



**International Academy for Engineering and
Media Science**

Engineering Division

**Electrical Power and Machines Engineering
Department**

Program Specification

For

**Electrical Power and Machines Engineering
Program**

Bylaw 2012

**Program
Specification**

**International Academy for Engineering and Media Science
Engineering Division**

A- Basic Information

- 1 **Program title** : Electrical Power and Machines Engineering
- 2 **Program type** : Single
- 3 **Department** : Electrical Power and Machines Engineering
- 4 **Program coordinator** : Dr. Moustafa Hassan
- 5 **External Evaluators** : Prof. Dr. Sayed Abo-Elsood Syaed Ward
- 6 **Internal Evaluators** : Prof. Dr. Said Mohamed El-Halafawy
- 7 **Date of program Bylaw approval** : Ministerial decision No. 4266 dated 17/9/2012
- 8 **Date of program specification approval** : 08/2023

B- Professional Information

1. Electrical Power and Machines Engineering Program Mission

The electrical power and machines engineering program commits to qualify distinguished graduates who are capable of innovation and development in the field of electrical power and machines engineering to compete in the local and regional labor market according to the national academic reference standards to meet the goals of sustainable development under a strict adherence to the engineering ethics and code of conduct.

2. Program Aims

The Electrical Power and Machines Engineering program aims to provide prospective engineers with appropriate theoretical knowledge, basic science, humanities, and technical skills which allow the graduates to work efficiently in local and regional industries and to display basic competency in each of the technical areas identified as essential to electrical power and machines engineers.

After completing the program, the graduate will be able to:

- Obj1. Learn and practice a broad range of engineering knowledge and specialized skills.
- Obj2. Integrate creative thinking, modern engineering tools, skills to solve engineering problems.
- Obj3. Collaborate, communicate, and lead a team from different disciplines within a framework of ethics and international standards.
- Obj4. Contribute in the development of the profession and the community and engage in recent research studies.
- Obj5. Employ sustainable and environmentally friendly resources and recognize the importance of the environment.
- Obj6. Design, maintain and utilize Electrical/Electronic systems using appropriate tools and techniques and following appropriate regulations and standards.
- Obj7. Select, model, and maintain electrical power systems and machines by applying the concepts of: generation, transmission and distribution following the related standards.
- Obj8. Investigate and assess the performance of high voltage equipment safely.
- Obj9. Plan and rate electrical power control systems and components using appropriate tools and techniques.

3. Graduate Attributes of Electrical Power and Machines Engineering Program

The Electrical Power and Machines Engineering program commits to prepare graduates with specifications that meet the needs of the labor market in accordance with the national academic reference standards to meet the goals of sustainable development, so that the electrical power and machines engineering graduate must:

- GA1. Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.
- GA2. Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.
- GA3. Behave professionally and adhere to engineering ethics and standards.
- GA4. Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.
- GA5. Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.

- GA6. Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
- GA7. Use techniques, skills and modern engineering tools necessary for engineering practice.
- GA8. Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.
- GA9. Communicate effectively using different modes, tools and languages with various audiences, to deal with academic/professional challenges in a critical and creative manner.
- GA10. Demonstrate leadership qualities, business administration and entrepreneurial skills.
- GA11. Demonstrate a comprehensive knowledge and understanding of system modeling, energy management, operating and control principles associated with electrical power systems.
- GA12. Apply appropriate computer software packages to design, model, and simulate electrical power systems.
- GA13. Design electrical power systems generated from conventional and renewable sources, using technological and professional tools.
- GA14. Test, maintain and operate electrical power systems.
- GA15. Gain the skills needed for the market such as utilizing Programmable Logic Controllers (PLC), Distributed Control Systems (DCS), AC and DC drives, and Supervisory Control and Data Acquisition (SCADA).

4. Relationship of Graduate Attributes with Program Aims

Table (1) shows the relationship between the program aims and graduate attributes.

Table (1): The Relationship Between Program Aims and Graduate Attributes.

