# Program Specification

(Bachelor)

| | |
|---|---|
| Program: | **Bachelor of Science in Industrial Chemistry** |
| Program Code (as per Saudi university ranking): | **0531 02** |
| Qualification Level: | **6** |
| Department: | **Department of Physical Sciences** |
| College: | **College of Science** |
| Institution: | **Jazan University (JU)** |
| Program Specification: | **New** ☒ **updated*** ☐ |
| Last Review Date: | 1-3-2024 |

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## A. Program Identification and General Information

### 1. Program's Main Location:

- *Main Campus*
  *Male Section: university city male Campus, College of Science, Jazan University*
  *Female Section: Mahlia Campus, College of Science, Jazan University*

### 2. Branches Offering the Program (if any):

*none*

### 3. Partnerships with other parties (if any) and the nature of each:

*none*

### 4. Professions/jobs for which students are qualified

*The program proposes introducing theoretical and practical courses in chemistry to prepare students for direct entry into the labor market with technical skills and competencies aligned with international standards and advanced education.*
*Skills industrial chemistry students must possess include (Analysis skills, critical thinking skills, Problem-solving skills, Attention to detail, a sense of leadership, Working within a team, and communication skills. Technology-related skills, Business management skills, Mathematical skills).*
*According to Professions and Jobs in the Ministry of Civil Service and the Saudi National Commission, students will be prepared for the following professions and occupations by the completion of the curriculum;*

| Code | Professional Name | Remarks |
|---|---|---|
| 211301 | Chemist | a & b |
| 211302 | Chemist for Industrial Sector | a & b |
| 231026 | lecturer | b |
| 231027 | Administrator | b |
| 211304 | Chemist for petrochemical industries | b |
| 232005 | Applied science instructor Chemistry | b |
| 211303 | Chemist for Pharmaceutical Sciences and health sector labs | b |
| 223011 | Science Teachers | b |
| 233034 | Chemistry Teacher | b |
| a: According to the classification of the Ministry of Human Resources | | |
| b: Unified Saudi Occupational Classification Guide | | |

### 5. Relevant occupational/ Professional sectors:

- Ministry of Health: medical analysis laboratories.
- Governmental Research Centers.
- Industrial Research and Development Sectors.
- *Public/Private Universities and* Scientific Research Institutions
- *Ministry of Agriculture - Pesticide Analysis Unit - Fertilizers - Food Analysis Laboratories*
- *Private sector such as the pharmaceutical companies in the area in quality control, production, and research and development*
- *Petrochemical companies Production Sector and Quality* Control, Research and Development.

- *Ministry of Education*

| 6. Major Tracks/Pathways (if any): | | |
|---|---|---|
| **Major track/pathway** | **Credit hours** (For each track) | **Professions/jobs** (For each track) |
| none | | |

| 7. Exit Points/Awarded Degree (if any): | |
|---|---|
| **Exit points/awarded degree** | **Credit hours** |
| **none** | --- |

| 9. Total credit hours: (135 hrs) |
|---|

## B. Mission, Objectives, and Program Learning Outcomes

### 1. Program Mission:

***providing students with the knowledge, research services, and skills necessary to advance their careers in industrial chemistry and the community.***

### 2. Program Goals:

***G1. Establishing an academic environment that supports excellent learning in the sciences of industrial chemistry.***
***G2. Giving students the opportunity to acquire the information and abilities necessary to participate in all areas of applied Chemistry Science, the industry, and scientific research while promoting lifelong learning.***
***G3. Fostering a culture of scientific inquiry and enhancing relationships with the community to help solve issues facing it, particularly those pertaining to industrial chemistry.***
***G4. Utilizing cutting-edge digital and ICT (information and communications technology)***

### 3. Program Objectives:

| Knowledge and Understanding; *Upon completion of the program, students are able to:* | |
|---|---|
| ***K1*** | ***Demonstrate a comprehensive understanding and critical perspective on the key principles, concepts, and terminology of both theoretical and experimental/applied chemistry knowledge, as well as a good foundation in Physics and Mathematics.*** |
| ***K2*** | ***Describe correctly chemical phenomena, practical procedures, tools, and techniques related to industrial chemistry.*** |
| Skills; *Upon completion of the program, students are able to:* | |
| ***S1*** | ***Solve problems using appropriate principles, methodologies, tools, and modelling related to industrial chemistry.*** |
| ***S2*** | ***Reporting the analyzed results from the experimental work in the correct manner*** |
| ***S3*** | ***Use a variety of instruments to efficiently analyze different materials.*** |
| ***S4*** | ***Employ chemical safety skills in laboratory, industry and other work environment*** |
| ***S5*** | ***Communicate scientific information and research findings effectively in writing (laboratory notebooks, laboratory reports, research papers, etc.) or orally, using clear and concise scientific language.*** |
| Values, Autonomy, and Responsibility; upon *completion of the program, students are able to:* | |

| | |
|---|---|
| ***V1*** | ***Work in groups and teams collaboratively with others.*** |
| ***V2*** | ***Recognize a chemist's ethical and scientific responsibilities.*** |

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

## C. Curriculum

### 1. Curriculum Structure

#### a) Program Structure

| a) Program Structure | Required/ Elective | No. of courses | Credit Hours | Percentage |
|---|---|---|---|---|
| Institution Requirements | Required | 3 | 6 | 4.4% |
| | Elective | - | - | |
| College Requirements | Required | 10 | 31 | 23.0% |
| | Elective | - | - | |
| Program Requirements | Required | 32 | 82 | 60.7% |
| | Elective | 4 | 8 | 5.9% |
| Capstone Course/Project | | 2 | 6 | 4.4% |
| Field Training/ Internship | | 1 | 2 | 1.5% |
| Residency year | | - | - | |
| Others | | - | - | |
| **Total** | | 52 | 135 | 100.0% |

* ***The curriculum includes 13 electives (12 with in the specialization and1 outside the specialization), and the student selects 4 courses from the seventh and eighth levels based on his preferences and the courses available for selection.***

### 2. Program Courses

* Include additional levels (for three semesters option or if needed).
** Add a table for the courses of each track (if any)

| Years | Levels | Course Name | Course Code | Required or Elective | Pre-Requisite Courses | Co-requisite Course | Credit Hs | | | | Type of requirements (Institution, College, or Program) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lec | Tut | Lab | Total | |
| Year 1 | Level 1 | ENGL101-6 | English 1 | R | ----- | ----- | 6 | 0 | 0 | 6 | College |
| | | SLM101-2 | Islamic Culture I | R | ----- | ----- | 2 | 0 | 0 | 2 | University |
| | | MATH102-4 | General Mathematics | R | ----- | ----- | 3 | 1 | 0 | 4 | College |
| | | PHYS102-3 | General Physics (1) | R | ----- | ----- | 3 | 0 | 0 | 3 | College |
| | | PHYS103-1 | General Physics Lab. (1) | R | ----- | PHYS102-3 | 0 | 0 | 1 | 1 | College |
| | Level 2 | ENGL102-6 | English 2 | R | ENGL101-6 | ----- | 6 | 0 | 0 | 6 | College |
| | | CHEM102-3 | General Chemistry (1) | R | ----- | ----- | 3 | 0 | 0 | 3 | College |
| | | CHEM103-1 | General Chemistry Lab. (1) | R | ----- | CHEM102-3 | 0 | 0 | 1 | 1 | College |
| | | BIO102-3 | General Biology | R | ----- | ----- | 3 | 0 | 0 | 3 | College |
| | | BIO103-1 | General Biology Lab. | R | ----- | BIO102-3 | 0 | 0 | 1 | 1 | College |
| | | STAT103-3 | Principals of Statistics | R | ----- | ----- | 2 | 1 | 0 | 3 | College |
| Year 2 | Level 3 | SLM102-2 | Islamic Culture II | R | ----- | ----- | 2 | 0 | 0 | 2 | University |
| | | ARB102-2 | Arabic Editing | R | --- | ----- | 2 | 0 | 0 | 2 | University |
| | | MATH243-3 | Introduction to calculus | R | MATH102-4 | ----- | 2 | 1 | 0 | 3 | Department |

