's ability in the field of inorganic and applied chemistry.

المواضيع المختارة:

1 – الكيمياء التطبيقية :(الكيمياء والجريمة- الكيمياء وانتاج الطاقة - النفايات الكيميائية الضارة وكيفية التخلص منها - معالجة مياه الشرب والصرف الصحي والصناعي)

2 - كيمياء عضو معدنية متقدمة وتطبيقاتها في التفاعلات الحفزية

3 - دور الفلزات في الأنظمة البيولوجية

4 - المركبات العنقودية (التكوين وتحديد البنية التركيبية) وأنواع الروابط الفلزية0

5 - كيمياء المواد وتطبيقات الحالة الصلبة (دراسة التشوه البلوري وتطبيقاتها في المواد الموصلة وأشباه الموصلة - بلورات الـ Spinels وتطبيقاتها في المواد المغناطيسية المستعملة في صناعة شرائط الفيديو والكاسيت وغيرها - تراكيب البيروفسكايت ومتعلقاتها من التراكيب البلورية الأخرى وتطبيقاتها في مواد السيراميك الكهربائي - التراكيب الزجاجية غير البلورية وتطبيقاتها.

العنوان البريدي: قسم الكيمياء، كلية العلوم، جامعة الملك خالد، ص ب: 9004، الرمز البريدي: 61413، أبها – المملكة العربية السعودية
Mailing Address: Department of Chemistry, College of Science, King Khalid University, P.O. Box: 9004, Postal Code:61413, Abha, Saudi Arabia
Phone: 966–17–241–7709 **Fax:** 966–17–241–7637 **Email:** chemistry@kku.edu.sa

Contents:

1. Applied chemistry (chemistry and crime - chemistry and energy production - hazardous waste and waste disposal - treatments of drinking, domestic and industrial waters.
2. Advanced organometallic chemistry and its applications in industry and Catalytic Reactions.
3. Role of metals in Biological systems.
4. Types of M-M bonds and metallic clusters.
5. Materials chemistry and applied solid state, this will include:
    - Crystal defects, nonstoichiometric compounds and its applications in solid electrolytes.
    - Fuel Cells, electrical conductors, solid semi-conductors, diods, photo-voltaic effect, light emitting diods (LED).
    - Spinel crystals and magnetic materials and their applications in the industry of magnetic tapes.
    - Perovskites and related phases and their applications in ferroelectric, piezoelectric and electroceramic materials and soperconductors.
    - Vitreous state and its application.

الكتب والمراجع:Textbooks & References

يعرض الأستاذ الذي سيقوم بتدريس أحد هذه المقررات المختارة كل المفردات والكتب والمراجع على مجلس القسم لمناقشتها وإقرارها.

It depends on the topic of the research and the type of course, and it is decided at the time by the research supervisor after the approval of the department council.

رقم المقرر ورمزه: 633 كيم	**Chem633**
اسم المقرر: مواضيع مختارة في الكيمياء الفيزيائية Selected Topics in Physical Chemistry	
عدد الوحـــدات: 2	
المستوى/ السنة: الثالث / الثانية	

أهداف المقـرر:

1- تعريف الطالب ببعض المواضيع الهامة في الكيمياء الفيزيائية.

2- تطوير مفاهيم الطالب وإعداده للمجالات التطبيقية والبحثية.

Course Objectives:

1- Introducing the student to some important topics in physical chemistry.

2- Developing the student's concepts and preparing him for applied and research fields.

مفردات المقـرر:

- الكيمياء الفيزيائية للبلمرات
- كيمياء السطوح والحفز
- كيمياء كهربية
- ديناميكا حرارية إحصائية
- كيمياء الغرويات

Contents:

- Physical properties of polymers
- Surface chemistry and catalysis
- Electrochemistry
- Colloidal state
- Statistical thermodynamics

الكتب والمراجع:Textbooks & References

يعرض الأستاذ الذي سيقوم بتدريس أحد هذه المقررات المختارة المفردات والكتب والمراجع على مجلس القسم لمناقشتها وإقراره.