		Graduate Attributes														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Program Aims	1	*						*								
	2		*					*								
	3			*	*				*	*	*					
	4			*		*			*							
	5						*							*		
	6											*	*	*	*	
	7											*		*	*	
	8												*		*	
	9											*	*			*

5. The Academic Reference for the Program

In the Framework of the National Academic Reference Standards for the Engineering Sector 2018 (NARS 2018), the program competencies are classified into three levels:

- Level A: This level reflects the general competencies that any graduate from the College of Engineering should have gained.
- Level B: This level reflects the general specialized competencies that any graduate in the field of electrical engineering should possess.
- Level C: This level reflects the specialized competencies that a graduate of the electrical power and machines engineering program should acquire.

5.1 Competencies of Engineering Graduate (Level A)

The Engineering Graduate must be able to:

- A1. Identify, formulate, and 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.
- 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 sustainable design and development.
- 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.
- A6. Plan, 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.
- A8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.

-
- A9.** Use creative, innovative and flexible thinking and 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.
-

5.2 Competencies of Electrical Engineering Graduate (Level B)

In addition to the Competencies for All Engineering Programs the basic Electrical Engineering graduate must be able to:

-
- 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.
-
- 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.
-
- B3.** Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.
-
- 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.
-
- B5.** Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.
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5.3 Competencies of Electrical Power and Machines Engineering Graduate (Level C)

In addition to the competences for all Engineering Programs (A-Level) and the competencies for the Electrical Engineering Discipline (B-Level), the Electrical Power and Machines Engineering Program graduate must be able to:

-
- C1.** Identify and formulate engineering problems to solve problems in power system, power electronics, electrical machines and high voltages.
-
- C2.** Integrate electrical, electronic and mechanical components and equipment with transducers, actuators and controllers in creatively computer-controlled systems.
-

C3. Apply modern techniques, skills and engineering tools to electrical power and machines engineering systems.

6. Benchmarks and Academic Reference Standards

The external references for standards considered in the development of this program were the National Academic Reference Standards for Engineering (NARS 2018) and for Electrical Engineering graduate.

7. The Academic Reference and Program Aims

Table (2) explains how the competencies of the current program achieve the program aims:

Table (2): The Relation Between Program Aims and Academic Reference

		Academic Reference																	
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3
Program Aims	1	*	*																
	2	*							*								*		
	3						*	*	*										
	4					*					*								
	5				*									*					*
	6			*									*	*		*			
	7											*						*	
	8														*				*
	9												*	*		*		*	

8. Learning Outcomes:

The program learning outcomes are divided into three domains cognitive, psychomotor and affective:

1. Cognitive Domain:

- A1.1** Identify and formulate complex engineering problems by applying engineering fundamentals, basic science and mathematics.
- A2.1** Analyze and interpret data, assess and evaluate findings to draw conclusions
- A3.1** Formulate a design process to meet specified needs.
- A4.1** Identify technologies, codes of practice and standards related to the discipline.
- A5.1** Investigate research techniques and methods of investigation.
- A6.1** Plan the implementation of engineering projects taking into consideration other trades requirements.
- A7.1** Identify his/her role as an individual and as a member of multi-disciplinary and multi-cultural teams.
- A8.1** Recognize methods of communications (verbally/written) with a range of audiences using contemporary tools.
- A9.1** Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations
- A10.1** Acquire new knowledge using and self-practice lifelong and other learning strategies.
- B1.1** Choose and analyze electrical power systems applicable to the specific discipline by applying the concepts of: generation, transmission and distribution of electrical power systems.
- B2.1** Design and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.
- B3.1** Design elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.
- B4.1** Estimate the performance of an electrical/electronic/digital system and circuit under specific input excitation, and evaluate its suitability for a specific application.

- B5.1** Choose suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.
- C1.1** Identify and formulate engineering problems in the field of power system, power electronics, electrical machines and high voltages.
- C2.1** Design computer-controlled systems including electrical, electronic and mechanical components and equipment with transducers, actuators and controllers
- C3.1** Utilize modern techniques, skills and engineering tools to electrical power and machines engineering systems.

