جامعة المنوفية
كلية الهندسة بشبين الكوم
Faculty of Engineering

Undergraduate Programs

Electrical Engineering Department
Program specification

Basic information:

Program name	Electrical Power and Machines Engineering
Program type	Single
Adoption Date	18/10/2021
Study system	Credit Hours System

Specialized Information:

1- PROGRAM MISSION

The Electrical Engineering Department contributes by its turn into the academic mission sought by the Faculty of Engineering. In this regards, the department looks eagerly to prepare high quality graduates, who enjoy excellent background that combines between deep knowledge and basic skills. This makes the graduates capable of solving the problems of the different community sectors in the fields of electric power and machinery. This is in addition to planting the basics of graduate professional ethics. The department aims also at preparing well post-graduate students (Diploma, M.Sc. and Ph.D.) for coping with the vast developments in different electrical engineering fields.

2-PROGRAM Aims

The graduates of the engineering programs should be able to:
1-Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
2- Design a system component and process to meet the required needs within realistic constraints.
3- Design and conduct experiments as well as analyze and interpret data.
4- Identify, formulate and solve fundamental engineering problems.

5- Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
6- Work effectively within multi-disciplinary teams.
7- Communicate effectively.
8- Consider the impacts of engineering solutions on society and environment.
9- Demonstrate knowledge of contemporary engineering issues.
10- Display professional and ethical responsibilities; and contextual understanding
11- Engage in self- and life- long learning.
12- Design and supervise the construction of systems to generate, transmit, control and use electrical energy.
13- Design and develop heavy equipment, such as generators, motors, transmission lines and distributing systems.
14- Plan and manage engineering activity during the diverse phases of electric power generation, transmission and control
15- Prepare and reviews simple sketches, specifications and data sheets for electric power generation, control and distribution systems
16- Perform design reviews and checks for electric power generation and distribution systems
17- Perform review of supplier documentation for compliance with specifications
18- Develops load lists
19- Develops low and high voltage power systems and protection.

3-PROGRAM Objectives

The graduates of the engineering programs should be able to:

To prepare undergraduate students who will be able to create new ways to meet society's needs through the applications of fundamentals of engineering sciences to practical problems using design, analyses and syntheses of electrical components, circuits, and systems. Thus, becoming successful engineering problems solvers, lifelong learners, innovators, and professionals in the field of electrical power and machines.

To prepare engineers who will become leaders in the electrical power and machines engineering profession, and be able to shape the social, intellectual, business and technical activities.

To prepare engineers who will be able to work on electrical power and machines systems including the design and realization of such systems.

To insure that students are exposed to elements of social sciences, humanities and environmental studies so that they understand the necessities for professionalism, ethical responsibilities and the needs to function in multidisciplinary teams.

To prepare students to express themselves effectively in both oral and written communication.

To prepare students for engineering analyses and problem solving using appropriate mathematical and computational methodologies.

To teach students to use experimental and data analysis techniques for electrical power and machines engineering applications.
To provide students with awareness of tools and skills necessary for participating effectively in building a strong national economy and to meet current and future modern industry needs.
To provide various industries by highly qualified electrical power and machines engineers who have a broad knowledge of electrical engineering and related principles, theories and applications.

4-Learning Outcomes (LO's)

4-1 Level A: Competencies of engineering graduate

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.

4-2 Level B: Competencies of basic Electrical Engineering

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.

4-3 Level C: High specialized competencies
The graduates of the Electrical Power and Machines Engineering program should be able to:

C1) Design and perform experiments, as well as analyze and interpret experimental results related to electrical power and machines systems.
C2) Test and examine components, equipment and systems of electrical power and machines.
C3) Integrate electrical, electronic and mechanical components and equipment with transducers, actuators and controllers in creatively computer controlled systems.
C4) Specify and evaluate manufacturing of components and equipment related to electrical power and machines.
C5) Apply modern techniques, skills and engineering tools to electrical power and machines engineering systems.
5. Academic Standards
National Academic reference Standards of Mechanical engineering program (2018) which were issued by the National Authority for Quality Assurance & Accreditation of Education NAQAAE.

6-Reference standards
• None

7-Program Structure and Contents

7-1 Program duration:

The program duration is five years, 10 semesters.

7-2 Program structure:

Hours	148	Theoretical	115	Practical	263	Total
	231	Mandatory	32	Elective	---	Not bound

7-3 Indicative curricula content by subject area

Item	Subject Area	Credit Hours	%	NARS 2018%
A	Humanities and Social Sciences	13	7.88%	8-12%
B	Project Managements	4	2.42%	2-4%
C	Mathematics and Basic Sciences	42	25.45%	20-25%
D	Engineering Cultural	8	4.85	4-6%
E	Basic Engineering Sciences	45	27.27%	25-30%
F	Applied Engineering and Design	45	27.27%	25-30%
G	Projects and Practice	8	4.85%	4-6%
Total Credit Hours		165 Hours		

8-Program courses (Level/Semester)

	Level 1	(term 1) 1st term	Fall					
م #	Course Code	Course Title	Pre Requisite	الساعات Contact Hours				ساعات معتمدة Credit Hours
				محاضرة Lecture	تمرين Tutorial	عملي Practice	اجمالي Total	
1	GEN 111	Introduction to Quality Assurance		1	0	0	1	1
2	GEN 19x	General Elective 1		1	0	0	1	1
3	BES 111	Mathematics 1		2	2	0	4	3
4	BES 121	Physics 1		3	1	1	5	3
5	PRE 151	Manufacturing Engineering		2	0	3	5	3
6	BES 141	Statics		2	2	0	4	3
7	PRE 131	Engineering Drawing		2	3	0	5	3
				13	8	5	25	17

	Level 1	(term 2) 2nd term	Spring				
م #	Course Code	Course Title	Pre Requisite	Contact Hours الساعات			ساعات معتمدة Credit Hours
				محاضرة Lecture	تمرين Tutorial	عملي Practice	اجمالي Total	
1	GEN 112	Human Rights		1	0	0	1	1
2	ELE 141	Introduction to Computers		2	0	3	5	3
3	BES 112	Mathematics 2	BES 111	2	2	0	4	3
4	BES 122	Physics 2	BES 121	3	1	1	5	3
5	BES 131	Engineering Chemistry		2	1	2	5	3
6	BES 142	Dynamics	BES 141	2	2	0	4	3
7	FAC 111	Computer Aided Drawing	PRE 131	1	0	3	4	2
				13	6	9	28	18

