Academic Reference Standards (ARS)

for

Faculty of Postgraduate Studies

for Advanced Sciences

Beni-Suef University

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Contents

Introduction

Faculty of postgraduate studies for advanced science is the First and leader college in Egypt and the Middle East which gives credit for diploma, master and doctoral degrees in interdisciplinary fields of Nnotechnology, Biotechnology, Renewable Energy, and Environmental Science and industrial development. The courses are designed to keep the pace with the advanced European and American programs with the help of internationally recognized experts. The faculty admit exceptional students that hold of bachelor's degree in science, engineering, pharmacy, medical schools, veterinary medicine, and agriculture.

General Academic Reference Standards (GARS) for Diploma Program

Attributes of the Graduates

The graduates should be able to:

1. Applying the specialized knowledge he has acquired in his professional practice
2. Identify professional problems and propose solutions
3. Mastering professional skills and using appropriate technological means in his professional practice.
4. Communicate and lead the work teams through professional and professional work
5. Make a decision in the light of available information
6. Recruiting available resources efficiently
7. Awareness of its role in the development of society and the preservation of the environment
8. Act to reflect the commitment to integrity, credibility and rules of the profession and accept accountability and accountability.
9. Understand the need to develop oneself and engage in continuous learning.

A. Knowledge and Understanding

The graduates should be able to:

Upon completion of the diploma program, the graduate should demonstrate knowledge and understanding of:

- Theories, fundamentals and specialized knowledge in the field of learning as well as the sciences related to his professional practice.
- Ethical and legal principles of professional practice in the field of specialization.
- Principles and fundamentals of quality in professional practice in the field of specialization.
- Effect of professional practice on the environment and work on the preservation and preservation of the environment.

B. Intellectual Skills

Upon completion of the diploma program, the graduate should be able to:

- Identify and analyze problems in the field of specialization and arrange them accordingly to priorities.
- Solve specialized problems in the field of the profession.

- Analytical decision for research and topics related to specialization.
- Risk assessment in professional practices.
- Taking professional decisions in the light of available information.

C. Practical and Professional Skills

Upon completion of the diploma program, the graduate should be able to:

- Apply professional skills in the field of specialization.
- Writing professional reports.

D. General and Transferable Skills

Upon completion of the diploma program, the graduate should be able to:

- Effective communication of different types.
- Use of information technology to serve the development of professional practice.
- Self-assessment and identification of personal learning needs.
- Use different sources to access information and knowledge.
- Working in a team and managing time.
- Leading a team in familiar professional contexts.
- Self-learning and continuous.

General Academic Reference Standards (GARS) for M.Sc. Program

Attributes of the Graduates

A graduate of the Master's degree must be able to:

1. Mastering the application of the basics and methodologies of scientific research and the use of its various tools.
2. Application of the analytical method and its use in the field of specialization.
3. Apply specialized knowledge and integrate it with relevant knowledge in his professional practice.
4. Demonstrate awareness of current problems and modern visions in the field of specialization.
5. Identify professional problems and find solutions.
6. Mastering an appropriate range of specialized professional skills and using appropriate technological means to serve his professional practice.
7. Communicate effectively and be able to lead teams.
8. Decision-making in different professional contexts.
9. Utilizing available resources to achieve the highest utilization and preservation.
10. Show awareness of his role in the development of society and the preservation of the environment in the light of global and regional changes.
11. Act in a way that reflects the commitment to integrity, credibility and adherence to the rules of the profession.
12. Develop himself academically, professionally and able to continuous education.

A. Knowledge and Understanding

Upon completion of the M.Sc. program, the graduate should demonstrate knowledge and understanding of:

- Basic facts & theories of the specialty and related fields.
- Mutual relation between professional practice and impacts on the environment.
- Main scientific advances in the field of specialty.
- Fundamentals of ethical and legal practice in the field of specialty.
- Principles and standards of quality in the field of professional practice.
- Principles and ethics of scientific research.

B. Intellectual Skills

Upon completion of the M.Sc. program, the graduate should be able to:

- Analyze and evaluate information in the field of specialty to solve problems.
- Solve problems in the specialty that do not conform to classical data.
- Integrate different information to solve professional problems
- Conduct scientific research and /or write scientific systematic approach to a research problem
- Evaluate risks imposed during professional practice
- Plan for professional improvement
- Take professional decisions in wide range of professional situations

C. Practical and Professional Skills

Upon completion of the M.Sc. program, the graduate should be able to:

- Develop competence in basic and advanced professional skills.
- Write and appraise professional reports
- Evaluate methods and tools used in specialty.

D. General and Transferable Skills

Upon completion of the M.Sc. program, the graduate should be able to:

- Communicate effectively using different methods
- Use information technology to serve professional practice
- Practice self appraisal and determines learning needs.
- Use different sources to obtain data and information
- Setting standards for the evaluation of the performance of others
- Work in teams and as team leader in different professional situations
- Manage time effectively
- Learn independently and seek continuous learning

General Academic Reference Standards (GARS) for Doctorate Program

Attributes of the Graduates

Graduates of PhD program should have the ability to:

- Mastering the basics and methodologies of scientific research.
- Continuous work to add knowledge in the field of specialization.

- Apply the analytical and critical approach to knowledge in the field of specialization and related fields.
- Integrating specialized knowledge with related knowledge and deducing and developing the interrelationships between them
- Demonstrate a deep awareness of current problems and modern theories in the field of specialization
- Identify professional problems and find innovative solutions to solve them
- Mastering a wide range of professional skills in the field of specialization
- Guide the development of new methods, tools and techniques for professional techniques.
- Using appropriate technological means to serve his professional practice
- Communicate effectively, lead a team in different professional contexts
- Taking decisions under the available information.
- The efficient use and development of available resources and the creation of resources new.
- Awareness of development of society and the preservation of the environment.
- Acting in a way that reflects commitment, credibility and the rules of profession.
- Continuous self-development and transfer of knowledge to others.

A. Knowledge and Understanding

Upon completion of the Ph.D program, the graduate should be able to know:

- Theories, fundamentals and modern knowledge in the field of specialization and related fields.
- The basics, methodologies and ethics of scientific research and its various tools.
- Ethical and legal principles of professional practice in the area of specialization.
- Principles of quality in professional practice in the area of specialization.
- Knowledge on the effects of professional practices on the environment and methods of environmental development and conservation.

B. Intellectual Skills

Upon completion of the Ph.D. program, the graduate should be able to know:

- Analysis and evaluation of information in the field of specialization, measurement and extraction.
- Solve specialized problems based on available data.
- Conduct research studies that add to knowledge.
- Formulation of scientific papers.
- Risk assessment in professional practices.
- Planning for the development of performance in the field of specialization.
- Making professional decisions in different professional contexts.
- Innovation & Creativity.

- Discussion and conversation based on evidence and proof**.**

C. Practical and Professional Skills

Upon completion of the Ph.D. program, the graduate should be able to know:

- Mastering basic and modern professional skills in the field of specialization.
- Writing and evaluating professional reports.
- Evaluation and development of existing methods and tools in the field of specialization.
- Use technological means to serve professional practice.
- Planning to develop professional practice to improve the performance of others.

D. General and Transferable Skills

Upon completion of the Ph.D. program, the graduate should be able to know:

- Effective communication of different types.
- Use of information technology to serve the development of professional practice.
- Teaching others and evaluating their performance
- Continuous learning and self-evaluation.
- Use different sources to access information and knowledge.
- Team leadership and working in team.
- Management of scientific meetings and the ability to manage time.

Academic Reference Standards (ARS)

Introduction

The General Academic Reference Standards (GARS) for postgraduate programs, issued by NAQAAE (Mar. 2009), were adopted. The specific academic reference standards for the faculty programs were developed and approved by the faculty council.

Academic Reference Standards (ARS) for Biotechnology Diploma Program

Attributes of the Graduates

Graduates of the biotechnology diploma program should have the ability to:

1. Recognize the Basic role of biotechnology in the development of societies in the past, present and future.
2. Apply the knowledge of biotechnology, their related disciplines, applications and tools to manage/solve environmental problems.

3. Consider the detrimental effects of human and non-human activities on the environment and propose sustainable solutions to biotechnology problems.
4. Utilize analytical methods in scientific research and enhance available information to improve the comprehension and manipulation of biotechnology issues and concerns.
5. Possess multidisciplinary and flexible professional skills to take decision related to biotechnology problems.
6. Disseminate the biotechnology knowledge and experience through effective interaction to enhance the performance of the profession.
7. Describe various industrial, medical, and Environmental related applications to biotechnology.
8. Hold professional values that maintain individuality, positive thinking, self-confidence and ethicality.
9. Follow up recent academic and commercial advancements related to the field of biotechnology.