2. Psychomotor Domain:

- A1.2** Solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics and on basis of limited or contradicting information.
- A2.2** Develop and conduct appropriate experimentation and/or simulation and use statistical analyses and objective engineering judgment to draw conclusions.
- A3.2** Apply engineering design processes and knowledge of mathematics, science, information technology, to produce cost-effective solutions that meet specified needs and to solve engineering problems.
- A4.2** Utilize and incorporate contemporary technologies, codes of practice and standards related to the discipline economic, societal, environmental dimensions and risk management in design.
- A5.2** Practice research techniques and methods of investigation.
- A6.2** Supervise, monitor and Judge engineering decisions, implementation of engineering projects taking into consideration other trades requirements, costs, benefits, safety, quality, reliability, and environmental impact.

- A7.2** Perform efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.
- A8.2** Communicate (verbally/written) and Exchange knowledge and skills with a range of audiences using contemporary tools with engineering community and industry.
- A9.2** Apply entrepreneurial and leadership skills to anticipate and respond to new situations.
- A10.2** Apply new knowledge; and practice self, lifelong and other learning strategies.
- B 1.2** Model electrical power systems by applying the concepts of generation, transmission, and distribution of electrical power systems.
- B2.2** Model an electrical/electronic/digital system and develop the tools to optimize this design.
- B3.2** Implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.
- B4.2** Measure the performance of an electrical/electronic/digital system and circuit under specific input excitation, and show its suitability for a specific application.
- B5.2** Build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services following suitable national and international standards and codes.
- C1.2** Troubleshoot engineering problems in the field of power system, power electronics, electrical machines and high voltages.
- C2.2** Build computer-controlled systems including electrical, electronic and mechanical components and equipment with transducers, actuators and controllers.
- C3.2** Practice modern techniques, skills, and engineering tools to electrical power and machines engineering systems.

3. Affective Domain:

- A1.3** Acknowledge the importance of engineering fundamentals, basic science and mathematics in solving complex engineering Problems.
- A2.3** Praise critical thinking to draw conclusions.

- A3.3** Consider social, environmental, ethical and other aspects while applying a design process to achieve solutions.
- A4.3** Follow quality guidelines, health and safety requirements, environmental issues and risk management principles.
- A5.3** Adopt researching techniques and methods of investigation as an inherent part of learning.
- A6.3** Encourage the staff and facilitate the required needs
- A7.3** Express appreciation for the contributions of all team members
- A8.3** Follow communications ethics guided by community morals and values.
- A9.3** Act effectively under difficult and new situation.
- A10.3** Adopt learning strategies as an effective lifelong learning strategy.
- B1.3** Respect and follow adopted national/international specifications to select the suitable electrical powers system.
- B2.3** Seek optimization techniques in the design process electrical/electronic/digital system or component.
- B3.3** Recommend using technological and professional tools in the design and implementation of electrical/electronic/digital engineering.
- B4.3** Empathize the important of measuring, testing and commissioning any electrical/electronic/digital system equipment before usage.
- B5.3** Adopt suitable national and international standards and codes while design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems.
- C1.3** Acknowledge the importance of power system, power electronics, electrical machines and high voltages.
- C2.3** Arrange work while dealing with computer-controlled systems including electrical, electronic and mechanical components and equipment with transducers, actuators and controllers
- C3.3** Value modern techniques, skills and engineering tools to electrical power and machines engineering systems.

9. Program Structure

Program Duration: 5 years.

Program Structure

Program Hours: 165 Hrs.

Compulsory hours: 137 Hrs.

Elective hours: 28 Hrs.

