Program Specification

Program Name: Bachelor of Science in Chemistry
Qualification Level : Bachelor
Department: Chemistry
College: Science
Institution: King Khalid University

Content

A. Program Identification and General Information

1. Program Main Location:

College of Science, Greiger, Abha

2. Branches Offering the Program:

Branch 1. College of Science, Male and Female Sections, Abha

3. Reasons for Establishing the Program:
(Economic, social, cultural, and technological reasons, and national needs and development, etc.)

To meet the local developments in community, industry, and teaching. Reasons for establishing the program can be summarized as:

- ✓ Graduate chemist experts with knowledge, skills and competences to meet the requirements of labor market.
- ✓ High needs for chemists in the Saudi industries.
- ✓ Develop the capability of students in different chemistry fields through effective use and combining acquired knowledge and skills in different parts of the program.
- ✓ Provide graduate with high skills can participate in scientific research in various fields of chemistry.
- ✓ Needs for chemistry teachers in the various stages of education.
- ✓ Provide graduate who can work in institutions of higher educations.

4. Total Credit Hours for Completing the Program: (126)

No	Requirements	Number of Courses	Number of credit hours	%
1	University Courses	6	12	9.52
2	College Courses	8	29	23.02
3	Department Courses	35	85	67.46
4	Elective Courses	-	-	-
Total		**49**	**126**	**100**

5. Learning Hours: (1875)

The length of time that a learner takes to complete learning activities that lead to achievement of program learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times)

To achieve the program learning outcomes, about 1875 learning hours are required to complete learning and activities including homework assignments, projects, preparing presentations, library times as illustrated in the table below.

Course	Learning Hours	Course	Learning Hours	Course	Learning Hours
011Eng-6	90	242Chem-3	45	362Chem-2	30
101Phys-4	60	241Chem-2	30	416Chem-2	30
111IC1-3	45	114IC1-2	30	417Chem-2	30
101Chem-4	60	213Chem-4	60	425Chem-2	30
101Math-3	45	222Chem-2	30	435Chem-3	45
101Biol-4	60	261Chem-2	30	464Chem-2	30
101Cms-3	45	313Chem-2	30	465Chem-2	30
110Ngl-3	45	314Chem-2	30	470Chem-3	45
112IC1-2	30	315Chem-2	30	418Chem-2	30
201Arab-2	30	324Chem-2	30	419Chem-2	30
102Cms-2	30	325Chem-2	30	426Chem-2	30
113IC1-2	30	336Chem-4	60	436Chem-2	30
202Arab-2	30	342Chem-2	30	450BCH-3	45
102Chem-3	45	363Chem-2	30	466Chem-2	30
212Chem-4	60	323Chem-4	60	467Chem-2	30
232Chem-2	30	335Chem-3	45		
233Chem-3	45	341Chem-2	30		
Total					**1875**

6. Professional Occupations/Jobs:

- **Teaching in various stages of pre-university education**
- **Working in the industrial fields that related to chemistry**
- **Working as assistant teaching staff in Saudi universities**
- **Working in research centers, public and private institutions that require skills in chemistry**
- **Working in institutions of higher education.**

7. Major Tracks/Pathways (if any):

Major track/pathway	Credit hours (For each track)	Professional Occupations/Jobs (For each track)
1. NA		

8. Intermediate Exit Points/Awarded Degree (if any): No Intermediate Exit Points or Awards

Intermediate exit points/awarded degree	Credit hours
1. NA	

B. Mission, Goals, and Learning Outcomes

1. Program Mission:

To graduate distinct chemists in knowledge and skills; effective in society development.

2. Program Goals:

- To graduate chemists having deep knowledge in chemistry
- To graduate well trained chemists in laboratory and field, as well as information technology and communication
- To graduate chemists fond of scientific research for problem solving and society development
- To graduate highly skilled chemists in self-learning and scientific thinking

3. Relationship between Program Mission and Goals and the Mission and Goals of the Institution/College.

The chemistry program is completely consistent with the mission and objectives of the faculty of science, which in turn is consistent with the message of King Khalid University of contributing to the educational process, scientific research, and community service.

		University mission To provide an academic environment conducive to teaching, learning, scientific research and social contribution through optimal utilization of our resources			
		academic environment	teaching, learning	scientific research	social contribution
College mission	Outstanding academic programs		√		
	Attractive academic environment	√			
	World-standards scientific research			√	
	Society development				√

College mission

To deliver distinct academic programs in attractive academic environment, to perform world-standards scientific research and to contribute in society development

Consistency (College Mission to Program Mission)

College: Science **Department:** Chemistry **Program:** BSc Chemistry

Program mission:

To graduate distinct chemists in knowledge and skills; effective in society development

		College Mission **To deliver distinct academic programs in attractive academic environment, to perform world-standards scientific research and to contribute in society development**			
		Outstanding academic programs	Attractive academic environment	World-standards scientific research	Society development
Program mission	Distinct chemists	√	√		
	Distinct knowledge	√			
	Distinct skills	√		√	
	Society development			√	√

4. Graduate Attributes:

- ✓ To implement knowledge from the foundation science.
- ✓ To apply the achieved knowledge from various chemistry fields in conducting scientific research.
- ✓ To contribute to decision making process based on statistics, information and key performance indicators.
- ✓ To communicate effectively orally and written.
- ✓ To identify and resolve problems in individual and collective situations, and exercise leadership in finding practical and innovative solutions.
- ✓ To developed knowledge in chemistry
- ✓ To apply advanced skills in information technology.
- ✓ To contribute in scientific research work, and community services
- ✓ To enhance the proper skills in self-learning and scientific thinking

5.Program learning Outcomes*

Knowledge :	
K1	To demonstrate a thorough understanding of the fundamental theories and concepts in chemistry
K2	To recognize the fundamentals of mathematics, physics, and biology related to chemical science
K3	To outline the recent experimental findings, developments, and applications of chemistry in life
Skills	
S1	To show appropriate applications of skills, methods, techniques and practices in chemistry to solve problems

