**Academic Reference Standards (ARS)**

**for**

**Digital Multimedia Program**

**BSc Program**

**Faculty of Computer and Information Sciences,**

**Ain Shams University**

# Contents

*ARS for Digital Multimedia program*

## Introduction

We developed our own Academic Reference Standards (ARS) for Multimedia specialization, which is based on the National Academic References Standards (NARS) for Computing Academic Programs, developed by the Computing and Engineering Sector in the Supreme Council of Universities.

## National Academic reference Standards (NARS) for Computing and Information

### 1-Attributes of the Graduates

The graduates of the computing and Information programs should be able to:

1.1 Apply the fundamental theories and principles of computing and information applications.

1.2. Integrate and evaluate the computing tools and facilities.

1.3. Apply knowledge of mathematics and science.

1.4. Design a computing system, component, and process to meet the required needs within realistic constraints.

1.5. Exploit the techniques, skills, and up-to-date computing tools, necessary for computing and information practice.

1.6. Display professional responsibilities and ethical, societal, and cultural concerns.

1.7. Use, compare and evaluate a range of formal and informal techniques, theories, and methods to develop computing and information applications.

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1.8. Consider and deal with the individual, social, environmental, organizational, and economic implications of the application of computing and information.

1.9. Carry out a work plan with minimal supervision.

1.10. Communicate effectively.

1.11. Hold knowledge and skills required by the computing and information industry.

1.12. Engage in self and life-long learning and research in computing and information.

1.13. Fulfill requirements of potential employers.

**2- Intended Learning Outcomes (ILOs)**

**2.1- Knowledge and Understanding**

The graduates of the computing and information programs should acquire the knowledge and understanding of:

2.1.1. Understand essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.

2.1.2. Understand modeling and design of computer-based systems bearing in mind the trade-offs.

2.1.3. Understand tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.

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2.1.4. Understand criteria and specifications appropriate to specific problems, and plan strategies for their solution.

2.1.5. Understand the extent to which a computer-based system meets the criteria defined for its current use and future development.

2.1.6. Understand the current and underlying technologies that support computer processing and inter-computer communication.

2.1.7. Understand principles of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.

2.1.8. Understand management and economics principles relevant to computing and information disciplines.

2.1.9. Understand professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.

2.1.10. Understand current developments in computing and information research.

2.1.11. Understand requirements, practical constraints, and computer-based systems

### 2.2. Intellectual Skills

The graduates of the computing and Information programs should be able to:

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2.2.1 Analyze computing problems and provide solutions related to the design and construction of computing systems.

2.2.2. Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.

2.2.3. Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.

2.2.4. Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.

2.2.5. Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.

2.2.6. Evaluate the results of tests to investigate the functionality of computer systems.

2.2.7. Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

2.2.8. Understand and be familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.

2.2.9. Evaluate research papers in a range of knowledge areas.

### 2.3. Professional / Practical

The graduates of the computing and information programs should be able to:

2.3.1. Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.

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2.3.2. Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.

2.3.3. Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.

2.3.4. Apply computing information retrieval skills in computing community environment and industry.

2.3.5. Develop a range of fundamental research skills, using online resources, technical repositories, and library-based material.

2.3.6. Design, implement, maintain, and manage software systems.

2.3.7. Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.

2.3.8. Handle a mass of diverse data, assess risk, and draw conclusions.

### 2.4. Transferable skills

Graduates of the computing and information programs should be able:

2.4.1. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.

2.4.2. Demonstrate skills in group working, team management, time management and organizational skills.

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2.4.3. Show the use of information-retrieval.

2.4.4 Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.

2.4.5. Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.

2.4.6. Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.

2.4.7. Show the use of general computing facilities.

2.4.8. Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.

## Academic Reference Standards (ARS)
## for Digital Multimedia Program

### 1-Attributes of the Graduates

In addition to the attributes of the undergraduate degree, the Digital Multimedia Program graduates should be able to:

1.1.    Recognize problems that are amenable to multimedia systems, and knowledge of the multimedia tools necessary for solving such problems.
1.2.    Understand fundamentals of image and video processing, audio processing, graphics, animation, interactive multimedia, databases, and network.

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1.3.    Use a range of programming languages and tools to develop computer programs and systems that are effective solutions to problems.

1.4.    Understand fundamentals of software development life cycle, design and analysis, information security, data mining, and SW quality assurance and testing

1.5.    Understand, design, and analyze precise specifications of algorithms, procedures, and interaction behavior.

1.6.    Implement solutions, including use of appropriate programming languages and multimedia software tools.

1.7.    Apply knowledge, skills, and applications of appropriate mathematical techniques, methods, and tools in multimedia.

