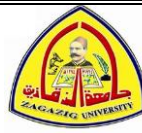




كلية العلوم- كلية معتمدة



وحدة البرامج الجديدة
مرحلة البكالوريوس



جامعة الزقازيق

المعايير الأكاديمية المرجعية (ARS) لبرنامجي

علوم البترول والمياه

و

ميكروبيولوجي / كيمياء حيوي

New Programs Unit

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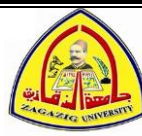
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مرحلة البكالوريوس



جامعه الزقازيق

Academic Reference Standards

1- Academic reference standard of the Petroleum Geology and Hydrogeology

Science program was referred to the Academic standard of the Petroleum Geology and Hydrogeology Science (ARS) for Faculty of Science New program Unit 2020.The New program committee N o.29 in 1/ 1/ 2020 and Faculty Council No.112 in 9/ 1/ 2020.

-Academic reference standard of the Petroleum Geology and Hydrogeology Science program was re-adopt according to the New program Unit committee No.50 in 10/ 10/ 2021 and Faculty Council No.133 in 13/ 10 / 2021.

-Academic reference standard of the Microbiology and Biochemistry program was re-adopt according to the New program Unit committee No.64 in 11/ 12/ 2022 and Faculty Council No.147 in 18/ 12 / 2022.

2-Academic reference standard of the Microbiology and Biochemistry program was referred to the Academic standards of the Microbiology and Biochemistry(ARS) for Faculty of Science New program Unit 2020.The New program committee N o.29 in 1/ 1/ 2020 and Faculty Council No.112 in 9/ 1/ 2020.

-Academic reference standard of the Microbiology and Biochemistry program was re-adopt according to the New program Unit committee No.50 in 10/ 10/ 2021 and Faculty Council No.133 in 13/ 10 / 2021.

-Academic reference standard of the Microbiology and Biochemistry program was re-adopt according to the New program Unit committee No.64 in 11/ 12/ 2022 and Faculty Council No.147 in 18/ 12 / 2022.

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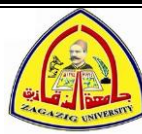
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كلية العلوم- كلية معتمدة



وحدة البرامج الجديدة
مرحلة البكالوريوس



جامعة الزقازيق

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First

Academic Reference Standards (ARS)

for

**Petroleum Geology and Hydrogeology Science
B. Sc. Program**

Presented by

New Program Unit

Faculty of Science

Zagazig University

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Academic Reference Standards (ARS) for Petroleum Geology and Hydrogeology Science

Introduction

The aim of science is to understand the nature and justification of scientific knowledge. Basic Sciences including, physics chemistry, biosciences, earth science and mathematics, furnish the basis for all scientific disciplines.

Geologic sciences is a broad discipline that involves the study of the earth's nature and characteristics. Hydrogeology and petroleum sciences are of the most important geologic applications. The study of water resources emphasizes on understanding of origin, amounts, physical and chemical properties of groundwater and surface water . In addition, the study of rivers and watersheds have high importance in development and mitigate flash flood hazards. Study of groundwater give more information about the storage and its possibility for new reclamation projects and developmental activities. It contributes effectively in save additional water source with the surface water. The shortage of water resources in the last decades let us in critical need for more and more hydrogeological and hydrological studies to save and investigate very possible water drop.

Petroleum geology is concerned with study the theories of oil and gas origin and accumulations in addition to the characteristics of reservoirs, migration and geophysical exploration. Study of petroleum geology and hydrogeology provide the students with high experiences in data collection and interpretation in addition to high skills in laboratory and field measurements. Petroleum geology and hydrogeology program give the students high opportunity to join in many jobs as in (petroleum companies, water well drilling companies, water quality labs and other related jobs).

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General Attributes of the Graduates of Basic Sciences

The graduates must be able to:

- 1.1.1. Recognize the role of Basic Sciences in the development of society.
- 1.1.2. Develop scientific approaches that meet community needs considering economic, environmental, social, ethical, and safety requirements.
- 1.1.3. Utilize scientific facts and theories to analyze and interpret practical data.
- 1.1.4. Collect, analyze, and present data using appropriate formats and techniques.
- 1.1.5. Postulate concepts and choose appropriate solutions to solve problems on scientific basis.
- 1.1.6. Apply effectively information technology relevant to the field.
- 1.1.7. Participate effectively in a multidisciplinary teamwork and be flexible for adaptation, decision making and working under contradictory conditions as well as exhibiting the sense of beauty and neatness.
- 1.1.8. Adopt self and long life-learning and participate effectively in research activities.
- 1.1.9. Deal with scientific data in Arabic, English or other languages.