العنوان البريدي: قسم الكيمياء، كلية العلوم، جامعة الملك خالد، ص ب: 9004، الرمز البريدي: 61413، أبها – المملكة العربية السعودية
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It depends on the topic of the research and the type of course, and it is decided at the time by the research supervisor after the approval of the department council.

العنوان البريدي: قسم الكيمياء، كلية العلوم، جامعة الملك خالد، ص ب: 9004، الرمز البريدي: 61413، أبها – المملكة العربية السعودية
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رقم المقرر ورمزه: 643 كيـم	**Chem643**
اسم المقـرر: طرق الفصل الكيميائى والكروماتوجرافى.	
Methods of Separation and Chromatographic Analysis	
عدد الوحـدات: 2	
المستوى/ الســـنة:الثالث / الثانية .	

أهداف المقـرر:

1- تقديم النظريات المختلفة لطرق الفصل بالاستخلاص والفصل الكروماتوجرافى.

2- تطبيق هذه النظريات في مجال الكيمياء التحليلية.

Course Objectives:

1- Presenting the different theories of extraction and chromatographic separation methods.

2- Application of these theories in the field of analytical chemistry.

وصف موجز للمقـــرر:

يعرض المقرر طرق الفصل بالاستخلاص والطرق المختلفة للفصل الكروماتوجرافى مع تطبيقاتها التحليلية مثل طرق الفصل بالاستخلاص فى المذيبات وفى الطبقات الصلبة ونظريات الفصل الكروماتوجرافى والطرق المختلفة للكروماتوجرافى مع التركيز على الطرق الحديثة .

Brief Course Description:

The course presents methods of separation by extraction and different methods of chromatographic separation with their analytical applications such as methods of separation by extraction in solvents and in solid layers, theories of chromatography and different methods of chromatography with emphasis on modern methods.

مفردات المقـرر:

- معامل التوزيع ونسب التوزيع والاستخلاص.
- الفصل بالاستخلاص بواسطة المذيبات وفى الطبقات الرقيقة.
- نظريات عمل طرق الفصل الكروماتوجرافى المختلفة.

- معدلات هجرة المواد المذابة وكفاءة الأعمدة.
- الكروماتوجرافى المنخلية والطبقة الرقيقة والورقية.
- الفصل الكروماتوجرافى للأيونات.
- كروماتوجرافيا الغاز(الأعمدة-الأصناف الصلبة- الفصل الكيميائى - GC-MS) .
- الفصل الكروماتوجرافى السائل ذو الكفاءة العالية بالتوزيع والإدمصاص والتبادل الأيوني وباستبعاد الحجوم .
- الإلكتروفوريسيس.

Contents:

Theory and analytical applications of equilibrium and non-equilibrium separation methods based on solvent extraction and chromatographic techniques :

- The distribution coefficient, the distribution ratio, the percent extracted.
- Solvent extraction of metals and analytical separations.
- Multiple batch extractions & counter current distribution.
- Solid phase extraction.
- Classification of different chromatographic techniques.
- Migration rates of solutes, band broadening, column efficiency and column resolution.
- Size exclusion chromatography.
- Ion exchange chromatography.
- Gas Chromatography (Columns, stationary phases, analytical separations and GC-MS).
- High performance liquid chromatography (partition, adsorption, ion
- exchange and size exclusion based techniques).
- Supercritical fluid chromatography.
- Paper and thin-layer chromatography.
- Electrophoresis and capillary zone electrophoresis.

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الكتب والمراجـع:Textbooks & References

1. G. D. Christian, *Analytical Chemistry*, John Wiley, New York, 5th Edn. (1994).
2. D. A. Skoog, D. M. West and F. J. Holler, *Fundamentals of Analytical Chemistry*, Saunders College Publishing, Philadelphia, 7th edn. (1998).

رقم المقرر ورمزه: 680 كيـم	**Chem680**
اسم المقـرر: رسالة ماجستير	
عدد الوحــدات: 6	
المستوى/ الســنــة: الرابع / الثانية	

أهدف المقـــرر:

تعريف وتدريب الطالب على مايلي:

- عمل تجارب عملية متقدمة في مجال التخصص.
- استخدام الأجهزة العلمية المتقدمة.
- جمع المعلومات من المراجع والدوريات من المكتبة والحاسب الآلى وشبكة المعلومات الدولية.
- تفسير النتائج وتبويبها ومناقشتها.
- كتابة البحث.
- مناقشة الطالب في البحث.