| Years | Levels | Course Name | Course Code | Required or Elective | Pre-Requisite Courses | Co-requisite Course | Credit Hs | | | | Type of requirements (Institution, College, or Program) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lec | Tut | Lab | Total | |
| Year 3 | | CHEM205-3 | General Chemistry II | R | CHEM102-3 | CHEM207-1 | 3 | 0 | 0 | 3 | Department |
| | | CHEM207-1 | General Chemistry II Lab | R | | CHEM205-3 | 0 | 0 | 1 | 1 | Department |
| | | CHEM225-3 | Inorganic Chemistry I | | CHEM102-3 | ----- | 3 | 0 | 0 | 3 | Department |
| | | CHEM233-3 | Organic Chemistry I | R | CHEM102-3 | ----- | 3 | 0 | 0 | 3 | Department |
| | Level 4 | CHEM213-3 | Principles of Analytical Chemistry | R | CHEM205-3 | CHEM214-2 | 3 | 0 | 0 | 3 | Department |
| | | CHEM214-2 | Analytical Chemistry Lab | R | | CHEM213-3 | 0 | 0 | 2 | 2 | Department |
| | | CHEM234-3 | Organic Chemistry II | R | CHEM233-3 | CHEM235-2 | 3 | 0 | 0 | 3 | Department |
| | | CHEM235-2 | Organic Chemistry Lab | R | | CHEM234-3 | 0 | 0 | 2 | 2 | Department |
| | | CHEM243-3 | Physical Chemistry I | R | CHEM205-3+ MATH102-4 | | 2 | 0 | 1 | 3 | Department |
| | | ICHM251-3 | Introduction to industrial chemistry | R | CHEM205-3 | | 3 | 0 | 0 | 3 | Department |
| Year 3 | Level 5 | CHEM311-4 | Instrumental Analysis | R | CHEM213-3 + CHEM214-2 | | 2 | 0 | 2 | 4 | Department |
| | | CHEM326-3 | Inorganic Chemistry II | R | CHEM225-3 | CHEM327-2 | 3 | 0 | 0 | 3 | Department |
| | | CHEM327-2 | Inorganic Chemistry Lab | R | | CHEM326-3 | 0 | 0 | 2 | 2 | Department |
| | | CHEM336-2 | Heterocyclic Organic Chemistry | R | CHEM234-3 | | 2 | 0 | 0 | 2 | Department |
| | | CHEM342-3 | Chemical Kinetics | R | CHEM243-3 | | 2 | 0 | 1 | 3 | Department |
| | | ICHM351-3 | Electrochemical Analysis | R | CHEM243-3 | ----- | 2 | 0 | 1 | 3 | Department |
| | | CHEM312-4 | Chromatographic Analysis | R | CHEM311-4 | ----- | 2 | 0 | 2 | 4 | Department |
| | | ICHM352-2 | Solid State Chemistry | R | CHEM225-3 | ----- | 2 | 0 | 0 | 2 | Department |
| | | ICHM353-2 | Sustainable Chemistry | R | ICHM351-3 | ----- | 2 | 0 | 0 | 2 | Department |
| | | ICHM354-2 | Chemistry of Inorganic Industries | R | CHEM326-3 | ----- | 2 | 0 | 0 | 2 | Department |
| | | ICHM355-3 | Corrosion Chemistry | E | ICHM351-3 | | 2 | 0 | 1 | 3 | Department |
| | | ICHM356-3 | Surfaces and catalysis chemistry | E | CHEM342-3 | | 2 | 0 | 1 | 3 | Department |
| | | ICHM396-2 | Collaborative Training | R | Department Approval | ----- | 0 | 0 | 2 | 2 | Department |
| Year 4 | level 7 | CHEM432-2 | Spectroscopy of Organic Compounds | R | CHEM234-3 | ----- | 2 | 0 | 0 | 2 | Department |
| | | CHEM434-2 | Chemistry of Natural Products | R | CHEM234-3 | ----- | 2 | 0 | 0 | 2 | Department |
| | | ICHM451-2 | Nanotechnology | R | ICHM356-3 | ----- | 2 | 0 | 0 | 2 | Department |
| | | ICHM452-2 | Modern Organic Synthesis | R | CHEM336-2 | ----- | 0 | 0 | 2 | 2 | Department |
| | | ICHM453-2 | Chemistry and applications of Polymers | R | CHEM234-3 + CHEM342-3 | ----- | 2 | 0 | 0 | 2 | Department |
| | | ICHM493-3 | Graduation Project (1) | E | CHEM336-2 ICHEM356-3 CHEM312-4 | ----- | 3 | 0 | 0 | 3 | Department |
| | | ICHM495-2 | Fundamentals of Standardized Tests | E | Department Approval | ----- | 2 | 0 | 0 | 2 | Department |
| | | Elective Course<br>Student should select ONE Course (2 Credit Hours) from the following courses | | | | | | | | | |
| | | CHEM411-2 | Environmental Analysis | E | CHEM311-4 | -- | 1 | 0 | 1 | 2 | Department |
| | | CHEM421-2 | Organometallic Chemistry | E | CHEM326-3 | --- | 2 | 0 | 0 | 2 | Department |
| | | ICHM457-2 | Chemistry of Dyes and Paints | E | CHEM336-2 | --- | 2 | 0 | 0 | 2 | Department |
| | level 8 | ICHM454-3 | Industrial analysis and quality control | R | CHEM311-4 | ----- | 2 | 0 | 1 | 3 | Department |
| | | ICHM455-2 | Chemistry of cement and construction materials | R | CHEM326-3 | ----- | 2 | 0 | 0 | 2 | Department |
| | | CHEM492-3 | Chemistry of Petroleum and Petrochemicals | R | CHEM234-3 | ----- | 2 | 0 | 1 | 3 | Department |
| | | ICHM494-3 | Graduation Project (2) | R | ICHEM493-3 | ----- | 1 | 0 | 2 | 3 | Department |
| | | Elective Courses<br>Student should select THREE Course (6 Credit Hours) from the following courses | | | | | | | | | |
| | | CHEM429-2 | Nuclear and Radiation Chemistry | E | CHEM326-3 | --- | 2 | 0 | 0 | 2 | Department |
| | | ICHM458-2 | Chemistry of Downstream Industries | E | ICHM251-3 | --- | 2 | 0 | 0 | 2 | Department |

| Years | Levels | Course Name | Course Code | Required or Elective | Pre-Requisite Courses | Co-requisite Course | Credit Hs | | | | Type of requirements (Institution, College, or Program) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lec | Tut | Lab | Total | |
| | | ICHM459-2 | Industrial Catalysis | E | ICHM356-3 | --- | 2 | 0 | 0 | 2 | Department |
| | | ICHM461-2 | Chemistry and Processing of Oils and Fats | E | CHEM336-2 | --- | 2 | 0 | 0 | 2 | Department |
| | | ICHM462-2 | Chemistry and Processing of Detergents and Pesticides | E | CHEM336-2 | --- | 2 | 0 | 0 | 2 | Department |
| | | ICHM463-2 | Food Industries | E | CHEM336-2 + CHEM311-4 | --- | 2 | 0 | 0 | 2 | Department |
| | | ICHM464-2 | Cosmetics and Perfumes | E | CHEM336-2 | --- | 2 | 0 | 0 | 2 | Department |
| | | ICHM465-2 | Water Treatment and Analysis | E | CHEM311-4 | --- | 1 | 0 | 1 | 2 | Department |
| | | ICHM466-2 | Pharmaceutical Chemistry | E | CHEM336-2 | --- | 2 | 0 | 0 | 2 | Department |
| | | IE467-2 | Project management | E | ---- | --- | 1 | 1 | 0 | 2 | Department |
| Total | | | | | | | 97 | 3 | 27 | 135 | |

Concurrently, the core courses (R) would provide students with a solid foundation in the subject matter, and the discipline-specific electives (E) would provide new information on the program's applied components and their relevance to related fields and academia. Various multidisciplinary courses will be merged using generic electives. Additional abilities relevant to the topic matter and others would be acquired through skill upgrade courses, study, and training. To put it simply, a student who completes this curriculum will be qualified to communicate their subject knowledge and gain the abilities required to excel in the chemical industry, academia, and entrepreneurship.

## 3. Course Specifications:

Insert hyperlink for all course specifications using NCAAA template (T-153)

https://drive.google.com/drive/folders/12N4l5QY1uI2oud8XTXOwmWqIfHj_Yp-R?usp=sharing

## 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)*.

* Add a separate table for each track (if any).

| Years | Levels | Course Code | Course Name | Required or Elective | PLOs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Knowledge and understanding | | Skills | | | | | Values, Autonomy, and Responsibility | |
| | | | | | K1 | K2 | S1 | S2 | S3 | S4 | S5 | V1 | V2 |
| Year 1 | Level 1 | ENGL101-6 | English 1 | R | I | I | | | | | I | | I |
| | | SLM101-2 | Islamic Culture I | R | I | I | | | | | I | | I |
| | | MATH102-4 | General Mathematics | R | I | I | I | | | | | | |
| | | PHYS102-3 | General Physics (1) | R | I | I | I | | | | | | |
| | | PHYS103-1 | General Physics Lab. (1) | R | I | I | I | I | | I | | I | |
| | Level 2 | ENGL102-6 | English 2 | R | P | P | | | | | P | | P |
| | | CHEM102-3 | General Chemistry (1) | R | I | I | I | | | | I | | |
| | | CHEM103-1 | General Chemistry Lab. (1) | R | I | I | I | I | | I | | | |
| | | BIO102-3 | General Biology | R | I | I | I | | | | | | |
| | | BIO103-1 | General Biology Lab. | R | I | I | | I | | I | | I | |
| | | STAT103-3 | Principals of Statistics | R | I | I | I | | | | I | | |

