

**Sana'a University**  
**Faculty of Engineering**  
**Department Electrical Engineering**



**Master of Science**  
**Electrical Power**  
**Engineering**

**Program**  
**Specifications**

**June - 2021**

Faculty of Engineering, Sana'a University

☎ 01464368, ☎ 01464365, ✉ m.albukhaiti@eng-su.edu.ye, 🌐 [www.eng-su.edu.ye](http://www.eng-su.edu.ye)

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### 1. Program Description

Electrical Power Engineering is important for the development of all countries, especially of Yemen in view of the very low electrification grade of the country. This 4 semesters Master Program by course and thesis aims to provide candidates with advanced knowledge and skills for planning, design and operation of electrical power systems with emphasis on emerging technologies, and their integration into new and existing power systems so as to ensure reliable delivery of electricity to the various development sectors.

### 2. Program Identification and General Information

Program Title	Master of Science in Electrical Power Engineering
Awarding Institution	Sana'a University
Department	Department of Electrical Engineering
Other Departments with major Teaching Contributions	-
Language of study	English Language
Date of Specification Preparation/Revision	May/June 2021
Mode of Study	Full time
Study System	Courses & Thesis
Main Location of Study	Faculty of Engineering/Sana'a University
Mode of Delivery	Full-time
Study Duration	Minimum: 2 Academic years (Two terms each, full-time) Maximum: 4 Academic years
Award(s) or Final Award	Master of Science in Electrical Power Engineering
Qualification required to join the program:	BSc. in Electrical Engineering and/or related fields
Minimum grade requirements to enroll in the program	Good
Other admission requirements	Detailed below
Name of the program coordinator	Prof. Omar Hassan Al-Sakaf
Approval date:	

### 3. Program Curriculum Committee:

Prof. Dr. Omar Hassan Al-Sakaf Dr. Adel Al-Schugairy Dr. Redwan Al-Buthaigy Dr. Mohamed Algorafi	Dr. Mohammed Al-Yedomy Dr. Amin Abdulgani Dr. Mohamed Ali Naser
---	---

### 4. Vision, Mission & Aims of the University

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

<b>Vision of the University</b>
Sana'a University aspires to achieve a national leading role in teaching, learning, scientific research and community service; and to be among the best regional universities and the foremost house of expertise and think tank in Yemen.
<b>Mission of the University</b>
To contribute to the sustainable development efforts by providing an accredited higher education environment and excellent research services within a fruitful national partnership based on transparency, professionalism and creativity.
<b>Aims of the University</b>
The University seeks to achieve the following objectives:
<ul style="list-style-type: none"> <li>• To provide specialized and in-depth academic opportunities for students in different fields of knowledge to meet the country's needs of specialties, technicians and experts, with special focus on the following:           <ul style="list-style-type: none"> <li>- To boost the level and quality of preparation and qualification tasks.</li> <li>- To create a general culture aiming at developing the elements of sound Islamic personality and the proper cognitive and scientific training.</li> <li>- To stabilize the true Islamic vision emanating from the broad horizons of Islamic knowledge and its perception of the universe, man and life.</li> <li>- To develop innovative and critical scientific thinking skills.</li> <li>- To provide students with the required knowledge and scientific and applied skills for solving problems effectively and efficiently.</li> </ul> </li> </ul>

<b>5. Vision, Mission &amp; Aims of the Faculty</b>
<b>Vision of the Faculty</b>
To excel in engineering education & scientific research with distinction at the local and regional levels.
<b>Mission of the Faculty</b>
To provide excellent and accredited engineering education to meet the development needs and match the labor market requirements locally and regionally.
<b>Aims of the Faculty</b>
<ol style="list-style-type: none"> <li>1. To offer study programs in various fields of knowledge and equip students with required knowledge and scientific and know-how skills to utilize them in resolving problems effectively and efficiently.</li> <li>2. To develop positive trends towards engineering science and its accelerating developments and enable students to use the techniques and methods of conducting scientific research in</li> </ol>

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

5. Vision, Mission & Aims of the Faculty
engineering fields.
3. To develop skills of scientific, innovative and critical thinking as well as the concept of continuous self-education.
4. To strengthen scientific ties with national and international colleges, scientific bodies, and research & development centers.
5. To provide technical and specialized studies and consultations to various state bodies and institutions, both public and semi-public, and utilize them in resolving the environment and society issues to promote sustainable development.
6. To develop a spirit of co-operation, group work, effective leadership, sense of responsibility, and ethical commitment.

6. Mission & Aims of the Department
<b>Mission of the Department</b>
Graduate qualified Engineers in Electric Power, communication and computer engineering in accordance with programs committed to the international quality standards. The Graduating Engineers handed with enough knowledge and skills necessary to meet the requirements of development as well as local and regional labor markets. Also, they able to self-development and proceed with contemporary issues. The department contribute to community wellness and the country development through scientific research, advisory services, and training and education programs.

Aims of the Department
1. Graduate high qualified engineers in electrical power, communication and computer engineering able to compete at national and regional levels.
2. Update undergraduate and post graduate programs and enhance the applied research environment to contribute in country development.
3. Establish partnerships with the public and private sectors and provide engineering consultancies, continuous training, teaching and awareness programs.
4. Improve the academic staff to student ratio as per standard.
5. Fill the gap in the number of assistance staff and laboratory technicians and implement training programs to enhance their skills.
6. Commit and uphold high ethical and professional conduct in the education and practice of engineering.

### 7. Mission & Aims of the Program

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### Mission of the Program

To graduate distinguished Master holders in the field of electrical power engineering through a strong academic program, qualified staff, and suitable research infrastructure that meet local development requirements and labor market needs.

### Aims of the Program

1. To provide specialized studies and encourage fundamental and applied research in different electrical power engineering disciplines.
2. To bridge the gap between the academic educational and industrial and technological environment.
3. To develop and improve the academic and educational level at the Faculty of Engineering in the field of electrical power engineering.
4. To provide graduates with up-to-date advanced knowledge and skills needed to attain excellence in solving technical problems and facing challenges in the electrical power engineering field.
5. To graduate researchers in electrical power engineering disciplines who can pursue further studies and contribute to the scientific research community.
6. To provide graduates able to effectively contribute to the electrical power engineering profession by applying ethical practices and communication skills, sharing innovative and clear ideas and pursuing further education through lifelong learning.

### 8. Program Standards & Benchmarks

#### Program Standards

- Post-graduate Studies Rules and Regulations of the Ministry of Higher Education and Scientific Research, Yemen.
- Prime Minister Resolution No. 40 (2008) and No. 141 (2020).
- Post-graduate Studies Guide, Sana'a University
- Accreditation Board for Engineering and Technology (ABET)
- European Accreditation of Engineering Programmers (EUR-ACE)

#### Program Benchmarks

No.	Program	University	Country
1.	Master Program in Electric Power Engineering	Norwegian University of Science and Technology	Norway
2.	M.Sc. Electrical Engineering/Power	The University of Jordan	Jordan
3.	Master of Engineering (Electrical Power)	University Teknologi Malaysia UTM	Malaysia
4.	MSc. Advanced Power Engineering	The University of Edinburgh.	UK
5.	Master of Science Program in Electrical Engineering	King Fahd University of Petroleum & Minerals	Saudi Arabia

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

6.	MSc Electric Power Engineering	Reykjavik University	Iceland
----	--------------------------------	----------------------	---------

### 9. Summary of Similar Programs (Benchmarks) for Electrical Power Engineering Program

	The Similar Programs (Benchmarks)						Current Program
	1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program	
Program Title	Master Program in Electric Power Engineering	M.Sc. Electrical Engineering/Power	Master of Engineering (Electrical Power)	MSc. Advanced Power Engineering	Master of Science Program in Electrical Engineering	MSc Electric Power Engineering	MSc. in Electrical Power Engineering
Faculty	Faculty of Information Technology and Electrical Engineering	School of Engineering	Faculty of Engineering	The School of Engineering	College of Engineering	Iceland School of Energy	Faculty of Engineering
University	Norwegian University of Science and Technology	The University of Jordan	Universiti Teknologi Malaysia UTM	The University of Edinburgh.	King Fahd University of Petroleum & Minerals	Reykjavik University	Sana'a University
Country	Norway	Jordan	Malaysia	UK	Saudi Arabia	Iceland	Yemen
Type of Program	Full-time, Master by Course and Research (International Master's Program)	Full-time, Master by Course and Research	Full-time, Master by Course and Research	Full-time, Master by Course and Research	Full-time, Master by Course and Research	Full-time, Master by Course and Research	Courses and Research
Study methods in the program:	Full-time	Full-time	Full-time	Full-time	Full-time	Full-time	Full-time

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

9. Summary of Similar Programs (Benchmarks) for Electrical Power Engineering Program							
Number of semesters	4	4	4	4	4	4	4
Total Credit Hours (without Thesis)	20	24	33	15	24	15	30
No. of Compulsory Courses	6	5	4	7	5	6	7
Credit Hours for Compulsory Courses	15	15	12	15	15	11	21
No. of Elective Courses	2	3	5	-	3	2	3
Credit Hours for Elective Courses	5	9	15	-	9	4	9
Complementary courses to join the program and their number	-	-	2 Courses (6 Credits) <i>Other required courses</i>	-	-	-	-
Credit Hours for Thesis	10	9	10	15	6	15	6
Total Credit Hours for courses & Thesis	30	33	43	30	30	30	36
The period for thesis completion	2 Semesters (with project work/practi	2 Semesters	2 Semesters	2 Semesters	1 Semester	2 Semesters	2 Semesters