A. Knowledge and Understanding

The graduates should be able to know:

1.1 Theories, fundamentals and specialized knowledge in the biotechnology field, as well as, science related to the professional practice.
1.2 Ethical and legal principles of professional practice in the field of biotechnology.
1.3 Principles and quality principles in professional practice in biotechnology field.
1.4 Effect of practicing the biotechnology profession on the environment and work on maintaining and preserving the environment.

B. Intellectual skills

The graduates should be able to:

2.1 Identify and analyze problems in the field of biotechnology and arrange them according to priorities.
2.2 Solve specialized technical problems using biotechnology field.
2.3 Analytical decision for research and topics related to biotechnology.
2.4 Risk assessment in professional practices.
2.5 Making professional decisions in the light of available information.

C. Practical and Professional Skills

The graduates should be able to:

3.1 Apply professional skills in the field of biotechnology.
3.2 Writing professional reports.

D. General and transferable skills

The graduates should be able to:

4.1 Communicate effectively

4.2 Use appropriately information technology for data management, recording and presenting information.
4.3 Experience reflective practice and self-evaluation.
4.4 Demonstrate efficiency in using electronic library and it sources.
4.5 Demonstrate capacity and skills of effective performance within a team setting
4.6 Acquire leadership attributes in situations comparable to his work level.
4.7 Master self-learning capacities for advanced knowledge in fields relevant to biotechnology.

Academic Reference Standards (ARS) for Biotechnology M.Sc. Program

Attributes of the Graduates

Graduates of the Biotechnology Studies M.Sc. program should have the ability to:

1. Recognize the Basic role of biotechnology in the development of societies in the past, present and future.
2. Apply the knowledge of biotechnology, their related disciplines, applications and tools to manage/solve environmental problems.
3. Consider the detrimental effects of human and non-human activities on the environment and propose sustainable solutions to biotechnology problems.
4. Utilize analytical methods in scientific research and enhance available information to improve the comprehension and manipulation of biotechnology issues and concerns.
5. Possess multidisciplinary and flexible professional skills to take decision related to biotechnology problems.
6. Disseminate the biotechnology knowledge and experience through effective interaction to enhance the performance of the profession.
7. Develop skills of writing and presenting dissertations, research assignments, professional reports and/or academic papers.
8. Take appropriate decisions in different professional aspects.
9. Utilize the available resources to prepare, characterize, and doing application in various areas of biotechnology.
10. Describe various industrial, medical, and Environmental related applications of biotechnology.
11. Hold professional values that maintain individuality, positive thinking, self-confidence and ethicality.
12. Follow up recent academic and commercial advancements related to the field of Biotechnology.

A. Knowledge and Understanding

The graduates should be able to:

1.1 Show a coherent knowledge of the essential principles and techniques in key areas of biotechnology and its related disciplinary areas
1.2 Scope the link between principles and practice in different fields to achieve the advancement of science and society.
1.3 Be updated with advanced progress relevant to the multidisciplinary biotechnology aspects.
1.4 Adopt the chief ethical and legislative features underlying the practice of the profession in the field of biotechnology.
1.5 Be familiar with the fundamentals of quality standards and assurance of different biotechnology processes.
1.6 Recognize basic scientific and ethical knowledge that underlie research.

B. Intellectual Skills

The graduates should be able to:

2.1. Analyze, evaluate criteria and specifications to various problems at different levels to propose options for their solutions.
2.2. Demonstrate inter-disciplinary ways of thinking, drawing insights and evidence from a variety of perspectives to solve professional problems
2.3. Conduct research in different scientific issues in a systematic approach to biotechnology issues.
2.4 Recognize the risks, safe and proper operation of field and/or laboratory techniques and instruments.
2.5 Identify professional needs and ways to enhance professional skills
2.6 Exercise initiative and personal responsibilities in making decisions in various professional situations.
2.7. Define, identify and deal with problems through logical, analytical and critical thinking.

C. Practical and Professional Skills

The graduates should be able to:

3.1. Develop competence in professional utilizing the acquired knowledge and approaches in handling different research.
3.2. Acquire skills of scientific writing and appraise scientific manuscripts related to different disciplines of environmental studies
3.3. Assess relevant quantitative and/ or qualitative methods, tools and techniques in the analysis, interpretation and synthesis of solutions to different research or professional problems.

D. General and Transferable Skills

The graduates should be able to:

4.1. Communicate efficiently; verbally and written means.

4.2. Use appropriately information technology for data management, recording and presenting information.
4.3. Experience self- evaluation and reflective practice.
4.4. Demonstrate efficiency in using electronic library and IT sources
4.5. Develop abilities for constructive evaluation of others
4.6. Demonstrate capacity and skills of effective performance within a team setting.
4.7. Acquire leadership attributes in situations comparable to the work level.
4.8. Organize, plan and manage a demanding workload efficiently.
4.9. Master continuous and self-learning capacities for advanced knowledge in fields relevant to biotechnology.

Academic Reference Standards (ARS) for Biotechnology Doctorate Program

Attributes of the Graduates

Graduates of the Biotechnology Studies PhD program should have the ability to:
1. Mastering the basics and methodologies of biotechnology sciences
2. Continuing work on the addition of knowledge in biotechnology field.
3. Application of the analytical and critical approach to knowledge in the field of biotechnology.
4. Integration of specialized biotechnology knowledge with relevant knowledge and development of inter-linkages.
5. Demonstrate deep awareness of current problems and modern theories in biotechnology area.
6. Identify professional problems and find innovative solutions to solve them.
7. Mastering a wide range of professional skills in biotechnology field.
8. Guide the development of new methods, tools and techniques for different biotechnology techniques.
9. Use appropriate technological means to serve biotechnology professional practice.
10. Communicate effectively and lead a team in different biotechnology professional contexts.
11. Taking decisions under the available information.
12.The efficient use and development of available resources and the creation of resources New.
13. Awareness of development of society and the preservation of the environment.
14.Acting in a way that reflects commitment, credibility and the rules of the biotechnology profession.
15. Continuous self-development and transfer of knowledge to others in the field of biotechnology.

A. Knowledge and Understanding

The graduates should be able to:

1.1. Theories, fundamentals and specialized knowledge in the biotechnology field, as well as, Science related to the professional practice.
1.2 The basics, methodologies and ethics of scientific research in biotechnology field and its various tools.
1.3. Ethical and legal principles in professional practice in biotechnology field.
1.4 basics and principles of quality in professional practice in the area of biotechnology.
1.5. Effect of practicing the biotechnology profession on the environment and work on maintaining and preserving the environment.

B. Intellectual skills

The graduates should be able to:

2.1. Evaluate the evidence-based dat1.
2.2. Solve specialized technical problems using biotechnology field.
2.3. Conduct research studies that add to knowledge in biotechnology felid.
2.4 writing valuable scientific papers and publishing in international highly reputed journals.
2.5. Determine the threats in threatening situations during professional practices.
2.6 planning for the development of performance in biotechnology field.
2.7. Making professional decisions in the light of available information.
2.8. Innovation & creativity.
2.9. Evidence-based discussion and conversation.

C. Practical and Professional Skills

The graduates should be able to:

3.1 mastering basic and modern professional skills in biotechnology field.
3.2 writing and evaluating professional reports.
3.3 evaluation and development of existing research methods and tools in biotechnology field.
3.4 use technological means to serve professional practice.
3.5 develop professional practice to improve the performance of others in the same biotechnology field.

D. General and transferable skills

The graduates should be able to:

4.1. Communicate effectively.
4.2. Use appropriately information technology for data management, recording and presenting information.
4.3. Teaching others and evaluating their performance in related aspects to biotechnology.
4.4. Master self-learning capacities for advanced knowledge in fields relevant to biotechnology.
4.5. Demonstrate efficiency in using electronic library and it sources.
4.6. Exhibit capacity and skills of effective performance within a team setting
4.7. Acquire leadership attributes in situations comparable to the work level.
4.8. Management of scientific meetings and the ability to manage time.

Academic Reference Standards (ARS) for Applied Biochemistry Diploma Program

Attributes of the Graduates

Applied Biochemistry diploma graduates work in a multi-disciplinary profession and must acquire the necessary attributes in various aspects for pursuing their career. They should demonstrate comprehensive knowledge, clear understanding and outstanding skills as follows:

1 Deal with chemicals and biochemical equipment effectively and safely.
2 Comprehend principles of metabolic pathways and diseases, and participates with other health care professionals in improving health care services.
3 Plan, design and conduct research using appropriate methodologies.
4 Develop presentations, numeric and computation skills.
5 Demonstrate capability of communications skills, time management, critical thinking, problem- solving, decision–making and team working.
6 Perform responsibilities in compliance with legal, ethical and professional rules.
7. Consider the detrimental mutual effects of human and environment.
8. Utilize analytical methods in scientific research and enhance available information to improve the comprehension and manipulation of biochemical issues and concerns.
9. Follow up recent academic and commercial advancements related to the field of biochemistry and its applications.

