



الهيئة القومية
لضمان جودة التعليم والاعتماد



معايير البرامج المزدوجة لكليات العلوم

- (الكيمياء/الفيزياء – الكيمياء/الكيمياء الحيوية – الكيمياء/الجيولوجيا – الكيمياء/ علم الحيوان –
الكيمياء/ النبات – الكيمياء/ علم الحشرات – الاحصاء/ علوم الحاسب)

أولاً: المواصفات العامة لخريج كلية العلوم:

General Attributes of the graduates of basic sciences programs:

The graduate of any program in basic sciences should 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 data of various sources.
4. Collect, analyze, and present data using appropriate formats and techniques and use information technology relevant to the field efficiently.
5. Participate effectively as a member in a team, recognize and respect the views and opinions of the other members, and be flexible for adaptation to work conditions.
6. Develop the skills and attitude necessary for lifelong and independent learning and participate effectively in research activities.
7. Deal with scientific data and communicate about specific subjects appropriately in Arabic, English or other languages.



ثانياً: البرامج:

Chemistry / Physics Program

In addition to the general attributes of the graduate of faculties of Sciences, the graduate of the chemistry/ physics program should be able to:

1. Demonstrate a wide range of background knowledge related to the branches of chemistry and physics.
2. Design and conduct experimental work, critically evaluate the outcomes, review and report on practice.
3. Acquire the knowledge and experience of working with specialized laboratory techniques relevant to different disciplines of chemistry and physics.
4. Review quality control processes, conform to safety regulations, manage risks and organize time to finish jobs.
5. Apply theories and concepts of physics and chemistry to interpret the chemical and physical processes from an integrated point of view.
- 6- Employ theories and concepts of mathematics and statistics to understand the underlying mechanisms of the essential chemical and physical processes.
- 7- Abide by the legislations and ethics related to the environment preservation and human health and welfare.



Knowledge and Understanding

1. Demonstrate a wide range of knowledge including the theories, facts, concepts, and techniques related to chemistry and physics.
2. Recognize the relationship and interactions among chemistry, physics and the environment.
3. Acquire the essential knowledge in mathematics, statistical analyses, computing, and other collateral subjects required to understand the advanced and contemporary topics of chemistry and physics.
4. Demonstrate knowledge of principles and procedures used in chemical analyses, as well as in characterization and structural investigations of compounds.
5. Characterize the nature and behavior of the functional groups in different types of molecules.
6. Adopt clear understanding of the physics of energy transfer, thermodynamics and nuclear energy.
7. Characterize the static and dynamic prosperities of the matter.

Intellectual Skills

1. Discuss subject- related theories of chemistry and physics and critically assess their concepts and principles.
2. Analyze, evaluate and interpret qualitative and quantitative scientific data relevant to the various subjects of chemistry and physics.
3. Develop lines of argument and appropriate judgment in accordance with scientific theories and concepts in the area of study.
4. Postulate and deduce mechanisms and procedures to handle scientific problems. Choose optimum solutions for physical and chemical problems based on critical thinking
5. Construct several related information to confirm, make evidence and test hypotheses.



6. Analyze and interpret quantitative data relevant to the fields of physics and chemistry in graphs, figures, tables and other sources of information.

Practical and Professional Skills

1. Plan and conduct investigations using appropriate techniques and write structural reports on the data in accordance with the standard scientific guide lines.
2. Apply techniques and tools in accordance with the guidelines of scientific ethics.
3. Solve problems using a range of formats and approaches that are widely applicable in the different areas of chemistry and physics.
4. Identify and employ the specific methodologies used in addressing subject related issues that involve working on the interface between chemistry and physics.
5. Handle research materials safely and conduct risk assessments taking into account their physical and chemical properties to avoid hazards associated with their use.
6. Demonstrate sound familiarity with laboratory instruments, procedures and techniques used in experimental applications in physics and chemistry.
7. Monitor, by observation and measurement, chemical properties, events or changes followed by systematic and reliable recording and documentation thereof.
8. Choose and apply appropriate computational tools to analyze and interpret experimental data in terms of theories relevant to chemistry and physics.
9. Search and evaluate the validity and relevance of literature in a critical thinking approach.