S2	To demonstrate good practice of methods of investigation and research in chemistry and related fields
S3	To illustrate appropriate use of chemicals and equipment for carrying out experiments following safety procedures
S4	To interpret and evaluate chemical data from the literature and experimental results
Competence	
C1	To demonstrate social responsibility and ethical principles
C2	To show independency and working effectively in peer relationships for solving problems
C3	To acquire self-confidence to enter job market or integrate graduate programs
C4	To show effective oral and written communication
C5	To transmit relevant technical information from database and professional search engines

* Add a table for each track and exit Point (if any)

C. Curriculum

1. Curriculum Structure

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Institution Requirements	Required	6	12	9.52
	Elective			
College Requirements	Required	8	29	23.02
	Elective			
Program Requirements	Required	35	85	67.46
	Elective			
Capstone Course/Project				
Field Experience/ Internship				
Others				
Total		49	126	100

* Add a table for each track (if any)

2. Program Study Plan

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College or Department)
Level 1	111IC1	The Entrance to the Islamic Culture	Required		2	University
	101PHYS	Introduction to Physics	Required		4	College
	101CHEM	General Chemistry-1	Required		4	College
	011ENG	Intensive English Program 1	Required		6	College
Level 2	112IC2	Islamic Culture-2	Required		2	University
	201ARAB	Arabic Language Skills	Required		2	University
	101BIOL	General Biology	Required		4	College
	101MATH	Calculus-1	Required		3	College
	110NGL	Scientific English for Science Students	Required	011ENG	3	College
	101CMS	Computer Science	Required		3	College
Level 3	113IC3	Islamic Culture-3	Required		2	University
	102CHEM	General Chemistry 2	Required	101CHEM	3	Department
	202ARAB	Arabic Editing	Required		2	University
	102CMS	Computation Skills 2	Required		2	College
	212CHEM	Organic Chemistry-1	Required		4	Department
	241CHEM	Qualitative Analysis	Required	101CHEM	2	Department
	232CHEM	Chemical Thermodynamic	Required	101CHEM	2	Department
Level 4	114ICI	Islamic Culture- 4	Required		2	University
	213CHEM	Organic Chemistry 2	Required	212CHEM	4	Department
	222CHEM	Chemistry of Main Group Elements	Required	102CHEM	2	Department
	233CHE	Electrochemistry	Required	232CHE	3	Departme

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College or Department)
	M			M		nt
	242CHEM	Quantitative Analysis-1	Required	241CHEM	3	Department
	261CHEM	Quantitative Analysis-2	Required	241CHEM	2	Department
Level 5	313CHEM	Organic Chemistry 3	Required	213CHEM	2	Department
	323CHEM	Chemistry of Transition Elements	Required	222CHEM	4	Department
	335CHEM	Chemistry of Surfaces, Catalysis and Phase Rule	Required	232CHEM	3	Department
	341CHEM	Environmental Analysis	Required	242CHEM	2	Department
	362CHEM	Identification of Organic Compounds	Required	213CHEM	2	Department
Level 6	314CHEM	Spectroscopy of Organic Compounds	Required	313CHEM	2	Department
	315CHEM	Industrial Products	Required	313CHEM	2	Department
	324CHEM	Nuclear and Radiation Chemistry	Required	222CHEM	2	Department
	325CHEM	Solid State Chemistry	Required	102CHEM	2	Department
	336CHEM	Kinetics and Reaction Mechanism	Required	232CHEM	4	Department
	342CHEM	Instrumental Analysis 1	Required	242CHEM	2	Department
	363CHEM	Quantitative Organic Analysis	Required	213CHEM	2	Department
Level	416CHEM	Mechanism of Organic Reactions	Required	313CHEM	2	Department
	417CHE	Heterocyclic	Required	313CHE	2	Departme

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College or Department)
7	M	Chemistry		M		nt
	425CHEM	Inorganic and organometallic Chemistry	Required	323CHEM	2	Department
	435CHEM	Corrosion	Required	233CHEM	3	Department
	464CHEM	Organic Synthesis	Required	213CHEM	2	Department
	465CHEM	Instrumental Analysis 2	Required	342CHEM	2	Department
	470CHEM	Research Project	Required	342CHEM,314CHEM,323CHEM, 336CHEM	3	Department
Level 8	418CHEM	Organometallic Chemistry	Required	313CHEM	2	Department
	419CHEM	Natural Products	Required	313CHEM	2	Department
	426CHEM	Inorganic Reaction Mechanism	Required	323CHEM	2	Department
	436CHEM	Quantum Chemistry	Required	101CHEM + 101MATH	2	Department
	450BCH	Biochemistry	Required	313CHEM	3	Department
	466CHEM	Inorganic Chemistry	Required	323CHEM	2	Department
	467CHEM	Physical Chemistry	Required	335CHEM	2	Department

* Include additional levels if needed
** Add a table for each track (if any)

3. Course Specifications

Insert hyperlink for all course specifications using NCAAA template

https://drive.google.com/drive/folders/1GQ-9bYbYH7QwcTCrVGAk_j330RWqamjw

4. Program learning Outcomes Mapping Matrix

Align the program learning outcomes with program courses, according to the following desired levels of performance (**I = Introduced P = Practiced M = Mastered)**