| Years | Levels | Course Code | Course Name | Required or Elective | PLOs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Knowledge and understanding | | Skills | | | | | Values, Autonomy, and Responsibility | |
| | | | | | K1 | K2 | S1 | S2 | S3 | S4 | S5 | V1 | V2 |
| Year 2 | Level 3 | SLM102-2 | Islamic Culture II | R | P | P | P | | | | | | |
| | | ARB102-2 | Arabic Editing | R | P | P | P | P | P | P | | | |
| | | MATH243-3 | Introduction to calculus | R | P | P | P | | | | | | |
| | | CHEM205-3 | General Chemistry II | R | P | P | P | | | | | | |
| | | CHEM207-1 | General Chemistry II Lab | R | P | P | P | | | | | | |
| | | CHEM225-3 | Inorganic Chemistry I | R | P | P | P | P | P | P | | P | |
| | | CHEM233-3 | Organic Chemistry I | R | P | P | P | | | | | | |
| | Level 4 | CHEM213-3 | Principles of Analytical Chemistry | R | P | P | P | P | | P | | | |
| | | CHEM214-2 | Analytical Chemistry Lab | R | P | P | P | P | | P | | | |
| | | CHEM234-3 | Organic Chemistry II | R | P | P | P | | | | | | |
| | | CHEM235-2 | Organic Chemistry Lab | R | P | P | P | | | | | | P |
| | | CHEM243-3 | Physical Chemistry I | R | P | P | P | | | | | | |
| | | ICHM251-3 | Introduction to industrial chemistry | R | P | P | P | P | P | P | | | |
| Year 3 | Level 5 | CHEM311-4 | Instrumental Analysis | R | P | P | P | P | P | P | | P | |
| | | CHEM326-3 | Inorganic Chemistry II | R | P | P | P | | | | P | | P |
| | | CHEM327-2 | Inorganic Chemistry Lab | R | P | P | P | P | P | P | | P | |
| | | CHEM336-2 | Heterocyclic Organic Chemistry | R | P | P | P | | | | P | | P |
| | | CHEM342-3 | Chemical Kinetics | R | P | P | P | P | | P | | P | |
| | | ICHM351-3 | Electrochemical Analysis | R | P | P | P | P | P | P | | P | |
| | Level 6 | CHEM312-4 | Chromatographic Analysis | R | P | P | P | P | P | P | | P | |
| | | ICHM352-2 | Solid State Chemistry | R | P | P | P | | | | P | | P |
| | | ICHM353-2 | Sustainable Chemistry | R | P | P | P | | | | P | | P |
| | | ICHM354-2 | Chemistry of Inorganic Industries | R | P | P | P | | | | P | | P |
| | | ICHM355-3 | Corrosion Chemistry | R | P | P | P | P | | P | | P | |
| | | ICHM356-3 | Surfaces and catalysis chemistry | R | P | P | P | P | P | P | P | P | P |
| | | ICHM396-2 | Collaborative Training | R | P | P | P | P | P | P | P | P | P |
| Year 4 | level 7 | CHEM432-2 | Spectroscopy of Organic Compounds | R | M | M | M | | | | M | | M |
| | | CHEM434-2 | Chemistry of Natural Products | R | M | M | M | | | | M | | M |
| | | ICHM451-2 | Nanotechnology | R | M | M | M | | | | M | | M |
| | | ICHM452-2 | Modern Organic Synthesis | R | M | M | M | M* | M* | M* | M | M | M |
| | | ICHM453-2 | Chemistry and applications of Polymers | R | M | M | M | | | | M | | M* |

| Years | Levels | Course Code | Course Name | Required or Elective | PLOs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Knowledge and understanding | | Skills | | | | | Values, Autonomy, and Responsibility | |
| | | | | | K1 | K2 | S1 | S2 | S3 | S4 | S5 | V1 | V2 |
| | | ICHM493-3 | Graduation Project (1) | R | M | M | M | | | | M* | | M |
| | | ICHM495-2 | Fundamentals of Standardized Tests | E | M* | M | M | | | | M | | M |
| | | ICHEM4xx-2 | Elective Course (1) | E | M | M* | M | | | | M | | M |
| | Level 8 | ICHM454-3 | Industrial analysis and quality control | R | M | M | M | M* | M* | M* | M | M* | M |
| | | ICHM455-2 | Chemistry of cement and construction materials | R | M* | M | M | | | | M* | | M* |
| | | CHEM492-3 | Chemistry of Petroleum and Petrochemicals | R | M | M | M | M* | M* | M* | M | M | M |
| | | ICHM494-3 | Graduation Project (2) | R | M* | M* | M* | M | M | M | M* | M* | M* |
| | | ICHEM4xx-2 | Elective Course (2) | E | | * | | | | | | | |
| | | ICHEM4xx-2 | Elective Course (3) | E | | | * | | | | | | |
| | | ICHEM4xx-2 | Elective Course (4) | E | | | | | | | | * | |

For ELECTIVE Courses

| Years | Levels | Course Code | Course Name | Required or Elective | PLOs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Knowledge and understanding | | Skills | | | | | Values, Autonomy, and Responsibility | |
| | | | | | K1 | K2 | S1 | S2 | S3 | S4 | S5 | V1 | V2 |
| Year 4 | level 7 | CHEM411-2 | Environmental Analysis | E | M | M | M | M | M | M | M | M | M |
| | | CHEM421-2 | Organometallic Chemistry | E | M | M | M | | | | M | | M |
| | | ICHM457-2 | Chemistry of Dyes and Paints | E | M | M | M | | | | M | | M |

| Years | Levels | Course Code | Course Name | Required or Elective | PLOs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Knowledge and understanding | | Skills | | | | | Values, Autonomy, and Responsibility | |
| | | | | | K1 | K2 | S1 | S2 | S3 | S4 | S5 | V1 | V2 |
| Year 4 | level 8 | CHEM429-2 | Nuclear and Radiation Chemistry | E | M | M | M | | | | M | | M |
| | | ICHM458-2 | Chemistry of Downstream Industries | E | M | M | M | | | | M | | M |
| | | ICHM459-2 | Industrial Catalysis | E | M | M | M | | | | M | | M |
| | | ICHM461-2 | Chemistry and Processing of Oils and Fats | E | M | M | M | | | | M | | M |
| | | ICHM462-2 | Chemistry and Processing of Detergents and Pesticides | E | M | M | M | | | | M | | M |
| | | ICHM463-2 | Food Industries | E | M | M | M | | | | M | | M |
| | | ICHM464-2 | Cosmetics and Perfumes | E | M | M | M | | | | M | | M |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ICHM465-2 | Water Treatment and Analysis | E | M | M | M | M | M | M | M | M | M |
| | ICHM466-2 | Pharmaceutical Chemistry | E | M | M | M | | | | M | | M |
| | IE467-2 | Project management | E | M | M | M | M | | M | M | M | M |

## 5. Teaching and learning strategies applied to achieve program learning outcomes.

Describe teaching and learning strategies, including curricular and extra-curricular activities, to achieve the program learning outcomes (PLOs) in all areas.

Teaching and learning strategies are developed and determined based on each course's learning outcomes (CLOs), which are consistent with PLOs. Furthermore, the learning domains are considered when choosing these instructional methods. Class discussions, projects and seminars, brainstorming and self-study, reports and oral presentations, and interactive lectures are all examples of active learning strategies.
Our courses contain a variety of examinations, ranging in length from timed quizzes to mini-dissertations. The use of learning and methods that promote deep learning rather than superficial learning experiences is an important part of the evaluation process.
At the start of the course, the instructor will go over how to evaluate students' progress and what counts toward a course grade. Tests, quizzes, assignments, laboratory write-ups, research papers, oral presentations, small-group problem-solving of questions arising from the application of course concepts and concerns to experience, and the maintenance of a personal lab manual are among the methods used.
The student's ability to demonstrate an understanding of specific chemistry topics determines their grade and level of competence. Meet work assignment deadlines; participate in and complete reports on specified laboratory activities; abilities will be evaluated through surveys, focus groups, and feedback.
To check the results, the department chair and another instructor will go over the test, exam, and grade information. The QA committee then identifies the courses with grade shifts by comparing their results to those of other courses at the same level.
Furthermore, participating in university or departmental events, visiting companies and research sites, attending seminars, and other activities will allow our students to gain more experience.

Also see QMS Chapter 7, the student handbook, and the department manual.

We listed here some possible strategies that are used in the program according to the used domains as well as their methods of assessments:

| Domain | PLO | Teaching Strategy | Assessment Method |
|---|---|---|---|
| Knowledge and Understanding | ***K1: Demonstrate a comprehensive understanding and critical perspective on the key principles, concepts, and terminology of both theoretical and experimental/applied chemistry knowledge, as well as a good foundation in Physics and Mathematics.*** | Developing a comprehensive understanding of theoretical and experimental chemistry, along with a solid foundation in Physics and Mathematics, requires thoughtful teaching strategies and effective assessment methods. Let's explore some approaches:<br>**Problem-Based Learning (PBL)**:<br>Scenario-Based Challenges: Present real-world problems related to chemistry principles and concepts.<br>Collaborative Problem Solving: Encourage teamwork and critical thinking to analyze and propose solutions.<br>**Case Studies**:<br>Contextual Learning: Use case studies to explore complex chemistry scenarios.<br>Critical Analysis: Assess students' ability to analyze, synthesize, and apply theoretical concepts.<br>**Interactive Demonstrations**:<br>Visualizing Concepts: Use interactive demonstrations (e.g., simulations, models) to illustrate theoretical principles.<br>Conceptual Understanding: Assess their comprehension by asking questions during demonstrations.<br>**Mathematical Applications**:<br>Quantitative Problem Solving: Integrate mathematical techniques (e.g., algebra, calculus) into chemistry problems.<br>Equilibrium Calculations: Assess their ability to solve equilibrium, rate, and stoichiometry problems.<br>**Physics Connections**:<br>Atomic Structure: Relate atomic models to quantum mechanics principles.<br>Thermodynamics: Connect chemistry concepts (e.g., enthalpy, entropy) to thermodynamic laws. | To assess this outcome. Here are some effective assessment methods:<br><br>1**. Multiple-Choice Questions** (MCQs): MCQs are a type of assessment where students select the right response from a list of possibilities to gauge their comprehension and depth of knowledge.<br><br>2. **Essay Questions**: As a means of evaluation, students are required to prepare essays in which they can showcase their analytical, writing, and critical thinking abilities.<br><br>3. **Assignment**: Having students complete some tasks outside of class and turn them in to their teachers via Blackboard uploads |