General Skills

1. Use information and communication technology effectively.
2. Identify roles and responsibilities, delegate tasks, and set clear guidelines and performance indicators.
3. Think independently, and solve problems on scientific basis.
4. Work in a team effectively, manage time, collaborate and communicate with others positively.
5. Address the community linked problems with considerable attention to the community ethics and traditions.
6. Acquire self- and lifelong learning.
7. Deal with property rights legally and ethically.
8. Exhibit the sense of beauty and neatness.



Chemistry / Biochemistry Program

In addition to the general attributes of the graduate of faculties of Sciences, the graduate of the chemistry / biochemistry program should be able to:

1. Demonstrate wide background knowledge related to the different branches of chemistry / biochemistry
2. Acquire the knowledge and experience of principles and procedures employed in standard chemical and biochemical analyses using specialized laboratory techniques.
3. Review and evaluate quality control processes, safety regulations, manage risks and organize time to finish jobs.
4. Plan and conduct experimental work, critically evaluate the outcomes, review and report on practice.
5. Demonstrate knowledge, from an integrated point of view, of theories, facts, concepts and essentials of chemistry and biochemistry.
6. Recognize the relationship and interactions among chemistry, bio-chemistry and the environment and abide by the legislations and ethics related to the environment preservation and human health and welfare.
- 7- Apply theories and concepts of mathematics and statistics to understand the underlying mechanisms of the essential chemical and biochemical processes.



Knowledge and Understanding

1. Demonstrate knowledge and comprehension of the theories, facts, concepts, fundamentals and techniques related to the fields of chemistry and biochemistry.
2. Acquire the essential knowledge in mathematics, physics, biology, statistics and other collateral subjects in order to understand the advanced and contemporary topics of chemistry and biochemistry.
3. Exhibit familiarity with the principles and procedures used in chemical analyses as well as in characterization and structural investigation of compounds.
4. Characterize the chemical nature and behavior of the functional groups in different types of molecules.
5. Appreciate the concepts of bio-diversity and maintaining of natural resources.

Intellectual Skills

1. Discuss subject- related theories and assess their concepts and principles.
2. Analyze, evaluate and interpret qualitative and quantitative scientific data relevant to the various subjects of chemistry and biochemistry.
3. Develop lines of argument and appropriate judgment in accordance with scientific theories and concepts in the area of study.
4. Postulate and deduce mechanisms and procedures to handle scientific problems and choose optimum solutions for chemical and biochemical problems based on critical thinking.
5. Construct several related and integrated information to confirm, make evidence and test hypotheses.
6. Analyze and interpret quantitative data relevant to the fields of chemistry and biochemistry in graphs, figures, tables, equations, and other sources of information.



Practical and Professional Skills

1. Plan and conduct investigations using appropriate techniques relevant to the fields of chemistry and biochemistry and write structural reports on the data in accordance with the standard scientific guide lines.
2. Solve problems related to the fields of chemistry and biochemistry using a range of formats and approaches and employ appropriate techniques and tools in accordance with scientific ethics.
3. Handle chemical materials safely and conduct risk assessments taking into account their physical and chemical properties to avoid hazards associated with their use.
4. Employ standard laboratory instruments, procedures, and techniques used in the chemical and biochemical investigations.
5. Apply mathematical and computational tools to analyze and interpret experimental data in terms of theories relevant to chemistry and biochemistry.
6. Read, scrutinize, and evaluate the validity and relevance of literature in a critical thinking approach.
7. Consider variations inherent in dealing with biological materials such as sample size, accuracy, precision and calibration.