Course code & No.	Program Learning Outcomes											
	Knowledge			Skills				Competence				
	K.1	K. 2	K. 3	S. 1	S. 2	S. 3	S. 4	C. 1	C. 2	C. 3	C. 4	C. 5
101CHEM	I			I						I		
102CHEM			I				I	I				
212CHEM	I			I						I		
241CHEM		I				I					I	
232CHEM		I					I					I
213CHEM	I			I						I		
222CHEM			I				I		I			
233CHEM			I		I			I				
242CHEM			P	P							P	
261CHEM			P			P			P		P	
313CHEM	P			P								p
323CHEM	P					P		P	P			
335CHEM			P	P							P	
341CHEM			P	P			P	P				
362CHEM			P		P					P		
314CHEM			P				P					P
315CHEM			P		P					P		
324CHEM		p		P				P				
325CHEM		P					P				P	
336CHEM	P					P		P				
342CHEM			P			P				P		
363CHEM	P					P			P			
416CHEM	M							M				
417CHEM				M						M		
425CHEM	M								M	M		
435CHEM	M								M			
464CHEM			M								M	
465CHEM			M		M			M				M
470CHEM			M		M		M	M			M	
418CHEM				M						M		
419CHEM				M								
426CHEM									M			M
436CHEM						M	M		M			
450BCH						M						M
466CHEM							M				M	
467CHEM					M							

Course code & No.	Program Learning Outcomes											
	Knowledge			Skills				Competence				
	K.1	K. 2	K. 3	S. 1	S. 2	S. 3	S. 4	C. 1	C. 2	C. 3	C. 4	C. 5
101MATH		I										
101PHYS		I										
101BIOL											I	
011ENG											I	
201ARAB											I	
202ARAB											P	
110NGL												I
101CMS												P
102CMS								I				
111IC1								I				
112IC2								P				
113IC3								M				
114ICI		I										

The highlighted courses learning outcomes were involved in the measurement of learning out comes

* Add a table for each track (if any)

5. Teaching and learning strategies to achieve program learning outcomes

Describe policies, teaching and learning strategies, learning experience, and learning activities, including curricular and extra-curricular activities, to achieve the program learning outcomes.

The program offers its courses using several teachings and learning strategies, including traditional lectures, active learning activities (e.g. Problem solving, student presentations), case studies, presentations, laboratory sessions, and research projects.

E-learning has evolved as a supportive teaching method within the department of chemistry using the guidelines stipulated by the E-learning Deanship. All course materials are uploaded on the KKU E-learning platform, Blackboard. In addition, some teaching activities and assessment tasks may be conducted through Blackboard, such as assignments, quizzes, exams, etc. Blackboard also offers the 'Safe Assign' option that assesses the percentage of plagiarism in the submitted assignments. Also, the program provides opportunities for extracurricular activities to promote students' personal skills and experiences, including visits to places related to various applied fields of chemistry (eg. Shagig, AlJazira for painting, poison lab). The aim for these activities is to expose students to real experiences that may contribute to deep, meaningful learning, as well as achievement of the program learning outcomes. The following table shows the teaching strategies used to achieve learning domains.

PLOs		Teaching Strategies
Knowledge	K1	1. Classical lectures 2. Data show-based lectures
	K2	3. Demonstration using models and

		K3	movies 4. Historical reviews 5. Problem solving 6. Laboratory experiments
	Skills	S1	1. Case study
		S2	2. Reading books
		S3	3. Heuristic
		S4	4. In class cooperative groups 5. Seminar
	Competence	C 1	1. Team Learning
		C 2	2. POGIL 3. Problem Solving
		C 3	4. Tutorial and personal work
		C 4	1. Surveying literature
		C 5	2. Review and Report 3. Presentation 4. Concentric

6. Assessment Methods for program learning outcomes.

Describe assessment methods (Direct and Indirect) that can be used to measure achievement of program learning outcomes in every domain of learning.

Program Learning Outcomes (PLOs) Assessment

The PLO assessment process helps to determine whether the teaching and learning plans are effective. It is also used to test the students' learning of the subject matter that faculty presume to teach. All data obtained from the assessment methods help program to demonstrate whether program courses and learning activities are supporting student learning, promoting student success, and enhancing the institutional priorities consistent with the mission of KKU. A PLO assessment is periodically conducted to achieve three objectives:

- To collect data that indicates whether students are learning as effectively as possible.
- To improve the program.
- To establish outcomes and engage in a systematic process of collecting and analyzing data in order to support evidence-based changes in the curriculum and/or instruction.

Several direct and indirect methods will be used to assess the program outcomes:

- Direct assessment methods include course grade distributions, rubric of CLOs/PLOs achievement method, annual reports, retention, completion rates and Tests of National Center for Assessment (QIYAS) for teachers.

The following table shows the assessment methods used in courses to measure the achievement of students to PLOs.

PLOs		Assessment Methods
Knowledge	K1	1. Essay Questions 2. Completion exercise 3. Classical examination 4. In class tests 5. Homework
	K2	
	K3	

Skills	S1	1. Direct observation 2. Multiple choice questions 3. Fast questions 4. Laboratory reports 5. Classical examination
	S2	
	S3	
	S4	
Competence	C1	1. Problem and case study analysis 2. Short answer questions 3. Presentation 4. Field work report 5. Data interpretation exercise 6. Quizzes 7. Collaborative assignments
	C2	
	C3	
	C4	
	C5	

- Indirect assessment methods include stakeholders' feedback obtained through the student experience survey, course evaluation survey, students' evaluation of the quality of their learning experience in the program (program evaluation survey), an alumni survey and employment survey "evaluation of graduates".

Course grade distributions

PLOs can be assessed through the course's final grades. The grade distribution analysis report is done to ensure the quality of the courses taught and the achievement of the PLOs. A course grade distribution report shows the final grades given in each course and section. It aims to evaluate students' performance on their exams during the semester, as well as provide an indication of any concerns or failure results. In addition, it reports the number of students who were denied entry and the number of students who withdrew from the course. This report is prepared at the end of each semester and discussed in the departmental meetings.