	Level 2	(term 3) 1st term	Fall				
م #	Course Code	Course Title	Pre Requisite	Contact Hours الساعات			ساعات معتمدة Credit Hours
				محاضرة Lecture	تمرين Tutorial	عملي Practice	اجمالي Total	
1	BES 211	Mathematics 3	BES 112	2	2	0	4	3
2	BES 28y	Engineering Physics Elective	BES 122	2	1	2	5	3
3	GEN 241	Computer Languages and Programming	ELE 141	2	0	2	4	2
4	GEN 29x	General Elective 2		1	0	0	1	1
5	BES 212	Statistics and Probability Theory		1	2	0	3	2
6	ELE 211	Electric Circuit 1	BES 122	2	0	3	5	3
7	ELE 212	Electric Materials	BES 122	1	0	3	4	2
				11	5	10	26	16

	Level 2	(term 4) 2nd term	Spring				
م #	Course Code	Course Title	Pre Requisite	Contact Hours الساعات			ساعات معتمدة Credit Hours
				محاضرة Lecture	تمرين Tutorial	عملي Practice	اجمالي Total
1	BES 29x	Engineering Mathematics Elective	BES 211	2	2	0	4	3
2	MPE 223	Thermodynamics		1	2	0	3	2
3	ELE 213	Electromagnetic Fields	BES 122	2	2	0	4	3
4	ELE 231	Electronics	BES 122	2	0	3	5	3
5	ELE 214	Electric Circuit 2	ELE 211	2	0	3	5	3
6	ELE 215	Measurments & Measuring Instruments	ELE 211	2	0	3	5	3
				11	6	9	26	17

	Level 3	(term 5) 1st term	Fall				
م #	Course Code	Course Title	Pre Requisite	Contact Hours الساعات			ساعات معتمدة Credit Hours
				محاضرة Lecture	تمرين Tutorial	عملي Practice	اجمالي Total
1	FAC 121	Occupational Health and Safety		2	0	0	2	2
2	BES 316	Engineering Mathematics	BES 211	1	2	0	3	2
3	BES 311	Differential Equations	BES 211	2	2	0	4	3
4	MPE 334	Fluid Mechanics		1	2	0	3	2
5	ELE 311	Theories of Energy Conversion & Transformers	ELE 213	2	0	3	5	3
6	ELE 312	Logic Circuits	ELE 231	1	0	3	4	2
7	ELE 321	Electric Power Systems 1	ELE 214	2	0	3	5	3
				11	6	9	26	17

	Level 3	(term 6) 2nd term	Spring				
م #	Course Code	Course Title	Pre Requisite	Contact Hours الساعات			ساعات معتمدة Credit Hours
				محاضرة Lecture	تمرين Tutorial	عملي Practice	اجمالي Total	
1	GEN 321	Technical Report Writing		2	0	0	2	2
2	ELE 313	Numerical Analysis	BES 211	2	2	0	4	3
3	ELE 322	DC Machines	ELE 213	2	0	3	5	3
4	ELE 324	Electric Power Systems 2	ELE 321	2	0	3	5	3
5	ELE 331	Digital Electronics	ELE 312	2	0	3	5	3
6	ELE 323	Computer Applications	ELE 141	2	0	3	5	3
7	FAC 331	Field Training 1	100 Credit	0	0	3	3	1
				12	2	15	29	18

	Level 3	(term 7) 1st term	Fall				
م #	Course Code	Course Title	Pre Requisite	Contact Hours الساعات			ساعات معتمدة Credit Hours
				محاضرة Lecture	تمرين Tutorial	عملي Practice	اجمالي Total	
1	GEN 39x	General Elective 3		2	0	0	2	2
2	BES 312	Linear Algebra	BES 111	1	2	0	3	2
3	ELE 325	Synchronous Machines	ELE 213	2	0	3	5	3
4	ELE 333	Prgrammable Logic Controller	ELE 312	1	0	3	4	2
5	ELE 332	Power Electronics 1	ELE 231	2	0	3	5	3
6	ELE 326	High Voltage Engineering	ELE 324	2	0	3	5	3
7	ELE 39x	Elective Course 1	Approval	2	0	3	5	3
				12	2	15	29	18

	Level 4	(term 8) 2nd term	Spring				
م #	Course Code	Course Title	Pre Requisite	الساعات Contact Hours			ساعات معتمدة Credit Hours
				محاضرة Lecture	تمرين Tutorial	عملي Practice	اجمالي Total	
1	ELE 421	Testing of High Voltage Equipments	ELE 326	1	0	3	4	2
2	ELE 422	Power Systems Analysis 1	ELE 324	2	0	3	5	3
3	ELE 423	Induction Machines	ELE 213	2	0	3	5	3
4	ELE 432	Power Electronics 2	ELE 332	2	0	3	5	3
5	ELE 431	Automatic Control 1	ELE 214	2	0	3	5	3
6	FAC 431	Field Training 2	FAC 331	0	0	3	3	1
				9	0	18	27	15

	Level 4	(term 9) 1st term	Fall				
م #	Course Code	Course Title	Pre Requisite	الساعات Contact Hours			ساعات معتمدة Credit Hours
				محاضرة Lecture	تمرين Tutorial	عملي Practice	اجمالي Total	
1	GEN 421	Communication & Presentation Skills		1	2	0	3	2
2	ELE 424	Power System Analysis 2	ELE 422	2	0	3	5	3
3	ELE 425	Power System Protection	ELE 422	2	0	3	5	3
4	ELE 433	Automatic Control 2	ELE 431	1	0	3	4	2
5	ELE 411	Graduation Project 1	116 Credit	1	0	3	4	2
6	ELE 48x	Elective Course 2	Approval	2	0	3	5	3
				9	2	15	26	15

	Level 4	(term 10) 2nd term	Spring				
م #	Course Code	Course Title	Pre Requisite	الساعات Contact Hours			ساعات معتمدة Credit Hours
				محاضرة Lecture	تمرين Tutorial	عملي Practice	اجمالي Total	
1	FAC 39x	Engineering Economy Elective		2	0	0	2	2
2	FAC 49x	Project Management Elective		2	0	0	2	2
3	ELE 426	Electric Drives	ELE 432	2	0	3	5	3
4	ELE 427	Special Electrical Machines	ELE 213	1	0	3	4	2
5	ELE 412	Graduation Project 2	ELE 411	1	0	3	4	2
6	ELE 49x	Elective Course 3	Approval	2	0	3	5	3
				10	0	12	22	14

9-Program courses (Specialization)

9-1-Social Sciences and Humanities

Course Code	Contact Hours	Lab	Tutorial	Lec.	Contact Hours	Credit Hours
GEN111	Introduction to Quality Assurance	1	0	0	1	1
ELE141	Introduction to Computers	2	0	3	5	3
GEN112	Social Issues	1	0	0	1	1
FAC121	Occupational Health and Safety	2	0	0	2	2
GEN19x	General Elective 1	1	0	0	1	1
GEN29x	General Elective 2	1	0	0	1	1
GEN321	Technical Report Writing	2	0	0	2	2
GEN39x	General Elective 3	2	0	0	2	2
					15	13