The Attributes of the graduate from the Petroleum Geology and Hydrogeology Science program:

In addition to the general attributes of basic sciences graduates, the students who graduate from the Petroleum geology and hydrogeology Science program must be able to:

1. Learn advanced subjects and think clearly about hydrogeological and petroleum related topics.
2. Design and undertake petroleum and hydro geological experimental analysis and assess their results.
3. Estimate and assess the importance of water resources in new reclamation projects and construction of new communities.
4. Assess the prominent role of development of petroleum studies in enhancing the national economy.

1.2. Knowledge and Understanding of Basic Sciences.

Graduates must acquire knowledge and understanding of:

- 1.2.1 The related basic scientific facts, concepts, principles and techniques.
- 1.2.2 The relevant theories and their applications.
- 1.2.3 The processes and mechanisms supporting the structure and function of the specific topics.

- 1.2.4 The related terminology, nomenclature and classification systems.
- 1.2.5 The theories and methods applied for interpreting and analyzing data related to discipline.
- 1.2.6 The developmental progress of the program-related knowledge.
- 1.2.7 The relation between the studied topics and the environment.

1. Knowledge and understanding the Petroleum Geology and Hydrogeology Science;

In addition to the general knowledge acquired by Basic Sciences graduates, the Petroleum geology and hydrogeology program graduates must able to:

- 1.1.The procedures and techniques used for hydro geological and petroleum studies and required laboratory analysis.
- 1.2.The groundwater and petroleum exploration techniques.
- 1.3.The different hydrological and hydrogeological modeling systems
- 1.4.The importance and productivity of oil and gas reservoirs.
- 1.5.Different drilling systems for groundwater and petroleum wells.
- 1.6.The water resources management in Egypt.

1.3.Practical and Professional Skills

The graduates must be able to:

- 1.3.1 Plan, design, process and report on the investigated data, using appropriate techniques and considering scientific guidance.
- 1.3.2 Apply techniques and tools considering scientific ethics.
- 1.3.3 Solve problems using a range of formats and approaches.
- 1.3.4 Identify and criticize the different methods used in addressing subject related issues.

Practical and Professional skills of the Petroleum Geology and Hydrogeology Science.

In addition to the professional and practical skills acquired by Basic Sciences graduates, the Petroleum geology and hydrogeology program graduates must able to:

- 3.1.Investigate previous work and references.
- 3.2.Use laboratory and field equipment's carefully for sampling and analyzing techniques.
- 3.3.Apply scientific ethics for water sampling and accuracy during analyzing and reporting.
- 3.4.Apply the remote sensing (RS) and geographical information system (GIS) in interpreting

water resources management.

3.5. Apply field procedures in drilling water and petroleum wells.

3.6. demonstrate the seismic interpretation and well logging description.

3.7. Establish the water quality and its suitability for different purposes.

1.4. Intellectual Skills of Basic Sciences:-

The graduates must be able to:

1.4.1 Differentiate between subject-related theories and assess their concepts and principles.

1.4.2 Analyze, synthesize, assess and interpret qualitatively and quantitatively science relevant data.

1.4.3 Develop lines of argument and appropriate judgments in accordance with scientific theories and concepts.

1.4.4 Postulate and deduce mechanisms and procedures to handle scientific problems.

1.4.5 Construct several related and integrated information to confirm, make evidence and test hypotheses.

Intellectual skills of the Petroleum Geology and Hydrogeology Science:-

In addition to the intellectual skills acquired by Basic Sciences graduates, the Petroleum geology and hydrogeology program graduates must be able to:

2.1. Use the subject-related theories, concepts and principles for discussion and interpretation of geological, hydrogeological and petroleum phenomena's.

2.2. Hypothesize a range of ideas to solve different problems in groundwater and petroleum fields.

2.3. Criticize the techniques and theories to recognize the proper applicable methods

Identify and differentiate between the published hydrological, hydrogeological and petroleum data

1.5. General and Transferable Skills

The Petroleum geology and hydrogeology program graduates must be able to demonstrate general and transferable skills of Basic Science graduate.