Course and Annual Program Reports

The program and course reports were prepared using the NCAAA templates. These reports include several details regarding course issues, analysis, action plan, and priorities for improvement. These eventually lead to the identification and assessment of the courses and program quality. The annual program report represents data from enrolment management and cohort analysis. The program coordinator is responsible for the preparation of the annual program report. This report is intended to compile the course reports from each department and determine the actions requiring intervention by a higher administrative level. At the end of each semester, all the course coordinators from both campuses prepare the course reports. The reports are also included in the plans that address the identified problems.

D. Student Admission and Support:

1. Student Admission Requirements

There are no specific admission regulations for the current program. Instead, the program committed with the admission regulations of King Khalid University, please see the attached Admissions Guide.

Department of Chemistry (DC) is committed to fair, transparent and consistent admissions

practices. DC reaffirms its policy of equal opportunity for both male and female students as they are subjected to the same admission procedures and requirements. The admission of prospective chemistry program students is always carried out online via Deanship of Admission and Registration (DAR) website. Full details regarding admission requirements are updated annually by DAR and can readily be found on DAR's website. The number of admitted students is determined by DAR after conferring with DC. Generally, an applicant must be a Saudi national holding a general secondary certificate (i.e. high school) or any valid equivalent from outside KSA. Priority consideration for admission is given to fresh high school graduates whose applications must meet the minimum requirements for automatic admission which include a pre-set average qualifying score between high school diploma score and national standardized tests (i.e. general aptitude test and scholastic achievement admission test). Once all requirements are met, applicants are informed through e-mail and mobile messages (SMS) about their admission status. Directly, students enter the program of chemistry.

2. Guidance and Orientation Programs for New Students

An open orientation program is organized in the first week of the first semester for guidance and advising the new students. The program includes advisory presentation from the vise dean and the academic advisor about courses registration, grades, student's service, student's rights, duties and safety issues as well.
See attached

Orientation for new Students

A comprehensive orientation program is provided to new students at the beginning of the academic year by the academic advising and counselling unit. This orientation session is attended by the dean, department heads, and teaching staff. The goal of the orientation session is to provide comprehensive information pertaining to the campus life, academic rules and regulations, facilities, lab safety, learning resources, courses offered by individual departments, and teaching and assessment methodologies. The orientation session is also used as an opportunity to introduce faculty members teaching different courses. Orientation for female students is provided by the Assistant Dean in coordination with the academic advising and counseling unit in the female campus.

3. Student Counseling Services
(academic, career, psychological and social)

An assigned faculty academic advisor along with Academic Counselling and Guidance Unit at the college are available. They provide counselling, assessment, information, advice, personal and social development program, and referral. Regular interactions of students with instructors through e-mail, blackboard or planning for regular meetings to discuss academic issues are also available. Documents for students counseling services are attached.

4. Support for Special Need Students
(low achievers, disabled, gifted and talented)

Students with special needs (disabled, low achievers, gifted and talented) have special support from the academic advisor of the students. Talented students also have distinct attention and support from the Talent and Creativity Center at the university. Documents are attached.

Low achievers:

Academic Advising and Counselling Unit (AACU) in male and female sections directed most of the counseling services to underperforming students (students with a GPA < 2.5) but with different approaches. In the male section, the underperforming students were allotted to Arabic speaking faculty where regular counseling sessions are conducted and documented. To assess the impact of counseling, AACU embargos students' grades for quizzes and midterm until they visit their respective advisors. The advisor will then send a formal request to the vice dean for academic affairs to lift students' mark embargo. In the female section, the underperforming students were allotted to Arabic speaking advisors. The advisors met with the students and documented their visits (on paper and via academia). The AACU then compiled students' reports from the advisors and used a "design thinking" strategy to identify and resolve major problems.

At the end of each term, the academic advising and counseling unit discusses all issues and requirements of the unit with the Vice Dean of Academic Affairs and reports the dean of the college with the requirements and recommendations. All recommendations are to be taken in consideration to meet the students' demands and improve their performance with systematic action plans that ensure attaining optimal results.

Talented and gifted students:

The academic advising and counseling unit also identifies talented and underperforming students and implements particular motivational programs for them. Extracurricular activities at Department of Chemistry are encouraged through students' club where ample sports, educational, and cultural activities performed. Department of Chemistry applies efficient procedures for monitoring students' progress towards fulfilling graduation requirements and provides career development programs that align with the market needs. It is worth mentioning that Department of Chemistry recently formed alumni association to establish a comprehensive database about them, involve them in department events and benefit from their views and expertise in matters concerning the curriculum and the profession.

In addition, Department of chemistry acknowledged the importance of international exposure to its students. Thus, Department of chemistry in collaboration with the university administration initiated a summer training program abroad for talented students and students with a high GPA. The selected students will be going on a 6-weeks abroad training program with international universities.

E. Teaching and Administrative Staff

1. Needed Teaching and Administrative Staff

Academic Rank		Specialty		Special Requirements / Skills (if any)	Required Numbers		
	General	Specific			M	F	T
Professors	2	1	Organic		1	1	2
		-	Inorganic				
		-	Analytical				
		1	Physical				

Associate Professors	4	1	Organic		2	2	4
		1	Inorganic				
		1	Analytical				
		1	Physical				
Assistant Professors	6	2	Organic		3	3	6
		1	Inorganic				
		1	Analytical				
		2	Physical				
Lecturers	4	1	Organic		2	2	4
		1	Inorganic				
		1	Analytical				
		1	Physical				
Teaching Assistants	4	1	Organic		2	2	4
		1	Inorganic				
		1	Analytical				
		1	Physical				
Technicians and Laboratory Assistants	4				2	2	8
Administrative and Supportive Staff	4	1 Program instructors			2	2	6
		Dept. chairman, Dept. chairman assistant for girls					
		1 officers					
Others (specify)	-			-	-	-	-

2. Professional Development

2.1 Orientation of New Teaching Staff

Describe briefly the process used for orientation of new, visiting and part-time teaching staff

For new teaching staff, an orientation program is organized by the college of science. In this event, important information about the college, department, program, staff, workplaces, and safety are discussed. Practices on academic works, quality, workshops, seminars, lectures, teaching methods and assessments, and course file preparation are also illustrated.