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

9. Summary of Similar Programs (Benchmarks) for Electrical Power Engineering Program							
	cal)						
The min. period to complete the program	2 Years	2 Years	2 Years	2 Years	2 Years	2 Years	2 Years <b>(Min. years for courses: 1)</b>
The max. period to complete the program	NA	NA	NA	NA	NA	NA	3+1 Years <b>(Max. years for courses 1.5)</b>

10. Program Intended Learning Outcomes (PILOs)	
<b>A. Knowledge and Understanding</b>	
Upon successful completion of the Master of Science in Electrical Power Engineering Program, graduates should be able to:	
A1.	Demonstrate in-depth understanding of the theory and practice of modern electrical power systems design and operation and system identification.
A2.	Recognize and comprehend the key role of sustainable energy for national and global sustainable development.
A3.	Explain in detail the key considerations and challenges of sustainable design and development of modern electrical power system components.
<b>B. Intellectual Skills</b>	
Upon successful completion of the Master of Science in Electrical Power Engineering Program, graduates should be able to:	
B1.	Identify, formulate, and solve complex power engineering problems by selecting and applying appropriate tools and techniques.
B2.	Critically review the scientific literature for effective justification and support of results and decisions.
B3.	Select appropriate techniques and tools for successful problem solving.
<b>C. Practical and Professional Skills</b>	
Upon successful completion of the Master of Science in Electrical Power Engineering Program, graduates	

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			



University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

should be able to:

C1.	Apply modern tools for research, computation, simulation, analysis, and design of modern power systems.
C2.	Recognize the interdisciplinary nature of technical problems and apply other areas of knowledge to the solution, and work with other professions to arrive at a solution for complex engineering problems.
C3.	Employ design standards and safety codes as an integral part of the design and building process for machine parts and systems.

### D. Key Transferrable Skills

Upon successful completion of the Master of Science in Electrical Power Engineering Program, graduates should be able to:

D1.	Demonstrate leadership skills in the workplace, to function professionally in a globally competitive world, and to communicate engineering results effectively.
D2.	Realize the relevance of economics, ethics and teamwork to the profession.
D3	Pursue advanced graduate studies and lifelong learning.

### 11. Teaching Strategy to Achieve Program Learning Outcomes

ILOs	Teaching Strategy	Assessment Methods
A1	Lectures, Seminars, laboratory works, Self-Learning., independent study, active learning, computer hands-on sessions.	Reports, field work, laboratory report, survey, Written Exam, Assignments
A2		
A3		
B1	Project supervision, laboratory works, Self-Learning, simulation exercises, independent study, Analysis and Problem Solving, Lectures, Brain storming	Reports, field work, laboratory report, survey, Written Exam, Assignments.
B2		
B3		
C1	Project supervision, lectures, laboratory works, independent study, simulation exercises, Analysis and Problem Solving	Seminar report, written research proposal, thesis and publication.
C2		
C3		
D1	dissertation and presentation, independent study, presenting reports, Brainstorming, presenting researches, Publish research papers.	Written research proposal, thesis and publication, Written Exam, Assignments, Experimental and field work, laboratory report, survey, presentation, written report.
D2		
D3		

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

Teaching Strategy	Description of the Main Strategy Used
Lectures.	These are interactive lectures weekly conducted according to course plan in a class-room and supported with variety of teaching formats including, lectures and multimedia presentations, use of whiteboard and solved examples, and class discussions, in which concepts, approaches, and case studies are presented, explored, and shown students what they need to know.
Independent Study	Independent study is an individualized learning experience that allows students to select a topic focus, define problems or questions, gather and analyze information, apply skills, and create a product to show what has been learned.
Self-Learning.	Students are encouraged to undertake independent study to both supplement and consolidate what are being learned.
Active Learning	-
Computer Hands-on Sessions	Practical Applications using a variety of software before the real design and implementation. A variety of web-based searches students will be assigned to learn how they can search for solutions using the Web.
Simulation Exercises	Application of simulation programs.
Analysis and Problem Solving	The study of Electrical Power Engineering involves applying knowledge and problem-based learning. This allows students to become more active in their learning as they work out which information, they need to find out how to solve a particular problem. They can work out a problem collaboratively, practice research as well as testing different components to come up with a valid solution.
Laboratory Works	During laboratory sessions, students will be given experiments to work in groups where they can apply the theories and principles gained. This gives them the opportunity to have hands-on experience to design and conduct experiments in addition to analyzing, interpreting data obtained from experiments, and maximize their learning through actual simulation
Presentations/Presenting research	Students present their work to the whole group, for discussion, criticism and suggestions for improvement. Presentation sessions

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

Teaching Strategy	Description of the Main Strategy Used
	provide an opportunity to address questions, queries and problems.
Project Supervision	The instructor/lecturer needs to set advance work for students, and then have the students present their work to the whole group, for discussion, criticism and suggestions for improvement. Project sessions provide an opportunity to address questions, and problems.
Brainstorming	Brainstorming is an effective technique for generating lists of ideas, and creating interest and enthusiasm for new concepts or topics. Brainstorming provides teachers and students with an overview of what students know and/or think about a specific topic. Students can use brainstorming to organize their knowledge and ideas.
Dissertation	Documentation of research methodology and results.
Publish Research Papers	To publish research results in peer-reviewed journals.
Seminar	The instructor needs to set advance work for a selected number of students, and then have the selected students present their work to the whole group, for discussion, criticism and suggestions for improvement. Seminar sessions provide an opportunity to address questions, queries and problems.
Research Activities	Research-tutored activities envisage activities where students are participants, they are engaged in research discussions and emphasis is put on the research content.

Assessment Strategy	Description of the main strategy used.
Written Exam	Mid-term test is conducted in the 8 <sup>th</sup> week and final exam is conducted at the end of each course. Both tests are closed or open book, notes and resources. At least two quizzes must be done through the course.
Oral Discussion	To know the knowledge of the students.
Presentations	For Final Results displaying, to enhance the level of students in different subjects.
Quizzes	The entire assessment of Quizzes activities during the teaching period of

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

Assessment Strategy	Description of the main strategy used.
	each course.
Laboratory Reports	To demonstrate the personal skills, practical expertise, communication skills, report writing skills, and team work expertise they are expected to be learned and gained through their education.
Reports and field work	For evaluation, to demonstrate the personal skills, practical expertise, communication skills, report writing skills, and team work expertise they are expected to be learned and gained through their education.
Survey	For data collection and related field work.
Assignments	The entire assessment of coursework activities during the teaching period of each course (which includes group and individual work, tests and presentations, etc.).
Seminar	As described above.
Written report	As described above.
Written research proposal	As described above.
Thesis and publications	As described above.

### 12. Intended Learning Outcomes Mapping:

See Annex 10

### 13. Program Structure

Program Requirement	No. of Courses	Credit Hours	%
---------------------	----------------	--------------	---

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

Complementary Courses	See List below.		
Faculty Requirement	1	3	8%
Compulsory Courses	6	18	50%
Elective Courses	3	9	25%
Thesis	-	6	17%
Total		36	100%

### Complementary Courses (00 CH)

No.	Course Code	Course Title	L	T	P	CH
1.	PME221	Electrical Machines 1	2	2	2	4
2.	PME224	Electrical Machines 2	2	2	2	4
3.	PME327	Electrical Drives	2	2	2	4
4.	PME428	Substation Design	2	2	-	3
5.	PME231	Power Transmission Systems	2	2	-	3
6.	PME332	Power System Analysis 1	2	2	-	3
7.	PME242	Power Electronics	2	2	2	4
8.	PME343	Power Generation Plants	2	2	-	3
9.	PME447	High Voltage	2	2	-	3
10.	PME213	Renewable Energy Technology	2	2	-	3

### Compulsory Courses (7 Courses, 21 CH)

No.	Course Code	Course Title	L	T	P	CH
-----	-------------	--------------	---	---	---	----

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

1	FR501	Research Methodology in Electrical Engineering	3			3
2	PME537	Power System Planning and Operation	3			3
3	PME538	Advanced Power Electronics	3			3
4	PME539	Advanced Renewable Energy Systems	3			3
5	PME530	Advanced High Voltage Engineering	3			3
6	PME5311	Advanced Topics in Electrical Machines	3			3
7	PME529	Power System Dynamics	3			3
<b>Total</b>						<b>21</b>

### Elective Courses (3 Courses, 9 CH)

No.	Course Code	Course Title	L	T	P	CH
1	PME5312	Automatic Reactive Power Compensation	3			3
2	PME5313	Energy Efficiency and Conservation	3			3
3	PME5314	Advanced Engineering Project Management	3			3
4	PME5315	Energy Storage Systems	3			3
5	PME549	Electrical Power Quality	3			3
6	PME540	Health, Safety and Environmental Management	3			3

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### Thesis

The student must prepare and discuss a Thesis by (6) credit hours (THESIS599 MS Thesis).

### Thesis and Its Requirements

#### 1. Registration of the Thesis:

(Requirements/conditions and procedures for registration of the thesis as well as controls, responsibilities and procedures of scientific guidance)

- Completion of all required Compulsory & Elective Courses with average grade of more than or equal to 75%.
- Completion of all university requirements.
- Field of Research and precise research topic with short Description and suggested time plan.
- First Department Seminar.
- Decision letter (Supervisors) of acceptance of the research topic.
- Thesis work should be done in at least 2-semester.
- Thesis work should be done in at most 4-semester.
- Any further requirements and controls based on post-graduate deanship regulations.

#### 2. Scientific Supervision:

(The regulations of the selection of the scientific supervisor and his/her responsibilities, as well as the procedures/ mechanisms of the scientific supervision and follow-up)

- At most Two supervisors are selected for the supervision of a thesis.
- At least One Associate or Full Professor is appointed as supervisor either from the department or from another department inside or outside the faculty.
- Any Assistant Professor appointed as supervisor should have at least 4-year experience in the field of research and have published at least one paper.
- Candidates may apply for one-year extension (full-time) for completion of the thesis to the Postgraduate Program Administration at the Faculty of Engineering, which will be granted if the candidate provides a valid reason for extension.