Intended learning outcomes of course (ILOs)

A. Knowledge and Understanding Skills

At the end of this program, the graduates should be able to:

1.1 Etiology, epidemiology, laboratory diagnosis and clinical features of different diseases.
1.2 Perform responsibilities in compliance with legal, ethical and professional rules of biochemical practices.
1.3 Principles of quality in different analytical techniques.
1.4 Know public health issues including sources and control of microbial contamination as well as sanitation, disinfection, sterilization methods.

B. Intellectual Skills

At the end of this program, the graduates should be able to:

2.1 Analyze problems in the biochemical field and arrange them according to priorities.
2.2 Identify different diseases using advanced diagnostic tools.
2.3 Take an analytical decision for research and topics related to biochemistry.

2.4 Assess and grade the pitfalls faced while dealing with molecular and biochemical practices.
2.5 Making clinical decisions according to available information.

C. Professional and Practical Skills

At the end of this program, the graduates should be able to:

3.1 Acquire experience of principles in chemical, biochemical, microbiological, and immunological analyses using specialized medical laboratory techniques.
3.2 Present a professional report after evaluating scientific data.

D. General and Transferable Skills

At the end of this program, the graduates should be able to:

4.1 Communicates clearly by verbal and written means
4.2 Use appropriately information technology for data management, recording and presenting information.
4.3 Experience self- evaluation and reflective practice
4.4 Demonstrate efficiency in using electronic libraries and IT sources.
4.5 Exhibit capacity and skills of effective performance within a team setting including time management.
4.6 Acquire leadership attributes in situations comparable to the work.
4.7 Master continuous and self-learning capacities for advanced knowledge in fields relevant to biochemistry and its applications.

Academic Reference Standards (ARS) for Applied Biochemistry Master Program

Attributes of the Graduates

Applied Biochemistry master graduates work in a multi-disciplinary research profession and must acquire the necessary attributes in various aspects for pursuing their career. They should demonstrate comprehensive knowledge, clear understanding and outstanding skills as follows:

1.1 Differ between chemicals effectively and safely with respect to relevant laws and legislations.
1.2 Comprehend principles of pathophysiology of diseases and participates with other health care professionals in improving health care services.
1.3 Plan, design and conduct research using appropriate methodologies.
1.4 Develop presentations, promotion, marketing, business administration, and numeric and computation skills.

1.5 Demonstrate capability of communications skills, time management, critical thinking, problem- solving, decision –making and team working.
1.6 Perform responsibilities in compliance with legal, ethical and professional rules.

Intended learning outcomes of course (ILOs)

A. **Knowledge and Understanding**

The graduates should be able to:

1.1 Recognize the basics and fundamental concepts related to microbiology, immunology, as well as, clinical chemistry.
1.2 Describe the standard principles, procedures and techniques used in the field laboratory medicine.
1.3 Define the good practice and safety measures in the field laboratory medicine.
1.4 Recognize the current biochemical issues related to the environment.
1.5 Discuss up-to-date advanced different medical lab techniques.
1.6 Recognize the ethics of medical researches.

B. **Intellectual skills:**

2.1 Evaluate subject related theories by analyzing their concepts and principles.
2.2 Integrating theory with practice.
2.3 Analyze, synthesize and summarize information accurately.
2.4 Formulate different evidences and or ideas to confirm and test hypothesis.
2.5 Apply knowledge and understanding for the interpretation and solving problems.
2.6 Conform results using different scientific approaches.
2.7 Critical Evaluation: the ability to critically analyze, synthesize and summarize information and data.
2.8 Collecting and integrating several lines of evidence and applying them in a balanced way in an argument.

C. **Professional and practical skills**

3.1 Differentiation of laboratory materials (chemical/physical/biological/microbial/hazardous properties).
3.2 Have a molecular biology fine touch.
3.3 Perform research in biochemical sciences and demonstrate proficiency in the techniques and methods appropriate for their research area in minor specialty.
3.4 Planning, conducting, evaluating and reporting the results of investigations.
3.5 Obtaining, recording, collecting and analyzing data using appropriate standard techniques, working by themselves or in a group.

3.6 Collect evidences to test and confirm the scientific hypothesis in the field of minor specialty.
3.7 Aware and can apply laboratory precautions.

D- General and transferable skills

4.1 Oral and written communicate and exchange the information effectively through seminars and discussion meetings.
4.2 Citing and referencing work in an appropriate manner.
4.3 Preparing, processing, interpreting and presenting data, using appropriate qualitative and quantitative techniques, statistical programs, spreadsheets and programs for presenting data visually.
4.4 Manage time effectively.
4.5 Developing the skills necessary for self and lifelong learning
4.6 Experience self- evaluation and reflective practice.
4.7 Develop abilities for constructive evaluation of others.
4.8 Practice team work as a member or a leader.

Academic Reference Standards (ARS) for Applied Biochemistry Doctorate Program

Attributes of the Graduates

Graduates of the Biomedical Chemistry Studies PhD program should have the ability to:
1. Mastering the basics and methodologies of biomedical chemistry sciences
2. Continuing work on the addition of knowledge in biomedical chemistry field.
3. Application of the analytical and critical approach to knowledge in the field of biomedical chemistry.
4. Integration of specialized biomedical chemistry knowledge with relevant knowledge and development of inter-linkages.
5. Demonstrate deep awareness of current problems and modern theories in biomedical area.
6. Identify professional problems and find innovative solutions to solve them.
7. Mastering a wide range of professional skills in biomedical chemistry field.
8. Guide the development of new methods, tools and techniques for different biomedical chemistry techniques.
9. Use appropriate technological means to serve biomedical chemistry professional practice.
10. Communicate effectively and lead a team in different biomedical chemistry professional contexts.
11. Taking decisions under the available information.
12.The efficient use and development of available resources and the creation of new resources.
13. Awareness of development of society and the preservation of the environment.

14.Acting in a way that reflects commitment, credibility and the rules of the biomedical chemistry profession.
15. Continuous self-development and transfer of knowledge to others in the field of biomedical chemistry.

Intended learning outcomes of course (ILOs)

A. **Knowledge and Understanding**

The graduates should be able to know:

1.1. Theories, fundamentals and specialized knowledge in the biomedical chemistry field, as well as, Science related to the professional practice.
1.2. The basics, methodologies and ethics of scientific research in biomedical chemistry field and its various tools.
1.3. Ethical and legal principles in professional practice in biomedical chemistry field.
1.4. Basics and principles of quality in professional practice in the area of biomedical chemistry.
1.5. Effect of practicing the biomedical chemistry profession on the environment and work on maintaining and preserving the environment.

B. **Intellectual Skills**

The graduates should be able to:

2.1 Evaluate the evidence-based data.
2.2 Solve specialized clinical disorders.
2.3 Conduct research studies that add to knowledge in biomedical chemistry felid.
2.4 Writing valuable scientific papers and publishing in international highly reputed journals.
2.5 Determine the threats in threatening situations during professional practices.
2.6 Planning for the development of performance in biomedical chemistry field.
2.7 Making professional decisions in the light of available information.
2.8 Innovation & Creativity.
2.9 Evidence-based discussion and conversation.

C. **Practical and Professional Skills**

The graduates should be able to:

3.1 Mastering basic and modern professional skills in biomedical chemistry field.
3.2 Writing and evaluating professional reports.
3.3 Evaluation and development of existing research methods and tools in biomedical chemistry field.
3.4 Use technological means to serve professional practice.
3.5 Develop professional practice to improve the performance of others in the same biomedical chemistry field.

D. **General and Transferable Skills**

The graduates should be able to:

4.1 Communicate effectively.

4.2 Use appropriately information technology for data management, recording and presenting information.

4.3 Teaching others and evaluating their performance in related aspects to biomedical chemistry.

4.4 Master self-learning capacities for advanced knowledge in fields relevant to biomedical chemistry.

4.5 Demonstrate efficiency in using electronic library and IT sources.

4.6 Exhibit capacity and skills of effective performance within a team setting

4.7 Acquire leadership attributes in situations comparable to her/his work level.

4.8 Management of scientific meetings and the ability to manage time.

Academic Reference Standards (ARS) for Renewable Energy Diploma Program

Attributes of the Graduates

Graduates of Renewable Energy diploma program should have the ability to:

1. Recognize the Basic role of Renewable Energy in the development of societies in the past, present and future.

2. Apply the knowledge Renewable Energy, their related disciplines, applications and tools to manage/solve environmental problems.

