

Electrical Power and Machines Engineering Program

Program Report (2022-2023)



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1. Basic Information

▪ Program title: Electrical Power and Machines Engineering
▪ Program type: Single
▪ Department offering the program: Electrical Power and Machines Engineering
▪ Co-coordinator: Prof. Dr. AboulFotouh Abdel Rehiem Mohamed
▪ Assistant Co-ordinator: Dr. Mohamed Attia Saadeldine
▪ External evaluators: Prof.Dr. Ibrahim Badran
▪ Year of operation: 2022/2023

2. Professional Information

2.1. Statistics

- No. of students starting the program (admitted at 2018-2019): 221

Table (1): No. and percentage of students passing in each year/level/semester

Year		Number of students	No of passing Students	Percentage of passing students
Preparatory	2018-2019	221	221	100%
First	2019-2020	279	237	85%
Second	2020-2021	252	224	89%
Third	2021-2022	252	245	97%
Fourth	2022-2023	303	292	96.3 %

- Grading: No. and percentage in each grade

Academic year	Number
students joining the program on Sept 2018	221
students completing the program in May 2023	271
students completing the program in Nov 2023	21
Total Number of students completing the program at 2022-2023	302

No. and percentage of students passing in each grade -4th year

Year	Excellent		V.good		Good		Pass		Failed	
	No.	%	No.	%	No.	%	No.	%	No.	%
4 th year 2022-2023 (302)	3	1%	34	11%	108	36%	126	42%	31	11%

2.2. Academic Standards

2.2.1. Achievement of program intended learning outcomes, LO's

Prep. Year																				
Course Code	Course Name	Engineering Competencies (2018)										“Department” Electrical Engineering Competencies (NARS)					“Discipline” Electrical Power and Machines Engineering Competencies (ARS)			
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4
PHM 011	Mathematics (1)	√	√																	
PHM 013	Physics (1)	√	√																	
PHM 015	Mechanics (1)	√	√	√							√									
ARC 011	Engineering drawing & projection (1)		√						√	√										
CHE 011	Chemistry (1)	√	√	√																
HUM 013	Computer skills	√	√								√									
HUM 011	Technical language (1)							√	√		√									
PHM 012	Mathematics (2)	√	√																	
PHM 014	Physics (2)	√	√																	
PHM 016	Mechanics (2)	√	√	√							√									
ARC 012	Engineering drawing & projection (2)		√						√	√										
HUM 017	Production technology			√	√		√		√		√									
HUM 014	History of Eng. & Tech.			√	√	√		√			√									
HUM 012	Technical language (2)							√	√		√									

1st year Electrical Power Engineering and Machines Engineering

Course Code	Course Name	Engineering Competencies (2018)										“Department” Electrical Engineering Competencies (NARS)					“Discipline” Electrical Power and Machines Engineering Competencies (ARS)			
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4
EPM 111	Electrical circuits (1)											√	√							
PHM 133	Economics and statistics		√																	
EPM 113	Electrical & magnetic fields											√								
HUM 131	Technical writing, research and analysis								√	√										
HUM 1XX1	Selective course humanities (1)			√																
PHM 131	Mathematics (3)	√																		
PHM 134	Physics (3)	√	√																	
PHM 132	Mathematics (4)	√																		
PHM 135	Physics (4)	√	√																	
CVE 112	Civil Engineering				√															
EPM 112	Electrical circuits (2)												√							
EPM 114	Basis of energy conversion											√								
EPM 121	Electrical Measurements (1)											√								
HUM 1XX2	Selective course humanities (2)							√												

2nd year Electrical Power Engineering and Machines Engineering

Course Code	Course Name	Engineering Competencies (2018)										“Department” Electrical Engineering Competencies (NARS)					“Discipline” Electrical Power and Machines Engineering Competencies (ARS)			
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4
PHM 231	Mathematics (5)	√																		
EPM 213	Electrical circuits (3)													√						
EPM 241	Electrical Machines (1)											√								
EPM 222	Electrical Measurements (2)												√							
EPM 291	Mechanical Engineering											√								
ECE 231	Electronics and Logic Circuits													√						

HUM 231	Contracts, Laws, Quantities and Specs.						√												
PHM 232	Mathematics (6)	√																	
EPM 231	Electrical power generation and Eco. Oper.											√							
EPM 242	Electrical Machines (2)														√	√			
EPM 252	Automatic Control system (1)											√							
EPM 292	Thermo Dynamics										√								
ECE 249	Signals and Communication Systems												√						
EPM 271	Computer programming										√								