| Domain | PLO | Teaching Strategy | Assessment Method |
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| | *K2: Describe correctly chemical phenomena, practical procedures, tools, and techniques related to industrial chemistry.* | To achieve this learning outcome, the following teaching and learning strategies can be employed:<br>1- **Integrated Approach**: Creating lessons that incorporate abilities (listening, speaking, reading, and writing). Providing students with opportunities to practice and implement their knowledge in a variety of contexts promotes a well-rounded understanding of industrial chemistry.<br>2- **Engaging students in communicative activities** that require them to actively use the chemistry language. These activities may consist of role-playing, group discussions, debates, and problem-solving tasks. | To assess this outcome. Here are some effective assessment methods:<br>1. **Written Exams**: Give pupils written tests to gauge their understanding of industrial chemistry. Add parts where writing proficiency is tested. Assess students' knowledge and application of industrial chemistry using a mix of multiple-choice, fill-in-the-blank, and essay questions.<br>2. **Oral Presentations** and Interviews: Give students oral presentations or interview them to demonstrate their communication abilities and capacity for clear idea expression. Evaluate their capacity for information delivery. Comment on their accuracy,<br>3. **Writing Assignments**: Assign writing tasks that require students to demonstrate their ability to write, reports, sentences, or other written forms. |
| kills | *S1: Solve problems using appropriate principles, methodologies, tools, and modelling related to industrial chemistry.* | Teaching strategies and assessment methods for solving problems related to industrial chemistry involve a combination of theoretical knowledge, practical skills, and critical thinking. some effective approaches:<br>**1. Problem-Based Learning (PBL):**<br>-Scenario-Based Challenges: Present students with real-world industrial scenarios (e.g., process optimization, quality control, safety protocols).<br>-Collaborative Problem Solving: Encourage teamwork to analyze and propose solutions.<br>2. **Case Studies**:<br>-Industry-Specific Cases: Use case studies from chemical manufacturing, environmental compliance, or product development.<br>-Critical Analysis: Ask students to analyze the situation, identify key issues, and propose feasible solutions.<br>3. **Laboratory Simulations**:<br>-Virtual Labs: Provide online simulations of industrial processes (e.g., distillation, reactor design).<br>-Data Analysis: Have students analyze simulated data and troubleshoot issues.<br>4. **Modelling and Simulation**:<br>-Process Modelling: Teach students how to create mathematical models for chemical processes (e.g., mass balance, heat transfer).<br>-Software Tools: Introduce industry-standard software for simulation.<br>5. **Problem-Solving Workshops**:<br>-Structured Sessions: Conduct workshops where students work on industrial problems collaboratively.<br>-Feedback and Reflection: Provide feedback on their problem-solving approaches | 1. Written exams and assignments<br>2. Evaluate their ability to apply principles and methodologies to solve complex industrial problems.<br>3. Assess their problem-solving skills through written reports or presentations.<br>4. Evaluate their understanding of practical aspects and troubleshooting abilities.<br>5. Assess their ability to develop and interpret process models<br>6. Evaluate their problem-solving strategies and adaptability. |

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| | *S2: Reporting the analyzed results from the experimental work in the correct manner* | Reporting the analyzed results from experimental work is essential for scientific communication and understanding. Here are effective teaching strategies and assessment methods to guide students in presenting their findings accurately:<br>**1.Understanding the Purpose of Reporting**:<br>**Contextualize the Result**s: Teach students why reporting results matters. Discuss the purpose of scientific communication and how accurate reporting contributes to the scientific community.<br>**Audience Awareness**: Emphasize that the audience (peers, instructors, or the public) determines the level of detail and format of the report.<br>**2.Components of a Scientific Report**:<br>***Title and Abstract***: Explain the importance of a concise, informative title and a well-structured abstract that summarizes the study.<br>**Introduction**: Teach students to introduce the research question, hypothesis, and background information.<br>**Methods**: Discuss the methodology used, including materials, procedures, and data collection.<br>**Results**: Focus on presenting the analyzed data, using tables, figures, and descriptive text.<br>**Discussion**: Encourage critical analysis of the results, interpretation, and implications.<br>**Conclusion**: Summarize key findings and suggest future directions.<br>**3.Visual Representation of Data**:<br>**Graphs and Figures**: Teach students how to create clear graphs (e.g., bar charts, scatter plots) that accurately represent the data.<br>**Captions and Labels**: Emphasize the importance of labeling axes, providing units, and explaining symbols.<br>**4.Accuracy and Precision**:<br>Precision in Reporting: Discuss the significance of reporting results with appropriate precision (significant figures, decimal places).<br>**Error Analysis**: Teach students to acknowledge and discuss uncertainties or errors associated with measurements.<br>**5.Scientific Writing Skills**:<br>Clarity and Conciseness: Guide students in writing clear, concise sentences. Avoid jargon and unnecessary complexity.<br>**Logical Flow**: Teach them to organize information logically, moving from introduction to conclusion.<br>**Citations**: Explain the importance of citing sources (e.g., research papers, textbooks) when discussing background information or previous studies.<br>**6.Peer Review and Feedback**:<br>**Peer Assessment**: Have students review each other's reports. Provide guidelines for constructive feedback.<br>**Revision Process**: Teach them to revise based on feedback, improving clarity and accuracy. | • **Rubrics**: Develop a rubric that outlines the criteria for a well-structured report (e.g., content, organization, visual presentation).<br>• **Peer Evaluation**: Assess students' reports based on clarity, accuracy, and adherence to scientific conventions.<br>• **Self-Assessment**: Encourage students to reflect on their own writing and identify areas for improvement. |

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| | *S3: Use a variety of instruments to efficiently analyze different materials.* | Analyzing different materials using a variety of instruments is essential in fields such as industrial chemistry, and its related fields Here are teaching strategies and assessment methods to help students develop proficiency in using analytical instruments:<br>1. **Formative**:<br>○ ***Hands-On Practic***e: Provide students with opportunities to handle and operate various analytical instruments (e.g., spectrometers, chromatographs, microscopes).<br>○ ***Lab Exercises***: Design lab exercises where students analyze real-world samples using specific instruments.<br>○ ***Peer Feedback***: Encourage students to collaborate and provide feedback to each other during instrument practice sessions.<br>2. **Understanding Instrument Principles**:<br>○ ***Lectures and Demonstrations***: Explain the principles behind different instruments (e.g., UV-Vis spectroscopy, X-ray diffraction). Use visual aids and demonstrations.<br>○ **Interactive Discussions**: Engage students in discussions about how each instrument works and its applications.<br>3. **Instrument-Specific Strategies**:<br>▪ **Spectroscopy**:<br>▪ Teach students about absorption, emission, and scattering spectroscopy.<br>▪ Discuss sample preparation, calibration, and data interpretation.<br>▪ Assess their ability to identify peaks and analyze spectra.<br>○ **Chromatography:**<br>▪ Explain gas chromatography (GC) and liquid chromatography (HPLC).<br>▪ Demonstrate column selection, mobile phase composition, and peak integration.<br>▪ Evaluate their chromatogram interpretation skills.<br>○ **Microscopy**:<br>○ Cover light microscopy, electron microscopy, and atomic force microscopy.<br>○ Teach sample preparation, focusing techniques, and image analysis.<br>○ Assess their ability to identify structures and artifacts in microscope images.<br>**4. Problem-Solving Scenarios:**<br>○ Present complex analytical challenges (e.g., unknown compound identification, impurity detection).<br>○ Ask students to propose suitable instruments and methods to solve these problems.<br>○ Evaluate their reasoning and instrument selection.<br>**5. Safety and Maintenance:**<br>○ Emphasize safety protocols when using instruments (e.g., handling chemicals, laser safety).<br>○ Teach preventive maintenance, calibration, and troubleshooting.<br>○ Assess their understanding of safety practices and instrument care. | • **Practical Exams**: Conduct hands-on assessments where students use instruments to analyze provided samples.<br>• **Written Reports**: Ask students to write detailed reports on their instrument usage, results, and interpretations.<br>• **Oral Presentations**: Have students explain their analytical approach and findings to the class.<br>• **Self-Assessment**: Encourage reflection on their instrument skills and areas for improvement. |

| Domain | PLO | Teaching Strategy | Assessment Method |
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| | *S4: Employ chemical safety skills in laboratory, industry and other work environment* | Teaching chemical safety skills in laboratory and industry settings is crucial for ensuring the well-being of students, researchers, and professionals. Here are some effective strategies and assessment methods:<br>1. **Risk Assessment**:<br>**-Teach Risk Assessment**: Incorporate risk assessment as a fundamental skill. Students should learn how to identify hazards, assess risks, and implement appropriate safety measures.<br>**-Case Studies**: Use real-world case studies to illustrate risk assessment processes. Discuss incidents where chemical safety protocols were followed or overlooked.<br>**-Group Activities**: Assign risk assessment tasks to small groups. Have them analyze scenarios and propose safety measures.<br>2. **Laboratory Safety Training**:<br>**-Pre-Lab Briefings**: Before experiments, provide detailed safety briefings. Discuss hazards, emergency procedures, and protective equipment.<br>**-Hands-On Practice**: Allow students to practice safety procedures (e.g., handling chemicals, using fume hoods, wearing PPE) under supervision.<br>**-Safety Drills**: Conduct safety drills (e.g., spill response, fire evacuation) to reinforce safety protocols.<br>3. **Chemical Information Literacy**:<br>**-Source Evaluation**: Teach students how to evaluate the reliability of chemical information sources (e.g., MSDS, scientific literature, databases).<br>**-Search Skills**: Provide guidance on effective database searches for safety-related information.<br>**-Critical Thinking**: Encourage critical thinking when interpreting chemical data and safety recommendations.<br>4. **Industry-Relevant Training**:<br>-Guest Speakers: Invite industry professionals to discuss chemical safety practices, regulations, and challenges.<br>**-Site Visits**: Arrange visits to industrial facilities where students can observe safety protocols in action.<br>**-Simulations**: Use virtual simulations to replicate industry scenarios (e.g., chemical spills, process safety).<br>5. **Continuous Improvement**:<br>**-Feedback**: Provide constructive feedback on safety performance. Highlight areas for improvement.<br>**-Reflective Journals**: Ask students to maintain reflective journals about safety experiences and lessons learned.<br>**-Safety Committees**: Involve students in safety committees or initiatives within the department. | 1- Evaluate students' ability to perform risk assessments by grading their analyses and recommendations.<br>2- Assess students during lab sessions based on adherence to safety guidelines and their ability to respond to emergencies.<br>3- Evaluate students' ability to find and evaluate chemical information by assigning research tasks and assessing their sources.<br>4- Assess students' understanding of industry-specific safety practices through presentations or written reports.<br>5- Evaluate students' growth in safety awareness over time. |