1.5.1 Use information and communication technology effectively.

1.5.2 Identify roles and responsibilities, and their performing manner.

1.5.3 Think independently, set tasks and solve problems on scientific basis.

1.5.4 Work in groups effectively; manage time, collaborate and communicate with others positively.

1.5.5 Consider community linked problems, ethics and traditions.

1.5.6 Acquire self- and long life-learning.

ARS of Petroleum geology and hydrogeology program

1.5.7 Apply scientific models, systems, and tools effectively.

1.5.8 Deal with scientific patents considering property right.

1.5.9 Exhibit the sense of beauty and neatness

Curriculum & Program Structure

The curriculum of the Petroleum Geology and Hydrogeology program is designed to comply with the requirements of major international accreditation bodies including NAQAAE. It includes courses in basic sciences and mathematics, biosciences, communications skills, and humanities and social sciences. In addition, Lab hands-on experience with emphasis on design is an important element that is integrated throughout the curriculum.

Graduation requirements for obtaining a bachelor's degree in science (Petroleum Geology and Hydrogeology) are at least 140 credit hours distributed according to the following:

- 1- University requirements (Humanities): 8 credit
- 2- Faculty requirements (Basic Sciences): 27 credit hours are all in the first level included geology.
- 3- Specialty:- Petroleum and Hydrogeology & Basic science related to Specialty:
 - * 105 credit hours for Petroleum and Hydrogeology (9 compulsory + 10 elective) with 54 credit hours for each of the dual specialization fields determined by the specialized scientific departments.
 - * 9 credit hours for Basic science related to Specialty(geology of the first level)
 - * 6 credit hours for Courses included computer science related to Specialty.
 - * 2 credit hours for Research.

Curriculum Structure				
Subject Areas	Basic Science Field*		Petroleum Geology and Hydrogeology (ARS)	
	Tolerance	Percentage	Percentage	No. of credit hours
Basic Sciences	27-29	28	12.9	18
University requirements (Humanities)	5-7	6	5.7	8
Specialty (Petroleum + Hydrogeology) & basic science related to Specialty	55-61	58	75.7	106
Courses included computer science related to Specialty	5-7	6	4.3	6
Research and graduation project	1-3	2	1.4	2

*NARS for Basic Science field of National Authority for Quality Assurance and Accreditation of Education 2009

The curriculum is designed to grant students a Bachelor degree in Petroleum Geology and Hydrogeology program upon the successful completion of the four-year program. The first year is shared with all basics science majors, which allows students to transfer from one major to another without losing any credits earned in the first year.

GLOSSARY

1. Institution

A University, Faculty or higher institute providing education programs leading to a first university degree or a higher degree (Master's or Doctorate).

2. Attributes of the Graduates

Competencies expected from the graduates based on the acquired knowledge and skills gained upon completion of a particular program.

3. National Academic Reference Standards (NARS)

Reference points designed by **NAQAAE** to outline describe the expected minimum knowledge and skills necessary to fulfill the requirements of a program of study.

4. Academic Standards

Reference points defined by an institution comprising the collective knowledge and skills to be gained by the graduates of a particular program. The academic standards should surpass the **NARS**, and be approved by **NAQAAE**.

5. The Program

A set of educational courses and activities designed by the institution to determine the systematic learning progress. The program also imparts the intended competencies required for the award of an academic degree.

6. Intended Learning Outcomes (ILOs)

Subject-specific knowledge, understanding and skills intended by the institution to be gained by the learners completing a particular educational activity. The ILOs emphasize what is expected that learners will be able to do as a result of a learning activity.

7. Knowledge and Understanding

Knowledge is the intended information to be gained from an educational activity including facts, terms, theories and basic concepts. Understanding involves comprehending and grasping the meaning or the underlying explanation of scientific objects.

8. Intellectual Skills

Learning and cognitive capabilities that involve critical thinking and creativity. These include application, analysis, synthesis and evaluation of information.

9. Professional and Practical Skills

Application of specialized knowledge, training and proficiency in a subject or field to attain successful career development and personal advancement.

10. General and Transferable Skills

Skills that are not subject-specific and commonly needed in education, employment, life-long learning and self development. These skills include communication, team work, numeracy, independent learning, interpersonal relationship, and problem solving ... etc.

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Second

Academic Reference Standard (ARS)

for

**Microbiology and Biochemistry Program
B. Sc. Program**

Presented by

New Program Unit

Faculty of Science

Zagazig University

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Academic Reference Standards (ARS) for Microbiology and Biochemistry Program

Introduction

The aim of basic science is to understand the nature and justification of scientific knowledge. Basic Sciences including, physics chemistry, biosciences, earth science and mathematics, furnish the basis for all scientific disciplines.

