Beni-Suef University

Faculty of Computers and Artificial Intelligence

Quality Assurance Unit

جامعـــة بنى ســـويف

كليـــة الحاسبات و الذكاء الاصطناعى

وحدة ضمان الجودة

Academic Reference Standards (ARS)

For

Multimedia Program

B. Sc.

Faculty of Computers and Artificial Intelligence

October 2024

First Edition

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1. Introduction

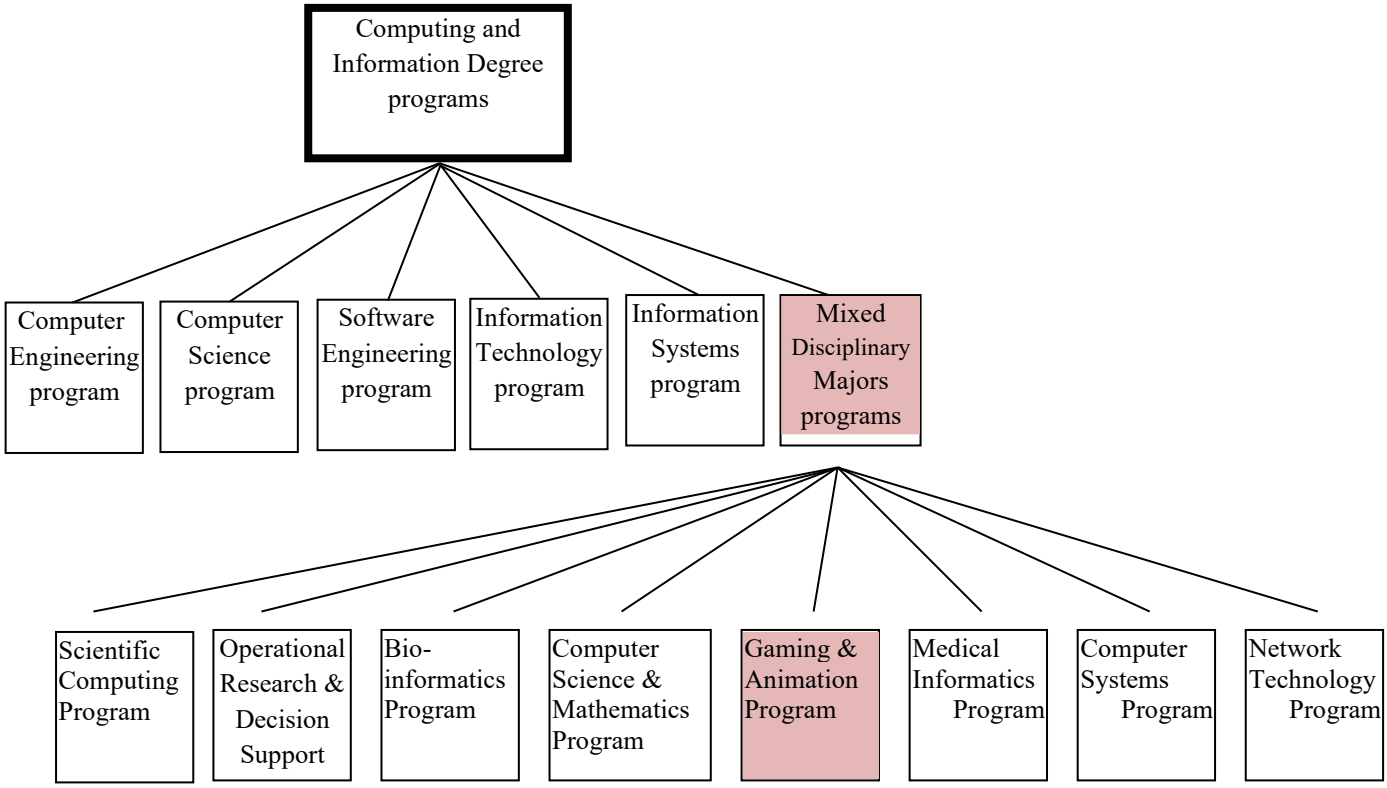
Computing and Information is concerned with the understanding, design, programming, and exploitation of computation, and computer technology one of the most significant advances of the twentieth century. It is a discipline that blends theories (including those derived from a range of other disciplines such as mathematics, engineering, psychology, graphical design or well-founded experimental insight) with the solution of immediate practical problems. it combines the ethos of the scholar with that of the professional. it supports the development of both small scale and large-scale systems that support organizational goals. it helps individuals in their everyday lives. it is everywhere and diversely applied to a range of applications, and yet important components are invisible to the eye *(NARS Computing and Information page 3)*.

