# المعايير الاكاديمية لبرنامج كيمياء التطبيقية

**4. National Academic Reference Standards for Applied Chemistry**

## 4.1. Graduate Attributes

**In addition to the general attributes of the basic science graduates, the applied chemist must develop a group of attributes which are the ability to:**

4.1.1. Ability to design and conduct experiments, critically analyze data, and prepare scientific reports.

4.1.2. Proficiency in advanced laboratory techniques used in chemical and industrial analysis.

4.1.3. Active participation in quality control and risk management processes in chemical industries, with effective time management skills.

4.1.4. Broad knowledge encompasses different fields of chemistry, with a strong emphasis on industrial and environmental applications.

4.1.5. Ability to apply chemical principles to solve real-world industrial and environmental problems.

## 4.2. Knowledge and Understanding

**In addition to the general knowledge acquired by the basic science graduates, the applied chemist should be able to demonstrate knowledge and understanding of:**

4.2.1. Fundamental concepts and theories of chemistry, including chemical reactions, nomenclature, and formulae.

4.2.2. Properties of matter in various states (solid, liquid, gas) with emphasis on industrial materials.

4.2.3. Analytical techniques and material characterization methods, using modern instrumentation (e.g., XRD, SEM, FTIR).

4.2.4. Types and mechanisms of chemical reactions and their kinetics, especially in industrial environments.

4.2.5. Principles of thermodynamics and quantum chemistry and their industrial applications.

4.2.6. Composition and properties of materials used in industrial processes such as polymers, ceramics, and composites.

4.2.7. Current research topics in applied chemistry and technological advancements in the field.

4.2.8. Environmental and health impacts of chemicals used in industry.

**4.3. Practical and Professional skills:**

**The Graduates of applied Chemistry Program must be able to:**

4.3.1. Assess laboratory hazards and safely handle chemicals and laboratory equipment.

4.3.2. Perform standard procedures in industrial and environmental chemical analysis.

4.3.3. Monitor and measure chemical properties and changes during reactions, systematically record data, and prepare technical reports.

4.3.4. Use software tools for data analysis, interpretation, and prediction of chemical processes.

4.3.5. Operate and maintain advanced analytical instruments (e.g., spectroscopy, chromatography).

4.3.6. Apply chemical knowledge to improve product quality and solve production problems.

**4.4. Intellectual skills**

**The Graduates of applied Chemistry Program must be able to:**

4.4.1. Differentiate between different materials and chemical compounds based on experimental data.

4.4.2. Use computational tools to process and analyze chemical data.

4.4.3. Interpret analytical data to identify and confirm chemical structures and compositions.

4.4.4. Propose solutions and technologies for industrial and environmental challenges related to applied chemistry.

4.4.5. Analyze environmental data related to air, water, and soil pollution caused by industrial activities.

**5. General and Transferable Skills**

**The Graduates of applied Chemistry Program must be able to:**

4.5.1. Communicate effectively, both orally and in writing, in scientific and industrial contexts.

4.5.2. Work effectively within multi-disciplinary teams.

4.5.3. Manage time efficiently, solve problems, and make informed decisions based on scientific analysis.

4.5.4. Adhere to professional ethics and demonstrate environmental and social responsibility.

4.5.5. Utilize modern technologies for research and continuous professional development.