Newly appointed members of the faculty receive special attention within the College of Science. The process is started by receiving the new faculty at the airport, arrange temporary housing, do the paperwork at KKU administration, and provide her/his with the faculty manual informing them about the College and its mission and programs, along with full details of the departments. The faculty handbook provides information including work requirements, performance indicators, and performance assessment processes. It has been developed by the College to appraise the new faculty with all policies and

procedures applicable in the College and University. Teaching and working loads are also clearly explicated. The departmental chair orients the new faculty with the tasks delegated and necessary information including; job description, duties, goals, training, classes, teaching load and schedule. Warm welcoming the new faculty member to the college of science family is an important part in settling down and prepare the new staff to perform with comfort and excellence.

New faculty (per University role) is encouraged to enroll in a 3-day Program (36 hours) of Orientation Seminar for New Faculty (conducted by the Deanship of quality and development) at the beginning of each academic year to explore the university's website and E-learning platforms.

2.2 Professional Development for Teaching Staff

Describe briefly the plan and arrangements for academic and professional development of teaching staff (e.g., teaching & learning strategies, learning outcomes assessment, professional development, etc.)

Professional development of teaching staff encompasses participating teaching staff in a broad range of training courses, workshops, and seminars activities (e.g. training courses on e-learning, research and publication skills, development and quality, teaching strategies, course learning outcomes assessment besides the regular scientific and educational seminars held in the department).

To ensure retaining the qualified faculties as one of the main goals of the department of chemistry, the department is committed to provide professional development activities to its faculty members such as teaching skills, information technology, research and general skills. The training includes a package of courses for faculty members in the fields of quality education, teaching methods, modern methods of evaluation and a package of courses for employees and administrative leaderships at the University. Such training courses and workshops are implemented for faculty members and employees based on the study of training needs. The University also encourages faculty members and employees to register in these courses and give certificates to attendees.

Faculty is encouraged to attend and participate in professional workshops, local conferences, and international conference to advance the scope of their research interests.

In addition, the department encourage its staff to participate in KKU excellence award in teaching, research and community service.

F. Learning Resources, Facilities, and Equipment

1. Learning Resources.

Mechanism for providing and quality assurance of learning resources (textbooks, references and other resource materials, including electronic and web-based resources, etc.)

The head of the department assigns committee for the plan and curriculum. One of the tasks of this committee is to update learning resources, facilities and equipment, and follow-up the availability of these resources to students. In this issue, the following processes are regularly practiced:

- Updating and assigning textbooks and references are approved in the departmental council.
- The Deanship of Library Affairs commits to supply hard-copies and soft-copies of learning resources after requesting by the Head of the Department.

- Materials of software programs for learning resources are supplied to academic programs by the Deanship of Information Technology after requesting by the Head of the Department.

Saudi Digital Library (SDL)

KKU maintains an active subscription to Saudi Digital Library and make it available to students inside and outside the department using a proxy system. The access to databases on Digital Saudi Library web is available 24/7 to students and faculty members.

The Deanship of Library Affairs (DOLA) provides access to Saudi Digital Library website [http://lib.kku.edu.sa/guidance.html] through the main KKU library website. This includes access to different scientific websites and search engines such as Doab directory of open access books, and E-book central. The SDL contains more than 310,000 E-books, 100,000 periodicals, 184 electronic databases, 5 million thesis. Annually, the DOLA requests all colleges within the university to provide them with the college's requirements from SDL.

E-learning services

The E-learning services offered by the Deanship of E-learning in order to promote an effective communication between faculties and students including Blackboard system. TAZAMON, and KKUx. It has been made mandatory in all the courses of the program that the faculties have to upload all their teaching material, tests, assignments, quizzes and all announcements through Blackboard system.

Software packages

KKU provides several software packages for students and faculty free of charge. This aims to improve the efficiency and effectiveness of teaching and learning experience in KKU. The free software packages include Office®, some statistical and antivirus software.

In addition, the College of science on both the campuses has sufficient number of classrooms, laboratories, conference rooms, faculty and administration rooms etc. that are equipped with all the necessary facilities.

2. Facilities and Equipment

(Library, laboratories, medical facilities, classrooms, etc.).

The committee of equipment and technical affairs at the department is responsible to follow the requirements of equipment in laboratories

Classrooms

The classrooms in the both the campuses comprise of computers, white boards, podium, with comfortable chairs and projectors. The computers are of Dell Core i5 model and the projectors that are used are of Optoma DLP Texas model. The classrooms are air conditioned, well ventilated that is suitable to create a good environment for learning. The provided teaching and learning facilities cover the teaching strategy of each learning outcome. For some of the courses, lectures are delivered through virtual classrooms using the blackboard.

Laboratory:

The department has seven student Labs for teaching practical course in chemistry branches in male section and nine Labs. in female section. Each Lab. has staff member as supervisor and one technician beside the course instructor. The student labs contain the necessary learning tools; glass wears, chemicals and instruments. The safety tools are provided as well; Lab. coat, safety glasses, gloves and face mask.

Research Labs:

Chemistry department contain nine research Labs. ; Physical chemistry research lab. ,

chromatography research lab., catalysis lab. , spectroscopic analysis lab., two organic chemistry lab., inorganic chemistry lab., graduation research lab, NMR lab., ICP-Ms lab.
Each research lab. has responsible staff member and technician. The research labs are provided with core instruments necessary for chemistry research.

3. Arrangements to Maintain a Healthy and Safe Environment (According to the nature of the program)

The committee of safety and occupational health affairs at the department is responsible to maintain a healthy and safe environment for faculty, staff, and students and provides security system and guards to secure the facilities. In addition, fire evacuation policy and fire drills are available in all laboratories with first aid kits.