1.8.    Design and implement multimedia systems and evaluate them in terms of general quality attributes and possible tradeoffs presented within the given problem.

1.9.    Apply multimedia solutions to functional, inter-organizational, operational, managerial, and executive problems and opportunities.

1.10.   Describe characteristics of various components of multimedia systems, use the appropriate tools and techniques to analyze, design, and construct information systems.

1.11.   Communicate effectively by oral, written, and visual means.

1.12.   Work effectively as an individual and as a member of a team.

1.13.   Perform independent and efficient time management.

1.14.   Aware of key ethical issues affecting multimedia systems and their responsibilities as multimedia professionals.

1.15.   Identify constraints, uncertainties, and risk of the system.


## 2- Intended Learning Outcomes (ILOs)

### 2.1.  Knowledge and understanding

In addition to the Knowledge and understanding, the Digital Multimedia Program

graduates should be able to:

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2.1.1 Recognize high-level programming languages.

2.1.2    Demonstrate basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.

2.1.3    Demonstrate strong knowledge of computational methods.

2.1.4    Show a critical understanding of the principles of artificial intelligence, virtual reality, image processing, computer vision and game programming.

2.1.5    Recognize effectively computational modeling techniques related to multimedia applications area.

2.1.6    Identify data qualitatively and/or quantitatively.

2.1.7    Understand different types of multimedia data with different techniques.

2.1.8    Deal with high performance computing resources.

 2.1.9 Understand Current developments in Multimedia research.

2.1.10 Understand the legal, ethical, and social responsibility of computer scientists.

## 2.2  Intellectual Skills

In addition to the Intellectual Skills, the multimedia Program graduates should be able to:

2.2.1 Analyze computing problems and provide solutions related to the design and construction of multimedia systems.

2.2.2 Realize the concepts, principles, theories and practices behind multimedia as an academic discipline.

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2.2.3   Identify criteria to measure and interpret the appropriateness of a multimedia system for its current deployment and future evolution.

2.2.4  Analyze alternative computer systems and processes taking into account limitations, and quality constraints.

2.2.5  Evaluate the results of tests to investigate the functionality of multimedia systems.

2.2.6   Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

2.2.7   Be familiar with the professional, legal, moral, and ethical issues relevant to the Bioinformatics industry.

2.2.8  Evaluate research papers in a range of knowledge areas.

2.2.9  Perform comparisons between algorithms, methods, and techniques.

## 2.3. Practical and Professional Skills

In addition to Practical and Professional Skills, the Digital Multimedia Program graduates should be able to:

2.3.1 Use large scale computing to solve problem related to multimedia.

2.3.2 Explore and solve problems related to multimedia by selecting appropriate techniques.

2.3.3 Use of standard numerical recipes and mathematical libraries in problem solving.

2.3.4 Use scientific visualization packages to visualize complex multimedia data sets.

2.3.5 Handle a mass of diverse data, assess risk, and draw conclusions.

2.3.6 Design and implement multimedia applications.

**2.4. General and Transferable Skills**

In addition to General and Transferable Skills, the Digital Multimedia Program graduates should be able to:

2.4.1 Work efficiently in a team

2.4.2 Work in stressful environment and within constraints

2.4.3 Communicate effectively.

2.4.4 Demonstrate efficient IT capabilities.

2.4.5 Lead and motivate individuals.

2.4.6 Manage tasks and resources to prepare technical reports.

2.4.7 Self-learning and information gathering

2.4.8 Acquire entrepreneurial skills.

2.4.9 Demonstrate critical thinking and problem solving skills.

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## Curriculum Structure

| Components | Number of Credit Hours | Number of Courses | Percentage |
|---|---|---|---|
| University Requirements | 16 | 8 | 11 % |
| Faculty Requirements | 47 | 13 | 33.33% |
| Digital multi Media Program Requirements | 78 | 25 | 55.66% |
| Total | 141 | 45 | 100% |

## Glossary

### 1.      Institution

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

### 2.      Attributes of the Graduates

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

### 3.      National Academic Reference Standards (NARS)

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

### 4.      Academic Standards

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

### 5.      Subject Benchmark Statements

Guideline statements that detail what can be expected of a graduate in terms of the learning outcomes to satisfy the standards set for the program. They enable the outcomes to be compared, reviewed, and evaluated against agreed upon standards.

## 6. 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.

## 7. 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 because of a learning activity.

## 8. Knowledge and Understanding

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

## 9. Intellectual Skills

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

## 10. Professional and Practical Skills

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

## 11.    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, teamwork, numeracy, independent learning, interpersonal relationship, and problem solving...... etc.