1.1.Computing and Information Programs

The scope of what we call computing and information has broadened to the point that it is difficult to define it as a single program. Recent curriculum approaches divide such programs into: computer science, computer engineering, information systems, information technology, and software engineering. These address major sub-programs, but additional possibilities still exist. Some Mixed Disciplinary Majors are introduced in this NARS for computing and information programs. This introduction has been produced in an attempt to characterize these sub-programs and also to characterize graduates from such degree programs. There is no question that computing and information in the 21st century will encompass many vital programs with their own integrity and educational practices *(NARS Computing and Information page 6)*.

It is hardly surprising that the diversity of computing and information is reflected in the varied titles and curricula that institutions have given to their computing and information-related degree courses. While this benchmarking standards NARS, aims to capture the nature of computing and information as a

discipline, individual institutions may need to draw on a wider range of materials and resources including other benchmarking standards to capture fully the specific character of their particular degree programs.



The common computing and information subprograms are listed in the following:

1. **Computer Engineering**

   Typically involves software and hardware and the development of systems that involve software, hardware, and communications.
2. **Computer Science**

   Tends to be relatively broad and with an emphasis on the underlying science aspects.
3. **Information Systems**

   Essentially, this is computing and information in an organizational context, typically in businesses.

4. **Information Technology**

   Focuses on computing infrastructure and needs of individual users. tends to involve a study of systems (perhaps just software systems, but perhaps also systems in support of learning, of information dissemination, etc.).

5. **Software Engineering**

   Focuses on large-scale software systems. employs certain ideas from the world of engineering in building reliable software systems.

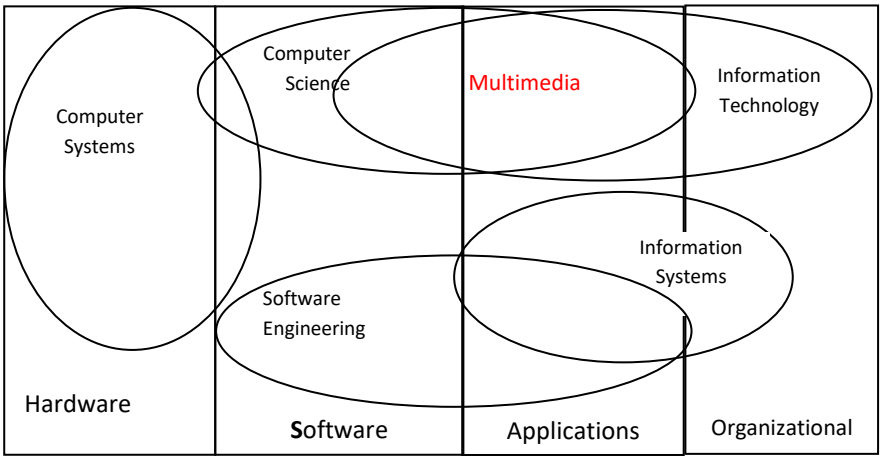
6. **Mixed Disciplinary Majors**

Because computing and information is such an important and dynamic field, many interdisciplinary majors, some are very recent developments, exist at some faculties. Here are just a few examples of these opportunities *(NARS Computing and Information page 7)*:

- Scientific Computing Program
- Operational Research & Decision Support program
- Bio-informatics Program
- Computer Science & Mathematics Program
- Gaming & Animation Program
- Medical Informatics Program
- Computer Systems Program
- Network Technology Program

1.2.Multimedia Program

The Multimedia program is a mixed discipline between computer science and Information Technology majors. This program is for students interested in creating computer games and computer animations. It has various flavors and may combine either or both computer science and information technology work with either or both digital media studies.



2. National Academic Reference Standards (NARS) for Computing and Information Disciplines

2.1. Attributes of Computing and Information Programs Graduates

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

1. Apply the fundamental theories and principles of computing and information applications.
2. Integrate and evaluate the computing tools and facilities.
3. Apply knowledge of mathematics and science.
4. Design a computing system, component, and process to meet the required needs within realistic constraints
5. Exploit the techniques, skills, and up-to-date computing tools, necessary for computing and information practice.
6. Display professional responsibilities and ethical, societal, and cultural concerns
7. Use, compare, and evaluate a range of formal and informal techniques, theories, and methods to develop computing and information applications.
8. Consider and deal with the individual, social, environmental, organizational, and economic implications of the application of computing and information.
9. Carry out a work plan with minimal supervision.
10. Communicate effectively.
11. Hold knowledge and skills required by the computing and information industry.