9-2 Projects and Business Management

Course Code	Course	Lec.	Tutorial	Lab	Contact Hours	Credit Hours
FAC39x	Engineering Economy Elective	2	0	0	2	2
FAC49x	Projects management Elective	2	0	0	2	2
Total Hours					4	4

9-3 Mathematics and Basic Sciences

Course Code	Contact Hours	Lab	Tutorial	Lec.	Contact Hours	Credit Hours
BES 111	Mathematics 1	2	2	0	4	3
BES 112	Mathematics 2	2	2	0	4	3
BES 121	Physics 1	3	1	1	5	3
BES 141	Statics	2	2	0	4	3
BES 211	Mathematics 3	2	2	0	4	3
BES 122	Physics 2	3	1	1	5	3
BES 131	Engineering Chemistry	2	1	2	5	3
BES 142	Dynamics	2	2	0	4	3
BES 29x	Engineering Mathematics Elective	2	2	0	4	3
BES28y	Engineering Physics Elective	2	1	2	5	3
BES212	Statistics and Probability Theory	1	2	0	3	2
BES311	Differential Equations	2	2	0	4	3
BES312	Linear Algebra	1	2	0	3	2
BES313	Engineering Mathematics	1	2	0	3	2
ELE313	Numerical Analysis	2	2	0	4	3
Total Hours					61	42

9-4-Engineering Culture

Course Code.	Course	Lec.	Tutorial	Lab	Cotact Hours	Credit Hours
FAC111	Computer Aided Drawing	1	0	3	4	2
GEN241	Computer Languages & Applications	2	0	1	3	2
GEN421	Communication & Presentation Skills	1	2	0	3	2
ELE312	Logic Circuits	1	0	3	4	2
Total Hours					14	8

9-5 Basic Engineering Sciences

Course Code	Course	Lec.	Tutorial	Lec.Lab.	Contact Hours	Credit Hours
PRE 151	Manufacturing Engineering	2	0	3	5	3
PRE 131	Engineering Drawing	2	3	0	5	3
ELE111	Electrical Materials	1	0	3	4	2
ELE 211	Electric Circuit 1	2	0	3	5	3
ELE223	Electromagnetic field theory	2	2	0	4	3
ELE 231	Electronics	2	0	3	5	3
ELE 214	Electric Circuit 2	2	0	3	5	3
ELE 215	Measurements & Measuring Instruments	2	0	3	5	3
ELE 311	Theories of Energy Conversion & Transformers	2	0	3	5	3
ELE 331	Digital Electronics	2	0	3	5	3
ELE 323	Computer Applications	2	0	3	5	3
ELE 332	Power Electronics 1	2	0	3	5	3
ELE 39x	Elective Course 1	2	0	3	5	3
ELE 431	Automatic Control 1	2	0	3	5	3
MPE 223	Thermodynamics	1	2	0	3	2
MPE 334	Fluid Mechanics	1	2	0	3	2
Total Hours					74	45

9-6-Applied Engineering and Design

Course Code	Course	Lec.	Tutorial	Lab	Contact Hours	Credit Hours
ELE321	Electric Power Systems 1	2	0	3	5	3
ELE322	DC Machines	2	0	3	5	3
ELE324	Electric Power Systems 2	2	0	3	5	3
ELE325	Synchronous Machines	2	0	3	5	3
ELE333	Programmable Logic Controller	1	0	3	4	2
ELE326	High Voltage Engineering	2	0	3	5	3
ELE422	Power Systems Analysis 1	2	0	3	5	3
ELE423	Induction Machines	2	0	3	5	3
ELE432	Power Electronics 2	2	0	3	5	3

ELE424	Power System Analysis 2	2	0	3	5	3
ELE425	Power System Protection	2	0	3	5	3
ELE433	Automatic Control 2	1	0	3	4	2
ELE426	Electric Drives	2	0	3	5	3
ELE427	Special Electrical Machines	1	0	3	4	2
ELE48x	Elective Course 2	2	0	3	5	3
ELE49x	Elective Course 3	2	0	3	5	3
					77	45

9-7 Project and Practice

Course Code	Course	Lec.	Tutorial	Lab	Total Hours	Credit Hours
FAC331	Field Training I	0	0	3	3	1
FAC431	Field Training II	0	0	3	3	1
ELE411	Graduation Project 1	1	0	3	4	2
ELE412	Graduation Project 2	1	0	3	4	2
ELE421	Testing of High Voltage Equipments	1	0	3	4	2
Total Hours					18	8

10- ENROLLMENT REQUIREMENTS

Admission to study

Graduates of high school in Mathematics or its equivalent, graduates of technical institutes who were nominated by the Coordination Office, transfer students, and expatriates are accepted in accordance with the rules and conditions set by the Supreme Council of Universities.

The college may accept applications submitted to it by holders of a bachelor's degree from other colleges and institutes equivalent to university degrees subject to the Universities Regulation Law, or from one of the college's departments to obtain a bachelor's degree from other departments or divisions. Each department determines admission rules for the academic level to which the student is enrolled. and the courses in which the exam is required to be taken.

The student is enrolled for the bachelor degree in engineering in one of the scientific electrical engineering (specializations) according to acceptance rules set by the coordination office in conformity with the decisions of the Universities Supreme Council.

The study begins with a preparatory year for all students and the specialization starts with the first year.

Students are distributed among the different departments according to rules set by the faculty council.

11- RULES FOR COMPLETING THE PROGRAM

11-1 study system

The official language of study and examinations is English, and the College Council may decide to teach some courses in Arabic based on the request of the department council supervising the program/program board of directors.

The system used in the college is the Credit Hours System.

The College Council may, after taking the opinion of the concerned department council and according to the nature of the academic courses, decide to teach one or more courses in the hybrid education style, so that the study in the course is 60 to 70% face-to-face and 40 to 30% by the distance education system, or any other percentage, according to That this be presented to the Council of Education and Student Affairs at the university for approval and to submit it to the University Council for approval.

11-2Contact hours and approved hours

The contact hour represents a measurement of the students' scheduled teaching activity for a period of 60 minutes per week during the duration of a full semester. One contact hour is divided into 50 minutes of actual teaching and 10 minutes of rest, and it depends on the method of communication with the student and includes:

A. Lecture hours, symbolized by the letter (L), and taught by a faculty member.

B. Hours of theoretical exercises (Exercises or Tutorials), symbolized by the letter (T), and include problem solving and theoretical exercises, and are with a member of the teaching staff or assisting staff.

C. Lab or practice hours, symbolized by the letter (P), and include hours for field or laboratory training, applied exercises for engineering courses, computer training and applications and applied design, or drawing hours for architecture.