3. Consider the detrimental effects of human and non-human activities on the environment and propose sustainable solutions to pollution due to fusel fuel problems.

4. Utilize analytical methods in scientific research and enhance available information to improve the comprehension and manipulation of Renewable Energy issues and concerns.

5. Possess multidisciplinary and flexible professional skills to take decision related to energy problems.

6. Disseminate the Renewable Energy knowledge and experience through effective interaction to enhance the performance of the profession.

8. Hold professional values that maintain individuality, positive thinking, self-confidence and ethicality.

9. Follow up recent academic and commercial advancements related to the field of Renewable Energy.

A. Knowledge and Understanding

Upon completion of the Diploma program, the graduate should be able to:

1.1. Theories, fundamentals and specialized knowledge in the field of learning as well as the energy sciences related to his professional practice.
1.2. Ethical and legal principles of professional.
1.3. Principles and fundamentals of quality in professional practice in the field of energy.
1.4. Effect of professional practice on the energy and work on the preservation.

B. Intellectual Skills

The graduates should be able to:

2.1. Identify and analyze problems in the field of renewable energy science and arrange them accordingly to priorities.
2.2. Solve specialized problems in the field of renewable energy science and industrial development.
2.3. Analytical decision for research and topics related to renewable energy and industrial development.
2.4. Risk assessment in professional practices.
2.5. Taking professional decisions in the light of available information.

C. Practical and Professional Skills

The graduates should be able to:

3.1. Apply professional skills in the field of renewable energy.
3.2. Writing professional reports.

D. General and Transferable Skills

The graduates should be able to:

4.1. Effective communication of different types.
4.2. Use of information technology to serve the development of professional practice.
4.3. Self-assessment and identification of personal learning needs.
4.4. Use different sources to access information and knowledge.

Academic Reference Standards (ARS) for Renewable Energy (Fuel Cell) M.Sc. Program

Attributes of the Graduates

The graduates should be able to:

1. Introduce the scientific skills-based energy devices to increase the knowledge of different research approaches in the field of energy storage system including Fuel Cell, supercapacitors and batteries.
2. Apply efficient strategies to enhance the capability of the student for understanding of the vast array of research possibilities.
3. Consider Understanding the relationship between the specialized knowledge gained during the academic courses and the labor market work.
4. Provide the appropriate research approaches to serve the professional practices related the field of renewable energy especially in fuel cell applications.
5. Increase the student's awareness of the world energy crises and the requirements for renewable energy.
6. The ability to define the various research lines regarding solving the renewable energy problems through reading and studying several research articles on a current subject.
7. Recognize the role of a proposed research topic in serving the economy and developing society.
8. Start to distinguish between the state of the art of a corresponding subject in the energy field, and what is to be done next in the area of energy conversion and storage.
9. Create novel ideas regarding and choosing a specific research line between material sciences or Engineering.
10. Differentiate between technical reports, academic writing of scientific journal or thesis to achieve the MSc requirements.
11. Adapt the scientific background to serve the needs of the labor market in renewable energy fields in particular fuel cell systems.
12. The ability to work and adapt in local and international environments in the field of practical research, development and innovation high performance fuel cell systems

A. Knowledge and Understanding

The graduates should be able to:

1.1. Comprehend the basic facts, theories and principles of sciences whose subject is central to renewable energy-based fuel cell system.

1.2. Build a body of scientific knowledge and approaches to diverse renewable energy problems.

1.3. Establish updated and recent developments relevant to multidisciplinary renewable energy studies.

1.4. Recognize the fundamentals of quality standards and quality assurance of procedures.
1.5. Recognize basic scientific and ethical knowledge that underlie research to promote ethical conduct of the graduate.
1.6.

B. Intellectual Skills

The graduates should be able to:

2.1 Analyze, evaluate criteria and specifications to various problems at different levels to propose options for their solutions.
2.2 Define, identify and deal with problems through logical, analytical and critical thinking.
2.3 Demonstrate inter-disciplinary ways of thinking, drawing insights and evidence from a variety of perspectives to solve professional problems
2.4 Conduct research into different scientific issues in a systematic approach
2.5 Recognize the risks, safe and proper operation of field and/or laboratory techniques and instruments.
2.6 Identify professional needs and ways to enhance professional skills
2.7 Exercise initiative and personal responsibility in making decisions in various professional situations.

C. Practical and Professional Skills

The graduates should be able to:

3.1. Develop competence in professionally utilizing the acquired knowledge and approaches in handling different research and/or professional renewable energy problems.
3.2. Acquire skills of scientific writing and appraise scientific manuscripts related to different disciplines of renewable energy studies.
3.3. Assess relevant quantitative and/ or qualitative methods, tools and techniques in the analysis, interpretation and synthesis of solutions to different research or professional problems.

D. General and Transferable Skills

The graduates should be able to:

4.1. Communicate efficiently both verbally and non- verbally.
4.2. Use appropriately information technology for data management, recording and presenting information.
4.3. Experience reflective practice and self evaluation.
4.4. Demonstrate efficiency in using electronic library and IT sources.
4.5. Develop abilities for constructive evaluation of others.
4.6. Demonstrate capacity and skills of effective performance within a team setting
4.7. Acquire leadership attributes in situations comparable to his work level.
4.8. Organize, plan and manage a demanding workload with efficient time management skills.
4.9. Master self-learning capacities for advanced knowledge in fields relevant to renewable energy studies.

Academic Reference Standards (ARS)
for Renewable Energy (solar Cell) M.Sc. Program

Attributes of the Graduates

The graduates should be able to:

1. Build comprehensive background knowledge and understanding of a broad spectrum of Renewable Energy sciences and their related disciplines.
2. Apply the knowledge of Renewable Energy sciences, their related disciplines, applications and tools to manage/solve environmental and energy problems.
3. Consider the detrimental effects of human and non-human activities on the environment and propose sustainable solutions to environmental problems.
4. Utilize analytical methods in scientific research and enhance available information to improve the comprehension and manipulation of Renewable Energy issues and concerns.
5. Possess multidisciplinary and flexible professional skills to take decision related to Renewable Energy challenges.
6. Disseminate the Renewable Energy knowledge and experience through effective interaction to enhance the performance of the profession.
7. Develop skills of writing and presenting dissertations, research assignments, professional reports and/or academic papers.
8. Use general ICT tools effectively.
9. Hold professional values that maintain individuality, positive thinking, self-confidence and ethicality.

A. Knowledge and Understanding

The graduates should be able to:

Upon completion of the M.Sc. program, the graduate should be able to:

1.1. Comprehend the basic facts, theories and principles of sciences whose subject is central to renewable energy studies.

1.2. Build a body of scientific knowledge and approaches to diverse environmental and energy problems.

1.3. Relate the connection between theory and practice in different fields of environmental studies.

1.4.Establish updated and recent developments relevant to multidisciplinary environmental studies.

1.5.Acknowledge the prime ethical and legislative aspects underlying the practice of the profession in the field of environmental studies.

1.6.Recognize the fundamentals of quality standards and quality assurance of procedures.

1.7.Recognize basic scientific and ethical knowledge that underlie research to promote ethical conduct of the graduate.

B. **Intellectual Skills**

The graduates should be able to:

2.1 Analyze, evaluate criteria and specifications to various problems at different levels to propose options for their solutions.

2.2 Define, identify and deal with problems through logical, analytical and critical thinking.

2.3 Demonstrate inter-disciplinary ways of thinking, drawing insights and evidence from a variety of perspectives to solve professional problems.

2.4 Conduct research into different scientific issues in a systematic approach.

2.5 Identify professional needs and ways to enhance professional skills.

2.6 Exercise initiative and personal responsibility in making decisions in various professional situations.

C. Practical and Professional Skills

The graduates should be able to:

3.1. Develop competence in professionally utilizing the acquired knowledge and approaches in handling different research and/or professional environmental problems.

3.2.Acquire skills of scientific writing and appraise scientific manuscripts related to different disciplines of environmental studies.

3.3.Assess relevant quantitative and/ or qualitative methods, tools and techniques in the analysis, interpretation and synthesis of solutions to different research or professional problems.