#### The Supervisor Responsibilities are:

- Help and assist the Candidate/researcher in planning the research.
- Guide the Candidate to adhere to the standards of academic integrity and research ethics, including combating plagiarism.
- Monthly follow up and meeting with the researcher (At least One meeting per month).
- Guide the researcher at every step to be done during thesis work.
- Write follow-up (progress report) after each meeting.
- Write a follow-up (evaluation report) every semester.
- The supervisor shall submit copies of these reports to the Postgraduate -Program coordinator, the

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

Head of the Department and the Head of the Post-graduate Deanship.

- Write the final thesis acceptance report in order to prepare the final department seminar and then initiating the preparation for thesis presentation, defense and approval.

### The Candidate/Student Responsibilities are:

- Commitment to attend regular meetings with supervisor.
- Commitment to keep firm contact with supervisor for consultation and update.
- Present his/her accomplishments by the end of every semester.
- Plan and actively pursue the research under close coordination with supervisor.
- Identify and deal with any research-related problems.
- Comply with administrative requirements.
- Meet and admit to ethical guidelines.
- The length of a 6 credit hours thesis or research portfolio will be appropriate to the discipline and Thesis text/size must not exceed 30,000 words, including bibliography, footnotes or endnotes and essential appendices, unless specific permission has been granted by the post-graduate deanship.

### 3.Thesis Defense/Examination:

(The regulations for selection of the defense/examination committee and the requirements to proceed for thesis defense, the procedures for defense and approval of the thesis, and criteria for evaluation of the thesis)

A Thesis is proceeded for defense after it supports the following:

- At least One research paper in the field of research published or accepted for publication in a scientific journal.
- Final acceptance letters provided by the supervisor(s) and the department final seminar committee.

The **Examination Committee** should consist of:

- One Associate or Full Professor specialized in the field of research from an external university.
- One Associate or Full Professor from the department of electrical engineering.
- The supervisor of the thesis.

A session for presentation, defense and approval of the thesis should be arranged based on the following:

- At least two members of the examination committee accept their assignment and reply by acceptance letter approving the thesis for defense within One month.
- The session of defense should be declared within two weeks after receiving of examination committee members' approval letters.

## 14. System of Study

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			



University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

Type of program	Courses and Research
Study methods in the program:	Regular
The period to complete the program	Min. 2 Years (4 Terms) Max. 4 Years (8 Terms)
Total Credit Hours for courses & Research	36

### 15. Study Plan

FR stands for Faculty Requirements.

PM5XX stands for electrical Engineering Department Requirements.

First Semester								
No.	Course Code	Course Name	اسم المقرر	Credit Hours				Prerequisites
				L	P	T	Total C.H.	
1	PME537	Power System Planning and Operation	تخطيط وتشغيل أنظمة القوى الكهربائية	3			3	
2	PME538	Advanced Power Electronics	الالكترونيات القوى - متقدم	3			3	
3	PME539	Advanced Renewable Energy Systems	أنظمة الطاقة المتجددة - متقدم	3			3	
4	PME5312	Automatic Reactive Power Compensation	تعويض القدرة غير الفعالة	3			3	
	PME5313	Energy Efficiency and Conservation	كفاءة الطاقة والحفاظ عليها					
5	PME5314	Advanced Engineering Project Management	إدارة المشاريع الهندسية - متقدم	3			3	
	PME5315	Energy Storage Systems	أنظمة تخزين الطاقة					
<b>Total Credit Hours</b>							<b>15</b>	

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
Faculty of Engineering  
Department: Electrical Engineering  
Title of the Program:  
Master of Science in Electrical Power Engineering



## Program Specification

Second Semester								
No.	Course Code	Course Name	اسم المقرر	Credit Hours				Prerequisites
				Lec.	Pr.	Tut.	Total C.H.	
1	FR501	Research Methodology in Electrical Engineering	طرق البحث في الهندسة الكهربائية	3			3	
2	PME530	Advanced High Voltage Engineering	هندسة الجهد العالي - متقدم	3			3	
3	PME5311	Advanced Topics in Electrical Machines	مواضيع متقدمة في الماكائن الكهربائية	3			3	Co: Advanced Power System Dynamics
4	PME529	Power System Dynamics	ديناميكيات أنظمة القوى الكهربائية	3			3	Advanced Power Electronics
5	PME549	Electrical Power Quality	جودة الطاقة الكهربائية	3			3	
	PME540	Health, Safety and Environmental Management	إدارة الصحة والسلامة والبيئة					
<b>Total Credit Hours</b>							<b>15</b>	

Course Code	Course Name	Cr. Hrs.
THESIS599	Research	6

### 16. Admission Requirements:

1. Bachelor of Electrical Engineering Certificate with not less than 65 % passing ratio, or equivalent.
2. Interview
3. TOEFL/IBT: 60 OR equivalent
4. ICDL (Computer Skills)
5. Arabic Language
6. Student number capacity of 20 students per year
7. Transfer Requirements and Courses Equivalency
8. Annex -13: shows the Admission Requirements for the Program.

### 17. Graduation Requirements:

Student attendance should not be less than 75%.
Student will graduate after successfully passing the 30 credit hours courses and 6 credit hours Research.
The minimum score for the average of all courses is 75%.
The minimum score to pass any credit hours course is 65%.
Grading System: From 90% to 100% of total marks      Excellent

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

From 80% to less than 90%	Very Good
From 75% to less than 80%	Good
From 65% to less than 75%	Pass
Less than 65%	Poor/Fail

### 18. Learning Resources, Facilities, and Equipment for Running the Program

#### Learning Resources.

Policies and Procedure for providing and quality assurance of learning resources textbooks, references and other resource materials, including electronic and web-based resources, Journal Database, etc.

- Library (Textbooks, references, ... etc)

Library upgrading necessary, List of required new publications to be provided by Master Program teaching staff

- Electronic Library (Existing, allows access to international research papers and publications).

#### Required Facilities and Equipment

Policies and Procedure for providing and quality assurance of Facilities and Equipment (Library, laboratories (Structure, material Labs), medical facilities, classrooms, etc.).

- Electrical Machines and Power Electronics Laboratory
- Power System Simulator Laboratory
- High Voltage Laboratory
- Advanced Control Laboratory
- Renewable Energy Laboratory
- Advanced Computer Laboratory
- Advanced Computer Lab
- Program-specific Simulation Software Packages (to be listed and updated regularly)

19. Teaching Staff				
	Profess or	Associate Professor	Assistant Professor	Technicians/Assistants
Required Number	1	1	3	10
Available Number	1	2	5	4
<b>Note:</b>				

### 20. Program Management and Regulations

#### 1. Program Management

##### 1.1 Program Structure

(Including boards, councils, units, committees, etc.)

- Electrical Engineering Department Board

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### 20. Program Management and Regulations

- Postgraduate Studies Administration
- Vice Dean for Postgraduate Studies
- College of Engineering Board
- Vice Presidency of the University for Postgraduate Studies

#### 1.2 Stakeholders' Involvement

Describe the representation and involvement of stakeholders in the program planning and development. (Students, professional bodies, scientific societies, alumni, employers, etc.)

The stakeholders, including representatives of universities, research centers, public and private sector, were involved in designing the program through their participation in a workshop, as well as through response to a needs assessment questionnaire.

#### 2. Program Regulations

Provide a list of related program regulations, including their link to online version: admission, study and exams, recruitment, appeals and complaint regulations, etc.)

- Prime Minister Resolution No. 40 of 2008.
- Prime Minister Resolution No. 141 of 2020.
- Sana'a University Post-Graduate Studies Guide

### 21. Evaluation of Program Quality Matrix:

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time

**Note:**

**Evaluation Areas/Aspects** (e.g., leadership, effectiveness of teaching & assessment, learning resources, partnerships, etc.)

**Evaluation Sources** (students, graduates, alumni, faculty, program leaders, administrative staff, employers, independent reviewers, and others (specify)

**Evaluation Methods** (e.g., Surveys, interviews, visits, etc.)

**Evaluation Time** (e.g., beginning of semesters, end of academic year, etc.)

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### 22. List of Annexes

<b>Annex (1)</b>	Academic Standards Curriculum Criteria of Accreditation Board for electrical power engineering program.
<b>Annex (2)</b>	Survey of names of Similar Accredited Programs at International Universities (Benchmarks) for electrical power Engineering Programs.
<b>Annex (3)</b>	Survey of Intended Learning Outcomes for similar Accredited electrical power engineering Programs at International Universities.
<b>Annex (4)</b>	Summary of similar Programs (Benchmarks) for Master of Science in electrical power engineering Program.
<b>Annex (5)</b>	Survey of course names of Similar Programs.
<b>Annex (6)</b>	Survey/Mapping of Vision, Mission and Objectives of similar Accredited Programs at International Universities (Benchmarks) for Masters of Science in electrical power engineering programs.
<b>Annex (7)</b>	Mapping of the mission and objectives of the program with the vision, mission and objectives of faculty, and the university.
<b>Annex (8)</b>	Main Themes/Sub-Themes with Relative weight for Program (if need)
<b>Annex (9)</b>	PILOs Distribution to General Themes for Program (if need)
<b>Annex (10)</b>	Matrix of mapping program P- ILO's with courses
<b>Annex (11)</b>	Mapping the benchmarks with PILO's (if need)
<b>Annex (12)</b>	Mapping Program's Goals with Intended Learning Outcomes
<b>Annex (13)</b>	The Admission Requirements for the Program.