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| | *S5: Communicate scientific information and research findings effectively in writing (laboratory notebooks, laboratory reports, research papers, etc.) or orally, using clear and concise scientific language.* | To achieve the learning outcome of communicate and writing relevant reports, reflections, projects, and research papers, the following teaching and learning strategies can be employed:<br>1- **Interactive Discussions**: To foster critical thinking and a deeper knowledge, the faculty members encourage interactive classroom discussions. They give students the opportunity to discuss the subjects, offer their opinions, and ask questions. This method promotes active learning and makes it easier to understand the subject matter more deeply.<br>2- **Research Skills Development**: Teach students research skills, including how to gather relevant information, evaluate sources, and integrate research effectively into their writing. Provide guidance on conducting literature reviews, citing sources properly, and using appropriate referencing styles. Help students develop critical thinking skills to analyze and synthesize information from various sources. | To assess the learning outcome of writing relevant reports, reflections, projects, and research papers, a variety of assessment methods can be used. Here are some effective assessment methods:<br>1- **Written Assignments**:<br>**Reports**: Assign students to write reports on specific topics or issues. Assess their ability to gather relevant information, present clear and organized content, and effectively communicate their findings in a structured report format.<br>**Projects**: Assign project-based assessments that require students to apply their knowledge and skills to real-world Problem. Assess their ability to plan, execute, and present a project that addresses a specific problem or objective, demonstrating relevance and creativity.<br>**Research Papers**: Assign research papers that require students to conduct in-depth research on a topic, analyze and synthesize information from various sources, and present their findings coherently. Evaluate their ability to use appropriate research methods, critically evaluate sources, and effectively communicate their research through a well-structured paper.<br>2- **Presentations**:<br>*Oral Presentations: Assign students to deliver oral presentations on their reports, projects, or research papers. Assess their ability to effectively communicate their ideas, present relevant information, engage the audience, and respond to questions or feedback.<br>* **Multimedia Presentations**: Allow students to create multimedia presentations that accompany their written work. Evaluate their ability to use visual aids, audio or video clips, and other multimedia elements to enhance the relevance and impact of their presentations.<br>3- **Research Proposal or Plan**:<br>* Request students to develop a research proposal or plan for a specific topic. Assess their ability to identify a research question or problem, outline the research methodology, and justify the relevance and significance of their proposed research. |

| Domain | PLO | Teaching Strategy | Assessment Method |
|---|---|---|---|
| | | | It is important to use a combination of these assessment methods to obtain a comprehensive evaluation of students' ability to write relevant reports, reflections, projects, and research papers. Assessments should align with the learning outcomes, provide clear criteria for evaluation, and offer constructive feedback that guides students' writing development. |
| Values, Autonomy, and Responsibility | ***V1: Work in groups and teams collaboratively with others.*** | Collaborating effectively in groups and teams is a valuable skill for both academic and professional settings. Here are teaching strategies and assessment methods to help students develop this skill:<br><br>**Team Formation**: Teach students how to form diverse and balanced teams. Discuss the importance of complementary skills and personalities.<br>**Communication Skills**: Emphasize active listening, clear communication, and respectful dialogue. Role-play scenarios to practice effective communication.<br>**Conflict Resolution**: Provide strategies for resolving conflicts constructively. Teach negotiation, compromise, and empathy.<br>Project Management: Introduce project management tools (e.g., Gantt charts, task lists) to help teams organize their work.<br>**Virtual Collaboration**: Discuss virtual teamwork, as remote collaboration is increasingly common. Teach tools for online communication and file sharing.<br>○ | Assessment Methods:<br><br>**1.Peer Evaluation**: Have team members assess each other's contributions. Use rubrics to evaluate teamwork, communication, and reliability.<br>**2.Teamwork Reflections**: Ask students to write reflections on their team experiences. What worked well? What challenges did they face?<br>**3.Group Projects**: Assign collaborative projects that require teamwork. Evaluate both the final product and the team dynamics.<br>**3.Role-Playing Scenarios**: Assess students' ability to handle conflict or difficult team situations through role-playing exercises.<br>**4.Self-Assessment**: Encourage students to evaluate their own teamwork skills. What areas do they need to improve?<br><br>**Rubrics**: Develop a rubric that outlines the criteria for Teamwork<br><br>**Teamwork Assessment Criteria**:<br><br>**Active Participation**: Evaluate how engaged each team member is during meetings and tasks.<br>**Contribution**: Assess the quality and quantity of contributions. Did everyone pull their weight?<br>**Leadership**: Consider leadership roles within the team. Did someone take initiative?<br>**Adaptability**: Evaluate how well team members adapt to changing circumstances or new information.<br>**Problem-Solving**: Assess the team's ability to overcome obstacles and find creative solutions. |

| Domain | PLO | Teaching Strategy | Assessment Method |
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| | *V2: Recognize a chemist's ethical and scientific responsibilities.* | Recognizing a chemist's ethical and scientific responsibilities is crucial for maintaining professional integrity and contributing to the scientific community. Here are some teaching strategies and assessment methods to help students understand and uphold these responsibilities:<br><br>1. **Ethical Theory Overview**: Begin by introducing students to ethical theories and principles. Discuss concepts such as deontology, utilitarianism, and virtue ethics.<br>2. **Codes of Conduct**: Familiarize students with professional codes of conduct specific to chemistry. Explain how these codes guide ethical behavior.<br>3. **Case Studies**: Use real-world case studies to illustrate ethical dilemmas faced by chemists. Encourage critical thinking and discussion.<br>4. **Guest Speakers**: Invite practicing chemists or ethicists to share their experiences and insights.<br>5. **Lab Safety and Responsible Conduct**: Integrate discussions on safety protocols, data integrity, and responsible research practices into laboratory sessions. | ○ **Ethical Reflections**: Assign reflective essays or journals where students analyze ethical scenarios related to chemistry. Ask them to consider the impact of their decisions.<br>○ **Role-Playing**: Organize role-playing exercises where students act out ethical situations. Evaluate their ability to apply ethical principles.<br>○ **Multiple-Choice Questions**: Include ethical questions in quizzes or exams. Assess students' understanding of ethical concepts.<br>○ **Group Discussions**: Evaluate participation in group discussions on ethical issues. Did students engage thoughtfully and consider different viewpoints?<br>○ **Research Integrity**: Assess students' adherence to research integrity principles (e.g., proper citation, avoiding plagiarism). |

Furthermore, extracurricular activities enrich students' experiences by strengthening and developing interpersonal skills and attitudes that supplement the academic Chemistry curriculum. Extracurricular activity engagement now has a clear impact on students' academic achievement and employment chances.

The extracurricular activities comprised the following fields:

Sports, participating in college and university sports teams falls under the category of sports. Thousands of college students sign up for sports teams each year. Participating in departmental sports can be a fulfilling experience. Students who participate in sports learn the value of leadership, cooperation, and putting in a lot of effort to succeed.

Community Service, Community service refers to any type of volunteer activity, whether it be locally, nationally, or internationally. The majority of educational institutions regularly provide chances for students to volunteer in the community. These can take many different forms, such as helping to clean up the environment or serving as a mentor to younger pupils in elementary schools. Putting volunteer experience on your resume demonstrates your level of dedication to the community and your readiness to help others.

Professional training and Chemistry clubs, demonstrate a desire to learn and obtain an edge over competitors. Many top-performing students receive invitations to professional societies at the undergraduate level. Usually, these are national organizations that look for members with expertise in a specific sector. Being a member of one of these societies demonstrates your level of professional expertise and dedication to your chosen field. It is advantageous to be a part of professional training programs or clubs since it demonstrates to prospective employers that you have some technical skills and that you actively look for possibilities to advance your career. Every semester, the Chemistry program arranges a variety of training courses covering various topics in the field of chemistry.

## 6. Assessment Methods for program learning outcomes.

Describe assessment methods (Direct and Indirect) that can be used to measure the achievement of program learning outcomes in all areas.
The program should devise a plan for assessing Program Learning Outcomes (all learning outcomes should be assessed at least twice in the bachelor program's cycle and once in other degrees).