The credit hour, symbolized by the letters (CR), represents a measure of the value of the course in one semester, and is calculated as follows:

The credit hour = one lecture hour or two to three hours for exercises or laboratories.

11-3Academic advisor

The college (through academic departments/program boards) identifies for each student an academic advisor from among the faculty members to assist the student in the registration procedures and in selecting courses each semester and to guide him in matters related to the study. When absolutely necessary, the assistant staff may be used as academic advisors with the approval of the College Council.

The academic advisor is committed to following up the student's performance and assisting him in selecting courses each semester. He may request that the student be placed under observation for one semester, while reducing the number of hours in which he is allowed to register, with a minimum of 12 credit hours.

The academic advisor can be changed based on other reasons and circumstances accepted by the College Council

11-4 Supervision of humanitarian and non-engineering courses

The Vice Dean for Education and Student Affairs supervises humanities and social sciences courses, business administration courses, and engineering culture courses that are not related to a specific program. To entrust the supervision of all or some of these courses to one or more departments of the college or to one or more members of the faculty of the college.

11-5 Distributing students to academic programmes

Before the beginning of the academic year, the College Council determines the offered programs in which students are allowed to register and the maximum number of students admitted to each program. The distribution of students transferred from the general level to majors/programs is in accordance with the rules determined annually by the College Council and in light of the educational capabilities available for each academic program.

11-6 Duration of study

Duration of study is ten main semesters, the minimum for study is nine main semesters, and the maximum for study is twenty main semesters, and the student is dismissed if he exceeds the maximum study limit without achieving the requirements for obtaining an academic degree.

The maximum study period does not include frozen semesters for reasons accepted by the College Board.

11-7 Study levels

Whenever the student completes a specific percentage of the program requirements, he is transferred to the higher level. The following table shows the student's status based on the percentage of the number of credit hours that the student successfully passed:

Academic level	Introducing the student's location to the study system	Percentage of the number of credit hours that the student successfully completed
1	Freshman	From 0% to less than 20%
2	Sophomore	From 20% to less than 40%
3	Junior	From 40% to less than 70%
4	Senior	From 70% to less than 100%

11-8 Dates of registration and study

The academic year includes three semesters as follows:

a) The first main semester (autumn): It starts in September and lasts for 15 weeks of teaching, followed by 3 weeks of examinations. Courses are registered within three weeks before the start of the semester.

b) The second main semester (spring): It starts in February and lasts for 15 weeks of teaching, followed by 3 weeks of examinations. Courses are registered within one week before the start of the semester.
c) Summer semester: It starts in late June or early July and lasts for 7 teaching weeks, followed by one week of exams. Courses are registered within one week before the beginning of the semester. The teaching is intensive in the summer semester, where the weekly contact hours are doubled
Course registration is not final unless approved by the academic advisor and approved by the program/scientific department coordinator
Registration for the summer semester is optional.
Sponsor the adjustment of semester timings according to developments in accordance with the rules set by the Supreme Council of Universities.

11-9 Academic fees
The educational service fees are determined in accordance with the rules and conditions set by the Supreme Council of Universities.
For inter-programs with special fees:
The educational service prescribed for each credit hour is determined by the university based on the proposal of the College Council annually. These fees can be increased annually for new students after the approval of the University Council.
The student signs a commitment to pay the educational service fees proposed by the college and approved by the university, with commitment to the same fees for the student from enrollment until graduation.
Educational service fees are collected every semester. The value of the educational service fees is estimated by the number of hours in which the student registers for each semester (the first main semester and the second main semester) with a minimum equivalent to an educational service fee of 12 credit hours per semester, unless the number of hours approved for obtaining If the grade is less than that, or if the student is under observation, he will be charged for the actual hours of study, and the educational service fees for the summer semester will depend on the number of credit hours in which the student is registered.

11-10 Conditions for registration of academic courses
a) The number of credit hours in which the student registers in the main semester is not less than twelve credit hours (except for graduate students), and does not exceed twenty-one hours, so that the maximum number of credit hours that the student registers in one semester is:
Up to 21 credit hours for a student with a cumulative grade point average greater than or equal to 3.0.
Up to 18 credit hours for a student with a cumulative GPA greater than or equal to 2.00 but less than 3.0. This number is recorded in the first semester after the student enrolls.

Up to 14 hours for a student with a cumulative average of less than 2.00, with a maximum of five courses.
b) A student may register for courses in the summer semester with a maximum total number of credit hours in accordance with the following rules and after the approval of the academic advisor:
Up to 9 credit hours for a student with a GPA greater than or equal to 3.0.
Up to 8 credit hours for a student with a GPA of less than 3.0.
c) A student may register for one additional course within the limits mentioned above if this leads to his graduation and with the approval of the academic advisor.
d) In all previous cases, the conditions for registration must be met in each course and on the dates specified in the registration times and rules issued by the college and after consulting the academic advisor.
e) A student may not register in specific courses that have pre-requisites before fulfilling the conditions for success in the pre-requisite courses, and the College Council may set the necessary controls for that.
f) Registration is allowed for students who are one week late for the announced scheduled date, subject to the approval of the academic advisor and in accordance with the registration rules set by the College Council. With payment of a late fine for each course determined by the College Council
g) The Board of Directors of the program/scientific department determines the courses that are offered each semester and the methods for students' registration in them, except for the specific courses for courses required to study other courses or necessary for graduation, which are available for registration every semester.

11-11 Adding and deleting courses
A student may add a course in the first week of the main semesters or in the first three days of the summer semester, subject to the approval of the academic advisor.
B. The student can drop the courses he is enrolled in until the end of the second week of the main semesters or the end of the first week of the summer semester, provided that the academic advisor agrees.
C.Adding or deleting courses should not lead to violating the minimum or maximum number of credit hours registered for each semester.
D. The deleted course does not appear on the transcript given to the student.
E. Failure to complete the necessary procedures to drop the course leads to the student being considered a failure in the course unless he withdraws from it.

11-12 Withdrawing from academic courses
A. The student can withdraw from any course he registered for, provided that this is done during the first ten weeks of the main semesters or during the first five weeks of the summer semester, and after the approval of the academic advisor, and provided that he meets the attendance rate, and that this does not prejudice the student's academic load.

B. The student is not considered to have failed the course from which he has withdrawn, provided that the withdrawal request is completed and approved within the specified time period.
C. The student gets a grade (W) in the course he withdraws from and is allowed to register for this course (full attendance and performance of all activities and exams) in the following semesters.
D. As for the elective course, the student is allowed to change it in subsequent semesters if he fails to pass it or withdraws from it, and this is subject to the approval of the academic advisor and the requirements of the program.

