Quality Guide of Computers and Control Program
2024/2025

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
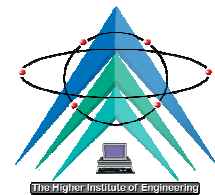**Communications and Computers Engineering Department**
Computers and Control Program
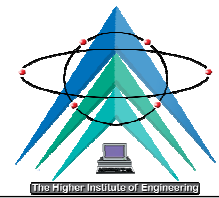
Computers and Control Engineering (CCE) Program Quality Guide

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

List of Contents

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

Introduction to the guide

This guide aims to introduce the basic data and information for the Computer Engineering and Control Program, which includes the definition of the program, the vision, mission and objectives of the program, the distinctive features of the program, as well as the graduate specifications and fields of work. The guide also includes the departments and units supporting the program. As well as, the guide includes the curricula of the 2013 and 2019 regulations according to what is available in the study regulations.

First: Basic information about the program

Name of the institution to which the program is affiliated: Higher Institute of Engineering in EL-Shorouk.

Type of institution: Private higher institute with fees.

Name of the university / academy affiliated to the institution: The institute is affiliated to the Ministry of Higher Education and Scientific Research.

Name of the scientific department to which the program is affiliated: Communications and Computer Engineering

Date of establishment: 1995

Duration of study: Five (5) years

Language of study: English

Geographical location: Cairo Governorate EL- Shorouk City – EL-Nakhil Suburb - P.O. Box 3 - Telephone 19644

Website: www.hie.sha.edu.eg

Second: definition of the program

Quality has become an essential and necessary element for any institution that provides its services in a global competitive manner .Universities are considered the most important elements and tools for the progress, development and prosperity of any society. Universities are the first institutions entrusted with preparing professionals and specialists for all sectors of society. Likewise, universities are responsible for advancing society and raising the country's status among the world. Likewise, universities in

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

developed countries such as the United Kingdom (UK) contribute a large percentage to the economy, which explains the importance of universities in the world countries in various sectors of society.

Quality in university institutions is considered the engine of progress for the quality of all institutions in society. Because graduates of university institutions are the bearers of progress and advancement in various institutions and sectors of society. These force us to pay attention to the quality of university education in the era of the information revolution that has made the world a small village that can evaluate one another. The current working paper addresses the elements of achieving educational quality in university institutions.

Because quality is a necessary and continuous work and a basic requirement represented in working efficiently and effectively with the variables of the current knowledge era of continuous and rapid development. Efforts and energies must be devoted to developing the practices and activities of the university system with its inputs, processes and outputs in accordance with standard standards, and to achieve continuous improvement in performance to provide a superior educational service, and raise the quality level of the graduate is constantly maintained, keeping pace with the corresponding rapid development in science and progress in quality standards.

Third: Vision, Mission and Objectives of the Program

(1) Program Vision

Local and regional leadership in the field of computer engineering and control via preparing a scientifically, research- and professionally creative generation that meets the requirements of the labor market, society and the surrounding environment.

(2) Program Mission

Preparing competent specialized engineers in the field of computer and control engineering who are able to meet the needs of the labor market,

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

advance in research fields and contribute to serving society and developing the environment for local and regional leadership.

(3) Program Objectives

(3-1) General Objectives of the Program

1. Preparing engineering cadres with a high level of understanding, knowledge and psychological preparation capable of building, analyzing and developing computer and control systems via the following:
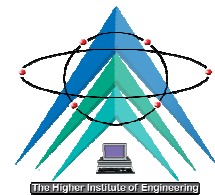
• Educational objectives of the program.

2. Providing a distinguished educational level for students via the following:

• Continuous development of academic programs and educational and applied systems in line with the requirements of preparing a distinguished graduate.

• Providing students with comprehensive multidisciplinary training in computer and control engineering.

• Continuous development of laboratories with modern devices and programs in line with the needs of the labor market.

3. Developing the skills of faculty members, assistants and administrative staff via the following:

• Attending specialized courses in modern technologies at all levels.

• Attending scientific seminars and conferences with the aim of deepening the concepts of technology and modern knowledge.

4. Supporting scientific research and community service via the following:

• Developing and enhancing the value of scientific and academic research and raising the level of scientific activities and research in response to the needs of society according to the highest quality standards.

• Exchanging experiences and information and concluding agreements with similar bodies, institutions and relevant companies

(3-2) Educational objectives of the program

1. Applying basic engineering sciences, algorithmic principles and computer science theories in modeling and designing computer and control systems.

2. Analyzing, modeling, designing, implementing and testing various control systems with aid of computer.   Also, control systems operation, maintenance

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

and repair. As well as design and implementation of embedded systems and electronic devices related to computers and modern software systems used in building computer systems.

3. Modeling, designing and implementing database systems, analyzing and designing computer networks and communications and measurement systems .As well as, determining the specifications and equipment required for them. Also, designing websites and mobile phone applications.

4. Applying the acquired knowledge in implementing pattern and signal recognition techniques, image processing and analysis. As well as, modeling and designing artificial intelligence systems for use in various fields.

5. Applying engineering methods, tools and skills in the field of computer and control technology to be able to analyze and model engineering problems and choose the optimal solution for them.

6. Developing self-learning skills and focusing on how to conduct scientific research, effective communication, technical presentations and preparing reports, and instilling teamwork ethics.
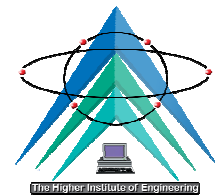
7. Designing and implementing applied and research projects in response to the needs of society and developing the environment according to the highest quality standards.

Fourth: Distinctive features of the program

1. The program is distinguished by its connection to the historical status of the institute, as the institute and the program were established in 1995 AD, the program grants a bachelor's degree in engineering after five years of study. Over the course of more than twenty-five years, the Electronics and Communications Engineering Program at the Higher Institute of Engineering (HIE) in EL-Shorouk city is considered one of the centers of excellence in engineering education in Egypt. A number of (24) batches have graduated, with (485) engineers, until the end of the academic year 2023/2022.

2. Partnerships and agreements with Huawei and the establishment of the Huawei Academy at the institute, which helps in training students, faculty members and their assistants in modern technological fields and topics, in addition to linking what is taught in some courses to what is available in the labor market and providing international exams for students.