*The chemistry curriculum employs a variety of ways to measure how well its learning objectives are being met. These strategies are used to collect the necessary information for the assessments. The effectiveness with which the outcomes are achieved is then evaluated by analyzing the data. The outcomes of the assessment and evaluation procedures are then used to continuously improve the program. The following techniques are used to review, evaluate, and provide feedback on programs to ensure continuous improvement.*

1. *Assessment methods for program learning outcomes can be direct assessment usually relies on the course work or indirect assessment methods (Course evaluation survey, Student survey on evaluating the chemistry program, Alumni survey, Employer's survey) usually obtained by using surveys (including designing forms of surveys and appropriate questions for the specific and applicable data).*
2. *The collected data is analyzed and compared to a pre-set (KPI) performance indicator, which constitutes the evaluation processes.*
3. *Checking the degree to which the data evaluation results meet the pre-set targets will be the force for the continuous improvement processes.*

*The tools are summarized in the following Table*

| Domain | PLO | Assessment Methods | |
|---|---|---|---|
| | | Direct Methods | Indirect methods |
| Knowledge and Understanding | ***K1: Demonstrate a comprehensive understanding and critical perspective on the key principles, concepts, and terminology of both theoretical and experimental/applied chemistry knowledge, as well as a good foundation in Physics and Mathematics.*** | • *Midterm Exams*<br>• *Quizzes*<br>• *Final Exams*<br>• *Class discussions rubric*<br>• *Assignments* | • *Program Evaluation Survey*<br>• *Student Experience Survey* |
| | ***K2: Describe correctly chemical phenomena, practical procedures, tools, and techniques related to industrial chemistry.*** | • *Midterm Exams*<br>• *Quizzes*<br>• *Final Exams*<br>• *Class discussions rubric*<br>• *Assignments* | • *Program Evaluation Survey*<br>• *Student Experience Survey* |
| *Skills* | ***S1: Solve problems using appropriate principles, methodologies, tools, and modelling related to industrial chemistry.*** | • *Midterm Exams*<br>• *Quizzes*<br>• *Final Exams*<br>• *Class discussions*<br>• *Problem based assignments* | • *Program Evaluation Survey*<br>• *Student Experience Survey* |
| | ***S2: Reporting the analyzed results from the experimental work in the correct manner*** | • *Assignments (group work/individual work)*<br>• *Presentation (group work/individual work)*<br>*Group Lab based assignments*<br>• *Lab report* | • *Program Evaluation Survey* |

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| | | | • *Student Experience Survey* |
| | ***S3: Use a variety of instruments to efficiently analyze different materials.*** | • *Assignments (group work/individual work)*<br>• *Presentation (group work/individual work)*<br>• *Group Lab based assignments*<br>• *Lab report* | • *Program Evaluation Survey*<br>• *Student Experience Survey*<br>• *Alumni Survey* |
| | ***S4: Employ chemical safety skills in laboratory, industry and other work environment*** | • *Assignments (group*<br>• *work/individual work)*<br>• *Presentation (group work/individual work)*<br>• *Group Lab based assignments*<br>• *Lab report*<br>• *Safety Exam* | • *Program Evaluation Survey*<br>• *Student Experience Survey*<br>• *Alumni Survey*<br>• *Employee Survey* |
| | ***S5: Communicate scientific information and research findings effectively in writing (laboratory notebooks, laboratory reports, research papers, etc.) or orally, using clear and concise scientific language.*** | • *Assignments (group work/individual work)*<br>• *Presentation (group work/individual work)*<br>*Group Lab based assignments*<br>• *Lab report*<br>• *Seminar evaluation [Rubrics-based]* | • *Program Evaluation Survey*<br>• *Student Experience Survey*<br>• *Alumni Survey*<br>• *Employee Survey* |
| Values, Autonomy, and Responsibility | ***V1: Work in groups and teams collaboratively with others.*** | • *Assignments (group work/individual work)*<br>• *Presentation*<br>• *Group Lab based assignments*<br>• *Lab report*<br>• *Observation* | • *Program Evaluation Survey*<br>• *Student Experience Survey*<br>• *Alumni Survey*<br>• *Employee Survey* |
| | ***V2: Recognize a chemist's ethical and scientific responsibilities.*** | • *Assignments (group work/individual work)*<br>• *Presentation*<br>• *Group Lab based assignments*<br>• *Lab report*<br>• *Observation*<br>• *Ethic rubric*<br>• *Quiz* | • *Program Evaluation Survey*<br>• *Student Experience Survey*<br>• *Alumni Survey*<br>• *Employee Survey* |

## D. Student Admission and Support:

### 1. Student Admission Requirements

*All requirements are aligned with JU admission requirements*

1. *The student applying to the program must have the certificate of a high secondary school (scientific section).*
2. *School Recommendations of highly regarded ethics and accountability.*
3. *Be a student of a Saudi national or Saudi Arabian mother.*
4. *Must not have been on the receiving a high school or its equivalent for more than five years.*
5. *Be at least average in high school about 70%.*
6. *Should not be disconnected from Jazan University for academic reasons, disciplinary or disconnected from another university for disciplinary reasons.*

*The of New Students (Article No (2):*

*The university council according to the college councils' proposal, as well as, proposals from other related bodies determines the number of students to be admitted next year.*

*Administrative Rules of Jazan University (Article No (3):*

*The Deanship of Admission and Registration according to the college councils' proposal submits a statement with the number of students to be admitted to the next semester or academic year to submit it to the university council.*

*Conditions necessary for admission to the university:*

1. *The student must have a certificate of general secondary school or its equivalent (from inside the kingdom or outside it)*
2. *The certificate or its equivalent must not exceed 5 years since the graduation of the holder from secondary school. In this respect, the university council may have the right to make exceptions if there are other convincing reasons.*
3. *The student must have good conduct.*
4. *The student must pass all tests or private interviews deemed necessary by the university council.*
5. *The student must be medically fit.*
6. *The student must get a letter of approval from his/her employer if he/she works in the public or private sector.*
7. *The student must satisfy any other condition identified by the university council.*

*Administrative Rules of Jazan University:*

1. *If a student has been dismissed from Jazan University or any other university for disciplinary reasons, the admission is considered null and void unless otherwise proved later*
2. *The student must not be registered in another university besides the University of Jazan, aiming to obtain a certain degree or he/she has already obtained it. Then the deanship of admission and registration has the right to cancel his/her admission if other thing is proved later. In this case, the University Council has the right to make an exception if it deems it necessary.*
3. *The university president has the right to make exceptions for the student if there are convincing reasons.*

*Article No 4:*
*From among all candidates wishing for admission, priority is to those who satisfy all conditions according to the marks they obtain in the general secondary school certificate, and the interview as well as admission tests if any.*

*Administrative Rules of Jazan University:*

*The Deanship of Admission and Registration upon recommendations from college councils shall prepare a presentation of the mechanisms of giving priorities to the students applied for admission to be submitted to the university council or the competent authority.*

- https://edugate.jazanu.edu.sa/jazan/ui/guest/application_online/index/typeApplicationOnlineIndex.faces
- https://edugate.jazanu.edu.sa/jazan/files/diploma_prog.pdf

## 2. Guidance and Orientation Programs for New Students

(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level).

*The orientation program for new students is held every time the department admits fresh students. The department Head presides over a welcoming session for new students attended by almost all the faculty members and administration staff. The Orientation program is designed to help students get acquainted with the following:*

- *Vision, mission, and objectives of the department, college, and university.*
- *University and college regulations and code of conduct.*

- *Tips on leading a successful college life in line with their potential career goals.*
- *Department and college facilities and places.*
- *plan of Study Review course*
- *methods of evaluation*
- *Wellness, self-care*
- *Faculty expectations*
- *Certification and licensure information*

## 3. Student Counseling Services

(Academic, professional, psychological, and social)
(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level).

### Academic Counseling:

*Academic advising courses are designed to help students succeed in college and make good career and life decisions. There are also specific topic courses that address a variety of topics linked to academic careers and personal development. Academic advisers are assigned to each student in the Chemistry program, and their purpose is to provide academic help and advice, primarily before registration but also at any time during the semester. Students should consult their adviser, department chair, and college dean if they have any queries or concerns concerning their academic careers. Because of their large enrollment, chemistry students are spread out among colleges for advising. The steps are as follows.*

- *Student counselling is guided by the Student Academic Counseling Committee.*
- *Every faculty member is tasked with advising a specific group of students*
- *Faculty members will be accessible for student counselling during designated office hours every day.*
- *Each student in the counselling group should have a file created by the faculty that contains the student's contact details, a copy of their schedule, and a copy of their academic record, all of which should be updated each semester.*

### Career Counseling:

*The alumni unit and academic advising provide opportunities for career exploration and evaluation of interests, abilities, talents, and other characteristics related to vocational and pre-professional planning and work success. This involves:*

- *Career Assessments and Interpretations.*
- *Career Workshops such as writing CVs, interviewing assistance, researching occupations, labor market information, and career planning.*
- *The Faculty of Science is going to plan to invite the stakeholders from the different authorities and ministries in the program advisory committee as speakers in Alumni celebrations and workshops.*

### Psychological Counseling:

*There is no psychologist in the faculty of science, however instances that need psychological help are directed to the Academic Help Unit of the Deanship of Student Affairs at Jazan University.*

### Social Counseling:

*Jazan University's social programs are designed to prepare students for leadership roles in all elements of biology, which can aid in the development process, community services, and the resolution of most ecological and biological problems.*

## 4. Special Support

(Low achievers, disabled, gifted, and talented students).

