-المعايير الأكاديمية القومية المرجعية

National Academic Reference Standards (NARS)

هى مجموعة من المعايير التى وضعتها لجان متخصصة، و هى الحد الأدنى من المعارف و المهارات المطلوب تحقيقها من خلال البرنامج التعليمى من اجل اعتماده من الهيئة القومية لضمان جودة التعليم و الاعتماد، و يتم الرجوع اليها فى صياغة اهداف و نواتج التعلم المستهدفة عن توصيف البرنامج التعليمى.

- **مواصفات الخريج:**

مجموعة من الخصائص و السمات المتوقعة من الخريجين لهذا البرنامج التعليمى.

- **مخرجات التعلم المستهدفة**

Intended Learning Outcomes

و هى المعرفة و الفهم و المهارات الضرورية للعمل التى تعتزم الكلية تقديمها فى برنامجها التعليمي و التى تعكس رؤية و رسالة الكلية.

1- Attributes of graduates for Computer Science Program

Graduates of the Faculty of computer and information, Suez Canal University will be able to:

i-Demonstrate knowledge in fundamental areas of computer science such as: algorithms, design and analysis, computer architecture, software based systems and high level languages programming.

ii. Apply mathematical foundations and computer science theory in the modeling and design, implementation, evaluation of computer-based systems.

iii. Define traditional and nontraditional problems in computer science and apply knowledge of mathematics and science to real world problems.
iv. Demonstrate skills necessary to effectively evaluate the algorithmic approaches.

v. Apply a wide range of principles and tools for topics in computer science including hardware, software and software engineering.

vi. Define principles and tools of programming languages such as data mining that identify risks involved in computing equipment within a given content.

vii. understand of algorithms, data structures, architecture, programming language concepts, compilers, networks, artificial intelligence, graphics, human computer.
interfaces, and databases, and identify and define the computing requirements for its solution.
viii. Design, implement, and evaluate computer-based systems.
ix. Use knowledge in a way that demonstrates comprehension of the trade-off involved in design choices.

x. Demonstrate skills in communication, time management, critical thinking, problem – solving, decision – making, team working, seminars and web resources.

xi. Demonstrate ability for continuing education.

2- Intended learning outcomes (ILOs)

A. Knowledge and understanding:

On completion of this program the successful student will be able to:

A1 – Define the fundamental concepts, principles, theories, analysis, algebra, applied mathematics, statistics and mathematical results relevant to computer science.

A2 - Recognize theoretical underpinnings of computing, computability and computer languages, its application in building models at various levels of abstraction, and its importance in reasoning, analyzing data qualitatively and/or quantitatively, communication and system development.

A3 – Explain hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, and networking systems and the relationship between all of these topics.

A4 – Outline the fundamental concepts, principles and theories of computing and problem solving with the aid of computer language, artificial intelligence and computer science covering topics such as algorithms, operating systems.

A5 – Recall the principles and techniques of a number of application areas informed by the research directions of the subject, such as artificial intelligence, image, pattern recognition, databases and computer graphics.

B. Intellectual Skills

On completion of this program the successful student will be able to:

B1- Illustrate the essential facts, concepts, principles, theories, and computer- system application attributes, components, relationships, patterns, and architecture relating to computer science and their relationship to one another.

B2- Identify criteria and a range of solutions then predict and verify the proposed design solutions and if necessary restrict the solution methodologies upon the results.

B3- Express commercial or industrial problems in the computer science field and estimate the methodologies that solve it in an innovative way.

B4- Summarize the solution of problems and be aware of the context of computer developments.

B5- Identify the different levels of computer systems modeling, system's design from variety of sources and translate these levels toward solving problems.

B6- Select algorithms, methods, software techniques based on some criteria to solve computer science problems and give a comparison between them.

C. Professional and practical skills

On completion of this program the successful student will be able to:

C1- Prepare and construct documentation of technical reports with verbal and written structure.

C2- Design technical presentations suitable for the time, place and audience.

C3- Use the scientific literature effectively for acquisition and practice of Professional skills in computer science and make discriminating use of web resources.

C4- Select and utilise appropriate software tools, database, and design methodologies for the construction, documentation and validation of computer applications.

C5- Apply computer science skills in a commercial or industrial environment and assess the risks or safety aspects involved in the operation of computing equipment within a specific context.