Table 3: Courses Classification According to NARS

Course Contents According to NARS							
NARS %	A	B	C	D	E	F	G
	8-12 %	2-4 %	18-22 %	4-6 %	25-30 %	25-30 %	4-6 %
Hours	18	6	33	9	43	48	8
Catalogue	10.9 %	3.6 %	20 %	5.5 %	26 %	29 %	4.8 %
Matching	<i>Matched</i>	<i>Matched</i>	<i>Matched</i>	<i>Matched</i>	<i>Matched</i>	<i>Matched</i>	<i>Matched</i>
<p>A. Humanities and Social Science, University Requirements. B. Business Administration C. Mathematics and Basic sciences D. Engineering Culture. E. Basic Engineering Sciences F. Engineering and design applications G. Project and field training</p>							

1- Social sciences and humanities (18 hours): 10 Hrs. compulsory + 8 Hrs. Selective

A- Compulsory: 10 Hrs.

Code	Course Title	Cr. Hrs	Lec.	Ex.	Lab
HUM 011	Arabic Language	2	2		
HUM 012	English Language 1	2	1	2	
HUM 013	English Language 2	2	1	2	
HUM 352	Human Rights	1	1		
HUM 351	Professional Ethics	1	1		
HUM 381	Principles of Negotiation	2	2		

B- Selective: Select 8 Hrs.

Code	Course Title	Cr. Hrs	Lec.	Ex.	Lab
HUM x62	Music Appreciation	2	2		
HUM x71	Introduction to the History of Civilizations	2	2		
HUM x72	Trends in Contemporary Arts	2	2		
HUM x73	Recent Egypt's History	2	2		
HUM x74	Heritage of Egyptian Literature	2	2		
HUM x75	Arab & Islamic Civilization	2	2		
HUM x76	Literary Appreciation	2	2		

2- Business Administration & Management: (6 Hrs.) = (4 Hrs. compulsory + 2 Hrs. Selective)

A-Compulsory (4 Hrs.)

Code	Course Title	Cr. Hrs.	Lec.	Ex.	Lab
IEN 351	Engineering Economics	2	2	1	
IEN 314	Project Management	2	2	1	

B- Selective: (2 Hrs.)

Code	Course Title	Cr. Hrs.	Lec.	Ex.	Lab
HUM 121	Introduction to Accounting	2	2		
HUM 221	Business Administration	2	2		

3- Mathematics and basic sciences (33 Hrs.)

Code	Course Title	Cr. Hrs	Lec.	Ex.	Lab
BAS 011	Mathematics 1	3	2	2	
BAS 012	Mathematics 2	3	2	2	
BAS 111	Mathematics 3	3	2	2	
BAS 211	Mathematics 4	3	2	2	
BAS 212	Statistics & Probability Theory	3	2	2	
BAS 031	Mechanics	4	3	2	
BAS 041	Engineering Chemistry	3	2	1	2
BAS 021	Physics 1	3	2	1	2
BAS 022	Physics 2	3	2	1	2
MED 011	Engineering Drawing & Projection	3	1	3	3
MED 022	Principles of Manufacturing Engineering	2	2	1	1

4- Engineering culture (9 Hrs.)

Code	Course Title	Cr. Hrs	Lec.	Ex.	Lab
MED 021	History of Engineering & Technology	1	1		
HUM 111	Technical Report Writing	2	1	2	
HUM 182	Analysis & Research Skills	2	1	2	
HUM 181	Communication & Presentation Skills	2	1	2	
HUM 081	Computer Skills	0	1		4
CIW 331	Environmental Impact of Projects	1	1		
IEN 131	Monitoring & Quality Control Systems	1	1		

5- Basic Engineering Sciences (37 Hrs. compulsory + 6 Hrs. Selective) =43 Hrs.

A- Compulsory (37 Hrs.)

Code	Course Title	Cr. Hrs	Lec.	Ex.	Lab
ELP 112	Electrical Circuits 1	2	1	1	1
ELP 113	Electrical Circuits 2	2	1	1	1
ELP 114	Electrical Measurements & Testing	3	2	1	2
ELP 115	Electrical Materials	3	2	2	
ELP 321	Electrical Power	3	2	2	1
ELP 141	Electromagnetic Fields	3	2	2	
ELP 241	Electrical Machines & Transformers	3	2	2	1
ELP 181	Energy Conversion	3	2	2	
ELE 221	Digital & Logic Circuits	3	2	1	2
ELE 222	Electronic Devices	3	2	1	1
ELE 361	Electrical Communications	3	2	2	1
ELC 221	Computer Programming	3	2	1	1
ELC 251	Modeling & Simulation of Engineering Systems	3	2	2	1