*The Deanship of Student Affairs is responsible for solving all of the obstacles and challenges faced by university students.*

### Low achievers

- *Colleges evaluate those profiles of academic achievement of students and monitor their performance during the year.*
- *Early during the year, the academic affairs committee prepares a list with names of students who are faltering and whose performance is below standard.*
- *The list is forwarded to the assigned academic advisor who initiates a remediation process.*
- *Academic advisors meet with students and provide immediate feedback.*
- *Recommendations for additional assistance in special cases are forwarded to the Dean of the college.*
- *The system permits those failing students to be given a second chance and are allowed to re-sit the exam.*
- *The college council requests that a departmental investigation and action-oriented review be triggered if the scores for a particular exam fall below the college benchmark.*

### Disabled

- *The college initiated a recurring awareness initiative to assist individuals with exceptional needs.*
- *Encouraged college staff members not to use the equipment and facilities meant for individuals with special needs. In addition, all campus buildings have parking spaces and amenities for those with special needs.*

### Gifted and Talented

- *Rewarding gifted, talented, and outstanding students via factual, moral rewards or facilities to participate in extra-curricular and recreational activities.*

# E. Faculty and Administrative Staff:

## 1. Needed Teaching and Administrative Staff

| Academic Rank | Specialty | | Special Requirements / Skills (if any) | Required Numbers | | |
|---|---|---|---|---|---|---|
| | General | Specific | | M | F | T |
| *Professor* | *2* | ▪ *Analytical*<br>▪ *Organic*<br>▪ *Inorganic*<br>▪ *Physical*<br>▪ *Biochemistry* | *Ability to work well with a range of people, organization, teamwork, excellent written and verbal communication* | *1* | *1* | *2* |
| *Associate Professor* | *16* | ▪ *Analytical*<br>▪ *Organic*<br>▪ *Inorganic*<br>▪ *Physical*<br>▪ *Biochemistry* | *Ability to work well with a range of people, organization, teamwork, excellent written and verbal communication* | *8* | *8* | *16* |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Assistant Professor* | *20* | ▪ *Analytical*<br>▪ *Organic*<br>▪ *Inorganic*<br>▪ *Physical*<br>▪ *Biochemistry* | *Ability to work well with a range of people, organization, teamwork, excellent written and verbal communication* | *10* | *10* | *20* |
| *Lecturer* | *16* | ▪ *Analytical*<br>▪ *Organic*<br>▪ *Inorganic*<br>▪ *Physical*<br>▪ *Biochemistry* | *Good organizational, ability to manage groups, flexibility and creativity* | *8* | *8* | *16* |
| *Teaching Assistant* | *6* | ▪ *Organic*<br>▪ *Inorganic* | *Good organizational, ability to manage groups, flexibility and creativity* | *3* | *3* | *6* |
| *Technicians and Laboratory Assistants* | *2* | ▪ *Analytical* | *Meticulous attention to detail, excellent written and oral communication, good team working…* | *1* | *1* | *2* |
| *Administrative and Supportive Staff* | *2* | ▪ *Administrative* | *Adept in Technology, verbal & and written communication, organization, time management, strategic planning…* | *1* | *1* | *2* |
| *Others (specify)* | *none* | *none* | *none* | *none* | *none* | *none* |

## F. Learning Resources, Facilities, and Equipment:

### 1. Learning Resources

Learning resources required by the Program (textbooks, references, e-learning resources web-based resources, etc.)

- The Program QA committee keeps a copy of each course's learning materials in the relevant Course File. • The committee also maintains a list of educational resources.
- The Program Council approves the list of educational materials after it is reviewed by the teaching faculty once a year. The revised list of instructional resources is then shared with the College of Science Deanship and the Deanship for Library Affairs.
- The CS includes a list of all available resources, including suggested resources.

### 2. Facilities and Equipment

(Library, laboratories, classrooms, etc.)

**Library**

The college library can be found on the second floor and serves all faculty departments. It is a larger, well-equipped library that complements Jazan University's main library with a current collection of books, indexes, videos, and computer software. It has enough literature for all college students, including those studying chemistry. All university students have access to the university's central library as well as the Digital Library of Saudi Arabia (SDL). Students can check out books from the library for one week and then return them to make room for another student. Site for SDL; https://sdl.edu.sa/SDLPortal/ar/Publishers.aspx

**Teaching Laboratories**

A number of teaching laboratories cover all chemistry disciplines, including beginning courses as well as courses in organic, inorganic, physical, analytical, and biochemistry. Our teaching labs contain modern equipment that students routinely use.

**Equipment & Instrumentation**

The department provides labs with all of the instruments, supplies, safety equipment, and materials required for student research. We have cutting-edge atomic absorption, GC-MS, FTIR, flame photometers, HPLC, and excellent UV absorption.

**Medical facilities**

First aid boxes are provided for emergencies inside each Lab and other locations. There is a medical facility close to our campus, and our college has a medical room as well.

**Classroom Supplies**

Air conditioning, a whiteboard, writing pens, dusters, an overhead projector with screens, and enough seats are all provided in classrooms. Additional classroom resources can be provided by academic departments.

**Textbooks and Course Materials**

Each scheduled course has a department-approved textbook. Since every student enrolling in the course will receive a copy of this book, the instructor is free to consult it whenever necessary. The use of a textbook does not compel the instructor to use it exclusively; thus, he is free to supplement his lesson plans with other materials, such as prepared lecture notes.

In the absence of a mandated textbook, a teacher must rely on his own collection of resources. When necessary and appropriate, he should offer his students with course materials. If an instructor follows the University's procedures and obtains approval from the department, college, and university, they may offer a new textbook to replace an existing one or add to a course that does not have a prescribed textbook.

Each level also has computer rooms, a sports activity room, a canteen, a theater, and many study areas.

## 3. Procedures to ensure a healthy and safe learning environment

(According to the nature of the program)

The College of Science is committed to creating a safe and clean campus. One of its primary goals is to ensure the health and safety of all teachers, staff, and students, as well as the general public, while on campus and in the surrounding area. Implement procedures for occupational health and safety as well as environmental protection, and ensure that all applicable laws and regulations are followed. a variety of healthcare services for the community, teachers, staff, and students. We accept a wide variety of health insurance plans.

- The Campus Health Clinic is located inside the main campus and a small room over the medical support inside the science building.
- Smoking is prohibited in any University facility and on any University grounds.
- First aid boxes are located in almost all rooms.
- The purpose of the Safety Program is to ensure the proper handling of hazardous chemicals, as well as hazardous waste management and disposal. Exposure to hazardous chemicals is kept at a minimum by using the appropriate Personal Protective Equipment and by performing experiments in a certified chemical fume hood.
- The Chemical Hygiene Committee oversees lab safety issues and reviews information regarding pertinent regulations and requirements.
- Fire prevention guidelines are listed in all places.
- Emergency Exit doors in all parts with sufficient Signboards in all places.
- Safety and safety instructions are announced at the laboratories and the places where students gather.

# G. Program Quality Assurance:

## 1. Program Quality Assurance System

Provide a link to the quality assurance manual.
Bachelor in CHEMISTRY QMS 2022

## 2. Procedures to Monitor Quality of Courses Taught by other Departments

For courses that are taught outside the program and include the first-year courses and general courses such as Arabic, Islamic culture, and English language courses…etc.

1. The scientific department in charge of instructing these courses will create the course description and specifications in compliance with the most recent formats established by the NCAAA.
2. The university's scientific department's teaching staff teaches the course.
3. Following the final test, the faculty members create a comprehensive course file, which they provide to our department through the vice dean of development at the scientific faculty.
4. All course reports are examined by the Program Assessment Committee.

QA committee contacted the staff through courses to our student to collect all related data about our student.
We review CS, CR, Exams, Quizzes, Assessments, assignments, attendance sheets, final marks and grades, and feedback, …etc.
By comparing the results of our students in the faculty and university requirement courses we could improve the quality of those courses.

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

*For male & female Sections*

- Coordinators for male and female student sections participate in institutional governance, including senior management, strategic planning, and decision-making. They also ensure that the parts maintain consistent and efficient contact. Strategic planning ensures equitable distribution of resources and facilities for program delivery, research, and related activities, while quality evaluations consider performance across the institution.
- Both male and female sections participate completely in decision-making procedures that follow the Higher Council of Education's bylaws and regulations, and they are represented on relevant committees and councils.
- Effective communication among committees and councils ensured full participation in planning, assessments, and decision-making.
- Effective planning and performance evaluation yielded comparable standards across all components, accounting for variable needs.
- Quality indicators, assessments, and reports illustrate overall performance, including similarities and differences.

## 4. Assessment Plan for Program Learning Outcomes (PLOs),

The Assessment and Evaluation

The BSc Industrial Chemistry uses a range of approaches and instruments to analyze and evaluate how well its PLOs are satisfied. These processes are used to acquire the necessary data for the evaluations. The next step in the process is evaluation, which is examining the data to determine how well the objectives are being met. Finally, the results of the assessment and evaluation techniques are used for the program's continued development. The three steps below are used for program assessment, evaluation, and feedback for continuous improvement.

1. PLO assessment tools (i.e., data collecting) may be direct or indirect. PLOs are typically tested directly through coursework rather than indirectly through surveys. This entails creating survey forms and appropriate questions for the unique and relevant data.
2. The acquired data is compared to a predetermined outcome indicator, which forms the foundation for the evaluation processes.
3. The driving force behind continuous improvement processes will be determining the extent to which data evaluation outcomes fulfil pre-determined targets.

### Course Mapping of PLOs:

To lay the groundwork for the assessment process, the material presented in each course, as well as the predicted course learning outcomes (CLOs), are used to determine the number of PLOs that will probably be covered by the course. It is vital to note that each CLO must be associated with one of the selected PLOs. Thus, the PLO with a single CLO indicates that the CLO statement may be identical to the PLO. To this goal, each course has selected a specified number of quantifiable (CLOs) that are linked to the various PLOs.
The mappings are created by each course team (which includes the course coordinator(s) and instructors) in collaboration with the Program Quality Assurance Committee.