C6- Apply advanced validation and verification techniques, principles of human-computer interaction to implement a test plan, user interfaces for a given software system.

D. General and transferable skills

On completion of this program the successful student will able to:

D1- Formulate approach to the deployment the communication skills.

D2- Schedule the personal responsibility by working to multiple deadlines in complex activities and categorize any risks or safety aspects related to these activities.

D3- Demonstrate significantly enhanced group working abilities and show effectively the communication skills.

D4- Collect information from a variety of sources such as libraries, hard copies or electronic sources.

D5- Use project management, risk analyze, quality assurance and system validation skills for variation in different fields.

D6- Design a technical presentation that based on reading references.

3- Academic standards

The National Academic Reference Standards (NARS) for the Computer Science program set forth by the National Authority for Quality Assurance and Accreditation of Education were adopted as academic standards.

Consistency of NARS by Program ILOs

(NARS)	Program ILOS Covered by No.PP
1- Knowledge and Understanding	
By the end of computer science program the graduate should be able to:	
1.1- Understand the essential mathematics relevant to computer science.	A1- Define the fundamental concepts, principles, theories, analysis, algebra, applied mathematics, statistics and mathematical results relevant to computer science.
1.2- Use high-level programming languages.	A2- Recognize theoretical underpinnings of computing, computability and computer languages, its application in building models at various levels of abstraction, and its importance in reasoning, analyzing data qualitatively and/or quantitatively, communication and system development. A4 – Outline the fundamental concepts, principles and theories of computing and

	problem solving with the aid of computer language, artificial intelligence and computer science covering topics such as algorithms, operating systems.
1.3- Demonstrate basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.	A1– Define the fundamental concepts, principles, theories, analysis, algebra, applied mathematics, statistics and mathematical results relevant to computer science.
1.4- Interpret and analyzing data qualitatively and/or quantitatively.	A2- Recognize theoretical underpinnings of computing, computability and computer languages, its application in building models at various levels of abstraction, and its importance in reasoning, analyzing data qualitatively and/or quantitatively, communication and system development.
1.5- Know and understand the principles and techniques of a number of application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases and computer graphics.	A4– Outline the fundamental concepts, principles and theories of computing and problem solving with the aid of computer language, artificial intelligence and computer science covering topics such as algorithms, operating systems.
1.6- Show a critical understanding of the principles of artificial intelligence, image, and pattern recognition.	A4 – Outline the fundamental concepts, principles and theories of computing and problem solving with the aid of computer language, artificial intelligence and computer science covering topics such as algorithms, operating systems. A5 – Recall the principles and techniques of a number of application areas informed by the research directions of the subject, such as artificial intelligence, image, pattern recognition, databases and computer graphics.
1.7- Understand the fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems and software tools.	A3- Explain hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, and networking systems and the relationship between all of these topics.
1.8- Select advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing	A3– Explain hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, and networking systems and the relationship between all of these topics. A5– Recall the principles and techniques of a number of application areas informed by the research directions of the subject, such as artificial intelligence, image, pattern recognition, databases and computer graphics.
2- Intellectual Skills **By the end of computer science program the graduate should be able to:**	
2.1- Define traditional	