Course Objectives:

Introduce and train the student on the following:

1-Conducting advanced practical experiments in the field of specialization.

2-Use of advanced scientific equipment.

3-Collecting information from references and periodicals from the library, computer and the international information network.

4-Interpretation, tabulation and discussion of the results.

5-Writing a search.

6-Discussing the student in the research.

مفردات المقـــرر: يحدد موضوع الرسالة من قبل مجلس القسم في حينه.

Contents:

The topic is to be determined by the department committee.

الكتب والمـراجع: تحدد بواسطة عضو هيئة التدريس بالقسم المشرف على الرسالة.

10. Preparing and Supervising Theses for Graduate Students

10.إعداد الرسائل الجامعية والإشراف عليها لطلبة الدراسات العليا

10.1Preparing Thesis

10.1 تحضير الرسالة

Article 41:

"Every graduate student shall have a scientific advisor at the beginning of his enrolment in the program. To guide him in his studies, help him choose a thesis topic, and prepare a research plan in accordance with the rules approved by the University Council, based on the recommendation of the Council of the Deanship of Graduate Studies."

Implementation rules:

1. The concerned department determines the scientific advisor for each new student within a period not exceeding one month from the beginning of the student's enrolment in the program
2. The scientific advisor guides the student, solves his problems, and follows up on the progress of his studies, its regularity, the selection of the topic of the thesis, the preparation of the research plan, and the stages of recording the thesis.
3. The period of scientific guidance begins from the date of approval of the name in the department council, and ends with the approval of the name of the scientific supervisor in the council of the Dean of Graduate Studies.
4. Scientific guidance is calculated for every three students for one hour in the teaching load of a faculty member, provided that the scientific advisor performs the tasks mentioned in the origin of this article and its executive rules, provided that the number of students does not exceed five for each scientific advisor.
5. The scientific advisor must specify the academic advising hour in his academic schedule and announce it to the students.
6. The student must communicate with the counsellor throughout the period of scientific counselling, and must come to him at the appointed hour for counselling.
7. If the student does not communicate with the advisor within a period not exceeding two months; The provisions of Article (52) of these Regulations and its

implementing rules shall apply to him.

8. The scientific advisor submits to the head of the concerned department a detailed report on the student's scientific progress at the end of each semester, according to the form prepared by the Deanship of Graduate Studies.
9. The scientific advisor may be an assistant professor.
10. After being appointed as a student's scientific advisor, a faculty member may submit a request for an apology for the guidance, justified by convincing reasons accepted by the department council.
11. It is preferable that the scientific advisor be the supervisor of the student's thesis or research project, unless this contradicts his specialization, and with the provisions of Articles (45 and 48) of these regulations.

Article 42:

"After completing all admission requirements, passing at least fifty percent of the academic courses, and with a cumulative average of no less than (very good), the postgraduate student must submit the thesis project - if any - to the department. The thesis supervisor and the assistant supervisor - if any - or the names of the members of the Supervisory Committee with the identification of its head, and this shall be submitted to the College Council and the Council of the Dean of Graduate Studies; To be approved based on the approval of the College Council."

Implementation rules:

1. The student is not entitled to submit the thesis draft to the department council unless it is approved by the scientific advisor.
2. The student presents an overview of his subject (Seminar), if necessary, in a panel discussion in front of the department council members.
3. Upon approval of the student's subject, a supervisor is appointed for his thesis, and when needed, two supervisors may be appointed for him, one of whom is a head, and the other an assistant.
4. If the student needs to make a fundamental modification to his research plan

approved in the title, or if the modification exceeds 25%; He submits to the concerned department a request for the amendment, stating the justifications for the amendment, and the approval of the supervisor for it. This is then submitted to the College Council, and then to the Council of the Dean of Graduate Studies.

Article 43

"The topics of master's theses must be distinguished by novelty and originality, and the topics of doctoral theses must be distinguished by originality and innovation, and an effective contribution to the development of knowledge in the student's specialization."