3. Partnerships and agreements with the Egyptian Space Agency(ESA), which allow students to train in space and satellite technology, in addition to

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

participating with the agency in graduation projects proposed by the Egyptian Space Agency(ESA).

4. The existence of a research plan for the program that is consistent with the research plan of the Egyptian state.

5. Conducting many applied researches and projects to serve the community in cooperation with many state institutions (such as Armed Forces Research Center - Electronics Research Institute – EL-Shorouk City Authority - Ain Shams University) to complete these researches and projects.

6. Cooperating with many state institutions in the field of student training and field visits such as Benha Electronic Industries Company - National Authority for Military Production - Arab Organization for Industrialization - Telecommunications Egyptian Company - Huawei Company - Radio and Television Union - Egyptian Space Agency.

7. The program is distinguished by the fact that a large number of faculty members have obtained scientific degrees from prestigious universities and distinguished scientific schools.

8. Student participation in student activities by participating in local competitions and obtaining advanced positions.

9. The presence of student families in partnership and cooperation with institutions such as the Institute of Electrical and Electronics Engineers (IEEE).

10. The availability of a number of incoming students to the program.

11. The program is a professional entity specialized scientifically in teaching specialized courses in the field of electronics and communications engineering.

12. The program is an interactive entity that carries out its tasks through students, administrators and faculty members in a dynamic environment inside and outside the institute.

13. The existence of a clear and announced organizational structure that allows for easy organization of work and interconnection between the program and the institute's departments and units.

14. Continuous development to keep pace with new variables and labor market requirements.

15. Reliance on technological development and communication and the use of modern means in teaching and communication, which contributes to raising

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

the efficiency of time utilization for faculty members, assisting staff, administrators and students.

Fifth: Program Graduate Specifications
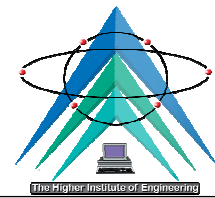
(5-1) General Graduate Specifications

A graduate of the Computer and Control Engineering Program must be able to do the following:

1. Mastering a wide range of engineering knowledge and specialized skills and be able to apply the acquired knowledge using theories and abstract thinking in real-life situations.

2. Apply analytical and systematic thinking to identify engineering problems in their diversity and different degrees of complexity and provide appropriate and innovative solutions to them.

3. Act professionally and adhere to the ethics and standards of the engineering profession.

4. Lead or work within a diverse team of professionals from various engineering disciplines and be able to bear personal responsibility and team performance.

5. Realize and distinguish his role in enhancing the engineering field and contributing to the development of the profession and society.

6. Appreciate the importance of the environment, both physical and natural, and work to promote the principles of sustainability.

7. Apply and use modern technologies, skills and tools necessary to practice the engineering profession.

8. Take full responsibility for learning and self-development, engage in lifelong learning and demonstrate the ability to participate in graduate studies and research.

9. Effective communication using various media, tools and languages with different audiences to deal with academic/professional challenges in a professional and creative manner.

10. Demonstrate leadership qualities, business management and project management skills.

(5-2) Special specifications for the graduate

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

1. Mastering the knowledge acquired from modeling, designing, implementing and operating computers and computer-related electronic devices, network systems, automatic control systems and embedded systems, as well as determining the specifications and equipment necessary for them, maintaining and repairing them.

2. Applying, developing and designing various artificial intelligence systems, image processing and pattern recognition techniques, as well as developing and designing databases, websites, mobile phone applications and satellites.

Sixth: Fields of work for the program graduate

The field of specialization in computer and control engineering is a broad field, as there are many jobs that the student can work in after graduation, such as:

6-1 First: Fields of computer engineering

A. Software Engineering:

• Software Developer "Design, Implement, Test and Maintain Software of Various Types" (Desktop Applications - Mobile Applications - … etc.)

• Computer Game Designer

B. Computer Networks:

• Computer Network Development (Computer Network Development Engineer)

• Computer Network Management (Computer Network Operation Engineer)

• Computer Network Testing (Test Engineer)

• Computer Network Maintenance (Site Maintenance Engineer)

• Securing and Protecting Computer Networks (Network Protection Engineer).

• Support and Technical Support Office in Wired and Wireless Telecommunications Companies (Technical and Technical Support Engineer).

C. Artificial Intelligence and Machine Learning:

• System Designers and Analysts (Cognitive Systems, Visual Computing, … etc.)

• Supervising the Work of Computers and Robots

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program
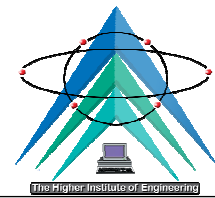
• Specialization in the Field of Machine Learning

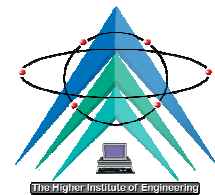## D. Data Science

• Technical Support Specialist.

• Data Analysts.

• Work in the Field of Education.

C. Websites Development

• Website designers and interfaces (Web pages)

• Website developers (Web pages)

• Database designers and specialists

6-2 Second: Control engineering fields

• Companies specialized in various industrial systems such as paper, iron and steel, textile, chemical, petrochemical, pharmaceutical, spinning and weaving, and food industries.

• Oil and natural gas exploration and refining companies

• Companies specialized in firefighting and industrial security systems

• Companies specialized in monitoring systems, securing facilities and assets, and building management

• Power generation, transmission, and distribution stations

• Water and sewage stations

• Remote sensing bodies and companies

• Companies specialized in intelligent transportation systems

• Companies specialized in designing, implementing, and testing fiber optic networks.

• Companies specialized in developing and testing control devices and measuring devices.

• Companies and factories specialized in manufacturing panels, circuits, and electrical supply cables

• Industrial control and automation field.

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

• Companies specialized in developing and calibrating electrical medical devices.

• Manufacturing quality - Quality control engineer.