B- Selective (6 Hrs.):

Code	Course Title	Cr. Hrs	Lec.	Ex.	Lab
ELP 111	Principles of Electrical Engineering	2	2	1	
ELE 121	Principles of Electronic Engineering	2	2	1	
MEP 111	Principles of Mechanical Power Engineering	2	2	1	
MED 111	Principles of Design & Manufacturing Engineering	2	2	1	
CIS 111	Principles of Construction & Building Engineering	2	2	1	
ARC 111	Art & Architecture	2	2	1	

6- Engineering and design Applications 48 Hrs. (36 Hrs. compulsory + 12 Hrs. Selective)

A- Compulsory: (36 Hrs.)

Code	Course Title	Cr. Hrs	Lec.	Ex.	Lab
ELP 421	Design & Analysis of Power Systems	3	2	2	1
ELP 441	Electric Drive Systems	3	2	2	1
ELP 451	Computer Control in Electrical Power Systems	3	2	2	1
ELP 341	Electrical Machines	3	2	2	1
ELP 331	High Voltage Engineering	3	2	2	1
ELP 361	Power Electronics	3	2	1	1
ELE 322	Electronics Engineering	3	2	2	1
ELC 331	Computer networks	3	2	2	
ELC 361	Automatic Control	3	2	2	1
ELC 311	Computer organization & Architecture	3	2	2	
ELE 241	Microprocessors & Applications	3	2	1	2
ELE 271	Signal Analysis	3	2	2	1

A- Selective (a) select 6 Hrs. from the following table:

Code	Course Title	Cr. Hrs	Lec.	Ex.	Lab
ELP 422	Electrical Distribution systems	3	2	2	
ELP 431	Measuring Devices & Systems	3	2	2	
ELP 452	Programmable logic control	3	2	1	1
ELP 471	Switching, Protection & Safety Equipment	3	2	1	1
ELP 481	Energy Utilization in Buildings & Industry	3	2	2	
ELP 482	Electrical Power Quality	3	2	2	
ELP 483	Renewable Energy Systems	3	2	2	
ELC 462	Digital control systems	3	2	1	1
MED 481	Hydraulic & Pneumatic control systems	3	2	2	

B- Selective (b): select 6 Hrs. from the following table:

Code	Course Title	Cr. Hrs	Lec.	Ex.	Lab
ELP 424	Flexible Control of Electrical Transmission Systems	3	2	2	
ELP 432	Environmental Effects of Electromagnetic Fields	3	2	2	

ELP 442	Special Electric Machines	3	2	1	1
ELP 453	Electrical Control Components	3	2	2	1
ELP 454	Electrical Control Systems Design	3	2	2	
ELP 461	Power Electronic Systems	3	2	2	
ELP 484	Electrical Installations	3	2	2	
ELC 461	Advanced Control Systems	3	2	2	1
MEP 342	Air Conditioning in Buildings	2	2	1	

7- Project and field training (8 Hrs.)

Code	Course Title	Cr. Hrs	Lec.	Ex.	Lab
ELP 491	Project 1	2	1	2	
ELP 492	Project 2	4		4	4
ELP 291	Field Training 1	1			6
ELP 391	Field Training 2	1			6

10. Suggested Study Plan for Electrical Power and Machines Engineering Program

Preparatory (1st Semester)

Course Code	Course Title	Weekly Hours				Grading (Marks)				Final Exam Time
		Lecture	Tutorial	Practical Application (Lab)	Total	Class Work	Oral or Practical Test	Final Exam	Total	
BAS 011	Mathematics (1)	2	2	-	4	60	-	90	150	3
BAS 031	Mechanics	3	2	-	5	60	-	90	150	3
BAS 021	Physics (1)	2	1	2	5	52.5	22.5	75	150	3
MED 011	Engineering Drawing and Projection	1	3	3	7	52.5	22.5	75	150	3
HUM 012	English Language 1	1	2	-	3	40	-	60	100	2
MED 021	History of Engineering & Technology	1	-	-	1	20	-	30	50	2
Total		10	10	5	25				750	