General Skills

1. Use information and communication technology effectively.
2. Identify roles and responsibilities, delegate tasks, and set clear guidelines and performance indicators.
3. Think independently and solve problems on scientific basis.
4. Work in a team effectively, manage time, collaborate and communicate with others positively.
5. Address the community linked problems with considerable attention to the community ethics and traditions.
6. Acquire self - and lifelong learning.
7. Deal with property rights legally and ethically.
8. Exhibit the sense of beauty and neatness.



Chemistry / Geology Program

In addition to the general attributes of the graduate of faculties of Sciences, graduate of the chemistry / geology program should be able to:

1. Demonstrate a wide range of integrated knowledge related to different branches of chemistry and geology.
2. Review and evaluate quality control processes, manage risks and organize time to finish jobs.
3. Plan and conduct experimental work, critically evaluate the outcomes, and report on practice.
4. Employ concepts and theories of chemistry to interpret geological processes taking place in and on the Earth.
5. Apply essential theories and concepts of mathematics and statistics to comprehend contemporary geological and chemical subjects.
6. Employ effectively the principles, procedures and techniques used in the chemical and geological investigations in accordance with the safety regulations and good practices in the laboratory and the field.
7. Recognize the relationship and interactions among chemistry, geology and the environment and abide by the legislations and ethics related to the environment preservation and human health and welfare.



Knowledge and Understanding

1. Demonstrate integrated knowledge and comprehension of the theories, facts, concepts, fundamentals and techniques related to the fields of chemistry and geology.
2. Employ mathematics, physics, and other collateral subjects in order to understand the major processes of chemistry and geology.
3. Exhibit familiarity with the principles and procedures used in chemical analyses as well as in characterization and structural investigation of compounds.
4. Develop coherent knowledge of the physical, chemical and biological processes operating on and within the Earth.
5. Enumerate the structure and composition of the Earth and other planets and the history of the Earth over geological timescales.
6. Demonstrate familiarity and comprehension of classification systems used for animals and plants and the chemical processes causing their fossilization.
7. Enumerate the concepts of bio-diversity and maintaining of natural resources.

Intellectual Skills

1. Discuss subject- related theories and assess their concepts and principles.
2. Analyze, evaluate and interpret qualitative and quantitative scientific data relevant to various subjects of chemistry and geology.
3. Develop lines of argument and appropriate judgment in accordance with scientific theories and concepts in the area of study.
4. Develop an integrated and systematic understanding of the present and past interactions between the processes operating in the Earth's core, mantle, crust, cryosphere, hydrosphere, atmosphere and biosphere.
5. Monitor and manage natural and human-induced environmental changes and evaluate the implications of sustainable development.



6. Combine and construct integrated information to choose optimum solutions for geological problems based on critical thinking
7. Analyze and interpret quantitative data from maps, graphs, figures, tables and other sources of information.

Practical and Professional Skills

1. Plan and conduct investigations using appropriate techniques and write structural reports on the data in accordance with the standard scientific guide lines.
2. Handle chemical materials and geological samples safely and conduct risk assessments taking into account their physical and chemical properties to avoid hazards associated with their use.
3. Employ recent laboratory equipment and procedures used in standard experimental applications in chemistry and geology in accordance with ethical guidelines.
4. Monitor, by observation and measurement, chemical properties, events or changes followed by systematic and reliable recording and documentation thereof.
5. Apply mathematical and computational tools to analyze and interpret experimental data in terms of theories relevant to chemistry and geology.
6. Exploit the geographical information system (GIS) in interpreting the different geological phenomena.
7. Apply exploration and exploitation strategies for natural resources such as hydrocarbons, minerals and water.

General Skills

1. Use information and communication technology effectively.
2. Identify roles and responsibilities, delegate tasks, and set clear guidelines and performance indicators.
3. Think independently, and solve problems on scientific basis.
4. Work in a team effectively, manage time, collaborate and communicate with others positively.