• Companies specialized in electrical works, load distribution, automatic control in buildings, and low current systems.
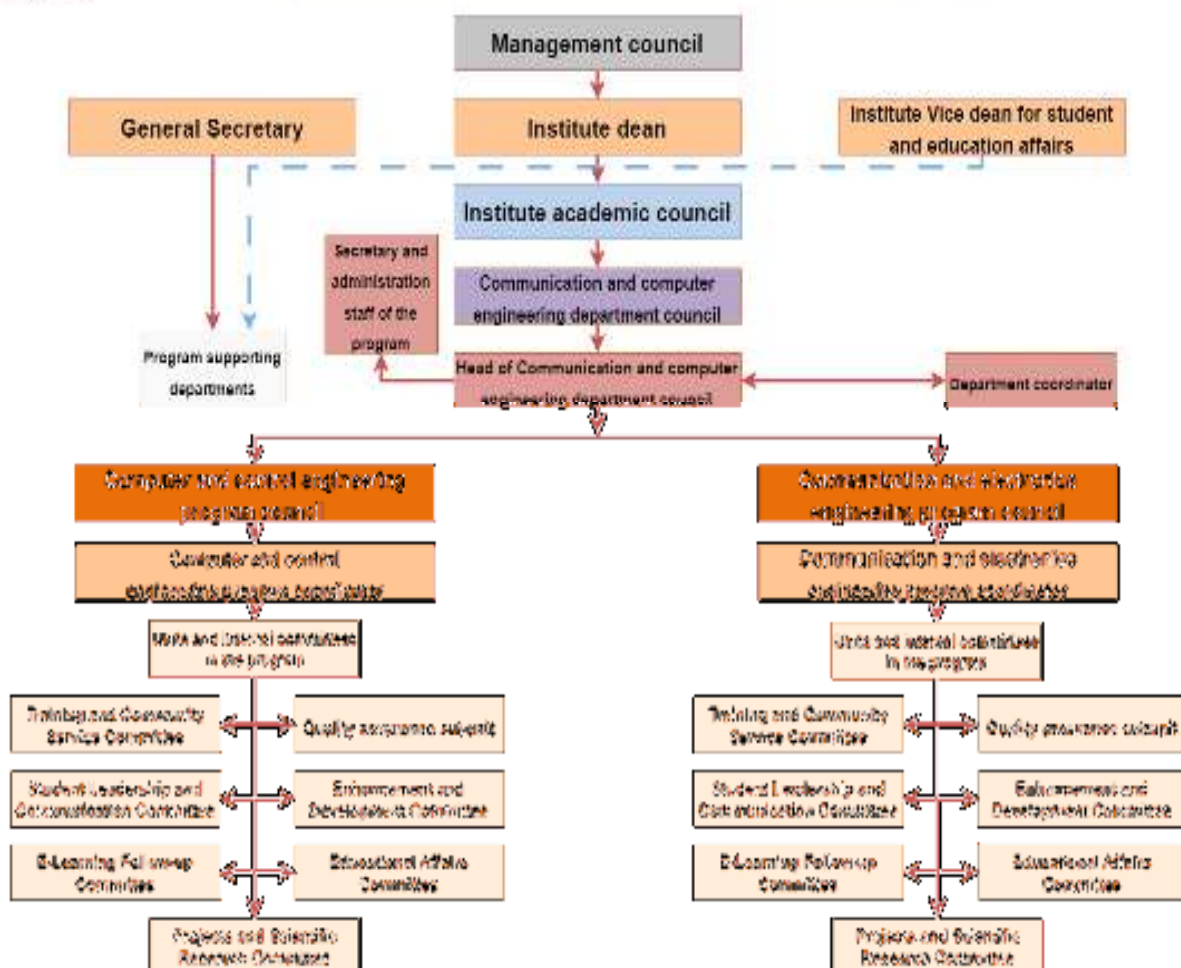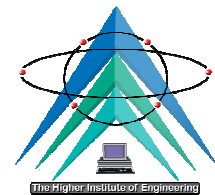
Seventh: Organizational Structure

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
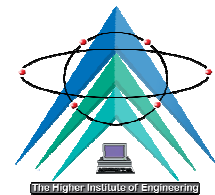**Computers and Control Program**

Eighth: competences of computer and control engineering program

• Learning Outcomes (LO's)

• Competencies of engineering graduate (Level A)

The engineering graduate must be able to:

A- General Engineering NARS Competencies in 2018		
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	a1.1 — Identify, and formulate complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
		a1.2 — Solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	a2.1 — Develop and conduct appropriate experimentation and/or simulation.
		a2.2 — Analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of	a3.1 — Apply engineering design processes to produce cost-effective solutions that meet specified needs.
		a3.2 — Illustrate contextual constraints such as global, social, cultural, economic, environmental, ethical and sustainability imperatives as an

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

	sustainable design and development.		integral part of the design process.
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.
A5	Practice research techniques and methods of investigation as an inherent part of learning.	a5.1	Identifies current developments and technologies related to engineering.
		a5.2	Applies selected research literature in the engineering approaches.
A6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	a6.1	Apply fundamental engineering processes and the project management tools to the planning, design, simulation, and execution of project work. Plan implementation of engineering projects, taking into consideration other trades requirements.
		a6.2	Supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.
A7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	A7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
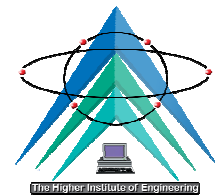Computers and Control Program

A9	Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	a9.1	Use creative, innovative, and flexible thinking to anticipate and respond to new situations.
		a9.2	Acquire entrepreneurial and leadership skills to anticipate and respond to new situations.
A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.

• Competencies of basic electrical engineering (Level B)

In addition to the competencies for all engineering programs the basic electrical engineering graduate must be able to:

B- Electrical NARS Competencies in 2018			
B1	Select, model, and analyze electrical power systems applicable to the specific discipline by applying the concepts of generation, transmission, and distribution of electrical power systems.	b1.1	Select, and model, electrical power systems applicable to the specific discipline by applying the concepts of generation, transmission, and distribution of electrical power systems.
		b1.2	Analyze electrical power systems applicable to the specific discipline by applying the concepts of generation, transmission, and distribution of electrical power systems.
B2	Design, model and analyze an electrical/electronic/digital system or component for a specific application: and identify the tools required to optimize this design.	b2.1	Design an electrical/electronic/digital system or component for a specific application: and identify the tools required to optimize this design.
		b2.2	Model and analyze an

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

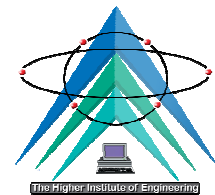|			
			electrical/electronic/digital system or component for a
			specific application: and identify the tools required to optimize this design.
B3	Design and implement elements, modules, sub-systems, or systems in electrical/electronic/digital engineering using technological and professional tools.	b3.1	Design elements, modules, sub-systems, or systems in electrical/electronic/digital engineering using technological and professional tools.
		b3.2	Implement elements, modules, sub-systems, or systems in electrical/electronic/digital engineering using technological and professional tools.
		b3.3	Identify the tools required to optimize the design of an electrical/electronic/digital system or component for an electrical application.
B4	Estimate and measure the performance of an electrical/electronic/digital system and circuit under specific input excitation and evaluate its suitability for a specific application.	b4.1	Measure the performance of electronic circuits, instrumentation, sensors, and communication systems using appropriate lab equipment effectively and safely.
		b4.2	Estimate and evaluate the performance of electrical/ electronic drivers, circuits, instrumentation, sensors, and actuators as stand-alone systems or as part of electronics and communication systems.