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

**University of Sana'a**  
**Faculty of Engineering**  
**Department: Electrical Engineering**  
**Title of the Program:**  
**Master of Science in Electrical Power Engineering**



## Program Specification

---

### 23. Attachment of Courses Specification and Syllabus of the Program

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
Faculty of Engineering  
Department: Electrical Engineering  
Title of the Program:  
Master of Science in Electrical Power Engineering



## Program Specification

---

# Appendix

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

**Prepared by:**

Prof. Omar Hassan Al-Sakaf	Program Coordinator
Dr. Mohamed Algorafi	Quality Assurance Unit/Faculty of Engineering

**Relationship between Program Mission and the Mission of the Faculty.**

Matching

**Relationship between Program Goals and the Goals of the Faculty.**

Matching

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			



University of Sana'a  
Faculty of Engineering  
Department: Electrical Engineering  
Title of the Program:  
Master of Science in Electrical Power Engineering



## Program Specification

### ملحق (1) المعايير الأكاديمية للمحتوى لهيئة الاعتماد المقترحة لبرنامج ماجستير هندسة القوى الكهربائية

#### (Annex 1) Academic Standards Curriculum Criteria of Accreditation Board for Master of Science in Electrical Power Engineering Program

- Rules and Regulations of the Ministry of Higher Education and Scientific Research, Yemen.
- Accreditation Board for Engineering and Technology (ABET).
- European Accreditation of Engineering Programmers (EUR-ACE).

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### ملحق (2): مسح أسماء البرامج المعتمدة المماثلة لبرنامج ماجستير هندسة القوى الكهربائية

**Annex (2): Survey of Names of Similar Accredited Programs at International Universities (Benchmarks) for Master of Science in Electrical Power Engineering Program.**

#	The Academic Program اسم البرنامج المماثل	The University الجامعة	The Faculty الكلية	The Department القسم	The Country الدولة	Program Accrediting Body جهة اعتماد البرنامج	Degree Award at Program Completion التي يمنحها الدرجة البرنامج للخريج	Year of accreditation سنة الحصول على الاعتماد	Type of program
The 1 <sup>st</sup> Program البرنامج الاول	Master Program in Electric Power Engineering <a href="http://www.ntnu.edu/studies/mselpower/components">www.ntnu.edu/studies/mselpower/components</a>	Norwegian University of Science and Technology	Faculty of Information Technology and Electrical Engineering	The Department of Electric Power Engineering	Norway	NA	Master of Science MSc.	NA	Full-time Master by Course and Research International Master's Program
The 2 <sup>nd</sup> Program البرنامج الثاني	M.Sc. Electrical Engineering/ Power	The University of Jordan	School of Engineering	Electrical Engineering Department	Jordan	Ministry of Higher Education	Master of Science MSc.	2017	Full-time Master by Course and Research
The 3 <sup>rd</sup> Program البرنامج الثالث	Master of Engineering (Electrical Power)	University Teknologi Malaysia UTM	Faculty of Engineering	Division of Electrical Power Engineering/ School of Electrical Engineering	Malaysia		Master of Science MSc.		Full-time Master by Course and Research

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

#	The Academic Program اسم البرنامج المماثل	The University الجامعة	The Faculty الكلية	The Department القسم	The Country الدولة	Program Accrediting Body جهة اعتماد البرنامج	Degree Award at Program Completion التي يمنحها الدرجة البرنامج للخريج	Year of accreditation سنة الحصول على الاعتماد	Type of program
The 4 <sup>th</sup> Program البرنامج الرابع	MSc Advanced Power Engineering	The University of Edinburgh.	The School of Engineering	Department of Electrical & Electronic Engineering	UK	UK Institution of Engineering and Technology (IET)	MSc.		Full-time Master by Course and Research
The 5 <sup>th</sup> Program البرنامج الخامس	Master of Science Program in Electrical Engineering	King Fahd University of Petroleum & Minerals	College of Engineering	The Electrical Engineering Department	Saudi Arabia	The undergraduate program "Electrical Engineering" accredited by ABET	MSc.	-	Full-time Master by Course and Research
The 6 <sup>th</sup> Program البرنامج السادس	MSc Electric Power Engineering	Reykjavik University (Ranks the highest among all universities in Iceland, publishes the most citations, and attracts talent from over 50 countries worldwide).	Iceland School of Energy	Department of Engineering	Iceland	Ministry of Education in Iceland	MSc.	-	Full-time Master by Course and Research

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### ملحق (3): مسح مخرجات التعلم في البرامج المماثلة لبرنامج ماجستير هندسة القوى الكهربائية

Annex-3, Survey of Intended Learning Outcomes for Similar Accredited for Master of Science in Electrical Power Engineering Program at International Universities.

Program Intended Outcomes	Suggested PILOs for the Current Program: Electrical Power Engineering Program	1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program	
<b>A.</b>  Knowledge and understanding	<b>Upon successful completion of the Master of Science in Electrical Power Engineering Program, graduates should be able to:</b>							
	<b>A1.</b>	Demonstrate in-depth understanding of the theory and practice of modern electrical power systems design and operation and system identification.	✓ (1, 2)	✓ (1, 2)	✓ (1, 2)	✓ (1, 2, 5)	✓ (1)	✓ (1.13, 1.14)
	<b>A2.</b>	Recognize and comprehend the key role of sustainable energy for national and global sustainable development.	✓ (2)	✓ (2)		✓ (4)		✓ (1.18)
	<b>A3.</b>	Explain in detail the key considerations and challenges of sustainable design and development of modern electrical power system components.	✓ (1, 2)	✓ (1, 2)		✓ (1, 2, 3)	✓ (1)	✓ (1.18)
<b>B.</b>  Cognitive/Intellectual Skills	<b>Upon successful completion of a Master of Science in Electrical Power Engineering program, graduates should be able to:</b>							
	<b>B1.</b>	Identify, formulate, and solve complex power engineering problems by selecting and applying appropriate tools and techniques.	✓ (1)	✓ (6, 7)	✓ (3, 2)	✓ (2)	✓ (3)	✓ (5.1, 5.2)

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

Program Intended Outcomes	Suggested PILOs for the Current Program:		1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program	
	Electrical Power Engineering Program								
	B2.	Critically review the scientific literature for effective justification and support of results and decisions.	✓ (2)		✓ (4)	✓ (5)	✓ (2)	✓ (5.1 - 5.5)	
	B3.	Select appropriate techniques and tools for successful problem solving.	✓ (3)	✓ (6, 7)	✓ (3, 4)			✓ (2.2, 2.3)	
C. Practical and Professional Skills	Upon successful completion of a Master of Science in Electrical Power Engineering program, graduates should be able to:								
	C1.	Apply modern tools for research, computation, simulation, analysis, and design of modern power systems.	✓ (6)	✓ (5, 6)		✓ (5)	✓ (2, 3)	✓ (2.1 – 2.3)	
	C2.	Recognize the interdisciplinary nature of technical problems and apply other areas of knowledge to the solution, and work with other professions to arrive at a solution for complex engineering problems.	✓ (4)				✓ (3)	✓ (4.4)	
	C3.	Employ design standards and safety codes as an integral part of the design and building process for machine parts and systems.						✓ (2.6, 5.4)	
D.	Upon successful completion of a Master of Science in Electrical Power Engineering program, graduates should be able to:								

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

Program Intended Outcomes	Suggested PILOs for the Current Program: Electrical Power Engineering Program		1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program
General and Transferable Skills	D1.	Demonstrate leadership skills in the workplace, to function professionally in a globally competitive world, and to communicate engineering results effectively.	✓ (2, 3)	✓ (3, 4, 7)	✓ (5)	✓ (6)	✓ (4)	✓ (4.1)
	D2.	Realize the relevance of economics, ethics and teamwork to the profession.	✓ (1, 5)				✓ (6)	✓ (4.6)
	D3.	Pursue advanced graduate studies and lifelong learning.	✓ (4)	✓ (3)	✓ (6)		✓ (5)	✓ (5.7)

### Intended Learning Outcomes for Similar Programs

#### Program 1: Master Program in Electric Power Engineering, Norwegian University of Science and Technology

##### A) Knowledge

- Advanced engineering knowledge in electric power engineering. The main focus is the advanced application of the basic aspects of high voltage technology, electrical machines, electrical motor drives and other related subjects. The subject areas are mastered at different levels of abstraction, from laboratory activities to theory, including a reflection of the subjects' content and relationships with other subject areas.
- Deep understanding of one or more of the following topics: Production of electrical energy from renewable energy sources, Transmission of electrical energy and Use of electrical energy.

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### B) Skills

1. Define, model and analyze complex problems in electric power engineering, plan and perform studies or planning tasks, and make well-founded choices of relevant methods used to solve challenges in electric power technology in an independent and systematic way.
2. Register and critically evaluate available knowledge in issues related to electrical energy technology, and if necessary, gather the relevant expertise.
3. Design and analyze individual components and systems related to the profound knowledge acquired by each candidate.
4. Work independently and in interdisciplinary groups. Collaborate effectively with specialists and, if necessary, act on own initiative.
5. Renew oneself and adapt, including actively updating own competence through own initiative.
6. Perform an independent, limited research or development project in electrical energy technology under guidance and in accordance with current research ethical standards.
7. Contribute to the development and implementation of new technologies in electrical energy technology and use their knowledge to plan and operate our present and future energy systems or individual components therein.
8. Integrate new knowledge and at the same time assess its limitations, ambiguity and incompleteness.
9. Understand the interaction between electrical energy technology and the energy system in general.

### C) General Competencies

1. Can cooperate and contribute to interdisciplinary interaction.
2. Communicates effectively to professionals and non-specialists. This applies to dissemination of knowledge, description of tasks solved, assessments made and conclusions drawn. In particular, this includes the preparation of reports, scientific publications and presentations.
3. Has an international perspective on his or her profession and a capability for international orientation and interaction.
4. Can contribute to innovation and innovation processes.