D. General and Transferable Skills

The graduates should be able to:

4.1. Communicate efficiently both verbally and non- verbally.

4.2. Use appropriately information technology for data management, recording and presenting information.

4.3. Experience reflective practice and self-evaluation.

4.4. Demonstrate efficiency in using electronic library and IT sources.

4.5. Develop abilities for constructive evaluation of others.

4.6. Demonstrate capacity and skills of effective performance within a team setting

4.7. Acquire leadership attributes in situations comparable to his work level.

4.8. Organize, plan and manage a demanding workload with efficient time management skills.

4.9. Master self-learning capacities for advanced knowledge in fields relevant to environmental studies.

Academic Reference Standards (ARS)
for Renewable Energy (solar Cell) doctorate Program

Attributes of the Graduates

Graduates of the Renewable Energy (solar Cell) Studies PhD program should have the ability to:

13. Mastering the basics and methodologies of Solar cell sciences.
14. Continuing work on the addition of knowledge in renewable energy solar cell field.
15. Application of the analytical and critical approach to knowledge in the field of renewable energy solar cell.
16. Integration of specialized renewable energy solar cell knowledge with relevant knowledge .
17. Demonstrate deep awareness of current problems and modern theories in renewable energy solar cell area.
18. Mastering a wide range of professional skills in renewable energy solar cell field.
19. Guide the development of new methods, tools and techniques for different renewable energy solar cell techniques.
20. Communicate effectively and lead a team in different renewable energy solar cell professional contexts.
21. Taking decisions under the available information.
22. The efficient use and development of available resources and the creation of new resources.
23. Awareness of development of society and the preservation of the environment.

24. Continuous self-development and transfer of knowledge to others in the field of renewable energy solar cell.

A. Knowledge and Understanding Skills

The graduates should be able to:

1.1. Theories, fundamentals and specialized knowledge in the renewable energy field, as well as, science related to the professional practice.

1.2. The basics, methodologies and ethics of scientific research in renewable energy field and its various tools.

1.3. Ethical and legal principles in professional practice in renewable energy field.

1.4. Basics and principles of quality in professional practice in the area of renewable energy.

1.5. Effect of practicing the renewable energy profession on the environment and work on maintaining and preserving the environment.

B. Intellectual Skills

The graduates should be able to:

2.1. Evaluate the evidence-based dat1.

2.2. Solve specialized technical problems using renewable energy field.

2.3. Conduct research studies that add to knowledge in renewable energy felid.

2.4. Writing valuable scientific papers and publishing in international highly reputed journals.

2.5. Determine the threats in threatening situations during professional practices.

2.6. Planning for the development of performance in renewable energy field.

2.7. Making professional decisions in the light of available information.

2.8. Innovation & creativity.

2.9. Evidence-based discussion and conversation.

C. Practical and Professional Skills

The graduates should be able to:

3.1. Mastering basic and modern professional skills in renewable energy field.

3.2. Writing and evaluating professional reports.

3.3. Evaluation and development of existing research methods and tools in renewable energy field.

3.4. Use technological means to serve professional practice.

3.5. Develop professional practice to improve the performance of others in the same renewable energy field.

D. General and Transferable Skills

The graduates should be able to:

4.1. Communicate effectively.

4.2. Use appropriately information technology for data management, recording and presenting formation.

4.3. Teaching others and evaluating their performance in related aspects to renewable energy.

4.4. Master self-learning capacities for advanced knowledge in fields relevant to renewable energy.

4.5. Demonstrate efficiency in using electronic library and it sources.

4.6. Exhibit capacity and skills of effective performance within a team setting

4.7. Acquire leadership attributes in situations comparable to her/his work level.

4.8. Management of scientific meetings and the ability to manage time.

Academic reference standards (ars)
for renewable energy (fuel cell) doctorate program

Attributes of the Graduates

Graduates of the renewable energy (fuel cell) Studies PhD program should have the ability to:

1. Mastering the basics and methodologies of renewable energy (fuel cell) sciences.
2. Continuing work on the addition of knowledge in renewable energy (fuel cell) field.
3. Application of the analytical and critical approach to knowledge in the field of renewable energy (fuel cell).
4. Integration of specialized renewable energy (fuel cell) knowledge with relevant knowledge.
5. Demonstrate deep awareness of current problems and modern theories in renewable energy (fuel cell) area.
6. Mastering a wide range of professional skills in renewable energy (fuel cell) field.
7. Communicate effectively and lead a team in different renewable energy (fuel cell) professional .
8. Taking decisions under the available information.
9. The efficient use and development of available resources and the creation of resources New.
10. Awareness of development of society and the preservation of the environment.

11. Continuous self-development and transfer of knowledge to others in the field of renewable energy (fuel cell)**.**

Attributes of the graduates

The graduates should be able to:

A. Knowledge and Understanding Skills

The graduates should be able to:

1.1- Supply the advanced knowledge and recent techniques of scientific research.
1.2- Identify the guidelines of ideal recent approach to collect the data and compilation.

B. Intellectual Skills

The graduates should be able to:

2.1- Select the ideal the appropriate methods for utilizing and citing the academic sources.

2.2- Provide the recent techniques for preparation of materials-based fuel cell devices.
2.3- Characterize the physiochemical inertia and conformation structure of the fabricated materials for advanced fuel cell systems.

2.4- Identify the positive impacts of the renewable energy on the environment as well as the negative impacts.
2.5- Learning about critical analyses and the state of the art of the research articles related to supercapacitors, batteries and fuel cell

C. Practical and Professional Skills

The graduates should be able to:

3.1- Applying the gained knowledge in order to know how the rational pathway and optimal requirements of energy storage devices.
3.2- Gathering and prioritize current energy storage problems including fuel cell systems.
3.3- Apply the practices and lessons learned during the academic study in the corresponding program.
3.4- Conduct a literature review of a renewable energy related subject.
3.5- Assessing the feasibility of the corresponding work to be conducted.
3.6- Attaining the ability to write technical reports, research articles, and research proposals.

D. General and transferable Skills

The graduates should be able to:

4.1- Investigate the electrochemical results according to the objectives of the corresponding research topic.
4.2- Develop the self-learning and technical skills through participation of local projects and annual energy department workshops moreover research activities related recent fuel cell program.
4.3- Use the information technology applications effectively and increase the awareness about safety standards to be followed during the experiments.
4.4- Start the self-learning process regarding the renewable energy design and applications.
4.5- Acquire the ability to differentiate between different problems in the renewable energy field.
4.6- Learn the different approaches to conduct a research in materials sciences and engineering.
4.7- Reduce the gap between the academic study and the labour market needs.

Academic Reference Standards (ARS)
For Materials Science and Nanotechnology Diploma

Attributes of the graduates

The graduates should be able to:

1. Recognize the Basic role of conventional and Nanomaterials in the development of societies in the past, present and future.
2. Apply the knowledge of nano-science, their related disciplines, applications and tools to manage/solve nanotechnology problems.
3. Consider the detrimental effects of human and non-human activities on the nanotechnology and propose sustainable solutions to nanotechnology problems.
4. Utilize analytical methods in scientific research and enhance available information to improve the comprehension and manipulation of nanotechnology issues and concerns.
5. Possess multidisciplinary and flexible professional skills to take decision related to nanotechnology problems.
6. Disseminate the nanotechnology knowledge and experience through effective interaction to enhance the performance of the profession.
7. Describe various industrial, medicinal, Environmental and Energy related applications of Nanomaterials.
8. Hold professional values that maintain individuality, positive thinking, self-confidence and ethicality.
9. Follow up recent academic and commercial advancements related to the field of Materials science and Nanotechnology.

A. Knowledge and Understanding

The graduates should be able to:

1.1. Theories, fundamentals and specialized knowledge in the field of learning as well as materials science and nanotechnology sciences related to his professional practice.

1.2. Ethical and legal principles of professional practice in the field of materials science and nanotechnology.
1.3. Principles and fundamentals of quality in professional practice in the field of materials science and nanotechnology.
1.4. Effect of professional practice on the environment and work on the preservation and preservation of the materials science and nanotechnology.

B. Intellectual Skills

The graduates should be able to:
2.1. Identify and analyze problems in the field of as materials science and nanotechnology and arrange them accordingly to priorities.
2.2. Solve specialized problems in the field of materials science and nanotechnology.
2.3. Analytical decision for research and topics related to as materials science and nanotechnology
2.4. Risk assessment in professional practices.
B5. Taking professional decisions in the light of available information.

C. Practical and Professional Skills

The graduates should be able to:
3.1. Develop competence in basic and advanced professional skills.
3.2. Apply professional skills in the field of as materials science and nanotechnology.
3.3. Writing professional reports.

D. General and Transferable Skills

The graduates should be able to:
4.1. Effective communication of different types.
4.2. Use of information technology to serve the development of professional practice.
4.3. Self-assessment and identification of personal learning needs.
4.4. Use different sources to access information and knowledge.
4.5. Working in a team and managing time.
4.6. Leading a team in familiar professional contexts.
4.7. Self-learning and continuous.

Academic Reference Standards (ARS)
for Materials Sciences and Nanotechnology M.Sc.