and nontraditional problems, set goals towards solving them, and observe results.	B2- Identify criteria and a range of solutions then predict and verify the proposed design solutions and if necessary restrict the solution methodologies upon the results.. B5- Identify the different levels of computer systems modeling, system's design from variety of sources and translate these levels toward solving problems.
2.2- Perform comparisons between (algorithms, methods, techniques...etc).	B6- Select algorithms, methods, software techniques based on some criteria to solve computer science problems and give a comparison between them .
2.3- Perform classifications of (data, results, methods, techniques, algorithms..etc).	B6- Select algorithms, methods, software techniques based on some criteria to solve computer science problems and give a comparison between them .
2.4-Identify attributes, components, relationships, patterns, main ideas, and errors.	B1- Illustrate the essential facts, concepts, principles, theories, and computer- system application attributes, components, relationships, patterns, and architecture relating to computer science and their relationship to one another.
2.5- Summarize the proposed solutions and their results.	B4- Summarize the solution of problems and be aware of the context of computer developments.
2.6-Restrict solution methodologies upon their results	B2- Identify criteria and a range of solutions then predict and verify the proposed design solutions and if necessary restrict the solution methodologies upon the results.
2.7-Establish criteria, and verify solutions.	B2- Identify criteria and a range of solutions then predict and verify the proposed design solutions and if necessary restrict the solution methodologies upon the results..
2.8- Identify a range of solutions and critically evaluate and justify proposed design solutions.	B2- Identify criteria and a range of solutions then predict and verify the proposed design solutions and if necessary restrict the solution methodologies upon the results.. B4- Identify the different levels of computer systems modeling, system's design from variety of sources and translate these levels toward solving problems.
2.9- Solve computer science problems with pressing commercial or industrial constraints.	B3- Express commercial or industrial problems in the computer science field and estimate the methodologies that solve it in an innovative way.
2.10- Generate an innovative design to solve a problem containing a range of commercial and industrial constraints	B3- Express commercial or industrial problems in the computer science field and estimate the methodologies that solve it in an innovative way. B5- Identify the different levels of computer systems modeling, system's design from variety of sources and translate these levels toward solving problems.
3- Professional and Practical Skills	
By the end of computer science program the graduate should be able to:	
3.1-Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database system	C4- Select and utilise appropriate software tools, database, and design methodologies for the construction, documentation and validation of computer applications. D5- Use project management, risk analyze, quality assurance and system validation skills for variation in different fields.
3.2- Communicate	C1- Prepare and construct documentation of technical reports with verbal and written

effectively by oral, written and visual means.	structure. D1- Formulate approach to the deployment the communication skills. D3- Demonstrate significantly enhanced group working abilities and show effectively the communication skills.
3.3- Perform independent information acquisition and management, using the scientific literature and Web sources.	C3- Use the scientific literature effectively for acquisition and practice of Professional skills in computer science and make discriminating use of web resources. D5- Use project management, risk analyze, quality assurance and system validation skills for variation in different fields.
3.4- Prepare and present seminars to a professional standard.	C2- Design technical presentations suitable for the time, place and audience. D6- Design a technical presentation that based on reading references.
3.5- Perform independent information acquisition and management, using the scientific literature and Web sources.	C3- Use the scientific literature effectively for acquisition and practice of Professional skills in computer science and make discriminating use of web resources. D4- Collect information from a variety of sources such as libraries, hard copies or electronic sources.
3.6- Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	C1- Prepare and construct documentation of technical reports with verbal and written structure. D6- Design a technical presentation that based on reading references.
3.7- Specify, design, and implement computer-based systems	C4- Select and utilise appropriate software tools, database, and design methodologies for the construction, documentation and validation of computer applications. C6- Apply advanced validation and verification techniques, principles of human-computer interaction to implement a test plan, user interfaces for a given software system. D5- Use project management, risk analyze, quality assurance and system validation skills for variation in different fields.
3.8- Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	C6- Apply advanced validation and verification techniques, principles of human-computer interaction to implement a test plan, user interfaces for a given software system. D5- Use project management, risk analyze, quality assurance and system validation skills for variation in different fields.
3.9- Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	C5- Apply computer science skills in a commercial or industrial environment and assess the risks or safety aspects involved in the operation of computing equipment within a specific context. D1- Formulate approach to the deployment the communication skills. D5- Use project management, risk analyze, quality assurance and system validation skills for variation in different fields.
3.10- Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and	C6- Apply advanced validation and verification techniques, principles of human-computer interaction to implement a test plan, user interfaces for a given software system. D5- Use project management, risk analyze, quality assurance and system validation skills for variation in different fields.

multimedia systems.	
3.11- Identify any risks or safety aspects that may be involved in the operation of computing equipment within a given context.	C5- Apply computer science skills in a commercial or industrial environment and assess the risks or safety aspects involved in the operation of computing equipment within a specific context.. D2- Schedule the personal responsibility by working to multiple deadlines in complex activities and categorize any risks or safety aspects related to these activities.
3.12- 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.	C4- Select and utilise appropriate software tools, database, and design methodologies for the construction, documentation and validation of computer applications. D5- Use project management, risk analyze, quality assurance and system validation skills for variation in different fields.
3.13- Prepare technical reports, and a dissertation, to a professional standard.	C1- Prepare and construct documentation of technical reports with verbal and written structure. D6- Design a technical presentation that based on reading references.