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

- Can evaluate and assess the technological, ethical and societal effects of projects and his or her own work, and takes responsibility for the work's effect on sustainability and societal development.

### Program 2: M.Sc. Electrical Engineering/ Power, University of Jordan

It is expected that the program will provide opportunities for students to develop and demonstrate knowledge and understanding, skills and competencies and other properties in the following fields:

- Demonstrate a sound, in-depth and up-to-date technical knowledge in the field of specialization.
- Ability to identify and solve engineering problems in their chosen field of study.
- Acquire the skills for continued professional development and independent self-learning.
- Demonstrate the ability to communicate technical information effectively and professionally both orally and in writing.
- Knowledge of contemporary issues.
- Utilize up- to- date knowledge in advanced electrical engineering/ power.
- Demonstrate competence within the area of electrical engineering/ power through the application of knowledge and skills and other sciences.
- Maximize use of information technology applications to enhance advanced roles of electrical engineering/ power practice, education, and research.
- Prepare and present oral presentation to a professional standard.
- Write an original research to a professional standard that build up knowledge in electrical engineering/power discipline and other related sciences.

### Program 3: Master of Engineering (Electrical Power), University Teknologi Malaysia UTM Malaysia

Graduates from this program are expected to have the following outcomes:

- Attain advanced knowledge on theories, methods and applications in Electrical Power field.
- Able to demonstrate proficiency in relevant analytical methods, simulations, and/or experiments to perform research.

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			



University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

3. Able to critically solve problems and apply engineering knowledge in design and development.
4. Able to plan and perform research undertakings responsibly, professionally and ethically.
5. Able to communicate, and express knowledge and ideas effectively.
6. Able to continue life-long learning and apply technology for the betterment of humanity.

### Program 4: MSc. Advanced Power Engineering, The University of Edinburgh, UK

The knowledge and understanding acquired within this program:

1. Specialized knowledge and understanding, associated with the individual modules within the program.
2. Advanced knowledge and understanding, fostered throughout the program and obtained from the supplementary training activities, group projects and the full year Masters research project.
3. Understanding of the current and future technological developments as dictated by global challenges.
4. Appreciation of the role and place of electrical power engineering in relation to societal needs and world economy, and the international dimension of electrical power engineering.
5. Thorough knowledge and understanding of advanced fundamental and applied power engineering research tools and techniques.
6. Appreciation, understanding and fostering of knowledge dissemination and public outreach.

### Program 5: Master of Science Program in Electrical Engineering, King Fahd University of Petroleum & Minerals, Saudi Arabia.

The graduates of this program should be able to demonstrate the following learning outcomes:

1. Master the knowledge of electrical engineering concepts.
2. Conduct research independently and collaboratively.

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

**University of Sana'a**  
**Faculty of Engineering**  
**Department: Electrical Engineering**  
**Title of the Program:**  
**Master of Science in Electrical Power Engineering**



## Program Specification

3. Formulate problems and plan a procedure for solution.
4. Communicate, organize and present information effectively.
5. Pursue advanced graduate studies and lifelong learning.
6. Realize the relevance of economics, ethics and teamwork to the profession.

### Program 6: MSc Electric Power Engineering, Reykjavik University, Iceland.

On the completion of the MSc program, the following criteria shall be fulfilled:

#### 1. KNOWLEDGE

On completion of the MSc program the student should possess understanding and knowledge of the following:

- 1.1. In the basic principles of multivariable calculus, including differentiation, integration and differential equations.
- 1.2. Basic principles of linear algebra, vectors, matrices, determinants, eigenvalues, eigenvectors and solving systems linear equations.
- 1.3. Complex numbers, complex exponentials, Laplace and Fourier transform and their applications in solving dynamical systems.
- 1.4. Basic probability and statistics, data analysis and error estimates.
- 1.5. Basic numerical methods relevant to engineering.
- 1.6. Physics, common to most engineering disciplines, including a practical foundation in classical dynamics, electromagnetism, and solid-state materials.

Head of the Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
Dr. Adel Ahmed Al-Shokairi	Assoc. Prof. Dr. Mohammad Al_Gorafi	Prof. Dr. Mohammed AL-Bukhaiti	Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University			
Prof. Dr. Al-Qassim Mohammed Abbas			

**University of Sana'a**  
**Faculty of Engineering**  
**Department: Electrical Engineering**  
**Title of the Program:**  
**Master of Science in Electrical Power Engineering**



## Program Specification

- 1.7. Basic understanding of engineering programming in common languages, such as Matlab and C++, and spreadsheet applications.
- 1.8. Basic theory and application of signal processing concepts, methods and algorithms
- 1.9. Basic knowledge of modern communication systems.
- 1.10. Basic theory of dynamical systems and identification.
- 1.11. Main areas of control engineering and design.
- 1.12. Basic knowledge of electric machines.
- 1.13. Theory and practice of electrical power systems design and operation and system identification.
- 1.14. Theory and practice of electrical power systems dynamical behaviour.
- 1.15. Basic theory and practice of high voltage engineering
- 1.16. Basic theory and practice of power electronics
- 1.17. Management principles and ethical issues for electrical engineers.
- 1.18. Sustainability, environmental impact and life cycle assessment of electrical engineering works.

## 2. DISCIPLINARY SKILLS

On completion of the MSc program the student should be able to:

Head of the Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
Dr. Adel Ahmed Al-Shokairi	Assoc. Prof. Dr. Mohammad Al_Gorafi	Prof. Dr. Mohammed AL-Bukhaiti	Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University			
Prof. Dr. Al-Qassim Mohammed Abbas			

**University of Sana'a**  
**Faculty of Engineering**  
**Department: Electrical Engineering**  
**Title of the Program:**  
**Master of Science in Electrical Power Engineering**



## Program Specification

- 2.1. Apply methods from physics, mathematics and computer science to model systems in electrical, electronic and electrical power engineering.
- 2.2. Use mathematical methods and tools to analyze and develop electrical and electronic engineering systems including electrical power engineering systems.
- 2.3. Use computational tools and packages in electrical design, process and electrical power system design and planning
- 2.4. Plan, manage and analyze projects, using current best-practice methods.
- 2.5. Devise lab experiments, collect and analyze data from physical and simulated test systems and use the results to solve technical problems.
- 2.6. Design electrical power system elements and electrical power system or processes to meet or exceed a set of performance specifications, standards and codes.
- 2.7. Analyze and control electrical power system elements and electrical power system or processes to meet or exceed a set of performance specifications, standards and codes.
- 2.8. Use lab equipment effectively and safely to analyze electrical circuits, instrumentation and actuators.
- 2.9. Use lab equipment effectively and safely to analyze material and electrical properties and performance of electric power components and systems.
- 2.10. Carry out risk assessment as an integral part of the design process
- 2.11. Analyze and communicate statistical data.
- 2.12. Apply project management methods to the planning of projects and apply business administration methods.
- 2.13. Apply standard scientific principles to develop engineering solutions to range of practical problems.

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

2.14. Carry out cost estimate for a design solution and understand the uncertainties associated with the cost estimation process.

### 3. PERSONAL SKILLS

On completion of the MSc program, the student should be able to:

- 3.1. Communicate in English and Icelandic (written and spoken) effectively and professionally and be able to present results using graphs, illustrations and simulations.
- 3.2. Use time-management and work planning related to the organization, implementation and successful completion and reporting of a project.
- 3.3. Interpret and critically assess existing theories, models, methods and results, both qualitatively and quantitatively, within a broad engineering and physical sciences framework.
- 3.4. Make choices based on reasoned arguments, and evaluate the outcomes of those choices by comparing them with alternative solutions.
- 3.5. Propose, plan and manage well defined research projects involving a team of individuals. Prioritise, organise and schedule work activities effectively.
- 3.6. Realize the limits of his/her expertise and know when it is necessary and appropriate to seek specialist advice.

### 4. INTERPERSONAL SKILLS

On completion of the MSc program, the student should be able to:

- 4.1. Communicate effectively and professionally and formulate sound arguments, both in writing and by means of presentations, using appropriate scientific and technical language.

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

**University of Sana'a**  
**Faculty of Engineering**  
**Department: Electrical Engineering**  
**Title of the Program:**  
**Master of Science in Electrical Power Engineering**



## Program Specification

- 4.2. Present ideas in an organized manner, and deliver presentations to peers and advisors from the industry.
- 4.3. Propose, plan, structure and manage well-defined projects involving a team of individuals. Prioritise, organise and schedule work activities effectively.
- 4.4. Recognize the interdisciplinary nature of technical problems and can apply other areas of knowledge to the solution, and work with other professions to arrive at a solution for complex engineering problems.
- 4.5. Give an oral scientific presentation, report on a research project and produce a research report.
- 4.6. Be an effective team member and contribute to the management of team projects.

### 5. COMPETENCE

On completion of the MSc program, the student should be able to:

- 5.1. Solve specific technical problems covering all phases of the CDIO (Conceive, Design, Implement, Operate) from problem identification, idea generation and requirements specification, through design, optimization and implementation to actual production and commissioning
- 5.2. Analyze a problem specification, compare alternative designs, processes, and products and make improvements.
- 5.3. Evaluate existing designs/processes/products and propose improved realizations.
- 5.4. Use design standards and safety codes as an integral part of the design and building process for machine parts and systems.

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

**University of Sana'a**  
**Faculty of Engineering**  
**Department: Electrical Engineering**  
**Title of the Program:**  
**Master of Science in Electrical Power Engineering**



## Program Specification

- 5.5. Appreciate the duties, responsibilities, role and liabilities of experts such as engineers, designers and other stakeholders in projects, companies and society.
- 5.6. Appreciate the meaning and importance of professionalism, including ethics, integrity and adherence to independent, informed judgement.
- 5.7. Continue studies within this field towards an advanced degree, i.e. at PhD level, having developed the necessary personal autonomy and knowledge to do so.