Attributes of the Graduates

The graduates should be able to:
1. Recognize the Basic role of conventional and Nanomaterials in the development of societies in the past, present and future.
2. Apply the knowledge of nano-science, their related disciplines, applications and tools to manage/solve environmental problems.
3. Consider the detrimental effects of human and non-human activities on the environment and propose sustainable solutions to nanotechnology problems.

4. Utilize analytical methods in scientific research and enhance available information to improve the comprehension and manipulation of nanotechnology issues and concerns.
5. Possess multidisciplinary and flexible professional skills to take decision related to nanotechnology problems.
6. Disseminate the nanotechnology knowledge and experience through effective interaction to enhance the performance of the profession.
7. Develop skills of writing and presenting dissertations, research assignments, professional reports and/or academic papers.
8. Use general ICT tools effectively.
9. Utilize the available resources to prepare, characterize, and doing application in various areas of nanotechnology.
10. Describe various industrial, medicinal, Environmental and Energy related applications of Nanomaterials.
11. Hold professional values that maintain individuality, positive thinking, self-confidence and ethicality.
12. Follow up recent academic and commercial advancements related to the field of Materials science and Nanotechnology.

A. Knowledge and Understanding Skills

The graduates should be able to know:

1.1. Theories, fundamentals and specialized knowledge in the field of learning as well as the materials sciences related to his professional practice.

1.2. Ethical and legal principles of professional practice in the field of Materials sciences and nanotechnology

1.3. Principles and fundamentals of quality in professional practice in the field of Nanotechnology.

1.4. Effect of professional practice on nanotechnology and its applications in industry.

B. Intellectual Skills

The graduates should be able to:

2.1. Identify and analyze problems in the field of Materials science and arrange them accordingly to priorities.

2.2. Solve specialized problems in the field of Materials science and Nanotechnology

2.3. Analytical decision for research and topics related to Materials sciences and nanotechnology.

2.4. Risk assessment in professional practices.

2.5. Taking professional decisions in the light of available information.

C. Practical and Professional Skills

The graduates should be able to:

3.1. Develop competence in basic and advanced professional skills.

3.2. Apply professional skills in the field of environmental science and industrial development.
3.3. Writing professional reports.

D. General and Transferable Skills

The graduates should be able to:
4.1. Use different sources to access information and knowledge.
4.2. Working in a team and managing time.
4.3. Leading a team in familiar professional contexts.
4.4. Self-learning and continuous.

Academic Reference Standards (ARS) for Material Sciences and Nanotechnology Doctorate

Attributes of the Graduates

The graduates should be able to:
1.1 Master the basics and methodologies of material sciences and nanotechnology.
1.2 Continuous work on adding knowledge in the field of nanotechnology.
1.3 Application of the analytical and critical approach to knowledge in the field of material sciences and nanotechnology.
1.4 Integration and developing of specialized knowledge with material sciences and nanotechnology.
1.5 Demonstrate a deep awareness of the current problems and modern theories in the field of nanotechnology.
1.6 Identification of nanotechnology problems and finding innovative solutions to solve them.
1.7 Mastering a wide range of professional skills in the field of material sciences and nanotechnology.
1.8. Orientation towards developing new methods, tools and methods for professional practice.
1.9 Use appropriate technological means to serve his professional practice.
1.10. Communicate effectively and lead a team in different professional contexts.
1.11 Decision making in light of the available information.

A. Knowledge and Understanding Skills

The graduates should be able to:
1.1. Theories, fundamentals and specialized knowledge in the materials science and nanotechnology field, as well as, science related to the professional practice.
1.2 the basics, methodologies and ethics of scientific research in materials science and nanotechnology field and its various tools.
1.3. Ethical and legal principles in professional practice in materials science and nanotechnology field.

1.4 basics and principles of quality in professional practice in the area of materials science and nanotechnology.
1.5. Effect of practicing the industrial development profession on the nanotechnology and work on maintaining and preserving the environment.

B. Intellectual Skills

The graduates should be able to:
2.1. Evaluate the evidence-based dat1.
2.2. Solve specialized technical problems using materials science field.
2.3. Conduct research studies that add to knowledge in materials science and nanotechnology field.
2.4 Writing valuable scientific papers and publishing in international highly reputed journals.
2.5. Determine the threats in threatening situations during professional practices.
2.6 planning for the development of performance in materials science and nanotechnology field.
2.7. Making professional decisions in the light of available information.
2.8. Innovation & creativity.
2.9. Evidence-based discussion and conversation.

C. Practical and Professional Skills

The graduates should be able to:
C.1 Mastering basic and modern professional skills in materials science and nanotechnology field.
C.2 Writing and evaluating professional reports.
C.3 Evaluation and development of existing research methods and tools in materials science and nanotechnology field.
C.4 Use technological means to serve professional practice.
C.5 Develop professional practice to improve the performance of others in the same materials science and nanotechnology field.

D. General and Transferable Skills

The graduates should be able to:
4.1. Communicate effectively.
4..2. Use appropriately information technology for data management, recording and presenting information.
4.3. Teaching others and evaluating their performance in related aspects to materials science and nanotechnology.
4.4. Master self-learning capacities for advanced knowledge in fields relevant to materials science and nanotechnology.
4.5. Demonstrate efficiency in using electronic library and it sources.
4.6. Exhibit capacity and skills of effective performance within a team setting
4.7. Acquire leadership attributes in situations comparable to her/his work level.
4.8. Management of scientific meetings and the ability to manage time.

Academic Reference Standards (ARS) for Diploma in Cement

Attributes of the Graduates

The graduates should be able to:

1. Build comprehensive background knowledge and understanding of a broad spectrum of environmental sciences and their related disciplines.
2. Apply the knowledge of environmental sciences, their related disciplines, applications and tools to manage/solve environmental problems.
3. Consider the detrimental effects of human and non-human activities on the environment and propose sustainable solutions to environmental problems.
4. Utilize analytical methods in scientific research and enhance available information to improve the comprehension and manipulation of environmental issues and concerns.
5. Possess multidisciplinary and flexible professional skills to take decision related to environmental problems.
6. Disseminate the environmental knowledge and experience through effective interaction to enhance the performance of the profession.
7. Develop skills of writing and presenting dissertations, research assignments, professional reports and/or academic papers.
8. Use general ICT tools effectively.
9. Hold professional values that maintain individuality, positive thinking, self-confidence and ethicality.

A. Knowledge and Understanding Skills

The graduates should be able to:

1.1 Comprehend the basic facts, theories and principles of sciences whose subject is central to cement diploma studies.

1.2. Build a body of scientific knowledge and approaches to diverse cement problems.

1.3. Relate the connection between theory and practice in different fields of cement studies.

1.4. Establish updated and recent developments relevant to multidisciplinary cement studies.

1.5. Acknowledge the prime ethical and legislative aspects underlying the practice of the profession in the field of cement studies.

1.6. Recognize the fundamentals of quality standards and quality assurance of procedures.

1.7. Recognize basic scientific and ethical knowledge that underlie research to promote ethical conduct of the graduate.

B. Intellectual Skills

The graduates should be able to:

2.1. Analyze, evaluate criteria and specifications to various problems at different levels to propose options for their solutions.

2.2. Define, identify and deal with problems through logical, analytical and critical thinking.
2.3. Demonstrate inter-disciplinary ways of thinking, drawing insights and evidence from a variety of perspectives to solve professional problems
2.4. Conduct research into different scientific issues in a systematic approach
2.5. Recognize the risks, safe and proper operation of field and/or laboratory techniques and instruments.
2.6. Identify professional needs and ways to enhance professional skills
2.7. Exercise initiative and personal responsibility in making decisions in various professional situations.

C. Practical and Professional Skills

The graduates should be able to:
3.1. Develop competence in professionally utilizing the acquired knowledge and approaches in handling different research and/or professional cement problems.
3.2. Acquire skills of scientific writing and appraise scientific manuscripts related to different disciplines of cement studies
3.3. Assess relevant quantitative and/ or qualitative methods, tools and techniques in the analysis, interpretation and synthesis of solutions to different research or professional problems.

D. General and Transferable Skills

The graduates should be able to:
4. 1. Communicate efficiently both verbally and non- verbally.
4. 2. Use appropriately information technology for data management, recording and presenting information.
4. 3. Experience reflective practice and self evaluation.
4. 4. Demonstrate efficiency in using electronic library and IT sources.
4. 5. Develop abilities for constructive evaluation of others.
4. 6. Demonstrate capacity and skills of effective performance within a team setting
4. 7. Acquire leadership attributes in situations comparable to his work level.
4. 8. Organize, plan and manage a demanding workload with efficient time management skills.
4. 9. Master self-learning capacities for advanced knowledge in fields relevant to cement studies.

