

Academic Reference Standards
(ARS)
for
National Institute of Laser Enhanced Sciences,
Cairo University

2016
1st Edition

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Introduction

The National Institute of Laser Enhanced Sciences was established in 1994 inside the campus of Cairo University. The main objective was to introduce the various areas of laser Science applications to Egyptian society and to qualify researchers and professionals to be able to work effectively with laser and create new methods of laser applications in various fields

The academic standards of The National Institute of Laser Enhanced Sciences have been written by a committee representing the different specializations in the institute. The committee was guided by the Academic Reference Standards for postgraduate studies issued by the National Authority for Quality Assurance & Accreditation in Education, issue 1, March 2009. The institute is a unique model locally and internationally, so although the committee was guided by same references, the academic reference standards of each specialized program were tailored to suit the special states of the institute as one of the distinguished institutes for education and research in laser science and applications.

The institute has a flexible research plan which covers the major areas of laser science and applications. The plan emphasize on the multidiscipline policy which is necessary for this type of researches. Laser method offers ready solutions for many problems so the researchers in the institute open new horizons of laser applications.

The studying programs in the institute can be divided to;

- Diploma of higher study,
- Master of Science degree,
- Doctor of Philosophy degree.
- Doctor of Science.

Academic Reference Standards (ARS) for Diploma Degree

1. Attributes of the Graduates

The Diploma graduate of each specialty should be able to:

- 1.1. Apply the basic knowledge and fundamental skills required to use lasers efficiently in the professional practice.
- 1.2. Determine professional problems and propose particular solutions for the professional practice of laser applications.
- 1.3. Master the professional skills using the available technology related to laser science and applications.
- 1.4. Acquire the skill of communications and leadership in a professional context.
- 1.5. Make a decision using the available information.
- 1.6. Allocate the available resources properly.
- 1.7. Be aware of his role in the society development and environment conservation.
- 1.8. Behave according to the code of ethics and credibility.
- 1.9. Recognize the importance of the self-development and continuous learning.

2. General Reference Standards

2.1. Knowledge and Understanding

By the end of program, the graduate should be able to acquire the basic knowledge and understanding of:

- 2.1.1. Basic concepts and theories in the field of study of laser science and related applications.
- 2.1.2. Basics and principles of ethics and law related to the professional practice in the field of laser sciences and laser applications.
- 2.1.3. Principles of quality assurance of professional practice in the field of study.
- 2.1.4. Effect of professional practice of laser science and applications on the environment and consider the protection and maintenance of environment.

2.2. Intellectual Skills

By the end of program, the graduate should be able to:

- 2.2.1. Interpret, analyze and arrange the problems in the field of laser science and applications according to priority

- 2.2.2. Maintain reasonable and professional solutions for the field of study.
- 2.2.3. Interpret analytical approach for research related to laser science and applications.
- 2.2.4. Interpret hazards relative to professional practice.
- 2.2.5. Make a decision in the light of available information.

2.3. Practical and Professional Skills

By the end of program, the graduate should be able to:

- 2.3.1. Apply professionally the gained skills in the field of study.
- 2.3.2. Write professional reports.

2.4. General and Transferable Skills

By the end of program, the graduate should be able to:

- 2.4.1. Interact actively in different prospects.
- 2.4.2. Utilize the information technology to develop professional skills
- 2.4.3. Self-assessment and identification of needs
- 2.4.4. Benefit different resources to seek information and knowledge
- 2.4.5. Work in groups and manage time effectively.
- 2.4.6. Lead groups of work in professional context.
- 2.4.7. Desire and skill for life-long learning and personal and professional development

Academic Reference Standards (ARS) for Master of Science Degree

1. Attributes of the Graduates

The MSc graduate of each specialty should be able to:

- 1.1. Apply efficiently the fundamentals and theories of research and utilize correctly of research tools in laser science and applications
- 1.2. Apply analytical processes into the field of laser science and applications.
- 1.3. Apply and relate the specialized knowledge of laser science and applications with the professional practice.
- 1.4. Apprise the current problems and new vision in the field of laser science and applications.
- 1.5. Diagnose professional problems and determine appropriate solutions based on laser science and technologies
- 1.6. Master specialized professional skills and select the appropriate technology to serve the professional practice of laser systems and applications
- 1.7. Communicate and lead team work effectively.
- 1.8. Take decisions to determine an appropriate solution based on laser science and technologies in different professional prospects
- 1.9. Employ efficiently the available resources to provide highest benefits.
- 1.10. Show the awareness of contribution into community development and environment conservation in the light of the global and regional variables.
- 1.11. Apply the code of ethics and commitments relative to the profession.
- 1.12. Develop self- academic and profession and the capability of continuous learning in the field of study

2. General Reference Standards

2.1 Knowledge and Understanding

By the end of program, the graduate should be able to acquire the basic knowledge and understanding of:

- 2.1.1. Advanced concepts and theories in the field of laser science and its related applications.
- 2.1.2. The impact of the professional practice of lasers on the society and environment.

- 2.1.3. Advances relevant to field of laser science and applications.
- 2.1.4. Ethics and legal principals of professional practice in field of laser science and applications.
- 2.1.5. Concepts and principles of quality assurance in professional practice in the field of laser science and applications.
- 2.1.6. Ethics and principles of scientific research.

