Handbook for

PhD in Chemistry Program

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1. Introduction and Purpose of the Handbook

The PhD in Chemistry Program at the Department of Chemistry, College of Science, King Khalid University (KKU), is designed to provide advanced academic education and research training in chemistry. The program aims to develop highly qualified researchers capable of conducting independent scientific investigations, addressing complex chemical problems, and contributing to the advancement of knowledge and innovation in chemistry and related fields. The program covers four major specializations: Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, and Physical Chemistry. Through advanced coursework, comprehensive examinations, supervised research, and dissertation preparation, students develop specialized knowledge, critical thinking, analytical and research skills, and the ability to communicate scientific findings effectively.

Purpose of the Handbook

This handbook serves as an official reference for prospective and enrolled PhD students, academic advisors, dissertation supervisors, and other stakeholders. It provides essential information about the program's academic structure, requirements, policies, and procedures to support students throughout their doctoral studies.

Specifically, the handbook aims to:

1. Introduce the program, its objectives, specializations, and academic structure.
2. Explain admission requirements, the approved study plan, coursework, comprehensive examinations, and graduation requirements.
3. Clarify the procedures for academic advising, dissertation supervision, research proposal approval, dissertation preparation, and examination.
4. Outline students' academic responsibilities, research ethics, and expectations for satisfactory academic progress.
5. Provide access to relevant university regulations, official forms, guidelines, and electronic services through links to King Khalid University's official websites.

Students are encouraged to consult this handbook regularly and maintain communication with their academic advisors and dissertation supervisors. The handbook should be read alongside the applicable university regulations, policies, and official decisions. In the event of any inconsistency, the approved university regulations and decisions shall prevail.

2. Program Identification and Background

2.1. Program Identification

Item	Description
University	King Khalid University (KKU)
College	College of Science
Department	Department of Chemistry
Program Title	Doctor of Philosophy in Chemistry
Degree Awarded	Doctor of Philosophy (PhD) in Chemistry
General Field of Study	Chemistry
Saudi Standard Classification of Educational Specializations (SASCED) Code	053101
Language of Instruction	English
Total Credit Hours	44 credit hours
Coursework	32 credit hours
Dissertation	12 credit hours
Minimum Program Duration	6 semesters
Maximum Program Duration	9 semesters
Specializations	Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, and Physical Chemistry

2.2. Program Background

The PhD in Chemistry Program is offered by the Department of Chemistry, College of Science, King Khalid University, as part of the University's commitment to advancing graduate education, scientific research, and the development of highly qualified researchers.

The program provides opportunities for advanced study and original research across four major disciplines of chemistry: Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, and Physical Chemistry. It builds upon students' previous academic preparation and develops the

specialized knowledge and research competencies required for independent scientific investigation.

The program integrates advanced coursework with comprehensive examinations and supervised doctoral research. Its current study plan comprises 44 credit hours, including 32 credit hours of coursework and 12 credit hours allocated to the doctoral dissertation. The program is designed to be completed within a minimum of six semesters and a maximum of nine semesters, in accordance with the applicable university regulations.

The program supports the development of researchers capable of addressing scientific and technological challenges, producing high-quality research, contributing to interdisciplinary collaboration, and pursuing careers in academia, research institutions, industry, and other sectors requiring advanced expertise in chemistry.

The program is governed by the applicable graduate studies regulations of King Khalid University and administered through the Department of Chemistry, College of Science, in coordination with the Deanship of Research and Graduate Studies.

Official Websites

- King Khalid University: https://www.kku.edu.sa/en
- College of Science: https://science.kku.edu.sa/en
- Department of Chemistry: https://science.kku.edu.sa/en/node/221
- PhD in Chemistry Program: https://science.kku.edu.sa/en/node/231
- Deanship of Research and Graduate Studies: https://dps.kku.edu.sa/en

3. Mission, Goals, and Learning outcomes

Mission:

To prepare qualified academicians and researchers with advanced knowledge and skills in the field of chemistry to contribute to community development.