Academic Reference Standards (ARS) for M.Sc. in Cement

Attributes of the Graduates

The graduates should be able to
1-Apply perfectly the basics and methodologies of scientific research and the use of different tools in the field of cement
2-Apply analytical methodologies and criticized the knowledge in the field of cement technology and in the related fields.

3- Show awareness of the ongoing problems and modern theories in the cement field.
4-Do a good range of appropriate professional skills and use appropriate technological means to serve the professional practices in the field of cement.
5- Understand the processes which effect in cement industry, how future change is predicted and how to interpret trajectories in elements of ecosystems and human health
6-identify professional problems and find their solutions.
7- Studying the cement and technological issues in the management and control of emissions and air pollution

A. Knowledge and Understanding Skills

The graduates should be able to:
1.1. Comprehend the basic facts, theories and principles of sciences whose subject is central to cement studies.
1.2. Build a body of scientific knowledge and approaches to diverse cement problems.
1.3. Relate the connection between theory and practice in different fields of cement technology studies.
1.4. Establish updated and recent developments relevant to multidisciplinary cement studies.
1.5. Acknowledge the prime ethical and legislative aspects underlying the practice of the profession in the field of cement studies.
1.6. Recognize the fundamentals of quality standards and quality assurance of procedures.
1.7. Recognize basic scientific and ethical knowledge that underlie research to promote ethical conduct of the graduate.

B. Intellectual Skills

The graduates should be able to:
2.1. Analyze, evaluate criteria and specifications to various problems at different levels to propose options for their solutions.
2.2. Define, identify and deal with problems through logical, analytical and critical thinking.
2.3. Demonstrate inter-disciplinary ways of thinking, drawing insights and evidence from a variety of perspectives to solve professional problems
2.4. Conduct research into different scientific issues in a systematic approach
2.5. Recognize the risks, safe and proper operation of field and/or laboratory techniques and instruments.
2.6. Identify professional needs and ways to enhance professional skills
2.7. Exercise initiative and personal responsibility in making decisions in various professional situations.

C. **Practical and Professional Skills**

The graduates should be able to:
3.1. Develop competence in professionally utilizing the acquired knowledge and approaches in handling different research and/or professional cement problems.

3.2. Acquire skills of scientific writing and appraise scientific manuscripts related to different disciplines of cement studies
3.3. Assess relevant quantitative and/ or qualitative methods, tools and techniques in the analysis, interpretation and synthesis of solutions to different research or professional problems.

D. General and Transferable Skills

The graduates should be able to:
4.1. Communicate efficiently both verbally and non- verbally.
4.2. Use appropriately information technology for data management, recording and presenting information.
4.3. Experience reflective practice and self-evaluation.
4.4. Demonstrate efficiency in using electronic library and IT sources.
4.5. Develop abilities for constructive evaluation of others.
4.6. Demonstrate capacity and skills of effective performance within a team setting
4.7. Acquire leadership attributes in situations comparable to his work level.
4.8. Organize, plan and manage a demanding workload with efficient time management skills.
4.9. Master self-learning capacities for advanced knowledge in fields relevant to cement studies.

Academic Reference Standards (ARS)
for PhD in Cement Chemistry and Technology

Attributes of the Graduates

The graduates should be able to:

1.1 Master the basics and methodologies of cement chemistry and technology.
1.2 Continuous work on adding knowledge in the field of cement technology.
1.3 Application of the analytical and critical approach to knowledge in the field of cement chemistry and technology.
1.4 Integration and developing of specialized knowledge with cement chemistry and technology.
1.5 Demonstrate a deep awareness of the current problems and modern theories in the field of cement technology.
1.6 Identification of cement technology problems and finding innovative solutions to solve them.
1.7 Mastering a wide range of professional skills in the field of cement chemistry and technology.
1.8. Orientation towards developing new methods, tools and methods for professional practice.
1.9 Use appropriate technological means to serve his professional practice.
1.10. Communicate effectively and lead a team in different professional contexts.
1.11 Decision making in light of the available information.

A. Knowledge and Understanding Skills

The graduates should be able to:

1.1. Theories, fundamentals and specialized knowledge in the cement chemistry and technology field, as well as, Science related to the professional practice.

1.2 The basics, methodologies and ethics of scientific research in cement chemistry and technology field and its various tools.

1.3. Ethical and legal principles in professional practice in cement chemistry and technology field.

1.4 Basics and principles of quality in professional practice in the area of cement chemistry and technology.

1.5. Effect of practicing the industrial development profession on the cement and work on maintaining and preserving the environment.

B. Intellectual Skills

The graduates should be able to:

2.1. Evaluate the evidence-based dat1.

2.2. Solve specialized technical problems using cement chemistry and technology field.

2.3. Conduct research studies that add to knowledge in cement chemistry and technology field.

2.4 Writing valuable scientific papers and publishing in international highly reputed journals.

2.5. Determine the threats in threatening situations during professional practices.

2.6 Planning for the development of performance in cement chemistry and technology field.

2.7. Making professional decisions in the light of available information.

2.8. Innovation & Creativity.

2.9. Evidence-based discussion and conversation.

C. Practical and Professional Skills

The graduates should be able to:

3.1 Mastering basic and modern professional skills in cement chemistry and technology field.

3.2 Writing and evaluating professional reports.

3.3 Evaluation and development of existing research methods and tools in cement chemistry and technology field.

3.4 Use technological means to serve professional practice.

3.5 Develop professional practice to improve the performance of others in the same environmental science and industrial development field.

D. General and Transferable Skills

The graduates should be able to:

4.1. Communicate effectively.

4.2. Use appropriately information technology for data management, recording and presenting information.

4.3. Teaching others and evaluating their performance in related aspects to cement chemistry and technology.
4.4. Master self-learning capacities for advanced knowledge in fields relevant to cement chemistry and technology.
4.5. Demonstrate efficiency in using electronic library and IT sources.
4.6. Exhibit capacity and skills of effective performance within a team setting

Academic Reference Standards (ARS)
for Diploma in Environmental Sciences and Industrial Development

Attributes of the Graduates
The graduates should be able to:
1. Build comprehensive background knowledge and understanding of a broad spectrum of environmental sciences and their related disciplines.
2. Apply the knowledge of environmental sciences, their related disciplines, applications and tools to manage/solve environmental problems.
3. Consider the detrimental effects of human and non-human activities on the environment and propose sustainable solutions to environmental problems.
4. Utilize analytical methods in scientific research and enhance available information to improve the comprehension and manipulation of environmental issues and concerns.
5. Possess multidisciplinary and flexible professional skills to take decision related to environmental problems.
6. Disseminate the environmental knowledge and experience through effective interaction to enhance the performance of the profession.
7. Develop skills of writing and presenting dissertations, research assignments, professional reports and/or academic papers.
8. Use general ICT tools effectively.
9. Hold professional values that maintain individuality, positive thinking, self-confidence and ethicality.

A. Knowledge and Understanding Skills
The graduates should be able to know:
1.1. Theories, fundamentals and specialized knowledge in the field of learning as well as the environment sciences related to his professional practice.
1.2. Ethical and legal principles of professional practice in the field of environment.
1.3. Principles and fundamentals of quality in professional practice in the field of environment.
1.4. Effect of professional practice on the environment and work on the preservation and preservation of the environment.

B. Intellectual Skills

The graduates should be able to:
2.1. Identify and analyze problems in the field of environmental science and arrange them accordingly to priorities.
2.2. Solve specialized problems in the field of environmental science and industrial development.
2.3. Analytical decision for research and topics related to environmental science and industrial development.
2.4. Risk assessment in professional practices.
2.5. Taking professional decisions in the light of available information.

C. **Practical and Professional Skills**

The graduates should be able to:
3.1. Develop competence in basic and advanced professional skills.
3.2. Apply professional skills in the field of environmental science and industrial development.
3.3. Writing professional reports.

D. General and Transferable Skills

The graduates should be able to:
4.1. Effective communication of different types.
4.2. Use of information technology to serve the development of professional practice.
4.3. Self-assessment and identification of personal learning needs.
4.4. Use different sources to access information and knowledge.
4.5. Working in a team and managing time.
4.6. Leading a team in familiar professional contexts.
4.7. Self-learning and continuous.

Academic Reference Standards (ARS)
for M.Sc. in Environmental Sciences and Industrial Development

Attributes of the Graduates

The graduates should be able to:
1.Apply perfectly the basics and methodologies of scientific research and the use of different tools in the field of environment.
2-Apply analytical methodologies and criticized the knowledge in the field of environment and in the related fields.
3- Show awareness of the ongoing problems and modern theories in the environmental field.
4-Do a good range of appropriate professional skills and use appropriate technological means to serve the professional practices in the field of environment.
5- Understand the processes which cause environmental change, how future change is predicted and how to interpret trajectories in elements of ecosystems and human health.
6-identify professional problems and find their solutions.