Head of the Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
Dr. Adel Ahmed Al-Shokairi	Assoc. Prof. Dr. Mohammad Al_Gorafi	Prof. Dr. Mohammed AL-Bukhaiti	Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University			
Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

ملحق (4): مسح ملخص البرامج المماثلة لبرنامج ماجستير هندسة القوى الكهربائية

Annex-4: Summary of Similar Programs (Benchmarks) for Master of Science in Electrical Power Engineering Program.

1.Summary of Similar Programs (Benchmarks) for Electrical Power Engineering Program							
	The Similar Programs (Benchmarks)						Current program
	1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program	
<b>Program Title</b>	Master Program in Electric Power Engineering	M.Sc. Electrical Engineering/ Power	Master of Engineering (Electrical Power)	MSc. Advanced Power Engineering	Master of Science Program in Electrical Engineering	MSc Electric Power Engineering	<b>MSc. in Electrical Power Engineering</b>
<b>Faculty</b>	Faculty of Information Technology and Electrical Engineering	School of Engineering	Faculty of Engineering	The School of Engineering	College of Engineering	Iceland School of Energy	<b>Faculty of Engineering</b>
<b>University</b>	Norwegian University of Science and Technology	The University of Jordan	University Teknologi Malaysia UTM	The University of Edinburgh.	King Fahd University of Petroleum & Minerals	Reykjavik University	<b>Sana'a University</b>
<b>Country</b>	Norway	Jordan	Malaysia	UK	Saudi Arabia	Iceland	<b>Yemen</b>

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			



University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### 1. Summary of Similar Programs (Benchmarks) for Electrical Power Engineering Program

	The Similar Programs (Benchmarks)						
	1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program	Current Program
<b>Type of program</b>	Full-time, Master by Course and Research (International Master's Program)	Full-time, Master by Course and Research	Full-time, Master by Course and Research	Full-time, Master by Course and Research	Full-time, Master by Course and Research	Full-time, Master by Course and Research	<b>Courses and Research</b>
<b>Study methods in the program:</b>	Full-time	Full-time	Full-time	Full-time	Full-time	Full-time	<b>Full-time</b>
<b>Number of semesters</b>	4	4	4	4	4	4	<b>4</b>
<b>Total Credit Hours (without Thesis)</b>	20	24	33	15	24	15	<b>30</b>
<b>No. of Compulsory Courses</b>	6	5	4	7	5	6	<b>7</b>
<b>Credit Hours for Compulsory Courses</b>	15	15	12	15	15	11	<b>21</b>
<b>No. of Elective Courses</b>	2	3	5	-	3	2	<b>3</b>
<b>Credit Hours for</b>	5	9	15	-	9	4	<b>9</b>

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### 1. Summary of Similar Programs (Benchmarks) for Electrical Power Engineering Program

Elective Courses							
Complementary courses to join the program and their number	-	-	2 Courses (6 Credits) Other required courses	-	-	-	-
Credit Hours for Thesis	10	9	10	15	6	15	<b>6</b>
Total Credit Hours for courses & Thesis	30	33	43	30	30	30	<b>36</b>
The period for thesis completion	2 Semesters (with project work/practical)	2 Semesters	2 Semesters	2 Semesters	1 Semesters	2 Semesters	2 Semesters
The min. period to complete the program	2 Years	2 Years	2 Years	2 Years	2 Years	2 Years	2 Years (Min. years for courses: 1)
The max. period to complete the program	NA	NA	NA	NA	NA	NA	3+1 Years (Max. years for courses 1.5)

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

ملحق (5): مسح أسماء المقررات الدراسية في البرامج المماثلة لبرنامج ماجستير هندسة القوى الكهربائية

Annex-5: Survey of Course Names of Similar Programs.

	1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program	Current Program
<b>University</b>	Norwegian University of Science and Technology	The University of Jordan	University Teknologi Malaysia UTM	The University of Edinburgh.	King Fahd University of Petroleum & Minerals	Reykjavik University	Sana'a University
<b>Faculty</b>	Faculty of Information Technology and Electrical Engineering	School of Engineering	School of Electrical Engineering Faculty of Engineering	School of Engineering	College of Engineering	Iceland School of Energy	<b>Faculty of Engineering</b>
<b>Program</b>	Master Program in Electric Power Engineering	M.Sc. Electrical Engineering/ Power	Master of Engineering (Electrical Power)	MSc. Advanced Power Engineering	Master of Science Program in Electrical Engineering	MSc Electric Power Engineering	<b>MSc. in Electrical Power Engineering</b>
<b>Country</b>	Norway	Jordan	Malaysia	UK	Saudi Arabia	Iceland	Yemen
<b>No. of Courses</b>	8	8	11	7	8	8	10
<b>Total Cr. Hrs.</b>	30	33	43	30	30	30	<b>30</b>

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

		1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program	Current Program
<b>Total Years</b>		2	2	2	2	2	2	2
Term	No.	Course Name						
								<b>Compulsory (3)</b>
<b>1</b>	1.	Energy Systems Planning and Operation	Power System Operation and Economics	Integrated Resource Planning in Energy Sector	Power Systems Engineering and Economics	EE Course in Area of Power Engineering	Power Systems Operation	<b>Power System Planning and Operation</b>
			Power System Planning and Reliability					
	2.	Power Electronics	Advanced Power Electronics	Power Electronics System	Advanced Power Electronics and Machines	EE Course in Area of Power Engineering	Power Electronics	<b>Advanced Power Electronics</b>
3.	Renewable Energy Management	Renewable Energy and Distributed Generation	Alternative Energy Technology System	Solar Energy & Photovoltaic Systems	Distributed Energy Resources and Smart Grids	Elective(s) in Renewable Energy	<b>Advanced Renewable Energy Systems</b>	

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

	1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program	Current Program
				Principles of wind energy			
							<b>Electives (2)</b>
4.			Power System Devices & Apparatus				Automatic Reactive Power Compensation
			Integrated Resource Planning in Energy Sector			Smart-Grids in Sustainable Energy Systems	Energy Efficiency and Conservation
5.	Energy Systems <b>Planning</b> and Operation	Power System Operation and <b>Economics</b>	Integrated Resource <b>Planning</b> in Energy Sector	Power Systems Engineering and <b>Economics</b>	EE Course in Area of Power Engineering		Advanced Project Management
	Solar and Storage – Electrical Energy for Future Power Systems						Energy Storage Systems

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

	1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program	Current Program
<b>Term No.</b>	<b>Course Name</b>						
							<b>Compulsory (4)</b>
<b>2</b>	1.		Research Methodology	Introduction to Research Methodology in Electrical Engineering	Engineering Research Methods with Grand Challenge		Research Methods Research Methodology in Electrical Engineering
	2.	High Voltage Equipment	High Voltage Engineering (E)	High Voltage Insulation & Coordination Advanced High Voltage Technology			<b>High Voltage Engineering</b> Advanced High Voltage Engineering
	3.	Power System Stability and Control	Advanced Control Systems Power System Stability and Control	Power System Control		EE Course in Area of Power Engineering	Stability and Control in Electric Power Systems Power System Dynamics
	4		Electrical	Electrical Drives	Advanced Power	EE Course in Area of	Advanced Topics in

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

	1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program	Current Program
		Machines and Drives		Electronics and Machines	Power Engineering		Electrical Machines
							Elective (1)
5.			Power Quality				Electrical Power Quality
	Power Markets, Resources and Environment				EE Course in Area(s) of Breadth (within EE)		Health, Safety and Environmental Management
	Safety and Reliability Analysis						
	Environmental Impacts on Ecosystems						
			Power System Analysis & Computational Methods				
		Linear Systems	Non-technical subject	Power Engineering Fundamentals	EE Course in Area(s) of Breadth (within EE)	Field School	

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

	1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program	Current Program
		Advanced Power System Protection	Electronic Power Conversion				
	Smart Grids		Power Transmission & Security		Free Technical Elective	Integrated Project	
	Power System Protection and Control		Lightning Protection & Grounding System			Independent Project	
	Smart Energy Use			-		Elective in Renewable Energy from ISE	
			Special Topic in Power Engineering	-	-		
	-	-	Power System Protection	-	-	-	
	-	-		-	-	-	
	-	-	Power Transmission & Security	-	-	-	
	-	-		-	-	-	

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			



University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

		1 <sup>st</sup> Program	2 <sup>nd</sup> Program	3 <sup>rd</sup> Program	4 <sup>th</sup> Program	5 <sup>th</sup> Program	6 <sup>th</sup> Program	Current Program
Term	No	Course Name						
3		Project Work/ Practical	Thesis	Thesis	Thesis	Free Technical Elective	Thesis	<b>Thesis</b>
						Free Technical Elective		
						M.S. Thesis		
4		Thesis	Thesis	Thesis	Thesis	Thesis	Thesis	<b>Thesis</b>
<b>Total CH</b>		<b>30</b>	<b>33</b>	<b>43</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>36</b>

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

**ملحق ( 6 ): مسح الرؤية والرسالة والأهداف البرامج المعتمدة المماثلة لبرنامج هندسة القوى الكهربائية.**

**Annex (6): Survey/ Mapping of Vision, Mission and Objectives of Similar Accredited Programs at International Universities (Benchmarks) for Master of Science in Electrical Power Engineering Program.**