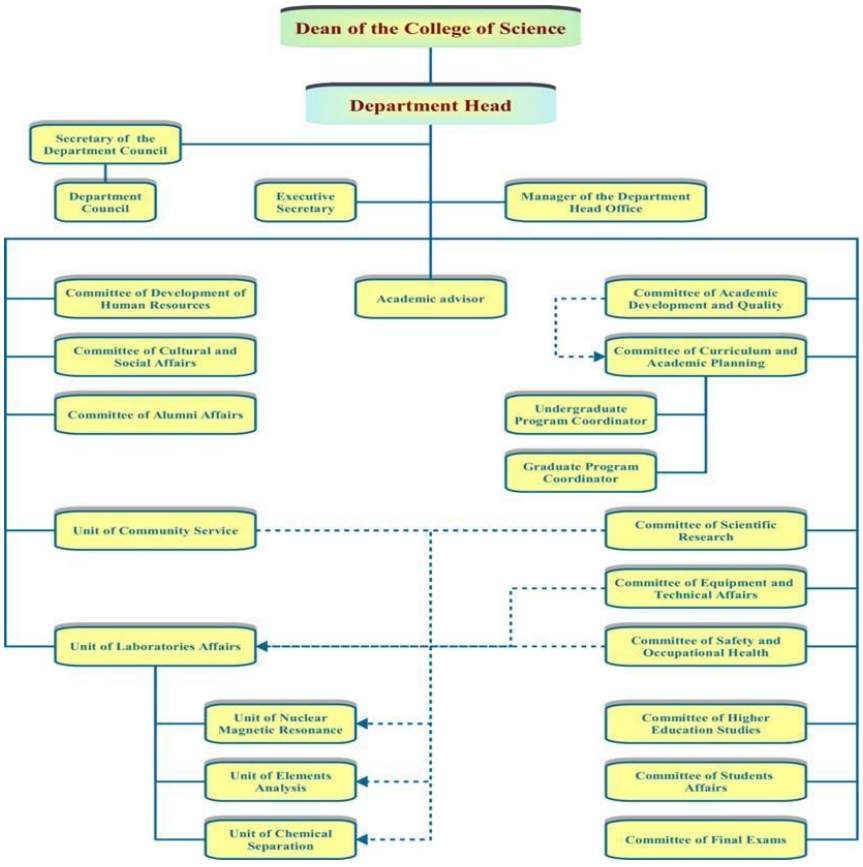
The department provides a safe and healthy environment, the department has safety signs, emergency exit signs and laboratory safety manuals.
The laboratory is an essential part of the successful teaching and learning for all courses that have practical sessions in the labs. The teaching quality in the laboratories is one of our priorities, since wet laboratories need special instructions and a unique teaching style**.**
To ensure that the department' laboratories have good teaching environments, all laboratories are well equipped with personal protective equipment such as masks, safety goggles, safety gloves, etc. A fire evacuation policy and first aid kits are also available in all laboratories.

G. Program Management and Regulations

1. Program Management

1.1 Program Structure

(including boards, councils, units, committees, etc.)



1.2 Stakeholders Involvement

Describe the representation and involvement of stakeholders in the program planning and development. (students, professional bodies, scientific societies, alumni, employers, etc.)

Representation and involvement of stakeholders are presented in the program advisory committee, which comprises members from program, stakeholders, employees, and experts in the relevant field. The role of the committee is to have a holistic view of the program, an overview of the global status of the industry within the KSA, and determining the potential of the program's graduates and their employability, i.e. it can serve as a platform/link between the academia and industry. Furthermore, the advisory committee aims to provide recommendations to the program academia, helping them in tailoring the program to suit the demands of industry. It can also provide the program academia with guidance about the future challenges and research directions…etc.

2. Program Regulations

Provide a list of related program regulations, including their link to online version: admission, study and exams, recruitment, appeals and complaint regulations, etc.)

- Student Admission Policy
- Examination and Grading System
- Academic Assessment and Evaluation Policy
- Transfer Policy
- Academic Advising Policy
- New Student Orientation Policy
- Students Guidance and Counselling Policy
- Extra-Curricular Activities Policy
- Student Academic Appeal Policy

(https://drive.google.com/drive/folders/1GQ-9bYbYH7QwcTCrVGAk_j330RWqamjw)

H. Program Quality Assurance

1. Program Quality Assurance System

Provide online link to quality assurance manual

Link to quality assurance manual of KKU

The college has responsibilities for internal quality assurance, standards and enhancement procedures. These procedures are designed to meet the expectations of the Education Training Evaluation Commission as well as other national frameworks, benchmarks, and statutory obligations. The Quality and Academic Development Unit helps to support departments in fulfilling their responsibilities within both the college's quality assurance framework and the broader national and international context. Departments are encouraged to contact The Quality and Academic Development Unit Team for advice and support. Quality Assurance brochure is attached.

2. Program Quality Monitoring Procedures

The quality of courses and the undergraduate program is monitored, assured, and subject to review and improvement through a continuous improvement cycle based on the cycle shown above. The following points address the details.

a. Individual faculty members & coordinators and the group/team as a whole review annually by the curriculum committee and within the divisions of the department the program.

b. Curriculum subcommittees and departmental committees are formed to look into the recommendations of various divisions and to make a final proposal

c. The revised program is discussed in the College Board before approval.
d. One course coordinators is assigned by the head of department and is responsible for monitoring the course quality formal meeting of course organizers and student representatives
e. Course improvement committee meets regularly to revise the course content and methods of teaching & assessment
f. Course coordinator prepare the course report by the end of each semester containing student's achievement, and action plan for course improvement.
g. Program coordinator prepare annual program report at the end of academic year, including all branches where program is offered.

Annual program report discussed in departmental board, and action plan to improvement program.