11-13 Repeating academic courses
A. The student must re-register in each compulsory course in which he fails in the first semester in which the course is offered for registration, according to the hours allowed for registration in the semester, and he is given an estimate for this course with a maximum of B+, and both grades are mentioned in the student's academic record, and the course hours are calculated once Cumulative GPA calculation.
B. The student may re-register for any course he wishes to improve his grade with a maximum of five courses during his studies in the college, and the improvement is not counted for the purpose of raising the academic warning (putting the student under academic probation) or to achieve the graduation requirements within the maximum limit, and the student is not allowed to improve any of the courses after achieving graduation requirements
C. The student is given the highest grade when improving and without adding the hours of these courses to the total credit hours he studied when calculating the cumulative average.
D. In the event that the student fails in the re-improvement, his previous grade for the course is canceled and is not considered after that, and he is considered to have failed and gets an F grade.
E. If the student repeats any course, he is required to repeat all course assessment requirements, full attendance, and performance of all activities and examinations.

11-14 Incomplete courses
A.If the student does not attend the final exam for the course in a main semester with an excuse accepted by the committee concerned with the affairs of the program in which he is registered and approved by the College Council, the course is considered incomplete.
B. The student gets grade (I) in the incomplete course, until the exam is taken in the course, and grade I is not included in calculating the student's cumulative average.
C. The student takes the exam on the next available exam date, and the final exam scores are added to the semester work grades to calculate the overall grade for this course.
D. If the student does not take the exam on the next available date for the course exam, he will receive an grade (F).

11-15 Study Requirements

The study requirements are divided into four parts as follows:

University requirements, including social sciences, humanities, general culture, and courses that focus on developing the student's personal skills, representing a total of 15 credit hours.

College requirements, including courses in mathematics, physics, basic engineering natural sciences, materials sciences, engineering culture, and practical exercises, representing a total of 46 credit hours.

General Specialization Requirements: Basic and specialized courses, some of which include elective courses according to the academic program, and represent no less than 35% of the total number of credit hours.

Specialization Requirements: Specialized and applied courses and design, some of which include elective courses according to the study program and represent no more than 30% of the total number of credit hours for the program.

11-16 Requirements for obtaining a bachelor's degree

A. To obtain a bachelor's degree, the student must successfully pass all the credit hours required by the program and a cumulative grade point average of not less than 2.00 upon graduation.

B. Field training inside or outside the college is considered an integral part of the study, and a bachelor's degree is not granted unless a total training period of no less than 6 weeks is spent. The training is equivalent to two credit hours and is implemented under the supervision of the concerned department. Training can also take place within the college in a similar environment, and it can take place in two phases, each of which is not less than 3 weeks.

C. The student performs field training after successfully completing 100 credit hours

D. The student performs the graduation project after successfully completing 116 credit hours

11-17 Estimates of study requirements courses

Points for each credit hour are estimated as follows:

Appreciation	The number of points	The percentage obtained by the student
+A	4.00	97% and above
A	4.00	93% to less than 97%
A-	3.70	89% to less than 93%
B+	3.30	84% to less than 89%
B	3.00	80% to less than 84%
B-	2.70	76% to less than 80%
C+	2.30	73% to less than 76%
C	2.00	70% to less than 73%
C-	1.70	67% to less than 70%
D+	1.30	64% to less than 67%
D	1.00	60% to less than 64%
F	0.00	less than 60%

Other estimates used

Appreciation	its meaning	The condition the estimate describes
W	Withdrawn	It is made for the student who withdraws from a course.
I	Incomplete	A credit is made for the student who did not complete the course requirements and was absent from the course. The final exam and submitted an application for that and the College Council accepted it.
MW	Military Withdrawal	It is made for the student withdrawing to perform military service.
AU	Audit	It is made for the registered student as a listener.
E	Excuse	A credit is made for the student who is absent from attendance with an excuse accepted by the College Council
DN	Denial	A student who is denied entry to the exam for exceeding the permitted percentage of absence is allocated and is included in calculating the average
Abs	Absent	Allocated to the student who is absent from the final exam without an excuse accepted by the College Council and is included in the calculation of the semester and cumulative average.
P	Pass	Allocated to the student in the courses that are not included in the calculation of the cumulative average.
IP	In Progress	It is made for the student during the continuous evaluation of the graduation project if the project is for more than one semester.

11-18 Calculating the semester and cumulative averages

A. A student is not considered successful in any course unless he/she obtains a grade of D at least.

B. Points for each course are calculated as the credit hours for the course multiplied by the points obtained at his discretion.

C. The total points obtained by the student in any semester are calculated as the sum of the points of all the courses he studied in that semester.

D. The average points for any semester (semester GPA) is calculated as the division of the total points obtained by the student in that semester divided by the total credit hours for these courses.

E. The cumulative cumulative average (CGPA) is calculated as the division of the sum of the points of all the courses that the student studied from the beginning of the student's first registration until the current semester, divided by the total credit hours for these courses. In the case of incomplete courses until the results are announced.

The ranking of graduates is determined on the basis of the cumulative GPA of graduation, and in the event of equality in the GPA, the arrangement is based on the cumulative total of points.

• The student's graduation certificate includes all the courses that were registered during the study period, including the courses in which he failed, withdrew from or were improved.

11.19 Persistence

A. The student must follow the lectures, theoretical exercises, practical exercises, and laboratories for each course, and his attendance rate must not be less than 75% of the total semester contact hours for each course separately. Status The student is considered to have failed and is given a grade of DN, which corresponds to points of 0.00 points, which is equivalent to grade F.

B. If the student submits an excuse for his absence in following up the lectures, theoretical exercises, applied exercises, or laboratories, and the College Council accepts it after taking the opinion of the concerned department council, then the student is considered absent with an acceptable excuse. E.

C. Anyone who is absent from a final exam due to a sick or compulsive excuse must submit proof of his excuse within two working days from the date of holding that exam, and if the excuse is accepted, the student will be given an E grade, unless he submits a request to consider the grade incomplete in the course.

D. Whoever is absent from a final exam without a satisfactory excuse or an acceptable compulsive excuse, will be given an Abs grade and get 0.00 points in that course, and this course will be treated when calculating the student's semester or combined average as the student who failed in a course.

11.20 Examinations and evaluation of academic courses

A. The total score for each course is calculated from one hundred points and to the nearest whole number.

B. The total score for each course is the sum of the final exam scores and the semester work scores, so that the percentage of the final exam does not exceed 50% of the course score, or in proportion to each course and according to what is shown in the course description. The final exam is written, with the exception of Graduation project and courses in which the course description specifies that the final exam is oral, computerized, or in any other way approved by the scientific department and the College Council.

C. A student is not considered successful in the courses for which a written exam is held unless he obtains grades of at least 40% of the written exam in the written exam.