2.2. Intellectual Skills:

By the end of program, the graduate should be able to:

- 2.2.1 Analyze and evaluate the information in the field of laser science and applications as a reference for problem solving.
- 2.2.2 Select appropriate solutions based on laser science and technologies for insufficient givens.
- 2.2.3 Relate between the different knowledge to solve professional problems in laser systems and related applications.
- 2.2.4 Perform a scientific study and methodology of solving research problems through the applications of lasers.
- 2.2.5 Assess the hazards while performing laser applications in engineering
- 2.2.6 Plan to develop performance in laser science and applications.
- 2.2.7 Take professional decision in the perspectives of different applications and utilization of lasers.

2.3. Professional and Practical Skills:

By the end of program, the graduate should be able to:

- 2.3.1 Master basic and up-to-date professional skills in the field of laser science and applications.
- 2.3.2 Write and evaluate the technical reports
- 2.3.3 Evaluate the techniques and equipment related to the field of specialty laser science and applications..

2.4. General and Transferable Skills:

By the end of program, the graduate should be able to:

- 2.4.1. Communicate effectively and differently.
- 2.4.2. Use information technology to serve professional practice

- 2.4.3. Self-assess of needs for life-long learning and personal and professional development.
- 2.4.4. Benefit different resources to seek information and knowledge.
- 2.4.5. State rules and indicators to evaluate the others performance.
- 2.4.6. Work in groups and lead teams in different professional prospects.
- 2.4.7. Manage the time effectively
- 2.4.8. Self and continuous learning.

Academic Reference Standards (ARS) for Philosophy Doctor Degree

1. Attributes of the Graduates

The PhD graduate of each specialty should be able to:

1. 1. Master the fundamentals and theories of research.
1. 2. Contribute continuously to the knowledge in the field of laser science and applications.
1. 3. Apply the analytical processes and critiques to the relevant field of laser science and applications.
1. 4. Integrate the advanced specialized professional knowledge for the developmental progress in the field of laser science and applications.
1. 5. Acquire deep awareness of the intricate problems and new theories in the field of laser science and applications.
1. 6. Analyze professional problems and provide innovative solutions based on laser sciences and technologies.
1. 7. Master a wide scope of specialized professional skills and advanced technology to serve the field of laser science and applications.
1. 8. Initiate new trends to develop new techniques and tools for professional practice in laser systems and its related applications.
1. 9. Utilize effectively information technology to serve professional practice in laser science and applications.
1. 10. Master the communication and leadership in professional context.
1. 11. Take the suitable decision within the available information and resources.
1. 12. Utilize efficiently the available resources to develop and create new resources.
1. 13. Contribute to the development of the society and the environment conservation.
1. 14. Commit to the code of ethics relative to the profession.
1. 15. Commit to the continuous self-development and to transfer the acquired knowledge and experience to the confreres.

2. General Reference Standards

2.1. Knowledge and Understanding:

By the end of program, the graduate should be able to acquire the basic knowledge and understanding of:

- 2.1.1. Acquire the knowledge of advanced Concepts, new theories, and technologies in the field of laser science and applications.
- 2.1.2. Recognize the advanced principles, methodologies, and ethics of scientific research in laser science and applications.
- 2.1.3. Recall the ethics and legal principals of scientific research and professional practice in the field of laser science and applications.
- 2.1.4. Memorize the concepts and principles of quality assurance in professional practice in the field of laser science and applications.
- 2.1.5. Reflect of acquired knowledge of laser science and applications on the environment and the development and maintenance.

2.2. Intellectual Skills:

By the end of program, the graduate should be able to:

- 2.2.1 Analyze and evaluate the information in the field of laser science and applications as a reference and the elicitation of them.
- 2.2.2 Select appropriate laser solutions based on laser science and applications for available givens.
- 2.2.3 Develop valuable research to add to the knowledge in laser science and applications.
- 2.2.4 Write scientific paper.
- 2.2.5 Assess laser hazards during professional practice.
- 2.2.6 Plan to develop performance in the field of laser science and applications.
- 2.2.7 Take professional decision in different professional perspectives based on laser science and applications.
- 2.2.8 Create and innovate new techniques and applications based on laser science and technologies.
- 2.2.9 Discuss proves and evidence to settle professional conclusions in the different prospects based on laser science and applications.

2.3. Professional and Practical Skills:

By the end of program, the graduate should be able to:

- 2.3.1 Master basic and up to date professional skills in the field of laser science and applications.
- 2.3.2 Write and evaluate the technical reports

2.3.3 Evaluate the techniques and equipment related to the field of laser science and applications.

2.3.4 Employ the technology to serve the field of laser science and applications

2.3.5 Plan for the evolution of professional practices and performance development of laser systems and applications.

2.4. General and Transferable Skills:

By the end of program, the graduate should be able to:

2.4.1 Communicate effectively and differently.

2.4.2 Use information technology to server professional practice development.

2.4.3 Deliver the acquired knowledge and experience to confreres and asses their progress development.

2.4.4 Self-assessment and continuous learning.

2.4.5 Benefit different resources to seek information and knowledge.

2.4.6 Work in groups and lead teams.

2.4.7 Modulate scientific meeting and mänge time effectively.