12. Engage in self and life-long learning and research in computing and information.
13. Fulfill requirements of potential employers.

2.2. National Academic Reference Standards (NARS) for Computing and Information Programs.

Graduates are expected to develop a wide range of abilities and skills. These may be divided into four broad categories:

- Knowledge and Understanding
- Computing and Information-related cognitive abilities and skills, i.e. abilities and skills relating to intellectual tasks.
- Computing and Information-related practical skills.
- Additional transferable skills that may be developed in the context of computing and information but which are general and applicable in many other contexts

Knowledge and understanding, cognitive, practical, and generic skills need to be placed in the context of the program of study as designed by the institution and/or the possible pathways selected by the individual student.

2.2.1. Knowledge and Understanding

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

1. Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.
2. Modeling and design of computer-based systems bearing in mind the trade-offs.
3. Tools, practices, and methodologies used in the specification, design, implementation, and evaluation of computer software systems.
4. Criteria and specifications appropriate to specific problems, and plan strategies for their solution.
5. The extent to which a computer-based system meets the criteria defined for its current use and future development.
6. The current and underlying technologies that support computer processing and inter-computer communication.

7. Principals of generating tests that investigate the functionality of computer programs and computer systems and evaluating their results.
8. Management and economics principles relevant to computing and information disciplines.
9. 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.
10. Understand current developments and techniques in computing and information research.
11. Requirements, practical constraints, and computer-based systems

2.2.2. Intellectual Skills

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

1. Analyze computing problems and provide solutions related to the design and construction of computing systems.
2. Realize the concepts, principles, theories, and practices behind computing and information as an academic discipline.
3. Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.
4. Analyze, propose, and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.
5. Make ideas, proposals, and designs using rational and reasoned arguments for the presentation of computing systems.
6. Evaluate the results of tests to investigate the functionality of computer systems.
7. Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact
8. Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.
9. Evaluate research papers in a range of knowledge areas

2.2.3. Professional / Practical

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

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

2. Implement comprehensive computing knowledge and skills in projects and in the deployment of computers to solve position practical problems.
3. Deploy the equipment and tools used for the construction, maintenance and documentation of computer applications.
4. Apply computing information retrieval skills in the computing community environment and industry**.**
5. Develop a range of fundamental research skills, through the use of online resources, technical repositories, and library-based material
6. Design, implement, maintain, and manage software systems.
7. Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.
8. Handle a mass of diverse data, assess risk and draw conclusions.

2.2.4. Transferable skills

Graduates of the computing and information programs should be able:

1. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.
2. Demonstrate skills in group working, team management, time management, and organizational skills.
3. Show the use of information retrieval.
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.
5. Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.
6. Reveal communication skills, public speaking and presentation skills, delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.
7. Show the use of general computing facilities.
8. Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.

3. Curricula Contents for Computing and Information Disciplines

Table 1: Indicative curricula content by subject area

	Subject Area	Tolerance %
A	Humanities, ethical and Social Sciences (Univ. Req.)	8-10
B	Mathematics and Basic Sciences	16-18
C	Basic Computing Sciences (institution req.)	26-28
D	Applied Computing Sciences (specialisation)	28-30
E	Training	3-5
F	Projects	3-5
	Subtotal	84-96
G	Optional (Institution character-identifying subjects)	4-16
	Total	100

4. ARS Characterization of Multimedia Program

4.1. The Attributes of Multimedia Graduate

14. Have a solid understanding of the used concepts in computer science to be able to pursue further learning, whether as graduate students or on their own. (NARS CS Attributes: 7)
15. Demonstrate an understanding of algorithms and data structures, networks, artificial intelligence, graphics, human-computer interfaces, and databases, and identify and define the computing requirements for its solution. (NARS CS Attributes: 8)
16. Design, implement, and evaluate a computer-based system, process, component or program to meet desired needs. (NARS CS Attributes: 9) (NARS IT Attributes: 3)
17. Use knowledge and understanding in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoff involved in design choices. (NARS CS Attributes: 10).