Goals:

I. To possess deep specialized knowledge in chemical sciences and understanding of emerging developments.

II. To prepare scientists for contributing in solving scientific problems in academia and industry.

III. To conduct high-impactful scientific research that contributes in the development and prosperity of society.

IV. To uphold integrity, autonomy, and responsibility in research and professional practice while fostering collaboration and community

Program Learning Outcomes:

Knowledge and Understanding:	
K1	To outline a specialized knowledge and advanced understanding of contemporary chemistry.
K2	To describe comprehensive accurate knowledge and understanding of various chemical processes and techniques as well as material chemistry with practices.
K3	To recognize current advanced knowledge and understanding of recent developments, emerging issues and challenges in a chemical discipline acquired from original research and scientific activities
Skills:	
S1	To solve key challenges in highly complex contexts in one or more disciplines in chemistry.
S2	To apply novel and highly advanced processes, techniques, tools, instruments, and/or materials to deal with highly complex, emerging, and challenging practical activities in chemistry.
S3	To evaluate emerging chemical concepts, principles, and theories; and develop highly advanced research or inquiry methodologies to generate original knowledge in one or more disciplines in chemistry.
S4	To communicate in numerous forms to disseminate and promote original knowledge and new insights, and to adapt highly advanced information and communication technologies to support research and innovations in chemistry.
Values, Autonomy, and Responsibility:	
V1	To demonstrate high levels of integrity and professional and academic values while dealing with and promoting emerging ethical and professional issues, research, and knowledge in chemistry and related applications.
V2	To acquire continuously professional experiences, and make academic and/or professional strategic decisions, with substantial autonomy in chemistry and related applications.
V3	To collaborate professionally and proactively leading groups in various research projects in chemistry while assuming full responsibility for the work.
V4	To efficiently reinforce professional relationships in chemistry, a relevant knowledge-based society, and quality of life.

4. Jobs and occupation

Professions/jobs for which students are qualified:

• Academia

• Research and development

• Industry

Relevant occupational/ Professional sectors:

• Higher education

• Research and development

• Industry

5. Admission Requirements for the PhD Program

1. Applicants must pass an English language proficiency test such as IELTS with a minimum score of 4, or an equivalent approved by the Deanship of Research and Graduate Studies. Exemption is granted to applicants who obtained their master's degree from an English-speaking country, provided the degree was obtained within the last five years.
2. The evaluation criteria and weights are composed of 50% for the Bachelor's GPA and 50% for the Master's GPA.
3. Holds a Master of Science degree in chemistry or related topics (biochemistry, chemical engineering, environmental sciences, or industrial chemistry).

6. PhD in Chemistry Program Structure and Requirements for Fulfilment

6.1. Guidelines

The minimum duration of the program is 6 semesters, while the maximum duration is 9 semesters. The program requires a total of 44 credit hours, comprising 32 credit hours of 12 graded courses and 12 credit hours for the dissertation. All courses are included in the calculation of the student's GPA. The credit hours assigned to each course and the dissertation correspond to the required contact hours. The basic study plan is presented in Section 3.1. The program requirements consist of the following six components.

Component 1: Completion of **four core courses**, totaling 12 credit hours, scheduled at Level 1. These include one course from each of the four chemistry specializations: organic, inorganic, physical, and analytical chemistry. See Sections 3.3.1–3.3.4.

Component 2: Completion of **one mandatory seminar course**, worth two credit hours, scheduled at Level 4.

Component 3: Completion of **five elective specialization courses**, totaling 15 credit hours, scheduled at the Levels 2 and 3. The program offers 10 elective courses in each specialization (organic, inorganic, physical, and analytical chemistry), for a total of 40 elective courses.

Component 4: Completion of **one elective course** titled "Special Topics," scheduled at Level 3. The program offers eight elective courses under this component.

Component 5: Submission of a **dissertation worth 12 credit hours**, together with at least one publication, scheduled at Levels 4–6, and can be continued up further 3 semesters.

Component 6: Successful completion of the **comprehensive examination**.

The comprehensive examination consists of two parts: written and oral. A student may not register for the dissertation until both parts have been successfully completed. At Level 3, the student must take four written examinations, one in each chemistry specialization: organic, inorganic, physical, and analytical chemistry. The student must pass at least two of the four written examinations with a minimum score of 70 out of 100 in each. At least one of the examinations passed must be in the specialization corresponding to the student's dissertation topic. The student must also pass the oral examination with a minimum score of 70 out of 100. If a student did not complete coursework in all four classical chemistry specializations—organic, inorganic, physical, and analytical chemistry—during the master's program, complementary courses (see Section 5) will be assigned during the first year of the PhD program. Depending on the student's previous coursework, zero to four complementary courses may be assigned.