Implementation rule:

In the event that the student seeks to achieve heritage books of scientific value in the field of specialization; This will be in one of the two stages only, taking into account the need to diversify the registration of topics among students in one batch between achieving heritage books and registering a research topic in the colleges that are interested in that.

Article 44

"Master's and doctoral theses are written in Arabic, and in some disciplines, they may be written in another language by a decision of the University Council, based on the recommendation of the Department and College Councils, and the Council of the Deanship of Graduate Studies. It should contain an adequate summary of it in Arabic."

Implementation rules:

1. The description of each program of its requirements must state the thesis in the language in which the thesis is written. If it does not state that and the interest requires writing the thesis in another language, then the procedures in the origin of this course should be followed.
2. The guide for writing scientific theses prepared by the Deanship of Graduate Studies must be followed.
3. Academic theses written in Arabic must contain a summary in English.

Article 45

The thesis is supervised by professors, and associate professors from the faculty members of the university. The assistant professor may supervise master's theses if two years have passed since his appointment to this degree, and he has at least two refereed papers - in his field of specialization - from research published or accepted for publication.

Implementation rule:

In appointing the thesis supervisor, the exact specialization and research interests shall be taken into consideration.

Article 46

"These may be supervised by supervisors with distinguished experience and scientific competence in the field of research who are not members of the university faculty, by a decision of the University Council based on the recommendation of the relevant department council, the concerned college council, and the Deanship of Graduate Studies Council."

Implementation rules:

1. Assigning supervision to a supervisor from outside the university is required to complete the shares of the faculty members in the department, and the concerned department, when necessary, may make an exception from that based on convincing justifications.
2. The competent department sets a precise control for the distinguished experience and scientific competence referred to in the original of this article.
3. Supervision may only be assigned to those who hold a doctorate degree in the specialization in which the research is registered.

Article 47

"A faculty member from other departments may assist in supervising the thesis, depending on the nature of the thesis, provided that the main supervisor is from the department in which the student studies."

Implementation rules:

1. If the nature of the subject requires the nomination of an assistant supervisor from another department at the university; It requires coordination between the two departments, the approval of the department and college councils to which the assistant supervisor is affiliated, and then the approval of the department and college councils to which the program is affiliated.
2. It is permissible to nominate an assistant supervisor from outside the university if the nature of the subject of the thesis so requires. Coordination is required between the university and the candidate's destination, the approval of the candidate's authority, taking into account what is stated in Article (46) of the regulations, and completing the procedures according to what was stated in the same article.
3. An assistant supervisor may be nominated from the same department if the nature of the subject matter of the thesis so requires, or if there are multiple tracks in the department.
4. The assistant supervisor is required to meet the requirements of the chief supervisor, and the department council has the right to make an exception from this condition in cases of necessity, with justifications being clarified.

Article 48

"The supervisor, whether alone or jointly with others, may supervise a maximum of four messages at one time. In cases of extreme necessity, upon the recommendation of the department council and the approval of the councils of the concerned college and the Deanship of Graduate Studies, the number of theses may be increased to five, and supervision of each thesis is calculated by one hour from the quorum of the faculty member, if he is a single supervisor or a major supervisor."

Implementation rules:

1. The supervision period starts from the time the name of the scientific supervisor is approved in the Council of the Deanship of Graduate Studies.
2. The student's supervision period ends with one of two things:

   A) The supervisor submits a report to the department after the discussion stating

that the student's thesis is complete and that all requirements for the academic degree are met, attached to it a copy of the thesis in its final form.

B) The expiry of the period prescribed for the student to obtain the scientific degree in accordance with Article (36) of these regulations, taking into account what is stated in Article No. (29).

3. The supervisor must assign each student a office hour each week, which is included in his academic schedule and announced to the students.
4. It is not permissible to approve the increase of the supervisor's quorum to five theses if there are other professors qualified to supervise in the same specialization who are not in a quorum.
5. The justifications must be clarified in the event that the quorum of the faculty member in supervision is completed and the need to add a fifth letter to it.
6. The assistant supervisor is treated as the main supervisor in calculating supervision of each thesis for one hour from its teaching load, and he must assign each student an office hour each week, to be included in his academic schedule and announced to the students.
7. The student must communicate with the supervisor throughout the supervision period, and attend to him at the appointed hour for supervision.
8. If the student does not communicate with the supervisor for a period not exceeding two months; The provisions of Article (52) of these Regulations and its implementing rules shall apply to him.