The study of microbiological sciences emphasizes on understanding of life's processes for different microbiological process including types, respiration, metabolism, movement, sensation and digestion. In addition, microbiological sciences are concerned with the environmental aspects, including ecosystem composition, protection, conservation, economics, utilization, interaction, competition and breeding between the microorganisms of the ecosystem. The study of microbiological sciences serve as information for a wide range of disciplines such as medicine, pharmacology, veterinary medicine, dental medicine and agriculture and biotechnology. It contributes effectively to the human health which is the wealth of the nation, and disease fundamentals through the study of the microorganisms together with the development of new vaccines, drugs and antibiotics in relation to the immune response.

Microbiological sciences of the basic science sector given under a number of specializations such as: entomology, botany and zoology. In addition to, the sub-disciplines within this area that focus on particular groups of microorganisms such as microbiology and other interdisciplinary specializations as biotechnology.

There are various job opportunities for microbiologist as researcher in academic, educational and environmental institutions. Other work opportunities are in drug, biotechnology, food, agricultural, chemical, biological supplies, forensic sectors and others.

Biochemistry is an advanced, interdisciplinary field that encompasses the biological sciences, chemistry and physics. The aim of biochemistry is the application of the concepts, theories, facts and techniques of both biology and chemistry to the study of living systems and understanding of life's processes at a molecular scale. In addition, biochemistry determines the function of cell components and explores how these components interact and integrate into biological systems and how they affect the overall functions of cells and living systems. Biochemistry is also concerned with the study of the complex cellular reactions and generation of the energy to power cellular activity, communication and co-ordination between and within cells. The study of biochemistry provides the concepts, knowledge and principles necessary for biochemist to understand how bio-molecules such as carbohydrates, proteins, nucleic acids, lipids, vitamins and hormones function in such processes. Particular emphasis is given to the chemical bases of inheritance and disease, the experimental design and the proper control of the conditions as well as the standard operation of modern techniques. This is covered

through the study of a wide variety of subjects including; chemistry, cell biology, macromolecules, molecular biology and molecular genetics as well as metabolism and enzymology. Thus, biochemistry graduates can be employed in different public and private sectors including research centers (biotechnological, medical, forensic, fishery and agricultural), food and beverage industries, manufacturing and processing, pharmaceutical, health and beauty care organizations, pollution control, hospitals, laboratory services as well as in sales.

1.1.General Attributes of the Graduates of Basic Sciences.

The graduates must be able to:

- 1.1.1.Recognize the role of Basic Sciences in the development of society.
- 1.1.2.Develop scientific approaches that meet community needs considering economic, environmental, social, ethical, and safety requirements.
- 1.1.3.Utilize scientific facts and theories to analyze and interpret practical data.
- 1.1.4.Collect, analyze, and present data using appropriate formats and techniques.
- 1.1.5Postulate concepts and choose appropriate solutions to solve problems on scientific basis.
- 1.1.6.Apply effectively information technology relevant to the field.
- 1.1.7.Participate effectively in a multidisciplinary teamwork and be flexible for adaptation, decision making and working under contradictory conditions as well as exhibiting the sense of beauty and neatness.
- 1.1.8.Adopt self and long life-learning and participate effectively in research activities.
- 1.1.9.Deal with scientific data in Arabic, English or other languages.

1.Attributes of a Microbiologist and Biochemist.

In addition to the general attributes, the microbiologist and biochemist must be able to:

- 1.1 Understand the life's basic processes in relation to the general cell biology, microbial taxa and their environmental habitales.
- 1.2. Recognize, understand and assess different ranks,types and products of microbial systems inrelation to their hosts and ecosystem.
- 1.3. Identify and characterize different communities and ecosystems supporting and affecting the physiological processes of microorganisms .
- 1.4. Be acquainted with the modern subjects and bio-techniques in microbiology surving the economic important
- 5.1.1 Be acquainted with the molecular basis and chemistry of the processes that take place in cells and organisms.
- 5.1.2 Work safely in a laboratory environment and possess the basic competencies necessary for a range of practical biochemical techniques.
5. 1.3. Apply statistical skills in manipulation and presentation of biochemical data.
- 5.1.4. Analyze biochemical data to characterize biomolecules and assess the activity of biochemical processes.