18. Knowledge of computing and mathematics appropriate to the discipline. (NARS IT Attributes: 1)
19. Identify a problem and analyze user needs and define the computing requirements appropriate to its solution taking into account in the selection, creation, evaluation, and administration of computer-based systems. (NARS IT Attributes: 2) (NARS IT Attributes: 11)
20. Use current techniques, skills, and tools necessary for Information technology practice and in the creation of an effective project plan. (NARS IT Attributes: 9)
21. Use and apply current technical concepts and practices in the core information technologies subjects. (NARS IT Attributes: 10)
22. Effectively integrate IT-based solutions into the user environment. (NARS IT Attributes: 13)

4.2. Academic Reference Standards for Multimedia Program

4.2.1. Knowledge and Understanding

In addition to knowledge and understanding of computing and information graduate, the Multimedia graduate should acquire the knowledge and understanding of:

12. Understand the essential mathematics relevant to Multimedia. (NARS CS K&U: 1)
13. Use high-level programming languages. (NARS CS K&U: 2)
14. Demonstrate basic knowledge and understanding of the core of analysis, algebra, applied mathematics, and statistics. (NARS CS K&U: 3)
15. Know and understand the principles and techniques of several application areas informed by the research directions of the subject, such as computer graphics. (NARS CS K&U: 5)
16. Show a critical understanding of video and audio, image, pattern recognition, multimedia, computer and communication networks, and web development principles. (NARS CS K&U: 6) (NARS IT K&U: 3)
17. Demonstrate basic knowledge and understanding of fundamental principles of core computing and strong knowledge of programming fundamentals and the

construction of computer-based systems, data structures, and software engineering techniques. (NARS IT K&U: 2) (NARS IT K&U: 1)

18. Know the role of human factors in the design of multimedia systems. (NARS IT K&U: 5)
19. Interpret tools and techniques for the design and development of applications. (NARS IT K&U: 6)
20. Provide an understanding of legal, professional, and moral aspects of the exploitation of Multimedia development. (NARS IT K&U: 8)
21. Understand the challenges inherent in the maintenance and evolution of multimedia computer-based systems, and the techniques and best practices currently available for dealing with them. (NARS IT K&U: 10)

4.2.2. Intellectual Skills

In addition to intellectual of computing and information graduate, the Multimedia graduate should be able to:

9. Define traditional and nontraditional problems, set goals to solve them, and observe results. *(NARS CS Intellectual: 1)*
10. Perform classifications of (data, results, methods, techniques, andalgorithms. etc.). *(NARS CSIntellectual: 3)*
11. Summarize the proposed solutions and their results. *(NARS CS Intellectual: 5)*
12. Establish criteria and verify solutions. *(NARS CS Intellectual: 7)*
13. Identify various solutions and critically evaluate and justify proposed design solutions. *(NARS IT Intellectual: 6)*
14. Perform problem analysis from written descriptions. derive requirements specifications froman understanding of problems (analysis, synthesis). *(NARS IT Intellectual: 9)*
15. Create and/or justify designs to satisfy given requirements (synthesis, evaluation,application). *(NARS IT Intellectual: 10)*

4.2.3. Professional and Practical Skills

In addition to Professional and Practical Skills in computing and information graduate, the Multimedia graduate should be able to:

9. Communicate effectively by oral, written, and visual means. *(NARS CS Prof & prac: 2)*
10. Prepare and present seminars to a professional standard. *(NARS CS Prof & prac: 4)*
11. Prepare technical reports, and a dissertation, to a professional standard. use IT skills and display mature computer literacy. *(NARS CS Prof & prac: 6)*
12. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video. *(NARS CS Prof & prac: 9)*
13. Apply the principles of human-computer interaction to the evaluation and construction of awide range of materials including user interfaces, web pages, and multimedia systems. *(NARSCS Prof & prac: 10)*
14. Deploy effectively the tools used for the construction and documentation of software, with particular emphasis on understanding the whole process involved in using computers to solve practical problems. *(NARS CS Prof & prac: 12)*
15. Deploy tools for the implementation and documentation of computer-based systems. *(NARSIT Prof & prac: 4)*
16. Work as part of a development team to recognize the different roles of its members. *(NARS IT Prof & prac: 5)*
17. Recognize and address professional, moral and ethical issues within the discipline. *(NARS ITProf & prac: 7)*
18. Make effective use of general IT facilities, plan and manage a project to complete within budget and schedule. *(NARS IT Prof & prac: 9)*
19. Manage one's own learning and development, including time management and organizational skills. *(NARS IT Prof & prac: 10)*
20. Present their work in the form of reports, oral presentations, or an internet website. *(NARS ITProf & prac: 11)*

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

5. **Subject Benchmark Statements**

   Guideline statements detail what graduates can expect in terms of 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 as a result 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, team work, numeracy, independent learning, interpersonal relationship, and problem-solving... etc.