Article 49

"In the event that the supervisor is unable to continue supervising the thesis, or his service at the university is terminated, the department proposes a replacement supervisor to take his place, approved by the relevant college council, and approved by the Council of the Deanship of Graduate Studies."

Implementation rules:

1. The supervisor may continue to supervise the thesis after the end of his service at the university based on the recommendation of the department and college

councils, and the approval of the Deanship of Graduate Studies Council.

2. The supervisor or the assistant supervisor, in case of apologizing for continuing to supervise the thesis, must provide sufficient justifications acceptable to the department council.
3. If the faculty council decides to change the supervisor proposed by the relevant department council; The subject is returned to the department council with sufficient justifications, and in the event of a difference between the two councils; The Council of the Deanship of Graduate Studies has the right to decide on the matter.
4. In the event that the supervisor is unable to continue supervising the thesis due to the end of his service at the university; It must be indicated in the thesis to his contribution to it.
5. The faculty member continues to supervise during his sabbatical leave.

Article 50

"At the end of each semester, the supervisor submits a detailed report to the head of the department on the student's progress in his studies, and a copy of the report is sent to the Dean of Graduate Studies."

Executive rule:

The Deanship of Graduate Studies puts an electronic version of this report on the academic system, so that it is filled out automatically and saved; To be viewed when needed.

Article 51

"After the student has completed the preparation of the thesis, the supervisor of the thesis submits a report on its completion to the head of the department, in preparation for the completion of the procedures determined by the Council of the Deanship of Graduate Studies."

Implementation rules:

1. The report shall be according to the form prepared on the electronic system, with a

copy of the thesis attached to it.

2. The report is presented to the department council to form a committee for discussion and judgment on the thesis.
3. In case of the student studies the courses and the research project, the faculty member assigned to teach the course of the research project submits a report to the head of the department stating that the student fulfills the graduation requirements and has completed the research project, and monitors the approved degree; In preparation for the completion of the award of the degree.

Article 52

"If it is proven that the student is not serious about studying, or has breached any of his academic duties, based on a report from the supervisor of his studies, the student will be warned by a letter from the concerned department, and if the student is warned twice and the reasons for the warning have not been avoided, the Council of the Deanship of Graduate Studies, based on the recommendation of the Department Council, cancels his restriction."

Implementation rules:

1. The student is warned by an official letter from the head of the department regarding the provisions of this article, in addition to the following cases:
   a) If his absence without an acceptable excuse exceeds two months at the stage of scientific guidance or supervision in each semester.
   b) If he exceeds half the period specified for obtaining the scientific degree and does not submit to the department with the subject of the thesis for the master's and doctoral stages, in accordance with Article (36) of these regulations.
   c) If the student is late in completing what was requested of him by the competent scientific councils, whether at the stage of studying the courses or preparing the thesis.
   d) If he does not respond to the directions of the scientific advisor or the supervisor of his thesis.
   e) If he is unable to write the scientific writing that is appropriate to the stage in which

he is studying.

2. The reports submitted by the scientific advisor are treated as reports submitted by the supervisor.
3. The Deanship of Graduate Studies shall provide a copy of the warning addressed to the student.
4. If the student does not respond after being warned twice for one reason; His matter is presented to the department council, and the department council's recommendation is submitted to the dean of the college and from there to the council of the dean of graduate studies to take the appropriate action in his regard.

10.2 Discussing theses

10.2 مناقشة الرسائل

Article 53

"The discussion committee is formed by a decision of the Council of the Dean of Graduate Studies, based on the recommendation of the specialized department and college councils."