7- Studying the environmental and technological issues in the management and control of water, air and land pollution

A. Knowledge and Understanding

The graduates should be able to:

1.1. Comprehend the basic facts, theories and principles of sciences whose subject is central to environmental studies.

1.2. Build a body of scientific knowledge and approaches to diverse environmental problems.

1.3. Relate the connection between theory and practice in different fields of environmental studies.

1.4. Establish updated and recent developments relevant to multidisciplinary environmental studies.

1.5. Acknowledge the prime ethical and legislative aspects underlying the practice of the profession in the field of environmental studies.

1.6. Recognize the fundamentals of quality standards and quality assurance of procedures.

1.7. Recognize basic scientific and ethical knowledge that underlie research to promote ethical conduct of the graduate.

B. Intellectual Skills

The graduates should be able to:

2.1 Analyze, evaluate criteria and specifications to various problems at different levels to propose options for their solutions.

2.2. Define, identify and deal with problems through logical, analytical and critical thinking.

2.3. Demonstrate inter-disciplinary ways of thinking, drawing insights and evidence from a variety of perspectives to solve professional problems

2.4. Conduct research into different scientific issues in a systematic approach

2.5. Recognize the risks, safe and proper operation of field and/or laboratory techniques and instruments.

2.6. Identify professional needs and ways to enhance professional skills

2.7. Exercise initiative and personal responsibility in making decisions in various professional situations.

C. Practical and Professional Skills

The graduates should be able to:

3.1. Develop competence in professionally utilizing the acquired knowledge and approaches in handling different research and/or professional environmental problems.

3.2. Acquire skills of scientific writing and appraise scientific manuscripts related to different disciplines of environmental studies

3.3. Assess relevant quantitative and/ or qualitative methods, tools and techniques in the analysis, interpretation and synthesis of solutions to different research or professional problems.

D. General and Transferable Skills

The graduates should be able to:

4. 1. Communicate efficiently both verbally and non- verbally.

4. 2. Use appropriately information technology for data management, recording and presenting information.

4. 3. Experience reflective practice and self-evaluation.

4. 4. Demonstrate efficiency in using electronic library and IT sources.

4. 5. Develop abilities for constructive evaluation of others.

4. 6. Demonstrate capacity and skills of effective performance within a team setting

4. 7. Acquire leadership attributes in situations comparable to his work level.

4. 8. Organize, plan and manage a demanding workload with efficient time management skills.

4. 9. Master self-learning capacities for advanced knowledge in fields relevant to environmental studies.

National Academic Reference Standards (ARS) for Ph.D in Environmental Sciences and Industrial Development

Attributes of the Graduates

The graduates should be able to:

1.1 Master the basics and methodologies of environmental sciences and industrial development.

1.2 Continuous work on adding knowledge in the field of environmental sciences and industrial development.

1.3 Application of the analytical and critical approach to knowledge in the field of environmental sciences and industrial development.

1.4 Integration and developing of specialized knowledge with environmental sciences and industrial development.

1.5 Demonstrate a deep awareness of the current problems and modern theories in the field of environmental sciences and industrial development.

1.6 Identification of industrial and environment problems and finding innovative solutions to solve them.

1.7 Mastering a wide range of professional skills in the field of environmental sciences and industrial development.

1.8. Orientation towards developing new methods, tools and methods for environmental and industrial studies.

1.9 Use appropriate technological means to serve his professional practice.

1.10. Communicate effectively and lead a team in different professional contexts.

1.11 Decision making in light of the available information.

A. Knowledge and Understanding Skills

The graduates should be able to:

1.1. Theories, fundamentals and specialized knowledge in the environment field, as well as, science related to the professional practice.

1.2 the basics, methodologies and ethics of scientific research in environmental science field and its various tools.

1.3. Ethical and legal principles in professional practice in environmental science and industrial development field.

1.4 basics and principles of quality in professional practice in the area of environmental science and industrial development.

1.5. Effect of practicing the industrial development profession on the environment and work on maintaining and preserving the environment.

B. Intellectual Skills

The graduates should be able to:

2.1. Evaluate the evidence-based dat1.

2.2. Solve specialized technical problems using environmental science and industrial development field.

2.3. Conduct research studies that add to knowledge in environmental science and industrial development field.

2.4 writing valuable scientific papers and publishing in international highly reputed journals.

2.5. Determine the threats in threatening situations during professional practices.

2.6 planning for the development of performance in environmental science and industrial development field.

2.7. Making professional decisions in the light of available information.

2.8. Innovation & creativity.

2.9. Evidence-based discussion and conversation.

C. Practical and Professional Skills

The graduates should be able to:

3.1 mastering basic and modern professional skills in environmental science and industrial development field.

3.2 writing and evaluating professional reports.

3.3 evaluation and development of existing research methods and tools in environmental science and industrial development field.

3.4 use technological means to serve professional practice.

3.5 develop professional practice to improve the performance of others in the same environmental science and industrial development field.

D. General and Transferable Skills

The graduates should be able to:

4.1. Communicate effectively.

4.2. Use appropriately information technology for data management, recording and presenting information.
4.3. Teaching others and evaluating their performance in related aspects to environmental science and industrial development.
4.4. Master self-learning capacities for advanced knowledge in fields relevant to environmental science and industrial development.
4.5. Demonstrate efficiency in using electronic library and it sources.
4.6. Exhibit capacity and skills of effective performance within a team setting
4.7. Acquire leadership attributes in situations comparable to her/his work level.
4.8. Management of scientific meetings and the ability to manage time.

National Academic Reference Standards (ARS) for diploma in quality control

1. Attributes of the Graduates

The graduates should be able to:
Graduates of the quality control diploma program should have the ability to:
Build comprehensive background knowledge and understanding of a broad spectrum of quality control and their related disciplines.
Apply the knowledge of quality sciences, their related disciplines, applications and tools to manage/solve industrial problems.
Consider the detrimental effects of quality lack on the industry and clients and propose sustainable solutions to industrial problems.
Utilize analytical methods in scientific research and enhance available information to improve the comprehension and manipulation of quality issues and concerns.
Possess multidisciplinary and flexible professional skills to take decision related to quality control.
Disseminate the quality knowledge and experience through effective interaction to enhance the performance of the profession.
Develop skills of writing and presenting research assignments, professional reports and/or academic papers.
Use general ICT tools effectively.
Hold professional values that maintain individuality, positive thinking, self confidence and ethicality.

2. Intended Learning Outcomes (ILOs)

A- Knowledge and Understanding:

A1- Identify the main terminology, nomenclature, classification and principles of quality control principles.

A2- Theories, fundamentals and specialized knowledge in the field of quality control and such sciences related to his professional practice.

A3- Identify the quality problems within a theoretical, temporal, practical and ethical framework.

A4- Ethical and legal principles of professional practice in the field of quality control.

A5- Recognize the relevant and most important quality control issues, treaties, conventions and/or organizations

A6- The effect of practicing professionalism in the field of quality control on the surrounding environment and working to preserve and maintain it.

A7- Use of quality control techniques to better assess life cycle sustainability.

B- Intellectual Skills

B1- Assess interactions between systems and evaluate human impact on ecosystems; critically assess datasets and methodologies and make data accessible to the public and policy makers

B2- Investigate a case study related to quality in industrial plant.

B3- Discriminate between the different techniques used in different analysis.

B4- Analyze and solve problems using a multidisciplinary approach, applying professional judgments to balance costs, benefits, safety and social and environmental impact.

B5- Plan, conduct and write-up a programmed of original research.

B6 - Apply knowledge and modeling skills

B7- Improve methodologies & standards for materials testing.

C- Professional and Practical Skills

C1- Use laboratory methods or computer-based tools to generate data

C2- Analyze results, determine their strength and validity, and make recommendations

C3- Prepare technical reports and presentations

C4- Acquire, retrieve, assess and select relevant information from a variety of sources.

C5- Undertake activities with due regard to control quality and industrial, development issues.

C6 - Develop management skills in specific process, objective criteria, problem definition, project design and evaluation needs

D- General and Transferable Skills

D1- Prepare and present work as an individual and as part of a team and research the scientific, technical and media literature on environmental issues.

D2- Effective communication of all kinds.

D3- Demonstrate, enhanced transferable skills such as effective communication, oral presentations, computer processing and presentations, and written reports.

D4- Self-evaluation and determination of his personal learning needs.

D5- Use of various sources to obtain information and knowledge.

D6- Teamwork and time management.

D7- Leading a team in familiar professional contexts to improve manufacturing quality.
D8- Self and continuous learning.

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 References Standards (ARS)

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 ARS, 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 Skills

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.