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5. Address the community linked problems with considerable attention to the community ethics and traditions.
6. Acquire self- and lifelong learning.
7. Deal with property rights legally and ethically.
8. Exhibit the sense of beauty and neatness.



Chemistry / Zoology Program

In addition to the general attributes of the graduate of faculties of Sciences, the graduate of the chemistry / zoology program should be able to:

1. Demonstrate wide integrated knowledge related to different branches of chemistry and zoology.
2. Develop knowledge and experience of working with contemporary laboratory techniques relevant to different disciplines in chemistry and zoology.
3. Plan and conduct experimental work using appropriate instruments, review safety regulations and quality control processes, assess and manage risks, report on practice, and critically evaluate the outcomes.
4. Apply concepts and theories of chemistry to interpret life's basic processes from cell to organism to ecosystems.
5. Recognize the relationship and interactions among chemistry, zoology and the environment.
6. Employ theories and concepts in mathematics and statistics to interpret the underlying mechanisms of the essential processes in chemistry and zoology.
7. Abide by the legislations and ethics related to the environment preservation and human health and welfare.

Knowledge and Understanding

1. Demonstrate wide knowledge and comprehension of the theories, facts, concepts, fundamentals and techniques related to the fields of chemistry and zoology.

2. Acquire the essential knowledge in mathematics, physics, biology and other collateral subjects in order to understand the recent advances in chemistry and zoology.
3. Exhibit knowledge of the principles and procedures used in chemical analyses as well as in characterization and structural investigation of compounds.
4. Demonstrate familiarity and comprehension of terminology, nomenclature and contemporary tools used for the classification systems of animals.
5. Acquire knowledge and understanding of the structure and function of various types of animal cells and cell organelles in unicellular and multi-cellular organisms.
6. Demonstrate a profound understanding of how the chemistry of biological molecules determines their biological functions with a special consideration to the major metabolic pathways and their interactions in living organisms..
7. Appreciate the concepts of bio-diversity and maintaining of natural resources.

Intellectual Skills

1. Test, evaluate and criticize an existing piece of information in the light of evidence provided by recent advances in zoology.
2. Analyze, evaluate and interpret qualitative and quantitative scientific data relevant to various subjects of chemistry and zoology.
3. Construct several lines of related information to confirm, make evidence and test hypotheses related to recent progresses in research such as stem cell and applications of nano-technology in biology.
4. Breakdown, synthesize, reconstruct and reformulate a bulk of information such as pathways for biosynthesis of biologically active compounds or macromolecules.

5. Analyze and interpret quantitative data in graphs, figures, tables and other sources of information.
6. Postulate and deduce mechanisms and procedures to deal with scientific problems relevant to advanced approaches in zoology and chemistry.
7. Link and integrate subject-specific theories, concepts and principles such as relationship between genes and their products, interactions and modulation of the actions of different types of physiological regulators in animals.
8. Combine knowledge gained from different sources to postulate the role of various cell signaling mechanisms in regulating cellular functions and growth.

Practical and Professional Skills

1. Plan, and conduct investigations using appropriate procedures and techniques. Write structural reports on the data in accordance with the standard scientific guide lines.
2. Use contemporary laboratory equipment, instruments, and tools efficiently in a safe, ethical and responsible manner to investigate living organisms and biological systems.
3. Solve problems using a range of formats and approaches.
4. Handle chemical materials and biological samples safely taking into consideration their physical and chemical properties to avoid hazards associated with their use.
5. Employ appropriate statistical and computational tools to analyze and interpret experimental data in terms of theories relevant to chemistry and zoology.
6. Search and evaluate the validity, credibility, and relevance of literature in a critical thinking approach.
7. Consider variations inherent in dealing with biological materials such as sample size, accuracy, precision and calibration.
8. Employ contemporary information retrieval, modeling approaches, taxonomic keys, bioassays and tools of molecular biology.
9. Collect and preserve animal samples and prepare sections for microscopic examination and identification of different types of cells and tissues.