7.2. Basic Study Plan

Total credit hours: 44 (32 courses + 21 thesis)

First Year/First Level				
Course code	**Course title**	**Required/ Elective**	**Credit H**	**Contact H**
7121CHEM	Advanced Physical Organic Chemistry	Required	3	3
7221CHEM	Advanced Topics in Inorganic Chemistry	Required	3	3
7321CHEM	Advanced Topics in Physical Chemistry	Required	3	3
7421CHEM	Advanced Topics in Analytical Chemistry	Required	3	3

First Year/Second Level				
Course code	**Course title**	**Required/ Elective**	**Credit H**	**Contact H**
****CHEM	Elective Course 1	Elective	3	3
****CHEM	Elective Course 2	Elective	3	3
****CHEM	Elective Course 3	Elective	3	3

Second Year/Third Level				
Course code	**Course title**	**Required/ Elective**	**Credit H**	**Contact H**
****CHEM	Elective Course 4	Elective	3	3
****CHEM	Elective Course 5	Elective	3	3
****CHEM	Special Topics	Elective	3	3

Second Year/Forth Level				
Course code	**Course title**	**Required/Elective**	**Credit H**	**Contact H**
7021CHEM	Seminar	Required	2	2
7020CHEM	Doctoral Dissertation	Required	12	12

Third Year/Fifth Level				
Course code	**Course title**	**Required/Elective**	**Credit H**	**Contact H**
7020CHEM	Doctoral Dissertation	Required	12	12

Third Year/Sixth Level				
Course code	**Course title**	**Required/Elective**	**Credit H**	**Contact H**
7020CHEM	Doctoral Dissertation	Required	12	12

7.3. Lists of Elective Courses in Chemistry Specialization

7.3.1. Elective Specialization Courses in Organic Chemistry

Course code	Course title	Required/ Elective	Credit H	Contact H
7102CHEM	Spectroscopic Identification of Organic Compounds	Elective	3	3
7123CHEM	Advanced Organic Chemistry Syntheses	Elective	3	3
7124CHEM	Green Chemistry	Elective	3	3
7125CHEM	Advanced Organic Materials and Functional Dyes	Elective	3	3
7126CHEM	Advanced Heterocyclic Chemistry	Elective	3	3
7107CHEM	Polymer Chemistry	Elective	3	3
7108CHEM	Bioorganic Chemistry	Elective	3	3
7109CHEM	Advanced Organometallic and Organic Chemistry	Elective	3	3
7110CHEM	Natural Products Chemistry	Elective	3	3
7111CHEM	Computational Organic Chemistry	Elective	3	3

7.3.2. Elective Specialization Courses in Inorganic Chemistry

Course code	Course title	Required/ Elective	Credit H	Contact H
7222CHEM	Synthesis of Inorganic Materials	Elective	3	3
7223CHEM	Advanced Materials Sciences	Elective	3	3
7224CHEM	Advanced Applications of Group Theory	Elective	3	3
7225CHEM	Advanced Inorganic Reaction Mechanisms	Elective	3	3
7226CHEM	Water Resources and Treatment	Elective	3	3
7207CHEM	Bioinorganic Chemistry	Elective	3	3
7208CHEM	Industrial Inorganic Chemistry	Elective	3	3
7209CHEM	Crystallography	Elective	3	3
7210CHEM	Advanced Organometallic and Inorganic Chemistry	Elective	3	3
7211CHEM	Advanced Radiochemistry and Nuclear Chemistry	Elective	3	3

7.3.3. Elective Specialization Courses in Physical Chemistry

Course code	Course title	Required/ Elective	Credit H	Contact H
7322CHEM	Quantum Chemistry and Structure	Elective	3	3
7323CHEM	Chemical Kinetics and Reaction Dynamics	Elective	3	3
7304CHEM	Statistical Thermodynamics	Elective	3	3
7325CHEM	Artificial Intelligence in Chemistry	Elective	3	3
7326CHEM	Advanced Electrochemistry	Elective	3	3
7307CHEM	Surface and Solution Chemistry	Elective	3	3
7308CHEM	Advanced Catalysis and Sustainability	Elective	3	3
7309CHEM	Molecular Spectroscopy	Elective	3	3
7310CHEM	Drug Design and Discovery	Elective	3	3
7311CHEM	Sustainable Energy and Its Applications	Elective	3	3

7.3.4. Elective Specialization Courses in Analytical Chemistry

Course code	Course title	Required/ Elective	Credit H	Contact H
7422CHEM	Advanced Separation Techniques	Elective	3	3
7423CHEM	Advanced Spectroscopic Techniques	Elective	3	3
7424CHEM	Sample Preparation Techniques	Elective	3	3
7425CHEM	Advanced Electroanalytical Chemistry	Elective	3	3
7426CHEM	Advanced Biochemical Analysis	Elective	3	3
7407CHEM	Advanced Pharmaceutical Chemical Analysis	Elective	3	3
7408CHEM	Statistical Analysis and Data Interpretation	Elective	3	3
7409CHEM	Advanced Environmental Chemical Analysis	Elective	3	3
7410CHEM	Advanced Forensic Chemical Analysis	Elective	3	3
7411CHEM	Green Analytical Chemistry	Elective	3	3

