



Academic Reference Standards (ARS) of Chemistry and Microbiology Program

Academic Reference Standards “Attributes of microbiologist”

Program general Aims:

For students undertaking this Program, they will be able to:

1. Recognize the role of basic sciences in the development of society.
2. Develop scientific approaches that meet community needs considering economic, environmental, social, ethical, and safety requirements.
3. Utilize scientific facts and theories to analyze and interpret practical data.
4. Collect, analyze and present data using appropriate formats and techniques.
5. Postulate concepts and choose appropriate solutions to solve problems related to chemistry and microbiology on a scientific basis.
6. Apply effectively information technology relevant to chemistry and organisms.
7. Participate effectively in a multidisciplinary teamwork and be flexible for adaptation, decision making and working under contradictory conditions as well as exhibiting a sense of beauty and neatness.
8. Adopt self and long life-learning and participate effectively in research activities.
9. Draft terms and data and write scientific data in Arabic, English, or other languages.
10. Understand life's basic processes in relation to organisms and ecosystems.
11. Recognize, understand and assess different levels of organization in biological systems.
12. Distinguish the different ecosystems that regulate the communities of living organisms.
13. Be acquainted with the modern subjects and bio-techniques related to different branches of chemistry and biology.



14. Acquires extensive knowledge during training programs to raise the skills of graduates in the fields of chemistry and microbiology.
15. Develops students' skills to match the job market in the fields related to chemistry and microbiology.
16. Establishes effective mechanisms for quality control processes, risk management and time organization to finish jobs in different branches of chemistry and microbiology.

Program Competencies (ARS)

Level (A) Knowledge and Understanding

On completing this Program, students will be able to:

- A1. Recognize the related basic scientific facts, concepts, principles and techniques in different branches of chemistry and microbiology.
- A2. Clarify the relevant theories of chemistry and microbiology and their applications.
- A3. Describe the processes and mechanisms supporting the structure and function of the different microorganisms' organelles.
- A4. Recognize the related terminology, nomenclature and classification systems of organisms.
- A5. Apply the theories and methods applied for interpreting and analyzing data related to chemistry and microbiology sciences.
- A6. Clarify the developmental progress of organisms by studying morphological, genetic properties and environmental factors.
- A7. Explain the relation between the physiological and metabolic processes and microorganisms' environment.
- A8. Describe the Morphological and anatomical compositions of plants from unicellular to multicellular.
- A9. Recognize physiological and biochemical aspects of organisms.
- A10. Explain the taxa limit and the characteristic habitat features of representative organisms.
- A11. Clarify processes and mechanisms in different ecosystems.



- A12. Recognize theories applied for interpreting and analyzing biological information.
- A13. Clarify the complexity and diversity of organisms through the study of genetics, developmental stages and evolution.
- A14. Clarify the types of chemical reactions and their mechanisms, as well as their kinetics, including catalysts.
- A15. Recognize the principles, steps, and techniques used in the chemical analysis, diagnosis and determination of the synthetic formulas of different chemical compounds.
- A16. Recognize naming compounds, their composition, and the units of measurement used. The mechanics of chemical reactions.
- A17. Explain the distinctive properties of the elements and their components, which include stereochemistry and their position in the periodic table.
- A18. Recognize the basics of chemistry, mathematics, physics, statistics, biological sciences and other secondary sciences to understand the evolutionary processes in the fields of chemistry and microbiology.

Level (B) Intellectual Skills

On completing this Program, students will be able to:

- B1. Differentiate between subject-related theories and assess their concepts and principles like the relationship between the effect of genes on morphological and physiological processes, and their functions in organisms.
- B2. Analyze, synthesize, assess and interpret quantitatively science-relevant data and analyze different sources of organisms and their effect on the human.
- B 3. Postulate and deduce mechanisms and procedures to handle scientific problems related to chemistry and microbiology.
- B 4 Construct several related and integrated information to confirm, make evidence and test hypotheses that were acquired from biology, chemistry, math, statistical, and physics sciences.



- B 5. Evaluate the ecosystem, its conservation, economics and sustainability.
- B6. Interpret the subject-related knowledge to solve problems, which are related to cells, tissues, secondary metabolites, toxins and environmental problems.
- B7. Formulate data and select the proper mechanism (charts, figures and tables) for their setting within a theoretical framework.
- B8. Assess the interrelationships and the impact of a specific organism (especially microorganisms) on its ecosystem.
- B9. Interpret biological data as the presence of microorganisms and respond to a variety of information sources like type of survival, host range and surrounding environment.

Level (C) Practical and Professional Skills

On completing this Program, students will be able to:

- C1. Plan, design, process and report on the investigated data, using appropriate techniques and considering scientific guidance.
- C2. Apply techniques and tools considering scientific ethics during laboratory investigations of living systems.
- C 3. Solve problems related to basic science, chemistry and microbiology using a range of formats and approaches including computers and other recent tools.
- C4. Identify and criticize the different methods used in addressing subject-related microorganisms.
- C5. Collect, record and analyze chemistry and biological data using appropriate techniques in the field and laboratory.
- C6. Select a representative sample considering its validity, accuracy and reliability during collection.
- C7. Deal with chemicals safely and consider the physical and chemical properties to avoid the risks associated with their use.
- C8. Apply scientific terms, and taxonomic principles to match with modern scientific papers by using advanced tools in the field of chemistry and microbiology.



Level (D) General and Transferable Skills

On completing this Program, students will be able to:

- D1. Use information and communication technology effectively.
- D2. Identify roles and responsibilities, and their performing manner.
- D3. Think independently, set tasks and solve problems on a scientific basis.
- D4. Work in groups effectively; manage time, collaborate and communicate with others positively.
- D5. Consider community-linked problems, ethics and traditions.
- D6. Acquire self- and long life-learning.
- D7. Apply scientific models, systems, and tools effectively.
- D8. Dealing with scientific patents considering property rights.
- D9. Exhibit a sense of beauty and neatness.

4- Academic Standards for Program

Reference Academic Standards (ARS) for Chemistry and Microbiology, which were approved in the College first Council on 21/8/2019."

5- Reference Standards for Program

National Academic Reference Standards for Basic Sciences (Jan. 2009)

National Academic Reference Standards for Biological Sciences sector (Jan. 2009)