Implementation rules:

1. The supervisor's report is submitted to the department board; In preparation for the formation of the discussion committee and judge the thesis.
2. The relevant department council shall suggest the members of the discussion committee, and it may suggest an alternate member.
3. The supervisor may suggest the name of one of the members of the discussion committee.
4. If the Council of the Dean of Graduate Studies decides to make a change in the members of the committee proposed by the college; Coordination is with the college.
5. Copies are sent to the members of the discussion committee by a letter from the head of the concerned department within a maximum period of one week from the date of the department's notification of the university president's approval of the decision of the Deanship of Graduate Studies Council.
6. Each discussing member shall submit to the head of the concerned department a detailed report on the thesis according to the prepared form, provided that the period of examination of the thesis does not exceed two months for the master's degree, and three months for the doctorate, starting from the date of sending the copy to the member of the discussion committee.
7. If a member of the discussion committee is late for the period specified for submitting the report; The department council may, after notifying the member of the expiry of the term, suggest an alternative debater.

Article 54

The following are required for the examination committee for master's theses:

1. The number of its members shall be odd, and the supervisor shall be its rapporteur.
2. The number of members of the committee shall not be less than three from among the faculty members, and the supervisor and the supervisor shall not be represented the assistant (if any) is a majority in it.
3. That the terms of supervision of theses apply to the members of the committee.
4. At least one of the members of the committee should be one of the professors or associate professors.
5. To take its decisions with the approval of at least two thirds of the members.

Implementation rules:

1. When discussing the thesis, the supervisor and the assistant supervisor, if any, have one vote in the event of their agreement, and in the event of equal votes, the side in which the main supervisor is present shall prevail.
2. That the student's discussion takes place within a period not exceeding three weeks from the date of the last discussants' delivery of his report on the thesis to the head of the department, taking into account what is stated in Executive Rule No. (6) of Article 53.
3. The date of the discussion shall be announced in the department, college, and the university's website at least one week before it is scheduled.

Article 55

The following are required in the PhD dissertation committee:

1. The number of its members shall be odd, and not less than three, and the supervisor shall be its reporter.
2. The membership of the discussion committee is limited to the professors and the associate professors, and the supervisor and the assistant supervisor (if any) are not the majority among them.
3. At least one of the professors should be among the members of the committee.
4. One of the committee members should be from outside the university.
5. To take its decisions with the approval of at least two thirds of the members.

Implementation rules:

1. When discussing the thesis, the supervisor and the assistant supervisor, if any, have one vote in the event of their agreement, and in the event of equal votes, the side in which the main supervisor is present shall prevail.
2. That the student's discussion takes place within a period not exceeding three weeks from the date on which the last discussants delivered his report on the thesis to the head of the department, taking into account what was stated in Executive Rule No. (6) of Article (53)
3. The date of the discussion shall be announced in the department, college, and the university's website at least one week before it is scheduled.

Article 56

"In the case that the thesis supervisor is unable to participate in the discussion committee, due to his death or the end of his service, or his presence on a mission abroad for a long period, the department proposes a replacement for him, and the council of the concerned college approves it and the Council of the Deanship of Graduate Studies approves it."

Implementation rules:

1. The department proposes a substitute for the supervisor if he is on a mission outside the country, if the assignment period exceeds three months from the date of formation of the discussion committee.
2. The substitute for the supervisor is considered a rapporteur for the discussion committee, provided that the name of the main supervisor remains written on the cover of the thesis.
3. The substitute for the supervisor is considered a member of the discussion committee in terms of financial rights, taking into account what is stated in Article (60) and its implementing rules regarding what the main supervisor is entitled to in the time he spent with the student.
4. In the case that one of the discussants apologizes for continuing in the discussion committee, he submits a request to the relevant department with sufficient justifications, and the department proposes a substitute for it, approved by the

concerned college council, and approved by the Council of the Deanship of Graduate Studies.

Article 57

The discussion committee prepares a report signed by all of its members and submitted to the head of the department within a week from the date of the discussion, including one of the following recommendations: -

1. Acceptance of the thesis and recommendation for awarding the degree.
2. Acceptance of the thesis with some amendments, without discussing it again. A member of the discussion committee is authorized to recommend the award of the degree, after making sure that these amendments have been adopted within a period not exceeding three months from the date of the discussion, and the University Council may make an exception to this.
3. Completing the deficiencies in the thesis, and re-discussing them during the period determined by the Council of the Deanship of Graduate Studies, based on the recommendation of the relevant department council, provided that it does not exceed one year from the date of the discussion.
4. Not accepting the thesis.