Preparatory (2nd Semester)

Course Code	Course Title	Weekly Hours				Grading (Marks)				Final Exam Time
		Lecture	Tutorial	Practical Application (Lab)	Total	Class Work	Oral or Practical Test	Final Exam	Total	
BAS 012	Mathematics (2)	2	2	-	4	60	-	90	150	3
BAS 041	Engineering Chemistry	2	1	2	5	52.5	2	75	150	3
BAS 022	Physics (2)	2	1	2	5	52.5	22.5	75	150	3
HUM 081	Computer Skills	1	-	4	5	-	-	100	100	2
MED 022	Principles of Manufacturing Engineering	2	1	1	4	60	15	75	150	3
HUM 013	English Language (2)	1	2	-	3	40	-	60	100	2
HUM 011	Arabic Language	2	-	-	2	40	-	60	100	2
Total		12	7	9	28				900	

First Year (1st Semester)

Course Code	Course Title	Weekly Hours				Grading (Marks)				Final Exam Time
		Lecture	Tutorial	Practical Application (Lab)	Total	Class Work	Oral or Practical Test	Final Exam	Total	
--- -A1	Institute Elective A	2	1	-	3	40	-	60	100	3
BAS 111	Mathematics 3	2	2	-	4	60	-	90	150	3
ELP 112	Electrical circuits 1	1	1	1	3	40	10	50	100	2
ELP 114	Electrical measurements & testing	2	1	2	5	52.5	22.5	75	150	3
ELP 141	Electromagnetic fields	2	2	-	4	60	-	90	150	3
HUM 111	Technical report writing	1	2	-	3	40	-	60	100	2
HUM 181	Communications & Presentation skills	1	2	-	3	40	-	60	100	2
Total		11	11	3	25				850	

First Year (2nd Semester)

Course Code	Course Title	Weekly Hours				Grading (Marks)				Final Exam Time
		Lecture	Tutorial	Practical Application (Lab)	Total	Class Work	Oral or Practical Test	Final Exam	Total	
--- -A2	Institute Elective A	2	1	-	3	40	-	60	100	2
HUM A1	General Elective A	2	-	-	2	40	-	60	100	2
HUM B1	General Elective B	2	-	-	2	40	-	60	100	2
ELP 113	Electrical circuits 2	1	1	1	3	40	10	50	100	2
HUM 381	Principle of Negotiation	2	-	-	2	40	-	60	100	2
IEN 351	Engineering Economics	2	1	-	3	40	-	60	100	2
ELP 115	Electrical Materials	2	2	-	4	60	-	90	150	3
ELP 181	Energy Conversion	2	2	-	4	60	-	90	150	3
Total		15	7	1	23				900	

Second Year (1st Semester)

Course Code	Course Title	Weekly Hours				Grading (Marks)				Final Exam Time
		Lecture	Tutorial	Practical Application (Lab)	Total	Class Work	Oral or Practical Test	Final Exam	Total	
--- -A3	Institute Elective A	2	1	-	3	40	-	60	100	2
HUM 352	Human Rights	1	-	-	1	20	-	30	50	1
BAS 211	Mathematics 4	2	2	-	4	60	-	90	150	3
ELP 241	Electrical machines & transformers	2	2	1	5	60	15	75	150	3
ELE 221	Digital & logic circuits	2	1	2	5	52.5	22.5	75	150	3
ELC 221	Computer Programming	2	1	1	4	52.5	22.5	75	150	3
HUM-A2	General elective A	2	-	-	2	40	-	60	100	2
Total		13	7	4	24				850	

Second Year (2nd Semester)