1.2. Knowledge and Understanding of Basic Science.

Graduates must acquire knowledge and understanding of:

- 1.2.1 The related basic scientific facts, concepts, principles and techniques.
- 1.2.2 The relevant theories and their applications.
- 1.2.3 The processes and mechanisms supporting the structure and function of the specific topics.
- 1.2.4 The related terminology, nomenclature and classification systems.
- 1.2.5 The theories and methods applied for interpreting and analyzing data related to discipline.
- 1.2.6 The developmental progress of the program-related knowledge.
- 1.2.7 The relation between the studied topics and the environment.

2. Knowledge and understanding in Microbiology and Biochemistry Sciences .

In addition to the knowledge mentioned in the general part for the Basic Sciences graduates, the Microbiologist Biochemist must know and understand the:

- 2.1. The fundamentals of general cellular feature ,structure and biological aspects of different microbial taxa.
- 2.2. The explanation of microbial taxa limit , the characteristic environmental habitat features , the host relation, their products and employing their genetic evolution.
- 2.3. The mechanisms of microbial physiological processes and their pathways in different environmental ecosystems in relation with microbial activity and their genomic feature .
- 2.4. The principles of complexity and diversity of microorganisms through the study of the developmental stages , evolution, mutation and biotechnology for the economic importance.
- 5.2.1. The fundamentals of sciences relevant to biochemistry especially chemistry, physics and mathematics.
- 5.2.2. The basic knowledge of the molecular biosciences, including biochemical processes, genetics, molecular biology and cell biology.
- 5.2.3. The principles and limitations of practical techniques, and methods related to biochemical investigations.
- 5.2.4. The structures, assemblies and functions of biological macromolecules and how they conduct and control the biochemical processes.
- 5.2.5. Mechanisms of the key metabolic reactions involved in the biochemical processes as well as the relation between biochemistry and cellular and organismal processes.
- 5.2.6. The key processes involved in the control of arrangement and expression of genes.
- 5.2.7. The important biochemical features that distinguish plants from animals.

1.3. Practical and Professional Skills of Basic Science.

The graduates must be able to:

- 1.3.1 Plan, design, process and report on the investigated data, using appropriate techniques and considering scientific guidance.
- 1.3.2 Apply techniques and tools considering scientific ethics.
- 1.3.3 Solve problems using a range of formats and approaches.
- 1.3.4 Identify and criticize the different methods used in addressing subject related issues.

3. Professional and Practical Skills of Microbiology and Biochemistry Science.

The Graduates of Microbiology and Biochemistry Sciences programs must be able to:

- 3.1. Solve microbiological problems by a variety of methods including computers and other recent tools.
 - 3.2. Collect, record and analyze microbiological data using appropriate techniques in the field and laboratory.
 - 3.3. Apply field and laboratory investigations of microbiological systems in an ethical and responsible manner.
 - 3.4. Select a methodology and representative microbial sample considering its validity, accuracy and reliability during collection and analysis.
-
- 5.3.1. Use advanced biochemical techniques and methods relevant to the molecular biosciences in a safe, logistical and ethical manner.
 - 5.3.2. Conduct standard laboratory procedures involved in biochemical analysis and synthetic work as well as industrial applications.
 - 5.3.3. Consider variations inherent in dealing with biological materials such as sample size, accuracy, calibration and precision.
 - 5.3.4. Use computational packages and statistics in data handling and manipulation of biochemical information.

1.4. Intellectual Skills of Basic Science.

The graduates must be able to:

- 1.4.1 Differentiate between subject-related theories and assess their concepts and principles.
- 1.4.2 Analyze, synthesize, assess and interpret qualitatively and quantitatively science relevant data.

- 1.4.3 Develop lines of argument and appropriate judgments in accordance with scientific theories and concepts.
- 1.4.4 Postulate and deduce mechanisms and procedures to handle scientific problems.
- 1.4.5 Construct several related and integrated information to confirm, make evidence and test hypotheses.

4. Intellectual Skills of Microbiology and Biochemistry sciences .

The Graduates of Microbiology and Biochemistry Sciences programs must be able to:

- 4.1. Assess the interrelationships and the impact of a specific microbiological techniques on their environmental ecosystems.
- 4.2. Evaluate the different microbial bioprocesses, its conservation, economics ,and sustainability and applications.
- 4.3. Interpret microbiological data and respond to a variety of biotechnological information sources.
- 5.4.1. Use computational soft-wares in simulation studies to understand, confirm and optimize his/her practical techniques.
- 5.4.2. Integrate and link information across different approaches studied in different areas of biochemistry.
- 5.4.3. Classify and elucidate mechanisms of biochemical processes.
- 5.4.4. Analyze biochemical data to identify and determine Biochemical Structures.