General Skills

1. Use information and communication technology effectively.
2. Identify roles and responsibilities, delegate tasks, and set clear guidelines and performance indicators.
3. Think independently, and solve problems on scientific basis.
4. Work in a team effectively, manage time, collaborate and communicate with others positively.
5. Address the community linked problems with considerable attention to the community ethics and traditions.
6. Acquire self- and life-long learning.
7. Deal with property rights legally and ethically.
8. Exhibit the sense of beauty and neatness.



Chemistry / Botany Program

In addition to the general attributes of the graduate of faculties of Sciences, the graduate of the chemistry/botany program should be able to:

1. Demonstrate a wide range of knowledge related to the theories, facts, concepts and essentials of chemistry and botany.
2. Acquire knowledge and experience of working with recent laboratory techniques relevant to different disciplines of chemistry and botany
3. Plan and conduct experimental work, review safety and quality control processes, report on practice, and critically evaluate the outcomes.
4. Apply concepts and theories of chemistry to interpret life's basic processes at the level of the cell, organism, and the ecosystem.
5. Recognize the relationship and interactions among chemistry, botany and the environment.
6. Apply theories and concepts of mathematics and statistics to understand the underlying mechanisms related to the essential processes in chemistry and botany.
7. Abide by the legislations and ethics related to the environment preservation and human health and welfare.

Knowledge and Understanding

1. Demonstrate integrated knowledge and comprehension of the theories, facts, concepts, and fundamentals related to the fields of chemistry and botany.
2. Acquire the essential knowledge in mathematics, physics, biology and other collateral subjects in order to understand the recent advances in chemistry and botany.
3. Exhibit familiarity with the principles and procedures used in chemical analyses as well as in characterization and structural investigation of chemical compounds.
4. Illustrate the nutrients and energy flow through plant organisms, populations, and ecosystems.

5. Acquire the necessary knowledge related to patterns of plant distribution, population processes, dynamics, and biodiversity.
6. Demonstrate familiarity with the major metabolic pathways and their interactions on the cellular level and in the living organisms.
7. Acquire knowledge and understanding of the structure and functions of various types of plant cells and cell organelles in unicellular and multi-cellular organisms.
8. Demonstrate familiarity and comprehension of terminology, nomenclature and contemporary tools used in classification systems of plants.
9. Appreciate concepts of bio-diversity and maintaining of natural resources.

Intellectual Skills

1. Test, evaluate and criticize an existing piece of information in the light of evidence provided by recent advances in botany.
2. Analyze, evaluate and, interpret scientific data relevant to the various subjects of chemistry and botany.
3. Breakdown, synthesize, reconstruct and reformulate a bulk of information such as pathways for biosynthesis of biologically active compounds or macromolecules.
4. Construct several related and integrated information to confirm, make evidence and test hypotheses and employ this information in problem solving.
5. Link and integrate subject-specific theories, concepts and principles such as relationship between genes and their products, interactions and modulation of the actions of different types of physiological regulators in plants.

6. Analyze and interpret quantitative data related to the fields of botany and chemistry from graphs, figures, tables and other sources of information.

Practical and Professional

1. Plan and conduct investigations using recent equipment and instruments. Write structural reports on the data in accordance with the standard scientific guide lines.
2. Use appropriate and contemporary laboratory equipment and tools efficiently in a safe, ethical and responsible manner to investigate living organisms and systems.
3. Identify and criticize the different methods used in addressing subject related issues in botany and chemistry.
4. Handle chemical materials safely taking into account their physical and chemical properties to avoid hazards associated with their use.
5. Employ statistical analyses and computational tools to analyze and interpret experimental data in terms of theories relevant to chemistry and botany.
6. Consider variations inherent in dealing with biological materials such as sample size, accuracy, precision and calibration.
7. Employ research techniques, information retrieval, modeling, taxonomic keys, bioassays and tools of molecular biology.
8. Collect and preserve plant samples and prepare sections for microscopic examination and identification of different types of cells and tissues.
9. Carry out experiments on plant material at a variety of levels of the biological organization; cells, tissues, up to a whole plant.