	The 1 <sup>st</sup> Program	The 2 <sup>nd</sup> Program	The 3 <sup>rd</sup> Program	The 4 <sup>th</sup> Program	The 5 <sup>th</sup> Program	The 6 <sup>th</sup> Program
<b>Country</b>	Norway	Jordan	Malaysia	UK	Saudi Arabia	Iceland
<b>University</b>	Norwegian University of Science and Technology	The University of Jordan	University Teknologi Malaysia UTM	The University of Edinburgh.	King Fahd University of Petroleum & Minerals	Reykjavik University
<b>Faculty</b>	Faculty of Information Technology and Electrical Engineering	School of Engineering	School of Electrical Engineering Faculty of Engineering	School of Engineering	College of Engineering	Iceland School of Energy
<b>Department/ Program</b>	The Department of Electric Power Engineering/Master Program in Electric Power Engineering	Electrical Engineering Department/ M.Sc. Electrical Engineering/ Power	Division of Electrical Power Engineering/ Master of Engineering (Electrical Power)	Department of Electrical & Electronic Engineering	The Electrical Engineering Department/ Master of Science Program in Electrical Engineering	Department of Engineering/MSc Electric Power Engineering
<b>Study Duration</b>	2 Years	2 Years	2 Years	2 Years	2 Years	2 Years

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

	The 1 <sup>st</sup> Program	The 2 <sup>nd</sup> Program	The 3 <sup>rd</sup> Program	The 4 <sup>th</sup> Program	The 5 <sup>th</sup> Program	The 6 <sup>th</sup> Program
<b>Program Accrediting Body</b>	-	Ministry of Higher Education		UK Institution of Engineering and Technology (IET)	ABET (Undergraduate programs)	Ministry of Education in Iceland
<b>Website Link</b>	<a href="http://www.ntnu.edu/studies/mselpower/components">www.ntnu.edu/studies/mselpower/components</a>	<a href="http://engineering.ju.edu.jo/">http://engineering.ju.edu.jo/</a>	<a href="https://engineering.utm.my/electrical/postgraduate-programme-off-campus/master-of-engineering-electrical-power/">https://engineering.utm.my/electrical/postgraduate-programme-off-campus/master-of-engineering-electrical-power/</a>	<a href="https://www.eng.ed.ac.uk/studying/postgraduate/msc-taught/msc-electrical-power-engineering">https://www.eng.ed.ac.uk/studying/postgraduate/msc-taught/msc-electrical-power-engineering</a>	<a href="http://www.kfupm.edu.sa/departments/ee/Pages/en/MS-EE.aspx#">http://www.kfupm.edu.sa/departments/ee/Pages/en/MS-EE.aspx#</a>	<a href="https://en.ru.is/ise/programmes/sustainable-energy/electric-power-engineering/#tab2">https://en.ru.is/ise/programmes/sustainable-energy/electric-power-engineering/#tab2</a>
<b>Department Vision</b>	NA	To be the region's innovative leader in providing excellent electrical engineering education and in conducting high quality fundamental and applied research.	The School of Electrical Engineering in UTM is committed to be a world-class center of excellence and a leader in teaching and learning within the field of electrical engineering.	The School of Engineering's vision is to advance and transmit the knowledge base of engineering to meet society's aspirations, creating and engineering the answers to global problems.	To be globally known for skillful graduates and quality research with focus on national needs.	The department thrives in an international study environment, with multidisciplinary programmes and a variety of research, based on close cooperation between industry and academia.
<b>Department</b>	To contribute to the	To provide high quality	To provide world-class	NA	• Imparting profound	To train experts in the

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

	The 1 <sup>st</sup> Program	The 2 <sup>nd</sup> Program	The 3 <sup>rd</sup> Program	The 4 <sup>th</sup> Program	The 5 <sup>th</sup> Program	The 6 <sup>th</sup> Program
Program Mission	fundamental and applied knowledge of electric power engineering, and to develop technology and systems for the planning, operation and maintenance of efficient, sustainable energy systems.	education in electrical engineering disciplines, prepare graduates for diverse careers in electrical engineering, contribute to the country's economic development, meet the needs of the industry and society, and to bring faculty and staff a rewarding career in teaching and research.	program in teaching and learning within the field of Electrical Engineering. To develop technology and technologists in the field of Electrical Engineering possessing high values and morals; and To spearhead technology knowledge in the field of Electrical engineering.		knowledge in the areas of electrical engineering. <ul style="list-style-type: none"> <li>Enriching graduates with technical and soft skills to take up leading role in the society.</li> <li>Producing high quality research with focus on energy-related challenges.</li> </ul>	field of clean energy for a sustainable world.
Department Objectives	NA	<ul style="list-style-type: none"> <li>Providing basic electrical engineering education in the various fields of this discipline, and maintaining a reasonable balance between theory and practice.</li> <li>Graduate competent electrical engineers through emphasizing</li> </ul>	<ul style="list-style-type: none"> <li>To produce professionals who are responsible to their Creator and the society.</li> <li>To produce professionals who are very well trained, skilled, and efficient</li> </ul>	NA	The goal of the department is to maintain excellence in teaching, research and public services. Teaching in undergraduate and graduate programs	<ul style="list-style-type: none"> <li>To address the some of the most pressing challenges of the 21st century.</li> <li>To solve modern-day challenges in a rigorous and</li> </ul>

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

	The 1 <sup>st</sup> Program	The 2 <sup>nd</sup> Program	The 3 <sup>rd</sup> Program	The 4 <sup>th</sup> Program	The 5 <sup>th</sup> Program	The 6 <sup>th</sup> Program
		quality education and properly oriented training. <ul style="list-style-type: none"> <li>• Engagement in active research programs in support of Jordan's development plans.</li> <li>• Positively contribute to the advancement of the electrical engineering profession, in order to meet the needs and requirements of the practicing engineers through the organization of specialized seminars, technical conferences, continuous education programs, joint research programs, and consulting services.</li> </ul>	through the establishment of excellent academic programs. <ul style="list-style-type: none"> <li>• To establish good university – industry relationship.</li> <li>• To develop and establish high quality academic and support personnel.</li> <li>• To create an excellent environment for consultancy, research and development activities.</li> </ul>		involves training the students to function effectively in a wide range of engineering organizations.	collaborative setting.
Program Mission	NA				NA	To develop a program specifically for electrical engineers wishing to specialize in power systems engineering

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

	The 1 <sup>st</sup> Program	The 2 <sup>nd</sup> Program	The 3 <sup>rd</sup> Program	The 4 <sup>th</sup> Program	The 5 <sup>th</sup> Program	The 6 <sup>th</sup> Program
						with focus on practical experience and fieldwork, while combining economics, technology, engineering and science into one comprehensive degree.
Program Objectives	<p>1- Provide candidates with knowledge and skills for planning, design and operation of Electric Power Systems.</p> <p>2- Develop new methods and new high-tech components for effective, reliable and sustainable systems.</p>	<p>1. To graduate students with high specializations in Electric power system.</p> <p>2. To introduce new topics which have local needs such as renewable energy.</p> <p>3. To strengthen ties with local industry.</p>	<ul style="list-style-type: none"> <li>To produce postgraduates with multidisciplinary knowledge needed for designing, integrating and optimizing solutions, central to modern-to-modern power engineering systems.</li> <li>To produce postgraduates who are able to generate new knowledge, idea and technique in power engineering.</li> </ul>	<p>The main objective of the program is to train the next generation of electrical power engineers who:</p> <ul style="list-style-type: none"> <li>are aware of the most recent, cutting edge developments in power engineering;</li> <li>are able to tackle the global energy trilemma of supplying secure,</li> </ul>	<ul style="list-style-type: none"> <li>Develop an introductory level of competence in conducting research.</li> <li>Acquaint knowledge on the state-of-the art technologies in electrical engineering disciplines.</li> <li>Demonstrate the</li> </ul>	<ul style="list-style-type: none"> <li>To give comprehensive treatment to the various components of power systems, their physical properties and design, along with the study of both nominal and perturbed operating conditions.</li> <li>To emphasize on emerging technologies, and their</li> </ul>

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

	The 1 <sup>st</sup> Program	The 2 <sup>nd</sup> Program	The 3 <sup>rd</sup> Program	The 4 <sup>th</sup> Program	The 5 <sup>th</sup> Program	The 6 <sup>th</sup> Program
	ems and industrial products.		<ul style="list-style-type: none"> <li>To produce postgraduates who are able to function in R&amp;D research team and innovative industrial ventures.</li> <li>To produce postgraduates who are able to consistently perform their responsibilities ethically and professionally.</li> </ul>	equitable and environmentally sustainable energy, appreciating the technical, social and economic challenges faced in both developed and developing countries; <ul style="list-style-type: none"> <li>have advanced research and development skills allowing them to excel in both industrial and academic settings.</li> </ul>	ability to learn independently and generate new knowledge in their chosen field of study. <ul style="list-style-type: none"> <li>Develop leadership, skills and ethics of the profession.</li> </ul>	integration into new and existing power systems so as to ensure reliable delivery of electricity to various types of consumer demands. <ul style="list-style-type: none"> <li>To focus on providing our graduates with the insight and skills necessary to join this challenging industry.</li> </ul>

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### ملحق ( 7 ): موازنة رؤية البرنامج مع رؤية الكلية والجامعة

Annex (7): Mapping of mission and objective of the program with vision, mission and objectives of faculty, and university.

#### Mapping of program vision with Department, faculty, and university vision

University Vision	Faculty Vision	Department vision	MSc. Program vision
Sana'a University aspires to achieve a national leading role in teaching, learning, scientific research and community service; and to be among the best regional universities and the foremost house of expertise and think tank in Yemen.	To excel in engineering education & scientific research with distinction at the local and regional levels.	Sustain the leadership locally and be excellence regionally in education and scientific research in the different fields of electrical Engineering.	To be a distinguished Master program in electrical power engineering locally and regionally.