Course Code	Course Title	Weekly Hours				Grading (Marks)				Final Exam Time
		Lecture	Tutorial	Practical Application (Lab)	Total	Class Work	Oral or Practical Test	Final Exam	Total	
--- 291	Field training 1	-	-	6	6				50	
BAS 212	Statistics & probability theory	2	2	-	4	60	-	90	150	3
ELE 222	Electronic devices	2	1	1	4	52.5	22.5	75	150	3
ELE 241	Microprocessors & applications	2	1	2	5	52.5	22.5	75	150	3
ELE 271	Signal analysis	2	2	1	5	60	1	75	150	3
HUM 182	Analysis & research skills	1	2		3	40	-	60	100	2
ELC 251	Modeling & simulation of engineering systems	2	2	1	5	60	15	75	150	3
Total		11	10	11	32				900	

Third Year (1st Semester)

Course Code	Course Title	Weekly Hours				Grading (Marks)				Final Exam Time
		Lecture	Tutorial	Practical Application (Lab)	Total	Class Work	Oral or Practical Test	Final Exam	Total	
CIW 331	Environmental Impact of Projects	1	-	-	1	20	-	30	50	1
ELP 321	Electrical Power	2	2	1	5	60	15	75	150	3
ELP 331	High Voltage Engineering	2	2	1	5	60	15	75	150	3
ELE 361	Electrical Communications	2	2	1	5	60	15	75	150	3
ELC 331	Computer Networks	2	2	-	4	60	-	90	150	3
ELC 361	Automatic Control	2	2	1	5	60	15	75	150	3
Total		11	10	4	25				800	

Third Year (2nd Semester)

Course Code	Course Title	Weekly Hours				Grading (Marks)				Final Exam Time
		Lecture	Tutorial	Practical Application (Lab)	Total	Class Work	Oral or Practical Test	Final Exam	Total	
--- 391	Field Training 2	-	-	6	6				50	
ELP 341	Electrical Machines	2	2	1	5	60	15	75	150	3
ELP 361	Power Electronics	2	1	1	4	60	15	75	150	3
ELE 322	Electronics Engineering	2	2	1	5	60	15	75	150	3
ELC 311	Computer Organization & Architecture	2	2	-	4	60	15	75	150	3
HUM 351	Professional Ethics	1	-	-	1	20	-	30	50	1
HUM -A3	General Elective A	2	-	-	2	40	-	60	100	2
Total		11	7	9	27				800	

Fourth Year (1st Semester)

Course Code	Course Title	Weekly Hours				Grading (Marks)				Final Exam Time
		Lecture	Tutorial	Practical Application (Lab)	Total	Class Work	Oral or Practical Test	Final Exam	Total	
ELP 421	Design & Analysis of Power Systems	2	2	1	5	60	15	75	150	3
ELP 441	Electrical Drive Systems	2	2	1	5	60	1	75	150	3
ELP 491	Project 1	1	2	-	3	50	50	-	100	-
ELP -A1	Electrical Power Elective A	2	2	-	4	60	-	90	150	3
ELP-B1	Electrical Power Elective B	2	2	-	4	60	-	90	150	3
IEN 131	Monitoring & Quality Control System	1	-	-	1	20	-	30	50	1
Total		10	10	2	22				750	

Fourth Year (2nd Semester)

Course Code	Course Title	Weekly Hours				Grading (Marks)				Final Exam Time
		Lecture	Tutorial	Practical Application (Lab)	Total	Class Work	Oral or Practical Test	Final Exam	Total	
ELP 451	Computer Control in Electrical Power Systems	2	2	1	5	60	15	75	150	3
ELP 492	Project 2	-	4	4	8	100	100	-	200	-
ELP -A2	Electrical Power Elective A	2	2	-	4	60	-	90	150	3
ELP -B2	Electrical Power Elective B	2	2	-	4	60	-	90	150	3
IEN 314	Project Management	2	1	-	3	40	-	60	100	2
IEN -A4	General Elective A	2	-	-	2	40	-	60	100	2
Total		10	11	5	26				850	

11. Program Admission Requirements:

Having Egyptian Secondary education or equivalent certificate with major in Mathematics, then after passing the preparatory year and fulfilling the admission requirements the students will be able to attend the department.