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

B5	Adopt suitable national and international standards and codes to design, build, operate, inspect, and maintain electrical/electronic/digital equipment, systems, and services.	b5.1	Take on suitable national and international standards to carry out specialized communications systems designs.
		b5.2	Examine the design of different in electrical/electronic/digital equipment, systems and services based on national and international codes.

• High specified competencies (Level C)

In addition to the competencies for all engineering programs (Level A) and the competencies for the basic electrical engineering discipline (Level B), the Computer and Control Engineering (CCE) program graduate must be able to (Level C):

C- Computer and Control Engineering ARS			
C1	Recognize, Explain, Analyze, describe, develop computer hardware, software developing applications, information technology systems and its user interface.	c1.1	Recognize, explain, and describe computer hardware and computer software.
		c1.2	Analyze and develop software applications, information technology systems and its user interface.
C2	Apply and develop new methodologies to design artificial intelligent systems, data base and signal / image process.	c2.1	apply, develop, and design artificial intelligence and database systems
		c2.2	Apply new methodologies to design signal /image processing techniques
C3	Explain, describe, analyze, and design, simulate, model, implement and test embedded	c3.1	Explain, describe, and analyze embedded systems, control systems and their applications.

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program
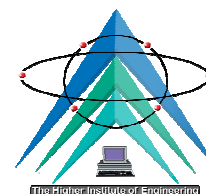
	systems, control systems and their applications to achieve acceptable quality measure.	c3.2	Design, simulate, model, implement and test, embedded systems, control systems and their applications to achieve acceptable quality measure.
C4	Explain, describe, analyze principles and advanced topics related to cloud computing, big data, computer networks, cryptography, and communication systems, for network's performance, control and troubleshooting and maintenance all types of systems.	c4.1	Explain, describe, analyze principles and advanced topics related to cloud computing, big data, computer networks, cryptography, and communication systems, for network's performance,
		c4.2	Control and troubleshooting and maintenance all types of systems.

Ninth: Quality Assurance, Accreditation and compressive Quality in Higher Education

(1) Definition of the National Authority for Higher Education Quality Assurance and Accreditation

The National Authority for Quality Assurance and Accreditation was established by Law Number (82) of year 2006 of the Presidency of the Republic, which stipulates that this authority shall have independence and have a public legal personality, and shall be affiliated with the Prime Minister, and its headquarters shall be in Cairo, and the Authority may establish branches in the governorates. Mr. President of the Republic also issued Decree Number 25 of year 2007 issuing the executive regulations of this law.

The National Authority for Quality Assurance and Accreditation in Education is one of the main pillars of the national plan for education reform in Egypt, as it is the body responsible for spreading the culture of quality in educational institutions and society, and for developing national standards that keep pace with international standard standards to restructure educational institutions and improve the quality of their operations and outputs in a manner

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
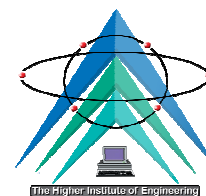**Computers and Control Program**

that leads to gaining the community's confidence in them, increasing their competitive capabilities locally and internationally, and serving the purposes of sustainable development in Egypt. In light of this, the Authority seeks to continuously develop education and ensure its quality according to a set of principles and values that emphasize transparency, objectivity, justice, and keenness to assist educational institutions in adjusting their conditions and improving their overall performance to qualify and obtain accreditation.

The Authority is not considered a regulatory body, but rather an accreditation body for educational institutions that are able to achieve the requirements of national standards. Therefore, it is keen to provide all forms of guidance, advice, and support to these institutions in a way that helps them continuously improve the quality of their outputs through objective and realistic mechanisms for self-evaluation and accreditation. To achieve the above, the Authority is keen to provide and disseminate sufficient and accurate information that can help educational institutions in self-evaluation, and then take the necessary steps to advance and obtain accreditation and Test.

(2) Awareness plan for quality concepts in the program

The awareness plan is based on starting from the senior leadership of the institution, through faculty members, assistants faculty members, administrators, and all employees of the institution, all the way to the students who are the cornerstone of the educational process.

Serial	Plan items	Implementation mechanisms	Time line	Implementation responsibility	Monitoring and performance evaluation indicators
1	Holding seminars and workshops regarding spreading the culture of quality, its concept and importance, and the procedures followed to ensure quality, progress and accreditation (faculty members - auxiliary staff - administrative staff - students).	Seminars and workshops. - Meetings and meetings. - Advertisement in the department and display screen. - Website.	During the year	Program administration Institute administration	Statement of attendance at seminars and workshops. - Meeting minutes. - Relevant questionnaires. - Awareness of relevant parties about the culture of quality.
2	Defining the vision, mission and objectives	- advertisement in the department	October	Program message	- Advertisement on the

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

	of the program, graduate specifications and program competencies	and display screen. - Website.	2023	standard	display screen. - Advertisement on the website. - Relevant questionnaires. - Awareness of relevant parties.
3	Seminars and workshops to define academic standards and updates of the National Authority for Quality Assurance and Accreditation in Education. (Faculty members – assistant faculty staff - specialists from the administrative staff.	Seminars and workshops. - Continuous review of the National Authority for Quality Assurance and Accreditation website.	During the year	Program administration Institute administration	- Statement of attendance at seminars and workshops. - Meeting minutes. - Relevant questionnaires. - Awareness of relevant parties.
4	Preparing a quality management guide	A guide to quality management in the program	October 2023	Program Coordinator Program Director	- Availability of a copy of the quality management guide.
5	Introducing the website of the National Authority for Quality Assurance and Accreditation	Link to the website of the National Authority for Quality Assurance and Accreditation.	During the year	Program Coordinator	- Awareness of the role of the National Authority for Quality Assurance and Accreditation and following up on its various publications. - Awareness of relevant parties.