### Program Learning Outcomes:

Assessing and evaluating how well the PLOs are being met. The program could be implemented using a variety of methods. These processes are specified to ensure that data collection is efficient and effective, and that evaluation is relevant to the process of continuous improvement. To achieve these goals, two sorts of assessments are used: direct and indirect. Surveys are used for indirect assessment, whereas student coursework-based evaluations provide direct assessment findings. As a result, this helps with the design of current and future extended assessment processes. The following table illustrates how the PLOs are evaluated. It covers the method of assessment, the data sources used to carry out these evaluation processes, and how the data is acquired.

| Academic Year /Semester | PLOs Alignments | Course Code | | |
|---|---|---|---|---|
| 1448 /1st Semester | K1 | ICHM495-2 | ICHM455-2 | ICHM494-3 |
| | K2 | ICHEM4xx-2 * | ICHM494-3 | ICHEM4xx-2 ** |
| 1448 /2nd Semester | S1 | ICHM494-3 | ICHEM4xx-2 *** | |
| | S2 | ICHM452-2 | ICHM454-3 | CHEM492-3 |
| | S3 | ICHM452-2 | ICHM454-3 | CHEM492-3 |
| 1449/ 1st Semester | S4 | ICHM452-2 | ICHM454-3 | CHEM492-3 |
| | S5 | ICHM493-3 | ICHM455-2 | ICHM494-3 |
| 1449/2nd Semester | V1 | ICHEM4xx-2 **** | ICHM494-3 | |
| | V2 | ICHM453-2 | ICHM455-2 | ICHM291-2 |

### Direct Assessment:

The direct assessment of outcomes is usually focused on the coursework and uses a variety of techniques such as final exams, midterm tests, quizzes, homework, laboratory work, assignments, practical, projects, presentations, and so on. The assessment tools, however, differ from course to course. Students will be evaluated for each PLO based on the average of their records in three previous years' courses (levels 7 and 8). If an exit test is conducted, the results will be taken into account in the assessment.

### *Indirect Assessment:*

To address indirect assessment, different surveys are conducted:

*Student Experience Survey (SES):* is conducted during the second semester of the second year. The survey focuses on the student's life at the university, including both significant aspects of the program in which they are enrolled as well as a few general questions on services and facilities. Regarding the SES, the final question is designed as a summary question that can be used as a general quality indicator.

*Course Evaluation Survey (CES):* is conducted near the end of a course. Students in the BSc. in Industrial Chemistry program are asked to complete formal written surveys on Course learning outcomes at the end of their courses.

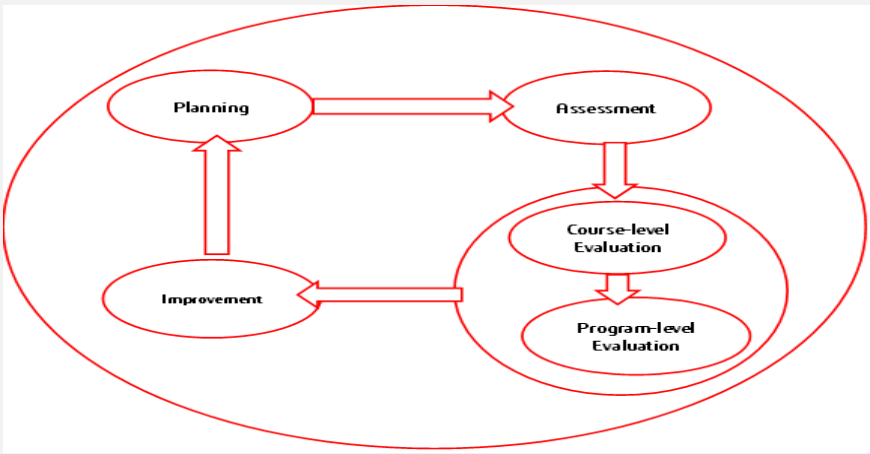
*Program Evaluation Survey (PES):* Graduates fill out this form at the end of their graduating semester. The graduating survey includes questions that directly address each of the Program Learning Outcomes.

*The alumni survey and employer survey* are filled in by the alumni and employers respectively that directly target each one of the Program Learning Outcomes.

Other surveys may be used as staff satisfaction survey, …..

*Continuous improvement process:*

The program objectives (derived from the department's mission) provide a framework for PLOs, curriculum creation, and teaching methods. To ensure that the PLOs were met, a number of assessment approaches were used, as previously described. At the end of each semester, the level of assessment and evaluation process is completed, and the results are used to improve the educational process in order to accomplish the intended PLOs. The method is detailed here, and it illustrates the assessment and evaluation process, as well as the completion of the loop on program learning outcomes. It should be emphasized that evaluation takes place at two levels: course and program. The evaluation results are utilized as input for improvement and are factored into the planning process to improve overall Program Learning achievement.




Schematic presentation for the following Assessment and Evaluation Processes for closure of the Planning Loop

*Course-level Evaluation/Improvement:*

At the end of each semester, the faculty member is expected to assess the success of course learning outcomes (CLOs) as stated in the course specifications, followed by the achievement of relevant PLOs as determined by the CLOs/PLOs mapping. Then he should create a course assessment report in which he reports directly on the outcomes achieved. If the assessment reveals any weaknesses in a specific program learning outcome, the faculty should carefully analyze the results to identify the cause(s) of the weakness and propose corrective action(s) that can be implemented during the following semester to improve that specific outcome achievement. The impact of the planned corrective actions on outcome achievement will be examined at the end of the next semester. On the other side, if the faculty identifies any strengths in

certain student results, he can explain why and suggest actions to retain such strengths. These reports also consider student comments gathered from Course Evaluation surveys, as well as the overall course delivery process. The suggested remedial steps are executed the next semester, and they serve as the driving force behind the continuous improvement process.

To that aim, the Coordinator of Quality Academic Accreditation in the program gathers course portfolios and reports, and the Assessment and Analysis committee examines the course reports, which include faculty members' suggestions and recommendations for improvement. This process occurs at the end of each semester. The Assessment and Analysis Committee meets to discuss comments and feedback from students on their achievement of outcomes, Student Course outcomes, and Exit Surveys. The committee considers program strengths and areas for improvement before deciding on steps to improve program learning outcomes.

*Program-level Evaluation/Improvement:*

The Department Council considers not just the course-level reports, but also the Program's general strengths and weaknesses, and suggests ways to address those weaknesses. The council members gather from time to time to assess and plan for the upcoming semesters. During these meetings, the council also reviews constituent comments as well as any other university or national projects.

## 5. Program Evaluation Matrix

| Evaluation Areas/Aspects | Evaluation Sources/References | Evaluation Methods | Evaluation Time |
|---|---|---|---|
| **Leadership** | **Students, graduates, alumni, faculty Staff, administrative staff, employers,** | **Surveys** | **End of semesters** |
| **Effectiveness of teaching** | **Students, graduates, alumni, program leaders,** | **Surveys, visits** | **Mid and End of Academic Year** |
| **Assessment** | **Students, graduates, alumni, faculty Staff, program leaders, independent reviewers,** | **Surveys, interviews, visits, independent reviewers** | **End of semesters** |
| **Learning resources** | **Students, graduates, alumni, faculty Staff,** | **Surveys** | **End of Semester** |
| **Effectiveness of teaching** | **Students, graduates, alumni, program leaders,** | **Surveys, visits** | **End of semesters** |

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

## 6. Program KPIs*

The period to achieve the target (4) year(s).

| | KPIs Code | KPIs | Targeted Level | Measurement Methods | Measurement Time |
|---|---|---|---|---|---|
| 1 | KPI-P-01 | Students Evaluation of quality of learning experience in the program | 4/5 | Average overall rating of final-year students for the quality of learning experience in the program on a five-point scale in an annual survey | End of the year |
| 2 | KPI-P-02 | Students evaluation of the quality of the courses | 4/5 | Average student's overall rating for the quality of courses on a five-point scale in an annual survey | End of the year |

| | KPIs Code | KPIs | Targeted Level | Measurement Methods | Measurement Time |
|---|---|---|---|---|---|
| 3 | KPI-P-03 | Completion rate | 90% | The proportion of undergraduate students who completed the program in minimum time in each cohort | End of the year |
| 4 | KPI-P-04 | First-year students' retention rate | 90% | Percentage of first-year undergraduate students who continue at the program the next year to the total number of first-year students in the same year | End of the year |
| 5 | KPI-P-05 | Students' performance in the professional and/or national examinations | 30% | Percentage of students or graduates who were successful in the professional and/or national examinations, or their score average and median (if any) | End of the year |
| 6 | KPI-P-06 | Graduates' employability and enrolment in postgraduate programs | a) 30 %<br>b) 30 % | Percentage of graduates from the program: who within a year of graduation were<br>a. employed.<br>b. enrolled in postgraduate programs during the first year of their graduation to the total number of graduates in the same year. | End of the year |
| 7 | KPI-P-07 | Employers' evaluation of the program graduates' proficiency | 4/5 | Average of overall rating of employers for the proficiency of the program graduates on a five-point scale in an annual survey | End of the year |
| 8 | KPI-P-08 | The ratio of students to teaching staff | 1:10 | Ratio of the total number of students to the total number of full-time and full-time equivalent teaching staff in the program | End of the year |
| 9 | KPI-P-09 | Percentage of publications of faculty members | 90% | Percentage of full-time faculty members who published at least one research during the year to total faculty members in the program | End of the year |
| 10 | KPI-P-10 | Rate of published research per faculty member | 1 | The average number of refereed and/or published research per each faculty member during the year (total number of refereed and/or published research to the total number of full-time or equivalent faculty members during the year) | End of the year |
| 11 | KPI-P-11 | Citations rate in refereed journals per faculty member | 10 | The average number of citations in refereed journals from published research per faculty member in the program (total number of citations in refereed journals from published research for full-time or equivalent faculty members to the total research published) | End of the year |

*including KPIs required by NCAAA

## H. Specification Approval Data:

| | |
|---|---|
| **COUNCIL /COMMITTEE** | Physical Sciences Department Council |
| **REFERENCE NO.** | **Meeting (3)** |
| **DATE** | **12/03/2024 -02/09/1445** |

## References

1- https://units.imamu.edu.sa/colleges/science/agents/SiteAssets/Lists/List/AllItems/saudi-standard-classification-en.pdf