D. The semester work for each course includes at least one examination, provided that it is held at the end of the seventh week from the beginning of each of the first and second main semesters (fall and spring). In the summer semester, it is held at the end of the fourth week thereof. The semester work may include: Reports, research, mini-projects, or other semester work as described in the course description. Grade distribution is announced to students before the start of the semester.

E. The department council/program management determines before the beginning of the semester a coordinator from among the faculty members of the department for

each course. For education and student affairs, or whomever he delegates as a coordinator for it. From among the lecturers, the department council chooses from among the course lecturers as a coordinator for it. As for humanities and social sciences, and administration courses

F. The teaching lecturers or the lecturer and the course coordinator (in the case of a single lecturer for a course) participate in reviewing the statistical distribution of students' grades based on the mechanisms established by the College Council.

G. The duration of the final exams is set at one hour for each of the humanities and social sciences courses and the college requirements courses of one accredited hour. The duration of the final exam is set at two to three hours for all other courses, except for drawing and design courses and similar courses, which may be increased and a decision is issued by the College Council.

H. The College Council may, after taking the opinion of the concerned department council and according to the nature of the academic courses, decide to hold the exam electronically, provided that this is presented to the University Council for Education and Student Affairs for approval and submitting it to the University Council for approval.

11.21 Placing the student under probation (academic warning)

A. If the student's GPA in any main semester falls below 2.00, the student is placed under academic probation and an academic warning is sent to him, and an Academic Warning is recorded in his record, with the number of credit hours allowed to be registered reduced to not less than twelve credit hours and not more than four. Ten hours and a maximum of five courses.

B. The student is expelled from the study if he/she obtains a semester average of less than 2.0 in six consecutive main semesters (excluding summer semesters) or ten separate main semesters.

C. If the student's semester average exceeds 2.0 in any major semester, the number of consecutive academic warnings will be recalculated

D.A student who is expelled from the study due to his inability to raise the semester average to at least 2.0 shall have an additional and final opportunity to register in two consecutive main semesters in addition to the summer semester to raise his semester average to at least 2.0 and fulfill the graduation requirements, provided that he has completed at least For 80% of the total number of credit hours required for graduation, and that there is an opportunity for the student to raise his semester GPA to at least 2.0.

11.22 Postponement of studies, suspension of enrollment, and withdrawal from the college

A. If the study begins in any of the first (fall) or second (spring) main semesters and the student is not registered for that semester, he is considered to have withdrawn from the study in this semester unless he presents a compelling excuse within two weeks of the start of the study, which is accepted by the College Council after taking the opinion of the Department Council .

B. A student may postpone his studies in the college for a period not exceeding four major semesters, whether intermittent or continuous, after presenting an acceptable excuse approved by the college council and submitted to the university council for approval.

C. The student must postpone his studies at the college throughout his enlistment period.

D. If the student exceeds the period of postponing the study that was approved without returning to study and registering courses in the first semester after the end of the postponement period, he will be dismissed from the college and not entitled to join the college again.

H. A student with an incomplete grade (I) may not postpone his studies at the college for the next semester except after removing the "incomplete" grade. and perform the course exam.

11.23Transferring students between the credit hour system and the semester system

Students may be transferred from another engineering program that operates on the semester system (whether inside or outside the college) to any of the credit hours programs in the college, according to the admission regulations determined by the college council as long as they do not pass 50% of the graduation requirements.

An offset is made between the courses that the student has already passed in the semester programs and the equivalent courses in Al-Braj using the credit hour system.

The following table is used to calculate the points of the courses studied by the student transferred from the semester system to credit hours

The accumulative average for students transferred to a program that works on the credit hour system is calculated based on what the student has studied under the umbrella of this program only, and what he studied in any program with the credit hour system in any other university or the two-semester system, whether at his university or any other university, is not considered. In all cases, an offset is made for what he studied to be counted within the requirements for obtaining the degree without being calculated in calculating the student's cumulative average.

Appreciation	The number of points	The percentage obtained by the student in the semesters
+A	4.00	95% and above
A	4.00	90% to less than 95%
A-	3.70	85% to less than 90%
B+	3.30	80% to less than 85%
B	3.00	75% to less than 80%
B-	2.70	71% to less than 75%
C+	2.30	68% to less than 71%
C	2.00	65% to less than 68%
C-	1.70	60% to less than 65%
D+	1.30	55% to less than 60%
D	1.00	50% to less than 55%
F	0.00	less than 50%

11.24 Transfer from one program to another within the college

A. Applications for transfer from one program to another are submitted to the Department of Education Affairs before the beginning of the first semester (fall) of each year, according to the timings set by the College Council. These requests are decided on according to the following conditions:

1. The student has not passed 50% or more of the total number of credit hours for the specialization he is transferring to.
2. Transfer between programs for one time throughout the college years.
3. To have achieved the acceptable rates and conditions for the program to which he wishes to transfer, which are set by the Scientific Department Council / Program Board of Directors and approved by the College Council.
4. College Council approval of the transfer.

B. When a student transfers from one program to another, the Scientific Department Council / the Board of Directors of the program to which the student is transferred makes the necessary set-off for the transfer.

11.25 Honors

Honors degree is awarded to a student whose semester average is not less than 3.30 during all semesters of study. To grant honors, the student must not have obtained an F grade in any course during his studies at the college or outside the college, otherwise he shall have been subjected to any disciplinary punishment during his studies at the college. .

11.26 Granting excellence in programs with special fees

• When any of the first thirty students in the Egyptian General Secondary School - majoring in Mathematics enrolls in the interim credit hour programs with special fees, he is exempted from all fees and tuition fees during the semester following his

enrollment, and this exemption remains valid as long as the student obtains a cumulative average of 3.60 or more.

• The college establishes a system to encourage outstanding students by reducing tuition fees in gradual proportions with the cumulative average, and announces at the beginning of each semester the list of outstanding students and the rates of reducing expenses for each student.

11.27 Listening system:

The College Council may, after taking the opinion of the councils of the relevant scientific departments, accept students from the College or from other colleges or universities as listeners to some courses in the College in accordance with the rules and fees determined by the College Council, and the College does not grant any certificate for passing these courses.

11.28 Studying courses outside the college

The student may, on condition of obtaining prior approval from the College Council and after the approval of the concerned department council, study some courses in another university recognized by the Supreme Council of Universities, or in foreign universities with which cooperation agreements are signed. The credit hours for these courses are based on 30 credit hours, and these hours are calculated according to the following conditions:

• That the student has successfully completed studying no less than (32) credit hours in the college

• That the student obtain a prior written recommendation approving the courses that he will study at the other university from the student's academic advisor and the head of the concerned department council, and it shall be approved by the dean of the college or his representative.