(3) Quality concepts and terms

When using these concepts and terms, the Authority emphasizes the meanings shown in front of each of them.The Authority is aware that these concepts and terms may have been mentioned with different meanings in other references or guides. The Authority emphasizes that these concepts have been

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

greatly simplified to maximize their benefit in a manner that suits the target group of this guide.

Educational institution: A university, faculty, or higher institute that offers educational programs leading to a university scientific curriculum (bachelor's or licentiate) or a higher degree (master's or doctorate).

Educational program: A set of educational courses and activities determined by the institution to achieve the competencies (educational outcomes) of the graduate required for the student to obtain a scientific degree in a specific specialization.
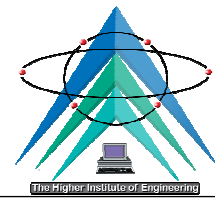
Program vision: An ambitious future description of what the program or the individual wants to achieve, and the period of its achievement ranges between the medium and long term, i.e. the distant future, so that the main goal of writing it is to use it as a guide in choosing the program's directions in the activities, policies, and events specific to the program, in the present and the future.

Program mission: Precisely formulated phrases that reflect the reasons for establishing the program and determine what can be offered to society and the labor market and present the purpose that makes it different from other programs. It clarifies the essence of its operations in education and learning, the targeted sectors, and the human and material resources that distinguish it. The program's mission may include the values and philosophy that govern the program's performance and its management's dealings with others.

Program objectives: The final results that the program seeks to achieve, which must be precisely defined, clear, understandable, realistic, flexible and measurable.

Policies: A guide for decision-making in various areas of activity related to the educational program, such as admission and transfer policy, teaching and learning policy, and financial policy. Policies must be written, approved, understandable, and flexible.

Governing Councils: The official councils of the institution and the educational program (e.g. University Council/Institute Administration, faculty/Institute Council, Academic Department Council) that have the legitimate authority derived from the organizational structure of the institution and have the right to set and approve educational policies, programs, curricula, and budgets, and to make related executive decisions.

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shorouk
Communications and Computers Engineering Department
Computers and Control Program

Educational Quality Assurance: The process of verifying that academic standards are consistent with the educational institution's mission that has been identified, defined, and approved by its governing councils, in a manner consistent with national academic standards or approved international standards, and that the level of quality of learning opportunities, scientific research, community participation, and environmental development are considered appropriate or exceed the expectations of all types of end-users of the services provided by the educational institution.
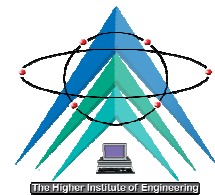
Accreditation: The recognition granted by the National Authority for Quality Assurance and Accreditation of Education to the educational institution if it can prove that it has the efficiency in institutional capacity, and achieves educational effectiveness, or grants it to the educational program according to the national standards or any other standards but approved by the Authority, and the institution or program has advanced systems that ensure continuous improvement, enhancement and development of quality.

National Academic Standards (NARS): The national academic standards for the various educational programs prepared by the Authority with the assistance of specialized experts and representatives of the various sectors of the beneficiaries. These standards represent the minimum required to be achieved for accreditation.

Accredited Standards (ARS): The academic standards adopted by the institution (or the educational program in the institution) and approved by the National Authority for Quality Assurance and Accreditation provided that their level is higher than the minimum level of the National Academic Standards (NARS).

Evaluation and Accreditation Standards: The standards prepared by the Authority to evaluate and accredit higher education institutions or educational programs in these institutions, which were designed and reviewed by a team of specialized experts from academic leaders and representatives of the various sectors of the beneficiaries. The evaluation and accreditation criteria for the educational program focus on both program management and the educational effectiveness of the program. The evaluation and accreditation criteria are considered the main tool used in the evaluation and accreditation stage.

Program management: represents the first axis for evaluating and accreditation of the educational program. This axis refers to the program's ability to perform efficiently through the availability of a clear message and

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shorouk
Communications and Computers Engineering Department
Computers and Control Program

specific goals, conscious academic and administrative leadership, clear and appropriate organization, sufficient and appropriate financial resources and supporting material facilities, and information technology.
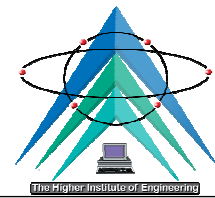
Program educational effectiveness: represents the second axis for evaluating and accreditation of the educational program, and refers to the effectiveness of the teaching and learning process in the program according to the adopted academic standards that achieve the planned message and goals of the program and meet the expectations of the end beneficiaries. This requires adopting specific and approved academic standards and a good design of the program and its curricula in a way that achieves the targeted learning outcomes of the program, following effective policies and methods for teaching and learning, following objective and announced policies for accepting students with the provision of appropriate academic guidance (or student leadership) and all other forms of support for students, continuous assessment of learning outcomes, using highly capable faculty members, and the availability of targeted plans for enhancement and development.

Program self-evaluation: The process of evaluating the overall performance of the educational program by those responsible for managing the program from academic and administrative leaders, in order to reveal areas of strength and weakness in the management of this program and its educational effectiveness.

Program self-study: One of the basic means of self-evaluation of the program, and it is based primarily on describing and diagnosing the current status of the program, and identifying areas of strength and weakness in its capabilities, management, design and educational processes, and the learning resources it uses, etc. In addition, the study must include an accurate identification of possible areas of improvement and development, and proposals, means and responsibilities for enhancement and development.

Program Evaluation and Accreditation Criteria: A set of criteria prepared by the Authority and related to the two main pillars of evaluation and accreditation of educational programs in higher education institutions, namely program management and program educational effectiveness.

Evaluation and Accreditation Indicators, Elements and Characteristics: Each of the evaluation and accreditation criteria specified by the Authority includes a set of indicators that express the intended standard, and each indicator includes a set of related elements, and finally each element includes a

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

set of characteristics that are required to be measured during the evaluation and accreditation process of the program.

Distinctive Features of the Program: A set of characteristics that distinguish the program and that distinguish it from other similar educational programs on the one hand, and from other programs in the same institution on the other hand, and such characteristics are called competitive advantages.
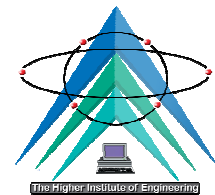
The competitive position of the program: It reflects the position of the educational program in comparison to other similar educational programs (or even non-similar ones in the same institution) in terms of areas and elements of excellence and distinction, which helps to determine its position among these competing programs directly or indirectly.