12. Regulations for progression and program completion:

- The student will be in the first level when he joined the academy. Then, he moves to the second level after the completion of the study of 36 credit hours. In this level, the student must choose the department that he wants to join. After that, he moves to the third level after the completion of the study of 72 credit hours, and moving to the fourth level at the completion of the study of 108 credit hours. Finally, the student moves to the fifth level.
- Courses registration policy is based on the average GPA of the student as follows: The maximum number of hours of teaching (36) credit hours spread over two semesters, and according to the following rules: -
 1. Registration of 18 credit hours for students with an average GPA of 2 or more
 2. Registration of 15 credit hours for students with an average GPA of less than 2 and even 1.5
 3. Registration of 12 credit hours for students with an average GPA of less than 1.5 to 1
 4. Registration of 9 credit hours for students with an average GPA of less than 1
 5. Registration priority will be given in the decisions of the repetition and the decisions of the lower level.

- **The Grades of Success:**

Table (4) shows the program grades of success.

Table (4): The Grades of Success

Symbol	Points	Percentage
A	4.0	more than 95%
A-	3.7	More than 90% and less than 95%
B+	3.3	More than 85% and less than 90%
B	3.0	More than 80% and less than 85%
B-	2.7	More than 75% and less than 80%
C+	2.3	More than 70% and less than 75%
C	2.0	More than 65% and less than 70%
C-	1.7	More than 60% and less than 65%
D+	1.3	More than 55% and less than 60%
D	1.0	More than 50% and less than 55%
F	0.0	Less than 50%

13. Assessment Methods:

Table (5) illustrates how the program assessment methods achieve the program competencies.

Table (5): The Relation Between Program Competencies and Assessment Methods

		Assessment Methods							
		Written Exam	Oral Exam	Quizzes	Lab Exam	Research Assignments	Reporting Assignments	Project Assignment	In-Class Questions
Program Competencies	A1	*		*		*	*		*
	A2		*		*	*	*		*
	A3	*		*			*	*	
	A4	*		*			*		
	A5					*			*
	A6				*	*	*	*	*
	A7					*	*	*	
	A8		*			*	*	*	
	A9		*			*	*		
	A10						*	*	*
	B1	*	*	*		*	*		
	B2	*		*	*	*	*		
	B3	*	*	*		*	*		
	B4	*		*	*	*	*		
	B5	*		*		*	*		
	C1	*		*			*		
	C2				*		*		
	C3				*		*		

14. Teaching and Learning Methods:

Table (6) clarify the relation between program teaching & learning methods and the program competencies

Table (6): The Relation Between Program Competencies and Teaching & Learning Methods

		Teaching and Learning Methods									
		Face-to-face Lecture	Online Education	Tutorial / Exercise	Group Discussions	Laboratory	Site Visit	Presentation	Mini Project	Research and	Brain Storming
Program Competencies	A1	*	*	*							
	A2				*	*			*	*	
	A3	*	*	*							*
	A4	*	*	*			*				
	A5									*	*
	A6				*	*	*		*		
	A7							*		*	*
	A8				*			*			
	A9				*			*		*	
	A10				*					*	*
	B1	*	*	*						*	*
	B2	*	*	*					*		
	B3	*	*	*		*		*			
	B4	*	*	*					*		
	B5	*	*	*			*				
	C1	*	*	*						*	
	C2	*	*			*			*		
	C3	*	*			*			*		

15. Evaluation of program learning outcomes

Evaluator	Tool	Sample
1- Senior students	Meeting+ questioner	20%
2- Alumni	questioner	20%
3- Stakeholders (Employers)	Site visits	NA
4-External Evaluator, and/or, External Examiner(s)	External members	NA
5- Others		NA

Program Coordinator: Dr. Moustafa Hassan

Signature: *Moustafa Hassan*

Date: 08/2023

Division Dean: Prof. Dr. Said M. El-Halafawy

Signature:

Date: 08/2023

Said Elhalafawy