3rd year Electrical Power Engineering and Machines Engineering

Course Code	Course Title	Engineering Competencies (2018)										“Department” Electrical Engineering Competencies (NARS)					“Discipline” Electrical Power and Machines Engineering Competencies (ARS)			
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4
EPM 353	High Voltage Engineering																√	√	√	
EPM 354	Protection equip. & sys																	√	√	
EPM 391	Practical training(1)																	√		
EPM 393	Training project (1)																	√		
HUM125	Selective course humanities(1) – Industrial Sociology	√																		
HUM351	Projects management				√		√													
EPM 324	Electrical Machines (4)																√	√		
EPM 352	Electrical Power sys. (2)																√			
EPM 362	Automatic Control Systems												√							
ECE 309	Communication & data transmission														√					
EPM 371	Power electronics																			√
EPM 392	Practical training(2)																	√		
EPM 394	Training project (2)																	√		
HUM232	Selective course humanities(2) – International Relations							√												
EPM 323	Electrical Machines (3)																√	√		
EPM 351	Electrical Power sys.(1)											√								

4thyear Electrical Power Engineering and Machines Engineering

Course Code	Course Title	Engineering Competencies (2018)										“Department” Electrical Engineering Competencies (NARS)					“Discipline” Electrical Power and Machines Engineering Competencies (ARS)			
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4
EPM456	Specialized elective course (2) - Reliability of electric power systems																√			
EPM472	Specialized elective course (2) - Special topics in power electronics																			√
EPM455	Specialized elective course (2) – Advanced studies in High Voltage Engineering																√	√	√	
EPM459	Specialized elective course (3) – Electrical Power Quality																√			
EPM458	Specialized elective course (3) – Design of Electrical systems in industry and buildings																		√	
EPM464	Specialized elective course (3) – Control system technologies																			√

Course Code	Course Title	Engineering Competencies (2018)										“Department” Electrical Engineering Competencies (NARS)					“Discipline” Electrical Power and Machines Engineering Competencies (ARS)			
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4
EPM 451	Electrical Power sys. Analysis (1)																		✓	
EPM 482	Exp. & standard specification																	✓		
EPM453	Specialized elective course (1) - planning of electric power systems																		✓	
EPM454	Specialized elective course (1) – New and Renewable Energy Systems																		✓	
EPM422	Specialized elective course (1) – Special Electric machines 1																			✓
EPM 463	Specialized elective course (1) - Control of electrical power systems																			✓
EPM 457	Specialized elective course (2) - Computer applications in electric power systems (ETAP)																		✓	

Course Code	Course Title	Engineering Competencies (2018)										“Department” Electrical Engineering Competencies (NARS)					“Discipline” Electrical Power and Machines Engineering Competencies (ARS)			
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4
EPM 462	Programmable Logic Controller																	✓		✓
EPM 491	Graduation Project																✓	✓	✓	✓
EPM 452	Electrical Power sys. Analysis (2)																		✓	
EPM 481	Utilization of elec. Power															✓				
EPM465	Distinction course (1)- Industrial Control System																✓			✓
EPM 473	Distinction course (2)- Power Electronics Applications in Industry																			✓
EPM 423	Distinction course (3)- Electrical Machines Design																✓	✓		
EPM 421	Electrical traction system																			✓
EPM 461	Digital control																✓			✓
HUM3XX	Selective course humanities(3)				✓															

Regarding the previous table we observe the achievement of the program intended learning outcomes to be covered by all courses taught:

- **Comments of external evaluator and other stakeholders**

- a. **Comments of stakeholders**

The courses of the electrical power-engineering program are sufficient to enhance the skills of the graduates to cope with the job market requirements. **Appendix (1)** refers to the alumina questionnaire.

- b. **Comments of external evaluators** External evaluator reports and Projects Management Unit, Ministry of Higher Education at program description **Appendix (6)**.