7.5. List of Special Topics Courses

Course code	Course title	Required/ Elective	Credit H	Contact H
7112CHEM	Special Topics in Nuclear Magnetic Resonance Techniques	Elective	3	3
7113CHEM	Special Topics in Mass Spectrometry	Elective	3	3
7212CHEM	Special Topics in Materials Preparation Methods	Elective	3	3
7213CHEM	Special Topics in Materials Characterization	Elective	3	3
7312CHEM	Special Topics in Advanced Computational Chemistry	Elective	3	3
7313CHEM	Special Topics in Physical Properties of Materials	Elective	3	3
7412CHEM	Special Topics in Separation Methods	Elective	3	3
7413CHEM	Special Topics in Quantitative Spectroscopy	Elective	3	3

7.6. List of Complementary Courses

Course code	Course title	Required/ Elective	Credit H	Contact H
7100CHEM	Selected Topics in Organic Chemistry	Elective	3	3
7200CHEM	Selected Topics in Inorganic Chemistry	Elective	3	3
7300CHEM	Selected Topics in Physical Chemistry	Elective	3	3
7400CHEM	Selected Topics in Analytical Chemistry	Elective	3	3

8. Official Graduate Studies Forms and Academic Procedures

King Khalid University provides official forms and procedural documents to support graduate students throughout their academic studies, from research proposal preparation to dissertation examination and graduation. Students should use the current versions available through the Deanship of Research and Graduate Studies and consult their academic advisors or dissertation supervisors when completing the required procedures.

8.1. Research Proposal Preparation and Submission

Form or guideline	Brief description
General Framework for the Research Plan	Provides the general framework for preparing a graduate research plan, including its principal components and organization.
Research Plan Preparation	Provides the relevant resource for preparing a research plan before submission for academic review.
Research Proposal Submission	Directs students to the official resource associated with submitting a research proposal through the applicable university procedures.

8.2. Dissertation Examination and Defense

Form or guideline	Brief description
Dissertation Readiness for Examination Report	Used to document the dissertation's readiness for examination and support the process of arranging the dissertation defense.
Dissertation Examination Committee Report	Used by the examination committee to record its evaluation of the dissertation and examination proceedings.
Dissertation Examination Committee Decision	Documents the formal decision of the dissertation examination committee following the defense.
Dissertation Defense Result Announcement	Provides the official form associated with announcing the outcome of a dissertation examination.

These forms are particularly relevant to doctoral students approaching the final stages of their research. The dissertation supervisor and the Department of Chemistry should guide students regarding the appropriate sequence of submission, review, examination, and approval.

8.3. Student Academic Procedures and Graduation

Form	Brief description
Graduation Clearance Form	Used to complete the required clearance procedures before graduation.
Coursework-Based Graduation Clearance Form	Intended for students graduating from coursework-based programs; generally not applicable to the PhD in Chemistry program.
Thesis Printing and Binding Allowance Form	Used to request the applicable financial allowance associated with printing and binding a scientific thesis. Eligibility is subject to university regulations.
Withdrawal Request Form	Used by students seeking formal withdrawal through the applicable academic procedures.
Internal Transfer Request Form	Used to request transfer between specializations within King Khalid University, subject to approval and eligibility requirements.
Transfer to King Khalid University Form	Used by eligible graduate students seeking to transfer from another university to KKU.
Transfer Course Equivalency Form	Used to request assessment and recognition of previously completed courses when transferring to KKU.
Academic Recommendation Form — English	Provides the official English-language recommendation form for academic or professional purposes.
Academic Recommendation Form — Arabic	Provides the corresponding Arabic-language academic recommendation form.

Transfer Clearance Form	Used to complete the clearance procedures associated with an approved academic transfer.

8.4. Graduate Program Development and Quality Assurance Forms

The Deanship also provides official templates for graduate program establishment, development, specifications, and evaluation. These documents are primarily intended for academic administrators, program committees, and faculty members rather than individual PhD students.

Form	Brief description
Graduate Program Establishment Request	Template for proposing the establishment of a new graduate program.
Graduate Program Development Request	Template for proposing changes to an existing graduate program.
Program Specification Template	Used to document program structure, objectives, learning outcomes, and related academic information.
Course Specification Template	Used to prepare standardized course specifications.
Graduate Program Review Form	Used for academic review and evaluation of graduate programs.
Education and Training Evaluation Commission 2024 Form	Provides access to the listed 2024 evaluation-related template for graduate programs.

For detailed course specifications, click here.