Quality Management in the Program: It relates to the mechanisms, procedures, rules and activities used to ensure achieving high levels of quality in the program, which are mainly related to the program management standards and its educational effectiveness.

Community stakeholders: All individuals, institutions and entities that have a legitimate interest or benefit or bear risks resulting from the existence and implementation of the educational program, which includes, for educational programs, (students, parents, faculty members and their assistants, employees of the institution, representatives of the professional association associated with the program, business organizations and governmental organizations, and individuals and institutions of civil society that constitute the local community of the institution geographically).

External reviewer: An academic member with experience in the field of specialization invited by the institution to review the program's structure, content and academic standards, its ability to achieve the targeted learning outcomes, the methods and resources of self-learning used, the teaching and learning facilities available, the evaluation of student work, and other activities related to its management and educational effectiveness

Accredited Reviewers: A team of faculty members or experts in the field of higher education development from outside the institution subject to evaluation and accreditation, who are related to the specializations of the programs offered by the institution and have no conflicting interests, as they are selected, appointed, trained and accredited by the Authority to carry out the review and evaluation process during field visits to the institution.

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

Coordinator: A faculty member nominated by the institution to coordinate the review and evaluation process of the educational program before, during and after the field visit of the team of accredited reviewers.

Field visit: A visit by the Authority's accredited auditors to the program site for evaluation and accreditation purposes, during which all standards, indicators, elements and characteristics related to the evaluation and accreditation axes of the program are reviewed and audited as stated in the self-study. The visit is conducted in coordination with the institution to which the program belongs.

Annual program report: A report submitted annually to the Authority on the educational program subject to evaluation and accreditation, which shows the results of the self-evaluation of the program's performance in the immediately preceding academic year, areas for improvement and addressing weaknesses in the program, areas for enhancing strengths, and any other practices to develop the program's performance in light of previous accredited auditors' reports.

Self-learning: The student's ability to continue to develop his cognitive, mental and professional abilities and skills independently, in contrast to the typical methods of learning.
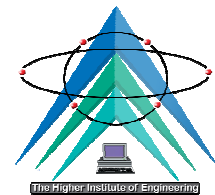
Learning styles: The different methods through which the learning process takes place, including face-to-face learning, distance learning, and e-learning.

Intended Learning Outcomes (LOs): The intended learning outcomes (knowledge, understanding and skills) that the institution seeks to achieve through its various programs and that are linked to its mission, reflect the adopted academic standards, are measurable, and are clearly linked to the various methods of evaluating students.

Student Performance Evaluation: A set of direct and indirect methods, including exams, approved by the institution to measure the extent of achievement and realization of the intended learning outcomes (cognitive abilities and their mental, practical and professional skills) from a specific educational program or course.

Graduate Specifications: The expected competencies/educational outcomes (competencies/abilities) of the graduate resulting from the acquisition of knowledge and skills upon completion of a specific educational program.

Student File: A record that includes all information related to the student during his/her study period in the program, as it includes data on the courses

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

he/she has completed, the grades he/she obtained, the courses in which he/she has failed academically, the types of support he/she received, and the grievance forms that were previously submitted, etc. It is considered a complete picture of the student's academic status.

Labor market organizations: government institutions, public and private companies, and civil society organizations that provide employment opportunities for program graduates.

Measurement: An organized process by which the amount of the characteristic we are measuring is determined in terms of an appropriate unit of measurement such as questionnaires and tests. Measurement in the educational process can be defined as the extent to which students achieve the planned objectives through the achievement test and passing the continuous assessment skills in which cognitive achievement and acquired skills are achieved by students.

Assessment: An organized process based on measurement by which a judgment (assesment) is issued on the thing to be evaluated in light of what it contains of the characteristic subject to measurement and its relation to an agreed value or a specific standard.
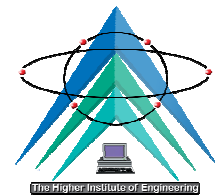
Evaluation: Identifying the extent to which students have achieved their objectives and making appropriate decisions and recommendations regarding them by diagnosing the strengths and weaknesses in any element of the educational system.

Quality control: The techniques and practical activities used to conduct a permanent examination of all components of the activity.

Quality Assurance: It is an activity and a means of ensuring that the requirements and standard criteria required for the institution are met to achieve the institution's goal to reach outputs that satisfy the labor market and the needs of society.

Quality Improvement: The executive procedures and activities taken by the institution to increase the effectiveness of activities and operations within it to benefit both the institution and the consumer.

Institutional Accreditation: It is a process of evaluating the quality of the educational level of the institution, on the basis that the institution achieves the greatest amount of its goals, and that it has the resources that enable it to continue in the future.

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

Academic Accreditation: It is the recognition that the programs of an educational institution have achieved or reached the minimum standards of efficiency and quality set in advance by the body granting the accreditation certificate.

Quality Management Unit: The unit responsible for quality management within the institution and has all the documents and evidence related to quality management within the institution.
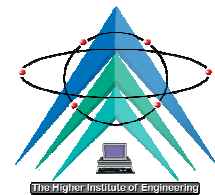
Academic Advisor: Provides academic guidance services by following up on the student's performance and assisting him in choosing or changing courses each semester.....etc. and is recognized in the credit hour system, but with regard to the academic regulations in the semester system, it is replaced by the academic leader.

Specifications of a good student: Possesses a set of knowledge, skills, experiences and attitudes in the field of specialization and in the field of life and citizenship within a sound ethical framework. The Authority has identified a set of standards that must be available in the graduate, which everyone (teacher - student - leaders .... etc.) seeks to achieve through the quality system.

Students who are struggling: Those with learning difficulties. And those who did not achieve the targeted educational results and are exposed to failure.

Community participation: Effective integration between society and the institution through mutual contribution in continuous efforts to improve education, increase its effectiveness, solve community problems and provide services to its individuals and institutions in a way that benefits society and the educational institution.

Academic Guidance: Introducing students to the academic programs, systems and laws within the college/institute, as well as revealing their inclinations and abilities and providing them with the opportunity to benefit from the expertise of faculty members to help them solve their problems using scientific methods appropriate for each case. It also aims to help the student discover himself and make his own decisions, especially how to overcome the difficulties that hinder his academic path. It is specific to the credit hour system, while regarding the academic regulations, the semester system is replaced by student leadership.