2.3. Achievement of program aims

The programs aim as stated in the program's objectives has been achieved with Contribute the society needs from electrical power and machines engineering by graduating engineerings have applicable and basic sciences and practical skills, by training, alumina questionnaire, elective courses and graduation projects we observed totally achievement of program aims which are:

1. Apply knowledge and understanding of key facts, theories, concepts, principles and techniques relevant to Electrical power and machines Engineering.
2. Plan, design, analyse, execute and manage industrial Electrical power projects.
3. Display practical and professional skills necessary for employment in the field of Electrical power and machine Engineering.
4. Define, analyse and solve Electrical power Engineering problems to reach proper conclusions and decision

2.4. Assessment methods

Commentary (quoting evaluations from the external evaluator and other stakeholders)

The assessment methods used in the program courses were as following:

1. Written Exams (class exams, mid-term, and final exam)
2. Practical exams especially for Lab courses
3. Oral exams for the project, Lab courses, and some other courses
4. Written reports

The current assessment methods of the program courses are considered quite appropriate due to a large number of students enrolled in this program. These methods measure the program ILO's with reasonable accuracy.

2.5. Student achievement

Graduated Students achievement through the program

Students passing percentage	
Year	Percentage
Prep Year (2017-2018)	100%
1 st Year (2018- 2019)	84.44%
2 nd Year (2019- 2021)	95.95%
3rd Year (2021- 2022)	95.78%
4th Year (2022 - 2023)	96.3%

The percentage of students completing the programs and graduating this year as referred to the admitted students is around 100 %, which is considered a good achievement.

The destinations of the program's graduates are, however, not now yet. However, it seems that market demand nowadays is high for engineers. Most of them are attracting to the private sector for a good payment.

2.6. Quality of teaching and learning

Most of the teaching methods are still traditional since it depends mainly on the whiteboard. This may suit the nature of many courses that are highly dependent on analysis. However, for other courses that demonstrate descriptive information electronic learning techniques should be applied.

Self-learning methods related to the search of information, which can be achieved through library search, internet search, and field training, are still limited due to some reasons, which are attributed to limited access to the internet in computer labs.

Moreover, the limitation of using such learning tools can be attributed to several factors among them no access to the EULC website and to some extent to the weak interest of students due to lack of motivation. The weakness of the student English language also can be considered as one of the obstacles since most of the eBooks and internet are in the English language.

Comments of external evaluator Appendix (6) , comments of internal evaluators Appendix (6), and other stakeholders Appendix (1) including students Questionnaire.

2.7. Effectiveness of student support systems

Commentary on both academic and pastoral/personal support for all students

The department is interested in the students' support, despite the growing numbers of students entering the department through the following:

- Divide the students of the same level into groups and the distribution of the studying schedule to optimize the use of lecture halls and Labs.
- A system was developed to solve the problems of students through the distribution of the responsibility on the faculty members to quickly resolve the problem and follow-up the complaints and to respond in a specific period.
- The periodic meeting with students' representatives to quickly solve the problems of students.
- There is a schedule of final revision for the studied courses at the end of each semester to assist low and middle caliber students.
-
- Students are helped in the case of special circumstances such as cases of the disease, the death of a parent, injuries during an incident, by taking into account the circumstances of each case in providing the requirements of this year, especially in materials that rely on semester marks and attendance.
- Encouraging high-grade (excellent and very good) students by discounts on their educational fees.

2.8. Learning resources

A. No. and ratio of faculty members and their assistants to students

No. of students $365+354+295+303=1317$

No. of program faculty members = 27

No. of program Faculty out posted members = $28 \times (1) = 28$

Total No of program members = 56

No. of program faculty member assistants = $31 + (23) = 54$

No. of faculty members/No. of students = $1317/56$ (about one faculty member for 23 students)

No. of faculty members and assistants/No. of students = $1317/54$ (about one faculty member for 24 students)

B. Matching of faculty members' specialization to program needs

The faculty member's specialization matches the courses offered in the program. **Appendix (1) in program specification.**

C. Availability and adequacy of the program handbook

There is a handbook for all B.Sc. programs offered by the faculty, including study plans and courses' short description.

D. Adequacy of library facilities

The faculty library is adequate, due to a sufficient number of computers connected to the internet adequate space, adequate lighting, adequate ventilation, computerized search, stuffiest in scientific periodic and journals, with enough recent textbook copies.

E. Adequacy of laboratories

- The department has six laboratories, which are:
 - Electric Machines Lab
 - Power Electronics Lab
 - Power System and Protection Lab
 - Electrical measurements Lab
 - Automatic Control Lab
 - Projects Lab

F. Adequacy of computer facilities

The available computer labs are adequate compared to a large number of students. Computer facilities are adequate.

Internet access is now available for faculty staff and for students through a wireless network covering the building where the department rooms exist.