• The number of credit hours for these courses should not exceed half of the credit hours required to obtain an academic degree

11.29The visiting student

• The College Council may, after taking the opinion of the councils of the relevant academic departments, accept students from other colleges or universities as visitors. The visiting student (Exchange Student) is the student who studies some courses in the college without obtaining any academic degree, and the maximum registration in the main semester is 12 credit hours, and the maximum registration in the summer semester is 9 credit hours, and the student is given a certificate (Statement) of what he studied only and the grades of the courses he studied in the college.

• The College Council proposes a fee for the educational service for each credit hour taught by the visiting student and is approved by the University Council

• All regulations and systems applicable to the regular student (exams - penalties) are applied to the visiting student.

11.30 The College Council may take the necessary decisions to complete and implement these regulations and facilitate their procedures.

11.31 The student bears responsibility for his knowledge of these regulations and for his knowledge of the bulletins and instructions issued by the college, and everything that is published on bulletin boards or on the college website in relation to this regulation.

12- Teaching and learning methods

Lecture
Presentation and Monitoring
Discussions
Tutorials
Problem Solving
Brain storming
Projects
Site Visits
Research and Reporting
Group Working
Discovering
Simulation and Modelling
Lab. Experiments

13-Student assessment (Methods and rules for student assessment)

Written Examine
Oral Examine
Tutorial Assessment
Project
Model
Research & Report
Quiz
Presentation
Discussion
Laboratory Test
Home Exams

14-Program Evaluation

Evaluator	Tools	Sample Evidance
1-Senior Students	-Meeting -Questionnaires	25% of the student
2-Alumni	-Meeting	
3-Stakeholders	-Meeting -Questionnaires	Samples representative
4-External Evaluator	-Reviewing according to external evaluator.	Reports
5-Othrs	None	

Coordinator of Program Quality assurance committee	Head of Electrical Engineering Dept. Council
Prof.Dr./ Ashraf Salah El Din Zein El Din Date:	Prof. Dr./ Nagy Ibrahim Elkalashy Date:

Appendix 1
Matching matrix of program aims and program attributes

Attributes of the Graduates of Engineering	Program Aims
1-Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations;	5- Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management 16- Perform design reviews and checks for electric power generation and distribution systems 17- Perform review of supplier documentation for compliance with specifications
2.Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation;	1-Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems. 4- Identify, formulate and solve fundamental engineering problems. 5- Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
3.Behave professionally and adhere to engineering ethics and standards	8- Consider the impacts of engineering solutions on society and environment. 10-Display professional and ethical responsibilities; and contextual understanding
4.Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance	6- Work effectively within multi-disciplinary teams. 7- Communicate effectively.
5.Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community	8- Consider the impacts of engineering solutions on society and environment. 9-Demonstrate knowledge of contemporary engineering issues. 10-Display professional and ethical responsibilities; and contextual understanding 12- Design and supervise the construction of systems to generate, transmit, control and use electrical energy.

6.Value the importance of the environment, both physical and natural, and work to promote sustainability principles	8- Consider the impacts of engineering solutions on society and environment. 10-Display professional and ethical responsibilities; and contextual understanding
7.Use techniques, skills and modern engineering tools necessary for engineering practice	3- Design and conduct experiments as well as analyze and interpret data. 5- Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management. 13- Design and develop heavy equipment, such as generators, motors, transmission lines and distributing systems. 14- Plan and manage engineering activity during the diverse phases of electric power generation, transmission and control 15-Prepare and reviews simple sketches, specifications and data sheets for electric power generation, control and distribution systems
8- 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;	10-Display professional and ethical responsibilities; and contextual understanding 11- Engage in self- and life- long learning. 18- Develops load lists 19- Develops low and high voltage power systems and protection.
9-Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner;	2- Design a system component and process to meet the required needs within realistic constraints. 8- Consider the impacts of engineering solutions on society and environment. 10- Display professional and ethical responsibilities; and contextual understanding 14- Plan and manage engineering activity during the diverse phases of electric power generation, transmission and control

10.Demonstrate leadership qualities, business administration and entrepreneurial skills.	5- Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management. 9- Demonstrate knowledge of contemporary engineering issues. 10- Display professional and ethical responsibilities; and contextual understanding 14- Plan and manage engineering activity during the diverse phases of electric power generation, transmission and control

Appendix 2
Map Competencies to Courses
Matching program LOs to course Los

2-1 Level A: Competencies of engineering graduate

Code	Course	Competencies of engineering graduate									
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
GEN 111	Introduction to Quality Assurance			X	X			X	X	X	
ELE 141	Introduction to Computers	X			X	X					
GEN 112	Societal Issues								X	X	
GEN 19x	General Elective 1			X	X					X	
GEN 29x	General Elective 2	X							X		X
GEN 241	Computer Languages & Applications	X	X						X		X
GEN 321	Technical Report Writing					X		x	X	X	
GEN 39x	General Elective 3				X	X			X		X
GEN 421	Communication & Presentation Skills							X	X	X	
BES 111	Mathematics 1	X				X					
BES 112	Mathematics 2	X			X	X					
BES 121	Physics 1	X	X	X							
PRE 151	Manufacturing Engineering	X	X	X	X						
BES 141	Statics	X		X		X					
PRE 131	Engineering Drawing	X			X			X			
BES 211	Mathematics 3	X							X	X	

BES 122	Physics 2	X	X			X					
BES 131	Engineering Chemistry	X	X		X						
BES 142	Dynamics	X		X		X					
FAC 111	Computer Aided Drawing	X			X			X			
FAC 121	Occupational Health and Safety				X						
FAC 39x	Engineering Economy Elective			X			X				X
FAC 49x	Project Management Elective			X	X		X				
BES 29x	Engineering Mathematics Elective	X							X	X	
BES 28y	Engineering Physics Elective	X	X	X							
FAC 331	Field Training I				X			X	X		X
FAC 431	Field Training II				X			X	X		X
BES 212	Statistics and Probability Theory	X	X	X							
BES 311	Differential Equations	X							X	X	
BES 312	Linear Algebra	X							X	X	
BES 313	Engineering Mathematics	X							X	X	
ELE 211	Electric Circuit 1										
ELE 212	Electric Materials										
ELE 213	Electromagnetic Fields										
ELE 231	Electronics										
ELE 214	Electric Circuit 2										
ELE 215	Measurements & Measuring Instruments										
ELE 311	Theories of Energy Conversion & Transformers										
ELE 312	Logic Circuits										
ELE 321	Electric Power Systems 1										
ELE 313	Numerical Analysis	X							X	X	
ELE 322	DC Machines										
ELE 331	Digital Electronics										
ELE 323	Computer Applications	X	X								
ELE 332	Power Electronics 1										
ELE 39x	Elective Course 1										
ELE 431	Automatic Control 1										
MPE 223	Thermodynamics	X	X								
MPE 334	Fluid Mechanics	X	X								
ELE 324	Electric Power Systems 2										
ELE 325	Synchronous Machines										
ELE 333	Programmable Logic Controller										