1.5.General and Transferable Skills

The graduates of microbiology and biochemistry program must demonstrate general and transferable skills of Basic Science graduate be able to:

- 1.5.1 Use information and communication technology effectively.
- 1.5.2 Identify roles and responsibilities, and their performing manner.
- 1.5.3 Think independently, set tasks and solve problems on scientific basis.
- 1.5.4 Work in groups effectively; manage time, collaborate and communicate with others positively.
- 1.5.5 Consider community linked problems, ethics and traditions.
- 1.5.6 Acquire self- and long life–learning.
- 1.5.7 Apply scientific models, systems, and tools effectively.
- 1.5.8 Deal with scientific patents considering property right.
- 1.5.9 Exhibit the sense of beauty and neatness

Curriculum & Program Structure

The curriculum of the **Microbiology and Biochemistry Program** is designed to comply with the requirements of major international accreditation bodies including NAQAAE. It includes courses in basic sciences and mathematics, biosciences, communications skills, and humanities and social sciences. In addition, Lab hands-on experience with emphasis on design is an important element that is integrated throughout the curriculum.

- **Graduation requirements for obtaining a bachelor's degree in science (Microbiology and Biochemistry) are at least 140 credit hours distributed as follows:**

- 1- University requirements(Humanities): 8 credit
- 2- Faculty requirements (Basic Sciences): 27 credit hours are all in the first level
- 3- Specialty (**Microbiology and Biochemistry**):
 - *105 credit hours for microbiology and biochemistry (38 compulsory and 22 elective) with 50% credit hours for each of the dual specialization fields determined by the specialized scientific departments.
 - *4 credit hours for Courses included computer science related to Specialty.
 - *2 credit hours for Research.

Curriculum Structure				
Subject Areas	Basic Science Field*		Microbiology and Biochemistry (ARS)	
	Tolerance	Percentage	Percentage	No. of credit hours
Basic Sciences	27-29	28	19.3	27
University requirements (Humanities)	5-7	6	5.7	8
Specialty (Microbiology and Biochemistry)	55-61	58	70.7	99
Courses included computer science related to Specialty	5-7	6	2.9	4
Research and graduation project	1-3	2	1.4	2

*NARS for Basic Science field of National Authority for Quality Assurance and Accreditation of Education 2009

The curriculum is designed to grant students a Bachelor degree in **Microbiology and Biochemistry** program upon the successful completion of the four-year program. The first year is shared with all basics science majors, which allows students to transfer from one major to another without losing any credits earned in the first year.

GLOSSARY

1. Institution

A University, Faculty or higher institute providing education programs leading to a first university degree or a higher degree (Master's or Doctorate).

2. Attributes of the Graduates

Competencies expected from the graduates based on the acquired knowledge and skills gained upon completion of a particular program.

3. National Academic Reference Standards (NARS)

Reference points designed by **NAQAAE** to outline describe the expected minimum knowledge and skills necessary to fulfill the requirements of a program of study.

4. Academic Standards

Reference points defined by an institution comprising the collective knowledge and skills to be gained by the graduates of a particular program. The academic standards should surpass the **NARS**, and be approved by **NAQAAE**.

5. The Program

A set of educational courses and activities designed by the institution to determine the systematic learning progress. The program also imparts the intended competencies required for the award of an academic degree.

6. Intended Learning Outcomes (ILOs)

Subject-specific knowledge, understanding and skills intended by the institution to be gained by the learners completing a particular educational activity. The ILOs emphasize what is expected that learners will be able to do as a result of a learning activity.

7. Knowledge and Understanding

Knowledge is the intended information to be gained from an educational activity including facts, terms, theories and basic concepts. Understanding involves comprehending and grasping the meaning or the underlying explanation of scientific objects.

8. Intellectual Skills

Learning and cognitive capabilities that involve critical thinking and creativity. These include application, analysis, synthesis and evaluation of information.

9. Professional and Practical Skills

Application of specialized knowledge, training and proficiency in a subject or field to attain successful career development and personal advancement.

10. General and Transferable Skills

Skills that are not subject-specific and commonly needed in education, employment, life-long learning and self development. These skills include communication, team work, numeracy, independent learning, interpersonal relationship, and problem solving ... etc.

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