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shorouk
Communications and Computers Engineering Department
Computers and Control Program

Strategic Planning: Determining the vision, mission, goals and strategic objectives of the institution that must be achieved in over a long period of time (5 years or more) as well as the means necessary to achieve this.

Strategic plan: represents the outcome of the strategic planning process and must be written and approved and define the vision and mission of the institution, its goals and strategic objectives and the available and future means to achieve this and reflect the university/academic strategy.

Executive plan for the institution's strategy: includes various activities and tasks required to be carried out in order to achieve the institution's goals and strategic objectives with a precise definition of responsibilities, timetable, monitoring and evaluation indicators, and achievement levels.

Corrective and preventive measures: are a set of procedures that the institution decides to undertake to meet unmet standards or to enhance the performance of some already met standards to maintain their fulfillment. This is done through organized procedures that specify tasks, distribute roles, and the specific time for implementation, and is followed up in what is known as the improvement plan.

Development: those planned efforts made by members of the institution's community to develop its performance level.
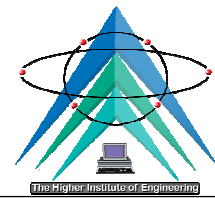
Development plans: specify the tasks required for the development process, implementation responsibilities, time frame, follow-up mechanism, and alternative procedures in the event of failure to implement.

Appropriate mechanism: a method announced by the college/institute and adopted that is consistent with its nature and the nature of its students, such as a complaints box - submitting a request or grievance - sending an email.

Questionnaire: standardized tools for polling opinions or collecting data on a specific topic/topics, prepared according to scientific conditions, and their results are statistically analyzed to determine opinions.

Feedback: Benefit from the results of the evaluation process and correct the path towards the desired goal.

Program/course file: A file containing the course description and its reports on previous years, teaching and evaluation activities, student comments, expert opinion, measures taken to improve it, measures being implemented, and everything related to the course to include better performance, as the experiences of the previous year are utilized to improve performance and

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

ensure the advancement and improvement of performance regardless of who is responsible for the course.

Program/course description: Includes a specification of academic standards, objectives, targeted educational outcomes, teaching and evaluation strategies, and identifies the courses, their hours distribution, and everything related to the program for its successful implementation.
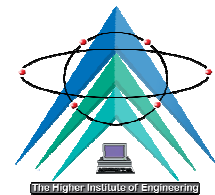
Cooperative Learning: Cooperative learning is a student-centered learning method where students work in heterogeneous groups (with different cognitive and skill levels) to achieve a common educational goal. The number of members in each group ranges between 4-6 individuals. One of the most important assumptions of cooperative learning is that students are not allowed to be passive recipients, but rather are encouraged to actively participate in learning to interact with their colleagues, explain what they have learned, listen to their points of view, and encourage and support each other.

Office hours: Specific hours during which faculty members are present in their offices to receive students, discuss any educational problems related to them, and work to guide them to solve them.

Student evaluation: A set of methods, including exams, approved by the institution to measure the extent of achievement and realization of the targeted learning outcomes (students' cognitive, mental, and professional abilities and skills) from a specific educational program or course.

Stages of obtaining programmatic accreditation:

• Forming a team to manage and prepare the self-study of the program.

• Preparing the self-study.

• Submitting an application for programmatic accreditation to the Education Quality Assurance and Accreditation Authority.

• Uploading the required documents and papers on the Authority's website.

• Forming the field visit team.

• Examining the documents, auditing and reviewing them by the field visit team.

• Sending the initial report from the Authority to the program management.

• Responding to the initial report from the program management and sending it to the Authority.

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

• The Authority's Board of Directors' decision regarding accreditation.

(4): Various opinion polls (evaluation guide):
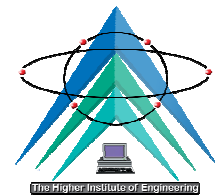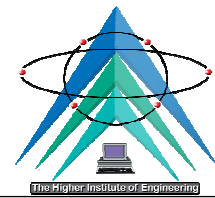
Model number	Subject	Target group	Proposed implementation mechanisms	
			Timing	Distribution mechanisms
First:- Methodology for preparing the guide for opinion polls				
Second:- Opinion polls for students (15 models)				
1	Educational effectiveness	All students	End of each semester	Electronic
2	Institutional capacity	All students	End of the academic year	Electronic
3	Summer training	Students benefiting from training	after the end of the training period	Electronic
4	Admission and transfer policies	Preparatory group - Fourth Communications	First month of the first semester	Electronic
5	Support systems for struggling students	Students benefiting from support	End of the academic year	Paper
6	Computer labs and specialized labs	- All students	End of each semester	Electronic
7	Library	Students visiting the library	End of each semester	Paper
8	Vision and mission of the institute	Fourth group for all programs	End of the academic year	Electronic
9	Assessment of academic leadership	for all groups except the (preparatory) group	End of the academic year	Electronic
10	Training and workshops	Students benefiting from training	after the end of the training course	Electronic

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

The Higher Institute of Engineering

11	Teaching and learning strategies	A sample of students	before preparing the strategic plan	Paper
12	Hybrid education	All students	at the end of the academic year	electronic
13	Complaints and suggestions mechanism	All students	at the end of each semester	electronic
14	Academic leader	All students	at the end of the academic year	electronic
15	Website assessment	All students	at the end of each semester	electronic

Third: - Opinion polls for graduates and works (5 models)

1	Specifications of the Institute's graduates and labor market requirements	Employers	annually	Electronic
2	Quality of educational service	Graduates	annually	Electronic
3	External environment	Beneficiaries	annually	Electronic
4	Website assessment	Beneficiaries	annually	Electronic
5	Services provided by the program	Graduates	annually	Electronic

Fourth: - Opinion polls for faculty members (12 models)

1	E-learning	Faculty members and assistant Faculty members		Electronic
2	Vision and mission of the Institute	Faculty members and assistant Faculty members	End of the academic year	Electronic
3	Job satisfaction	Faculty members and assistant	End of the academic year	Electronic