Each member of the discussion committee on the thesis has the right to present his different views or reservations in a detailed report to the head of the department and the dean of graduate studies, within a period not exceeding two weeks from the date of the discussion.

Implementation rules:

1. Each member of the discussion committee submits a report on the validity of the thesis for discussion to the department head, according to the prepared form.
2. If the members of the committee agree on the validity of the thesis for discussion; the thesis will be submitted for discussion.
3. If the members of the committee agree that the thesis is not valid for discussion, the student's registration is folded based on Paragraph (9) of Article (26) of these Regulations.

4. If the members of the committee disagree about the validity of the thesis for discussion, the committee's views are presented to the department council to take the appropriate recommendation, then its recommendation is submitted to the council of the Deanship of Graduate Studies for a decision.
5. The thesis may not be discussed more than twice, and the second discussion is considered final.
6. The committee rapporteur, who is the supervisor, manages the discussion session and judges the thesis.
7. The discussion committee submits its report after discussion according to the prepared form.
8. The committee may unanimously recommend printing the thesis at the expense of the university, based on convincing justifications.
9. The supervisor will follow up on the student's work in recommendations No. (2 and 3) in this article.
10. The student must submit the required copies of the thesis in its final form according to the prepared form, within a period not exceeding one month from the date of the committee's recommendation to grant the degree in accordance with paragraph (1) of this article.
11. If a member of the Committee offers different views or reservations; It is presented to the department council within a week from the date the department head received it to take the appropriate recommendation, and submit it to the college and graduate studies councils.
12. Announcing the result at the place of discussion is not considered a grant of the academic degree until it is approved by the University Council.

Article 58

"The head of the concerned department shall submit the report of the discussion committee to the Dean of Graduate Studies within a period not exceeding three weeks from the date of the discussion."

Implementation rules:

1. The head of the department shall submit the report of the discussion committee to the Dean of Graduate Studies through the Dean of the College, as stipulated in Article No. (2) of these regulations.
2. If the report of the discussion committee includes recommendation No. (2) of Article (57); The head of the department raises the recommendation to grant the degree within a period not exceeding two weeks from the date of delivery of the modified thesis.

Article 59

"The Dean of Graduate Studies submits the recommendation to grant the degree to the University Council for decision."

Article 60

A reward of (5000) five thousand riyals shall be paid to the supervisor of a master's thesis from outside the university, and a reward of (7,000) seven thousand riyals shall be paid to the supervisor of a doctoral dissertation from outside the university.

If necessary, the external supervising professor may meet with the students who are supervising them and with the approval of the Deanship of Graduate Studies Council of the university to which the faculty member is affiliated, based on a request from the university to which the student is affiliated, to assign an external supervisor for master's and doctoral theses according to the following order:

a. Once every semester for each external university, he supervises student theses.
b. The number of universities to which he is delegated does not exceed two universities each semester.
c. The duration of the assignment shall not exceed (3) days each time.
d. The total number of assignment days shall not exceed ten days in the full academic year for all universities.

e. The beneficiary university shall bear the expenses of the faculty member who is delegated to supervise the letters of her students, according to what is stipulated by law according to his rank.

Implementation rule:

In case of a succession of supervisors on the thesis; The Council of the Deanship of Graduate Studies determines what, each supervisor is entitled to from the supervision reward based on the recommendation of the department and college councils, so that the distribution of the reward is according to the following:

a) (50%) for the period during which he assumed supervision, based on the time the student spent on the thesis.

b) (50%) in return for what he accomplished of the thesis with the student.

Article 61

A reward of (1,000) thousand riyals will be paid to those who participate in the discussion of a master's or doctoral thesis, if the discussant is a member of the faculty at the same university to which the thesis is submitted. But if the discussant is not a faculty member at the university in which the thesis is being discussed, whether he is an employee of that university, or someone who is invited from outside it, then a reward of (1500) riyals shall be paid to him for discussing a doctoral thesis, and (1,000) riyals for discussing a master's thesis. And the reward is increased to become (2500) riyals if the discussant is from outside the Kingdom.