G. Adequacy of field/practical training resources

The field training is beneficial for students as there are scheduled visits training for several stations and factories.

H. Adequacy of any other program needs

Most of the lecture rooms are now equipped with data show, However Air conditioning needed in some of the section rooms.

2.9. Quality management

A. Availability of regular evaluation and revision system for the program

There are an evaluation and revision system for the program that is carried out through the update of the curriculum of the program every 5 years. This is based on the evaluation undertaken by the external evaluator.

- Students questionnaire and Alumni ([Appendix 1](#))
- Stakeholders questionnaire ([Appendix 1](#))
- Internal evaluation system and Improvement plan for the program. ([Appendix.4](#))
- Evaluation of exam papers ([Appendix 3](#))

B. Effectiveness of the system

There was no adequate and effective tool to evaluate the program.

The internal and external evaluator has newly adapted the evaluation system.

C. Effectiveness of Faculty and University laws and regulations for progression and completion

These laws and regulations are relatively effective from the perspective of program students. However, it is now unacceptable to pass the student to the next year in the program while some remaining courses (max. two) are not yet completed.

Change to credit hours systems should be thought of to avoid such problems.

D. Effectiveness of program external evaluation system

I. External evaluators

The External evaluator gives valuable notes specifically update the references of all courses. All external evaluator comments and corrections are covered in [Appendix \(6\)](#).

II. Students

The students' evaluation was to some extent adequate and effective since this approach is relatively recent. However, there is no uniform methodology for distributing the evaluation forms. Moreover, the structure of the evaluation form needs enhancements [Appendix \(1\)](#).

III. Other stakeholders

The stakeholders give valuable evaluation and suggestions. However, the number and specialty of the considered stockholders are not sufficient to get a more practical and realistic evaluation as depicted in Appendix (1).

3. Proposals for program development

A. Program structure (units/credit-hours)

The program structure must contain the National Academy reference standards (NARS) as:

Engineering Sciences Ratio 21.17%

Engineering Mathematics and Science 21.18%

Applied Engineering Sciences and Design 22.35%

Humanities and Social Sciences 9.412%

Computer Applications and Information Technology 9.412%

Project and field training 9.412%

Selective Subjects 7.06%

B. Courses, deletions, additions, and modifications

Some elective courses in the running study plan contain topics that depend on other courses, offered in later semesters. As a corrective action, the department council (6th May2018) proposed a modification in the study plan and the institute council has approved these modifications after approved from The Ministry of Higher Education for application starting from the academic year (2019-2020). The modifications include 1st, 2nd, 3rd, 4th and 5th years of the program.

C. Staff development requirements

- Frequent updating of the scientific information by investing in attending the international conferences and workshops as tabulated in the following table.

4. Progress of previous year's action plan

Action	responsible person	Status
• Upgrade some equipment for machine and measurements labs	Head of the program	Done
• Upgrade the IT support for all lab	Program Council	Done

5. Action plan for the year 2023/2024

Action	Person	progress
متابعة خطة تطوير معامل الهندسة الكهربائية (مرفق خطة التطوير)	Head of Department Faculty members follow up management	2023/2024
<ul style="list-style-type: none"> High voltage lab upgraded is needed 	Head of the program	2023/2024
<ul style="list-style-type: none"> Upgrade some equipment for machine, measurements and power electronics labs 	Department council	2023/2024
Start new regulation	Head of Department Faculty members follow up management	2023/2024
مساعدة المعهد لطلاب الخريجين على الحصول على فرصة عمل مناسبة من خلال الموقع الالكتروني الخاص بالقسم عرض بعض فرص العمل للطلاب	Head of Department Faculty members	2023/2024
نشر المقررات الدراسية على موقع الالكتروني للمعهد (تقرير المقررات)	اعضاء هيئة التدريس + وحدة التعليم الالكتروني	2023/2024

Program Coordinator: Prof. Dr. AboulFotouh Abdel Rehiem Mohamed

Signature:




Appendix (1)

The Stakeholders and alumni questionnaire and Student Evaluations

Appendix (2)

Modification to the study plan

Appendix (3)

Evaluation of the Exam papers

Appendix (4)

Quality management of the program

Appendix (5)

*Scientific department conference and
employment forum*

Appendix (6)

Comments on *External Evaluator*

Appendix (7)

Progress Sheet and blueprint

Appendix (2)

Staff Members

Appendix (3)

Exernal Evaluator Report

Appendix (4)

Courses Specification