(1) **Plan:** Course coordinator plan delivery, activities, and assessments of the course.

Involvement: Course coordinator + Director of undergraduate program
(2) **Implement:** Course coordinator implement plan for course delivery.

Involvement: Course coordinator
(3) **Monitor:** Director of undergraduate program monitor course delivery and conduct all relevant tasks.

Involvement: Director of undergraduate program
(4) **Review:** Course coordinator, director of undergraduate program, and students review the delivery of the course.

Involvement: Course coordinator + Director of undergraduate program + Students
(5) **Improve:** Director of undergraduate program prepare a plan for improvement according to step 4, and communicate the plan to quality assurance committee then to department chair and follow it up.

Involvement: Director of undergraduate program + Quality assurance committee + Department chair
(6) **Approve:** Plan for improvement developed in step 5 must be approved by Committee of Academic Planning and Curriculum, Program Advisory Board, and Department Council. Once approved it will go back to course coordinator and director of undergraduate program for planning and implementation.

Involvement: Committee of academic planning and curriculum, Program advisory board, and Department council.

The department levels

The department of chemistry is committed to providing the highest quality teaching and learning by closely monitoring their academic courses through internal department committees. The purpose of these committees is to ensure the quality of course materials, of the teaching and learning processes, of student support and assessments, and of faculty members. Committees include the educational services committee, quality and

development committee, scheduling and examination committee, graduate committee, and academic advising and counseling committee.

Academic policies and procedures

Several policies have been established to ensure program quality, such as the examination policy and its related committees. Regulations regarding exams, exam oversight, student attendance, alternative exams, exam re-correction, exam preparation, and conduct and correction procedures, have all been established in the program and monitored by the head of department. In addition, KKU has established a Guide for Student Rights and Responsibilities to ensure a fair and consistent process of student management. This guide provides a clear code of conduct with related sanctions to be imposed in the incidence of misconduct or violations.

Moreover, attendance and absenteeism rules are explained clearly to the students at the "new students' orientation" program and then reinforced at the beginning of each semester. Furthermore, a student's excuses are studied and processed through the Excuses committee in the department.

KKU has a policy for any form of cheating during any form of exam. If cheating occurs in an exam, a written report on the incident will be submitted to the college disciplinary committee for further evaluation. KKU policy also encourages good student-faculty relationships. The program is committed to providing full access to all necessary resources for all students, including those with disabilities.

Course-level monitoring procedures

1. Course syllabus

At the beginning of each semester, each course coordinator uploads the course syllabus to Blackboard. This syllabus should include a short course description, course learning outcomes (CLOs), teaching strategies, assessment methods, resources, list of topics (theory and practical), time for each section, campus location where the course is taught, proposed exam time, instructions, required reference books, instructor's office hours, contact information and course policies

2. Course Report (CR):

The NCAAA templates are used to prepare the course reports (CR). These reports provide information on the different scales of achievement of course learning outcomes. Course reports are submitted to the quality committee within the department. All course reports, SPSS grade analysis, assessment master blueprint and exam item analysis. The improvement priorities and recommendations are further discussed with the quality assurance (QA) committee members of department. Then, they are discussed at the department meeting, resulting in recommendations and proposals for improvement. If there is any needed action, the faculty member must propose an action plan in his/her course report (recommendation section) and this plan must be implemented during the next semester.

Program-level monitoring procedure:

1. **The Annual Program Report (APR):**

The APR is prepared by the Quality Committee within the department. This report highlights achievements, issues and future action plans. A number of recommendations are typically adopted in the department to improve the quality of the program. These

involve revising courses scientific contents, advising and counselling plans, educational services, research, faculty development, and student statistics.

B. Laboratory safety monitoring mechanism

The laboratory is an essential part of the successful teaching and learning for all courses that have practical sessions in the labs. The teaching quality in the laboratories is one of our priorities, since wet laboratories need special instructions and a unique teaching style. To ensure that the program laboratories have good teaching environments, all laboratories are well equipped with personal protective equipment such as masks, safety goggles, safety gloves, etc. A fire evacuation policy and first aid kits are also available in all laboratories.

C. Key Performance Indicators (KPIs):

Several key performance indicators (KPIs) are approved by the program and measured according its time frame to monitor the program and offer feedback from stakeholders (students, advisory board, alumni, and employers).

3. Arrangements to Monitor Quality of Courses Taught by other Departments.

The coordinator of program is responsible to ensure that the courses content achieve PLOs. Program coordinator revise course specification and annually course reports.

4. Arrangements Used to Ensure the Consistency between Main Campus and Branches (including male and female sections)

The course report includes the student's results for both male and female sections and their statistics, the teaching strategies, assignment methods were explained. The annual program report includes the both male and female sections.

Many measures and arrangements are in place to ensure consistency between male and female sections regarding teaching/learning activities, extracurricular activities, facilities and resources, examinations and quality measures.

The male and female students and faculties are on different campuses (Guraiger and female campus King Abdullah Road, respectively) and provided with adequate the requirement facilities of program.

The program at female campus is administered by supervisor of department. she maintains a close association with the head of department at the main campus to warrant appropriate development and to provide a statement of performance of the female students in the program.

The registration and enrollment of students at different levels is cooperatively achieved by registrars from the male and female sections. A clear protocol is available for effective communication between the Guraiger and female campus; female faculty and staff attended meetings of department council in an audio conference room. In addition, advanced and reliable technological tools are also used to facilitate communication.

The lectures and labs on both campuses are taught in a uniform manner. Female and some male teaching staff are exclusively teaching the female students. The faculty on both campuses are teaching the same courses, planning and developing their respective course materials and requirements together. This ensures that the same topics are taught in both sections. Both campuses' faculties contribute equally in writing the examination questions, while the head of department and supervisor of female department ensure the appropriateness and suitability of the exams for each course and responsible for ensuring that the teaching, training and assessment methods are similar in both sections, according to regulations. Thus, it is mandatory for both the male and female teaching staff to

communicate regularly by using advanced communication tools. This enhances the maximum level of coordination between the sections with respect to the development of courses and programs. The planning, implementation and progress of the program and courses are similar on both the campuses, according to the report provided by the NCAAA template. Male and female faculties (coordinators for the same courses) use the Blackboard platform to inform students about the upcoming course tasks and duties and to post the student marks.