General Skills

1. Use information and communication technology effectively.
2. Identify roles and responsibilities, delegate tasks, and set clear guidelines and performance indicators.
3. Think independently, and solve problems on scientific basis.
4. Work in a team effectively; manage time, collaborate and communicate with others positively.
5. Address the community linked problems with considerable attention to the community ethics and traditions.
6. Acquire self- and life-long learning.
7. Deal with property rights legally and ethically.
8. Exhibit the sense of beauty and neatness.

Chemistry / Entomology Program

In addition to the general attributes of the graduate of faculties of Sciences, the graduate of the chemistry / entomology program should be able to:

1. Demonstrate wide background knowledge related to different branches of chemistry and entomology.
2. Develop the experience required to work with recent laboratory techniques relevant to different disciplines of chemistry and entomology in accordance with the quality control processes and safety regulations.
3. Integrate concepts and theories of chemistry and entomology to interpret life's basic processes related to insects from the cell to the organism to the ecosystem.
4. Recognize the relationship and interactions among chemistry, entomology and the environment and appreciate bio-diversity and maintaining of natural resources.
5. Exploit the theories and concepts of mathematics and statistics to explain the underlying mechanisms of essential chemical and biological processes relevant to insect's life, growth and evolution.
6. Plan and conduct investigations that employ the standard principles and procedures in chemical and entomological investigations.
7. Abide by the legislations and ethics related to the environment preservation and human health and welfare.

Knowledge and Understanding

1. Develop integrated knowledge and comprehension of the theories, facts, concepts, fundamentals and techniques related to the fields of chemistry and entomology.
2. Acquire the essential knowledge in mathematics, physics, biology and other collateral subjects in order to understand the advanced topics of entomology and chemistry.

3. Characterize the chemical nature and properties of the functional groups in different types of molecules with special focus on insecticides.
4. Demonstrate familiarity and comprehension of terminology, nomenclature and contemporary tools used for classification systems of animals in general and insects in particular.
5. Acquire knowledge and understanding of the structure and functions of various types of animal cells and cell organelles in unicellular and multi-cellular organisms.
6. Demonstrate understanding of how the chemistry of biological molecules determines their biological functions.
7. Demonstrate familiarity with the major metabolic pathways and their interactions on the cellular level and up to the living organisms.
8. Enumerate the economic importance of the insects and the programs of insect management and control.
9. Acquire knowledge and awareness of the medical importance of insects as vectors of diseases.

Intellectual Skills

1. Test, evaluate and criticize an existing piece of information in the light of evidence provided by recent advances in entomology and chemistry.
2. Analyze, evaluate and interpret qualitative and quantitative scientific data relevant to the various subjects of chemistry and entomology.
3. Postulate and deduce mechanisms and procedures to deal with scientific problems relevant to contemporary approaches in entomology and chemistry.
4. Breakdown, synthesize, reconstruct and reformulate a bulk of information such as pathways for biosynthesis of biologically active compounds or macromolecules in insects.
5. Choose suitable insecticides and insect control protocols based on combined knowledge gained from student's study of chemistry and entomology.