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

		Faculty members		
4	Academic leadership	Faculty members and assistant Faculty members	Annually	Electronic
5	Training needs	Faculty members and assistant Faculty members	End of each semester	Electronic
6	Education and learning strategy	Faculty members and assistant Faculty members	After preparing the education and learning strategy plan	Electronic
7	Hybrid education	Faculty members and assistant Faculty members	End of the academic year	Electronic
8	The head of the department's opinion on the faculty member	Faculty members	End of the academic year	Electronic
9	Website assessment	Faculty members and assistant Faculty members	End of the academic year	Electronic
10	Training and workshops	Training beneficiaries	at the end of each training course	Electronic
11	Scientific research	Faculty members and assistant Faculty members	Annually	Electronic
12	Credibility and ethics	Faculty members and assistant Faculty members	Annually	Electronic
Fifth: - Opinion polls for the administrative apparatus (6 models)				
1	Job satisfaction	Administrative staff	End of the academic yea r	Electronic
2	Academic leaders	Administrative staff	Annually	Electronic
3	Vision and mission of the institute	Administrative staff	Annually	Electronic

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

4	4 Training needs	Administrative staff	End of each academic semester	Electronic
5	Website evaluation	Administrative staff	Annually	Electronic
6	Training and workshops Training	beneficiaries	at the end of each training course	Electronic
Sixth: - Opinion polls for community service (1 model)				
1	Community service and environmental development	Community parties	Annually	Electronic

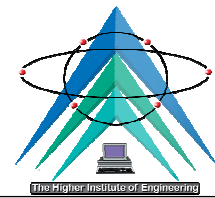## Tenth: Mechanisms and Standards

First: Mechanisms

1. Mechanism for polling/questionnaire of the various categories related to the program and measuring their satisfaction.

The program is keen to poll/questionnaire of the various categories related to the program and measure their satisfaction with the various services provided to them as follows:

• Preparing the items of the poll/questionnaire in coordination with the Quality Assurance Unit at the Institute.

• Determining the time frame for launching the poll/questionnaire.

• Launching the poll/questionnaire to the various categories, each in its own regard.

• Analyzing the poll/questionnaire.

• Presenting and discussing the results of the analysis of the poll/questionnaire in the relevant councils.

• Taking the necessary corrective measures and following up on the implementation procedures

2. Mechanisms for publishing academic standards

• Holding meetings, discussion groups and workshops in the department that mainly aim to introduce academic standards and raise awareness among faculty members of the need to review course descriptions in line with those standards

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

• Continuous training by the institute's management on describing and reporting the program and courses through continuing seminars and training courses.

• - Publishing and announcing the adopted academic standards on the institute's website to enable faculty members to review their course descriptions and inform students and other beneficiaries of the program's academic standards.

• Distributing an electronic copy of the National Standards Requirements (NARS) document to faculty members and their assistants in the department.

• A booklet was prepared to introduce the concepts of quality and the criteria for evaluating and accrediting the program for faculty members and assistants and published it through the website and on the display screen in the department, as well as making posters to introduce the importance of quality in addition to periodic follow-up by the program's quality committee.

• Presenting questionnaires to measure the extent of awareness of academic standards and their analysis.

• There are formal procedures established by the department to measure and monitor the extent of application of the academic standards adopted by the program and ensure compliance with them.

3. Mechanism for spreading the culture of quality

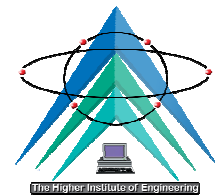The culture of quality is spread in the program via the following:

• Displaying the concepts and terms of quality and spreading its culture through the display screen in the department.

• Preparing the quality guide for the program and disseminating it to all categories in the program.

• Implementing workshops to introduce the concepts and terms of quality and spreading its culture.

• Implementing training courses in the field of quality.

Second: Standards

1. Standards for setting and evaluating oral and practical exams

Oral and practical exams are set and evaluated based on the following standards:

First: Oral exams

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

Oral exams mean tests and questions given to students and they are asked to answer them orally, and their purpose is to know the extent of students' understanding and comprehension of the academic material and the extent of their ability to express themselves with their opinions and ideas.
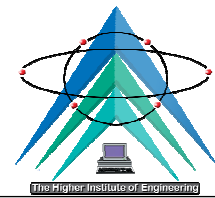
• The examination committee is able to measure the students' ability to understand the subject by following up on the dialogue and discussion with the students, and the (grades) are distributed according to the nature of the courses and within the framework of the applicable regulations.

• There is a plan for evaluation and distribution of grades, which is formulated in a manner that suits the applicable regulations.

Second: Practical exams

• Practical exams aim to evaluate students on a specific performance and determine their level in the steps of this performance. It is important that the examination committee is not concerned with evaluating the final product only.

• The faculty member should pay attention to the work style and behavior during the practical experiment. To achieve the goal of the practical tests, the faculty member/assistant staff uses an observation card to record the performance steps that the students perform during the work, then uses a scale to evaluate the final product.

• There is a plan for evaluation and distribution of grades that is formulated in accordance with the applicable regulations.

• Students must submit a report on the practical experiment. It is necessary for the faculty member/assistant staff to provide the student with a number of instructions related to each of:

1) The deadline for submitting the report
2) The method of submitting the report
3) The conditions that must be met in the report
4) The method of receiving feedback by the student
5) The percentages (grades) are distributed according to the nature of the courses and the applicable regulations.

2. Criteria for developing and assesment the examination paper

• The examination paper is developed and assessed based on the following criteria:

Ministry of Higher Education and Scientific Research
Higher Institute of Engineering in EL-Shourouk
Communications and Computers Engineering Department
Computers and Control Program

• The examination paper is written on the computer, clear and free of spelling errors.

• The examination paper is written in the language in which the course is taught.

• The header of the exam paper includes the name of the institute and the program.

• The header of the exam paper includes the course information - the academic year - the semester - the exam date - the exam time - the exam type (closed book or open book) - a statement of the compulsory and optional questions - a statement of the tables and curves that the student is allowed to enter for the exam, if any.....etc.

• The exam paper appears comfortable for the student and free of stuffing that confuses the student.

• The page number is written at the footer of the exam paper, especially if there is more than one page.

• The exam paper includes the name of the examiner or the names of the examinees if there is more than one examinee, and the examinee/examinees must sign the exam paper.

• The total score for the question is written opposite each question.

• The numbers of the main questions and their branches are clear and unambiguous.

• The exam paper ends with a phrase that clarifies the end of the questions, such as Good luck - The questions are over .... etc.