Members of each committee in the department are recruited from both the male and female faculty members to monitor both campuses and the students. This provides equal opportunities to participate in all the activities at the department.

Procedures applied to ensure the consistency between male and female sections:

- The same course contents, teaching strategies and assessment methods.
- Identical time tables for both sections.
- Simultaneous examinations in both sections.
- Separate course reports for each section to ensure evaluation of course quality for both sections and combined one.
- Analysis of program indicators stressing any differences between male and female sections.
- Program statistical data stressed male and female results and combined one.
- learning resources and facilities are almost at the same level in both sections including the average number of students enrolled per class, teaching aids, laboratories, internet coverage, library and extracurricular activities
- Male and female students result in examinations are reflected in separate course reports and combined one to explore any differences in courses completion rate, grade distributions and trend over time in either sections as well as the combined one.
- Other course evaluations including achievement of courses and program learning outcomes, courses and program evaluation surveys and course reporting, all these evaluations expressed the female and male as well as combined results with supposed improvements based on evaluations, and consequently a separate course portfolio for both male and female sections as well as a combined one for each course are there.
- Courses and program evaluations and types of surveys are conducted for both sections simultaneously using the same methods, analysis, interpretations and improvement actions.
- Male and female students' representatives are involved in relevant committees.

Results and analysis of program KPIs are usually done for both sections and for combined one based on the availability of data with suggested section wise improvement when required

5. Arrangements to Apply the Institutional Regulations Governing the Educational and Research Partnerships (if any).

NA

6. Assessment Plan for Program Learning Outcomes (PLOs), and Mechanisms of Using its Results in the Development Processes

	Assessment methods			
	Direct PLOs	Indirect		

	assessment	PLOs assessment		
PLOs	Selected courses (Mastered level)	Alumni	employers	Senior students (level 7 &8)
Data collections	Examination committee	Survey of alumni satisfaction	Survey of employer's satisfaction about graduate of program	Survey of student satisfaction
Data processing	Quality committee through the following tasks; Data presentation Discovering weaknesses Suggesting improvements Formulation of Annual Program Report (APR). Final improvement plans Broadcast of the action plans Follow up of Implementation Reporting of results in next APR			
Time	End of academic year			
Expected recommendation and Improvement plan	Curriculum; contents, teaching strategies, student assessment, courses sequencing or learning resources PLOs assessment methods; Further data. Data source, analysis PLOs constructions; Others; training, recruitment			

7. Program Evaluation Matrix

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
Effectiveness of teaching	• Departmental plan and curriculum committee • Students • Graduates • Independent advisors	Questionnaire Reports	End of academic year
Effectiveness of assessment	• Departmental plan and curriculum committee • Independent advisors	Reports	End of academic year
Course contents	• Departmental plan and curriculum committee • Independent advisors • Graduates	Reports Questionnaire	End of academic year
Learning resources	• Departmental plan and	Reports	End of academic

	curriculum committee • Independent reviewers • Stakeholders		year Beginning of semesters
Leadership	• Independent reviewers • Stakeholders	Reports	End of academic year

Evaluation Areas/Aspects (e.g., leadership, effectiveness of teaching & assessment, learning resources, partnerships, etc.)
Evaluation Sources (students, graduates, alumni, faculty, program leaders, administrative staff, employers, independent reviewers, and others (specify)
Evaluation Methods (e.g., Surveys, interviews, visits, etc.)
Evaluation Time (e.g., beginning of semesters, end of academic year, etc.)

8. Program KPIs*

The period to achieve the target (1441) year.

No	KPIs Code	KPIs	Target	Measurement Methods	Measurement Time
1	KPI-P-01	Percentage of achieved indicators of the program operational plan.	4	Analysis	1442
2	KPI-P-02	Students' Evaluation of quality of learning experience in the program.	4	Survey analysis	1442
3	KPI-P-03	Students' evaluation of the quality of the courses.	4	Survey analysis	1442
4	KPI-P-04	Completion rate.	4	Cohort analysis	1442
5	KPI-P-05	First-year student's retention rate	5	Cohort analysis	1442
6	KPI-P-06	Students' performance in the professional and/or national examinations	4	Exam results analysis	1442
7	KPI-P-07	Graduates' employability and enrolment in postgraduate programs	4	Survey analysis	1442
8	KPI-P-08	Average number of students in the class	4	Students in each teaching class	1442
9	KPI-P-09	Employers' evaluation of the program graduates proficiency	4	Survey analysis	1442
10	KPI-P-10	Students' satisfaction with the offered services	4	Survey analysis	1442
11	KPI-P-11	Ratio of students to teaching staff	4	Prog. Staff and enrolled students	1442
12	KPI-P-12	Percentage of teaching staff distribution	4	Prog. Staff degree analysis	1442
13	KPI-P-13	Proportion of teaching staff leaving the program	4	No. of leaving staff	1442
14	KPI-P-14	Percentage of publications of	5	KKU publication	1442

		faculty members		data , Scopus	
15	KPI-P-15	Rate of published research per faculty member	4.5	Total publications relative to staff	1442
16	KPI-P-16	Citations rate in refereed journals per faculty member	4	Scopus citations for prog. staff	1442
17	KPI-P-17	Satisfaction of beneficiaries with the learning resources	4	Survey analysis	1442

* including KPIs required by NCAAA

I. Specification Approval Data

Council / Committee	Department Council
Reference No.	1/22/1442
Date	15-9-1442