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			



University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### ملحق ( 8 ): موازنة رسالة وأهداف البرنامج مع رسالة وأهداف الكلية والجامعة

**Annex (8): Mapping of mission and objective of the program with vision, mission and objectives of faculty, and university.**

#### Mapping of program mission with Department, faculty and university mission

University Mission	Faculty Mission	Department Mission	Power Engineering Program	MSc. Program Mission
To contribute to the sustainable development efforts by providing an accredited higher education environment and excellent research services within a fruitful national partnership based on transparency, professionalism and creativity.	To provide excellent and accredited engineering education to meet the development needs and match the labor market requirements locally and regionally.	Graduate qualified Engineers in Electric Power, communication and computer engineering in accordance with programs committed to the international quality standards. The Graduating Engineers handed with enough knowledge and skills necessary to meet the requirements of development as well as local and regional labor markets. Also, they able to self-development and proceed with contemporary issues. The department contribute to community wellness and the country development through scientific research, advisory services, and training and education programs.	Electrical Power Engineering program mission is to prepare high qualified graduates in electrical power and machines engineering able to apply engineering principles to solve a wide range of problems in the field of electrical power engineering. In addition, the program is committed to provide continuing education, outreach activities, consulting and research.	To graduate distinguished Master holders in the field of electrical power engineering through a strong academic program, qualified staff, and suitable research infrastructure that meet local development requirements and labor market needs.

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### Mapping of program objectives with Department, faculty, and university objectives

University Objectives	Faculty Objectives	Department Objectives	Power Engineering Program	MSc. Program Objectives
<ol style="list-style-type: none"> <li>1. To provide specialized and in-depth academic opportunities for students in different fields of knowledge to meet the country's needs of specialties, technicians and experts, with special focus on the following:</li> <li>2. To boost the level and quality of preparation and qualification tasks.</li> <li>3. To create a general culture aiming at developing the elements of sound Islamic personality and the proper cognitive and scientific training.</li> <li>4. To stabilize the true Islamic vision emanating from the broad horizons of Islamic knowledge and its perception of the universe, man and life.</li> <li>5. To develop innovative and critical</li> </ol>	<ol style="list-style-type: none"> <li>1. To offer study programs in various fields of knowledge and equip students with required knowledge and scientific and know-how skills to utilize them in resolving problems effectively and efficiently.</li> <li>2. To develop positive trends towards engineering science and its accelerating developments and enable students to use the techniques and methods of conducting scientific research in engineering fields.</li> <li>3. To develop skills of scientific, innovative and critical thinking as well as the concept of continuous self-education.</li> <li>4. To strengthen scientific ties with national and international colleges, scientific bodies, and research &amp; development centers.</li> <li>5. To provide technical and specialized studies and consultations to various state bodies and institutions, both</li> </ol>	<ol style="list-style-type: none"> <li>1. Graduate high qualified engineers in electrical power, communication and computer engineering able to compete at national and regional levels.</li> <li>2. Update undergraduate and post graduate programs and enhance the applied research environment to contribute in country development.</li> <li>3. Establish partnerships with the public and private sectors and provide engineering consultancies, continuous training, teaching and awareness programs.</li> <li>4. Improve the academic staff to student ratio as per standard.</li> <li>5. Fill the gap in the number of assistance staff and laboratory technicians and implement training programs</li> </ol>	<p>Electrical power engineering program is devoted to graduate high qualified engineers that during their first few years after graduation will be able to:</p> <ol style="list-style-type: none"> <li>1. Work professionally and manage skillfully electrical power industries, including generation, transmission, distribution, electrical machines and drives.</li> <li>2. Implement knowledge in science, mathematics and computational technology to investigate and solve problems encountered in the electrical power industry.</li> <li>3. Compete at national and regional levels.</li> <li>4. Conduct effectively and ethically both as a member of or a leadership of a team in multicultural work atmosphere.</li> <li>5. Follow lifelong learning and continuously improve their knowledge in the electrical power</li> </ol>	<ol style="list-style-type: none"> <li>1. To provide specialized studies and encourage fundamental and applied research in different electrical power engineering disciplines.</li> <li>2. To bridge the gap between the academic educational and industrial and technological environment.</li> <li>3. To develop and improve the academic and educational level at the Faculty of Engineering in the field of electrical power engineering.</li> <li>4. To provide graduates with up-to-date advanced knowledge and skills needed to attain excellence in solving technical problems and facing challenges in the electrical power engineering field.</li> <li>5. To graduate researchers in electrical power engineering disciplines who can pursue further studies and contribute to the scientific research community.</li> <li>6. To provide graduates able to</li> </ol>

Head of the Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
Dr. Adel Ahmed Al-Shokairi	Assoc. Prof. Dr. Mohammad Al_Gorafi	Prof. Dr. Mohammed AL-Bukhaiti	Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University			
Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

### Mapping of program objectives with Department, faculty, and university objectives

University Objectives	Faculty Objectives	Department Objectives	Power Engineering Program	MSc. Program Objectives
scientific thinking skills. 6. To provide students with the required knowledge and scientific and applied skills for solving problems effectively and efficiently.	public and semi-public, and utilize them in resolving the environment and society issues to promote sustainable development. 6. To develop a spirit of co-operation, group work, effective leadership, sense of responsibility, and ethical commitment.	to enhance their skills. 6. Commit and uphold high ethical and professional conduct in the education and practice of engineering.	engineering practice and make contributions to the advance of engineering profession. 6. Realize the impact electrical power industry on the environment.	<b>effectively contribute to the electrical power engineering profession by applying ethical practices and communication skills, sharing innovative and clear ideas and pursuing further education through lifelong learning.</b>

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

ملحق (9): مواعمة مخرجات تعلم برنامج ماجستير هندسة القوى الكهربائية مع المقررات.

Appendix (9): Mapping Program Intended Learning Outcomes with courses for Master of Science in Electrical Power Engineering program.

Course Name	Program Intended Learning Outcomes (P-IOLs)											
	A1	A2	A3	B1	B2	B3	C1	C2	C3	D1	D2	D3
<b>• Compulsory Courses</b>												
Research Methodology in Electrical Engineering	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Power System Planning and Operation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Advanced Power Electronics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Advanced Renewable Energy Systems	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Advanced High Voltage Engineering	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Advanced Topics in Electrical Machines	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Power System Dynamics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>• Elective Courses</b>												

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

Course Name	Program Intended Learning Outcomes (P-IOLs)											
	A1	A2	A3	B1	B2	B3	C1	C2	C3	D1	D2	D3
Automatic Reactive Power Compensation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Energy Efficiency and Conservation		✓	✓	✓		✓		✓	✓	✓	✓	✓
Advanced Engineering Project Management	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓
Energy Storage Systems	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Electrical Power Quality	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Health, Safety and Environmental Management			✓	✓		✓	✓	✓	✓	✓	✓	✓
<b>THESIS599</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

**ملحق (12): مواءمة أهداف البرنامج مع مخرجات التعلم المقصودة لبرنامج ماجستير هندسة القوى الكهربائية.**

**Annex-12: Alignment of Electrical Power Engineering Program Objectives with Program Intended Learning Outcomes.**

Program Objectives أهداف البرنامج	Program Intended Learning Outcomes (PILOs)											
	رموز مخرجات التعلم للبرنامج											
	A1	A2	A3	B1	B2	B3	C1	C2	C3	D1	D2	D3
1.To provide specialized studies and encourage fundamental and applied research in different electrical power engineering disciplines.	✓	✓	✓	✓	✓	✓	✓	✓	✓			
2.To bridge the gap between the academic educational and industrial and technological environment.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3.To develop and improve the academic and educational level at the Faculty of Engineering in the field of electrical power engineering.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4.To provide graduates with up-to-date advanced knowledge and skills needed to attain excellence in solving technical problems and facing challenges in the electrical power engineering field.	✓	✓	✓	✓	✓	✓	✓	✓	✓			
5.To graduate researchers in electrical power engineering disciplines who can pursue further studies and contribute to the scientific research community.	✓	✓	✓	✓	✓	✓	✓	✓	✓			
7.To provide graduates able to effectively contribute to the electrical power engineering profession by applying ethical practices and communication skills, sharing innovative and clear ideas and pursuing further education through lifelong learning.										✓	✓	✓

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

University of Sana'a  
 Faculty of Engineering  
 Department: Electrical Engineering  
 Title of the Program:  
 Master of Science in Electrical Power Engineering



## Program Specification

Program Intended Learning Outcomes (PILOs)	
<b>A. Knowledge and Understanding</b>	
Upon successful completion of the Master of Science in Electrical Power Engineering Program, graduates should be able to:	
A1.	Demonstrate in-depth understanding of the theory and practice of modern electrical power systems design and operation and system identification.
A2.	Recognize and comprehend the key role of sustainable energy for national and global sustainable development.
A3.	Explain in detail the key considerations and challenges of sustainable design and development of modern electrical power system components.
<b>B. Intellectual Skills</b>	
Upon successful completion of the Master of Science in Electrical Power Engineering Program, graduates should be able to:	
B1.	Identify, formulate, and solve complex power engineering problems by selecting and applying appropriate tools and techniques.
B2.	Critically review the scientific literature for effective justification and support of results and decisions.
B3.	Select appropriate techniques and tools for successful problem solving.
<b>C. Practical and Professional Skills</b>	

Head of the Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
Dr. Adel Ahmed Al-Shokairi	Assoc. Prof. Dr. Mohammad Al_Gorafi	Prof. Dr. Mohammed AL-Bukhaiti	Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University			
Prof. Dr. Al-Qassim Mohammed Abbas			

**University of Sana'a**  
**Faculty of Engineering**  
**Department: Electrical Engineering**  
**Title of the Program:**  
**Master of Science in Electrical Power Engineering**



## Program Specification

### Program Intended Learning Outcomes (PILOs)

Upon successful completion of the Master of Science in Electrical Power Engineering Program, graduates should be able to:

Head of the Department Dr. Adel Ahmed Al-Shokairi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Al_Gorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			