ELE 326	High Voltage Engineering										
ELE 421	Testing of High Voltage Equipments										
ELE 422	Power Systems Analysis 1										
ELE 423	Induction Machines										
ELE 432	Power Electronics 2										
ELE 424	Power System Analysis 2										
ELE 425	Power System Protection										
ELE 433	Automatic Control 2										
ELE 411	Graduation Project 1		X	X			X	X		X	X
ELE 426	Electric Drives										
ELE 427	Special Electrical Machines										
ELE 412	Graduation Project 2		X	X			X	X		X	X
ELE 48x	Elective Course 2										
ELE 49x	Elective Course 3										

2-2 Level B: Competencies of basic Electrical Engineering

Code	Course	Competencies of engineering graduate				
		B1	B2	B3	B4	B5
GEN 111	Introduction to Quality Assurance					
ELE 141	Introduction to Computers					
GEN 112	Societal Issues					
GEN 19x	General Elective 1					
GEN 29x	General Elective 2					
GEN 241	Computer Languages & Applications					
GEN 321	Technical Report Writing					
GEN 39x	General Elective 3					
GEN 421	Communication & Presentation Skills					
BES 111	Mathematics 1					
BES 112	Mathematics 2					
BES 121	Physics 1					
PRE 151	Manufacturing Engineering					
BES 141	Statics					
PRE 131	Engineering Drawing					
BES 211	Mathematics 3					
BES 122	Physics 2					
BES 131	Engineering Chemistry					
BES 142	Dynamics					
FAC 111	Computer Aided Drawing					

FAC 121	Occupational Health and Safety					
FAC 39x	Engineering Economy Elective					
FAC 49x	Project Management Elective					
BES 29x	Engineering Mathematics Elective					
BES 28y	Engineering Physics Elective					
FAC 331	Field Training I	X	X	X	X	X
FAC 431	Field Training II	X	X	X	X	X
BES 212	Statistics and Probability Theory					
BES 311	Differential Equations					
BES 312	Linear Algebra					
BES 313	Engineering Mathematics					
ELE 211	Electric Circuit 1	X	X	X	X	
ELE 212	Electric Materials	X				X
ELE 213	Electromagnetic Fields	X				X
ELE 231	Electronics		X	X	X	X
ELE 214	Electric Circuit 2	X	X	X	X	
ELE 215	Measurements & Measuring Instruments	X	X		X	
ELE 311	Theories of Energy Conversion & Transformers	X				X
ELE 312	Logic Circuits		X	X		
ELE 321	Electric Power Systems 1					
ELE 313	Numerical Analysis					
ELE 322	DC Machines					
ELE 331	Digital Electronics		X	X		
ELE 323	Computer Applications		X	X		
ELE 332	Power Electronics 1				x	
ELE 39x	Elective Course 1					
ELE 431	Automatic Control 1					
MPE 223	Thermodynamics					
MPE 334	Fluid Mechanics					
ELE 324	Electric Power Systems 2					
ELE 325	Synchronous Machines					
ELE 333	Programmable Logic Controller		X	X		
ELE 326	High Voltage Engineering					
ELE 421	Testing of High Voltage Equipments					
ELE 422	Power Systems Analysis 1					

ELE 423	Induction Machines					
ELE 432	Power Electronics 2				X	
ELE 424	Power System Analysis 2					
ELE 425	Power System Protection					
ELE 433	Automatic Control 2					
ELE 411	Graduation Project 1	X	X			X
ELE 426	Electric Drives					
ELE 427	Special Electrical Machines					
ELE 412	Graduation Project 2	X	X			X
ELE 48x	Elective Course 2					
ELE 49x	Elective Course 3					

2-3 Level C : Competencies of Electrical Power and Machine Engineering

Code	Course	Competencies of engineering graduate				
		C1	C2	C3	C4	C5
GEN 111	Introduction to Quality Assurance					
ELE 141	Introduction to Computers					
GEN 112	Societal Issues					
GEN 19x	General Elective 1					
GEN 29x	General Elective 2					
GEN 241	Computer Languages & Applications					
GEN 321	Technical Report Writing					
GEN 39x	General Elective 3					
GEN 421	Communication & Presentation Skills					
BES 111	Mathematics 1					
BES 112	Mathematics 2					
BES 121	Physics 1					
PRE 151	Manufacturing Engineering					
BES 141	Statics					
PRE 131	Engineering Drawing					
BES 211	Mathematics 3					
BES 122	Physics 2					
BES 131	Engineering Chemistry					
BES 142	Dynamics					
FAC 111	Computer Aided Drawing					
FAC 121	Occupational Health and Safety					
FAC 39x	Engineering Economy Elective					
FAC 49x	Project Management					

	Elective					
BES 29x	Engineering Mathematics Elective					
BES 28y	Engineering Physics Elective					
FAC 331	Field Training I					
FAC 431	Field Training II					
BES 212	Statistics and Probability Theory					
BES 311	Differential Equations					
BES 312	Linear Algebra					
BES 313	Engineering Mathematics					
ELE 211	Electric Circuit 1					
ELE 212	Electric Materials					
ELE 213	Electromagnetic Fields					
ELE 231	Electronics					
ELE 214	Electric Circuit 2					
ELE 215	Measurements & Measuring Instruments					
ELE 311	Theories of Energy Conversion & Transformers					
ELE 312	Logic Circuits					
ELE 321	Electric Power Systems 1		X		X	X
ELE 313	Numerical Analysis					
ELE 322	DC Machines	X	X		X	X
ELE 331	Digital Electronics					
ELE 323	Computer Applications					
ELE 332	Power Electronics 1		X	X		
ELE 39x	Elective Course 1	X		X		X
ELE 431	Automatic Control 1			X		X
MPE 223	Thermodynamics			X		
MPE 334	Fluid Mechanics			X		
ELE 324	Electric Power Systems 2		X		X	X
ELE 325	Synchronous Machines	X	X		X	X
ELE 333	Prgrammable Logic Controller			X		
ELE 326	High Voltage Engineering				X	X
ELE 421	Testing of High Voltage Equipments				X	X
ELE 422	Power Systems Analysis 1	X	X			X
ELE 423	Induction Machines	X	X		X	X
ELE 432	Power Electronics 2		X	X		
ELE 424	Power System Analysis 2	X	X			X
ELE 425	Power System Protection				X	X
ELE 433	Automatic Control 2			X		X

ELE 411	Graduation Project 1	X			X	X
ELE 426	Electric Drives			X		X
ELE 427	Special Electrical Machines	X	X		X	X
ELE 412	Graduation Project 2	X			X	X
ELE 48x	Elective Course 2				X	X
ELE 49x	Elective Course 3			X		X