If the discussant is from outside the city in which the thesis is being discussed, whether he is from inside or outside the Kingdom, he shall be paid, in addition to the aforementioned reward, a boarding pass to and from his place of residence, and the appropriate accommodation and subsistence fare, with a maximum limit not exceeding two nights.

A boarding ticket will also be issued for the attendant's companion if the discussant is blind, in addition to the appropriate accommodation fee, with a maximum limit of two nights. The Council of Postgraduate Studies may add one or two nights in cases of necessity, and if the nature of the study so requires, based on the recommendation of

the specialized department and college councils, with clarification of the justifications for staying longer than two nights.

Implementation rules:

1. The supervisor is entitled to the reward stipulated in this article as a member of the discussion committee.
2. If the assistant supervisor participates in the discussion of the thesis; He shall be entitled to the reward stipulated in this Article as a member of the discussion committee.
3. If the discussion committee recommends completing the deficiencies in the thesis, and re-discussing them in accordance with Paragraph (3) of Article (57) of the Uniform Regulations for Graduate Studies in Universities; The committee deserves the financial reward stipulated in this article.
4. The University's Public Relations Department undertakes the task of arranging travel reservations, housing, transportation, catering, reception and farewell, and sending travel tickets to the external discussion well in advance of the discussion.
5. The University's Public Relations Department takes the necessary procedures regarding the issuance of an entry visa for the debater from outside the Kingdom, in accordance with the approved regulations.

Article 62

"The University Council sets the rules regulating the evaluation of graduate studies programs based on the proposal of the Council of the Deanship of Graduate Studies, provided that the evaluation results are submitted to the University Council."

Implementation rules:

1. The Deanship of Graduate Studies, in coordination with the Deanship of Academic Development and Quality, prepares the program evaluation requirements, provided that they are sent to the concerned faculties to complete the evaluation process, and then submit the results to the Deanship.
2. The evaluation results of each program of the concerned colleges shall be submitted to the Council of the Deanship of Graduate Studies, and then to the University

Council within a period not exceeding five years.

Article 63

"At the end of each academic year, the head of the department submits to the dean of the concerned college and the dean of graduate studies a report on the progress of graduate studies in it."

Executive rule:

The report submitted by the head of the department includes the following:

1. The open programs, the number of students applying, accepted, and alumni in each program.
2. The number of defaulting students in each program, and their ratio to the number of accepted students in each batch.
3. The number of faculty members in each program.
4. The number of faculty members who are entitled to supervise scientific theses.
5. A statement of the faculty members supervising theses, and their shares in supervision.
6. A statement of the status of students in each program in terms of regularity, interruption and withdrawal; postponement and deletion; cancellation of entries, returns and additional opportunities; and conversion.
7. The number of theses enrolled and discussed in each program.
8. The number of students late in registering subjects and the reasons for that.
9. The difficulties facing the postgraduate studies in each program, and the suggestions prepared to overcome them.
10. Suggestions and recommendations deemed by the head of the department.

Article 64

"Unless there is a special provision in these regulations, the system of the Council of Higher Education and Universities and its implementation regulations, and the laws, regulations and decisions in force in the Kingdom, shall be applied in this regard."

Article 65

"This regulation cancels the previous regulations of postgraduate studies in universities, and it applies to work from the first academic year following the date of its approval. The University Council may handle the cases of students enrolled under the regulations prior to the entry into force of this regulation."

Article 66

"University councils may set organizational and implementation rules and procedures for the conduct of graduate studies in them, in a manner that does not conflict with the provisions of these regulations."

Implementation rules:

1. The University Council has the right to interpret these executive rules in a manner that does not conflict with the regulations.
2. These implementation rules shall apply from the date of their approval by the University Council, and all internal regulations and other executive rules that contradict them shall be cancelled.
3. Each college has the right to set its own organizational procedures in a way that does not conflict with this regulation and its implementation rules, and they are submitted to the Council of Graduate Studies for approval based on the recommendation of the College Council and the Specialized Council

Article 67

The Higher Education Council has the right to interpret these regulations.