6. Analyze and interpret quantitative data from graphs, figures, tables, equations and other sources of information.

Practical and Professional

1. Plan and conduct investigations using appropriate techniques. Write structural reports on the data in accordance with the standard scientific guide lines.
2. Use appropriate and contemporary laboratory equipment, instruments and tools efficiently in a safe, ethical and responsible manner to investigate living organisms and biological systems.
3. Handle chemical materials safely, particularly insecticides, and conduct risk assessments taking into account their physical and chemical properties to avoid the hazards, to users and environment, associated with their use.
4. Demonstrate sound familiarity with standard laboratory procedures and techniques used in experimental applications in chemistry and entomology.
5. Apply statistical analyses and computational tools to analyze and interpret experimental data relevant to chemistry and entomology.
6. Search and evaluate the validity and relevance of literature in a critical thinking approach.
7. Consider variations inherent in dealing with biological materials such as sample size, accuracy, precision and calibration.
8. Employ contemporary information retrieval, insect rearing, taxonomic keys, bioassays, and tools of molecular biology.
9. Collect and preserve insect samples and prepare sections for microscopic examination and identification of different types of cells and tissues.



General Skills

1. Use information and communication technology effectively.
2. Identify roles and responsibilities, delegate tasks, and set clear guidelines and performance indicators.
3. Think independently, and solve problems on scientific basis.
4. Work in a team effectively; manage time, collaborate and communicate with others positively.
5. Address the community linked problems with considerable attention to the community ethics and traditions.
6. Acquire self- and life-long learning.
7. Deal with property rights legally and ethically.
8. Exhibit the sense of beauty and neatness.



Statistics / Computer Science Program

In addition to the general attributes of the graduate of faculties of Sciences, the graduate of the statistics / computer science program should be able to:

- 1- Reveal wide background knowledge related to the different branches of computer science and statistics.
- 2- Use such knowledge and understanding in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoff involved in design choices.
- 3- Apply statistical, computing knowledge and skills to the solution of real life problems.
- 4- Use computer science applications to solve statistical problems.
- 5- Understand the statistical reasoning and alternative ways of thinking.

Knowledge and Understanding

- 1- Demonstrate basic knowledge and understanding of the core ideas of mathematics and statistics.
- 2- Understand programming concepts for various branches of probability and statistics.
- 3- Use mathematical, statistical, and computing knowledge in solving different problems.
- 4- Recognize how the hardware and software are integrated to create computer systems and distinguish between selected forms of computer hardware architecture, and operating system technology.
- 5- Demonstrate knowledge and understanding of the principles of statistical modeling and application.
- 6- Deploy appropriate theory, practices, and tools for the specification, design, implementation, and evaluation of a computer-based system.
- 7- Construct and explain the meaning of complicated statements using mathematical notation and language.

Intellectual Skills

- 1- Construct and solve abstract and mathematical models of computer and communication systems.
- 2- Use the knowledge and understanding of the mathematical and statistical processes for modeling of real-world problems.
- 3- Develop appropriate knowledge and awareness of the importance and applications of mathematical and statistical assumptions.
- 4- Apply appropriate statistical and mathematical techniques to the development of software solutions.
- 5- Apply the principles of effective information management, information organization, and information-retrieval skills to various information systems.

Professional and Practical skills

- 1- Choose and apply essential concepts, principles, and practices of computer science and statistics, in the context of well-defined scenarios, showing judgment in the selection and application of tools and techniques.
- 2- Apply the concepts and methods of computer science, mathematics, and statistics to the solution of the real problems in professional practice.
- 3- Approximation of sources of numerical errors and usage of symbolic and numerical software as a part of practical computation.
- 4- Demonstrate competence in the use of statistical and mathematical methods in problem solving and modeling.
- 5- Specify, design, implement and upgrade computer-based systems.
- 6- Recognize and be guided by the social, professional, and ethical issues involved in the use of computer technology.

General Skills

1. Use information and communication technology effectively.
2. Identify roles and responsibilities, delegate tasks, and set clear guidelines and performance indicators.
3. Think independently, and solve problems on scientific basis.
4. Work in a team effectively; manage time, collaborate and communicate with others positively.



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5. Address the community linked problems with considerable attention to the community ethics and traditions.
6. Acquire self- and life-long learning.
7. Deal with property rights legally and ethically.
8. Exhibit the sense of beauty and neatness.