**University: Benha University**

**Faculty: Faculty of Engineering at Shoubra**

**Department: Electrical Engineering Department**

**Program Specification for Master of Science in**

**Electrical Machines and Electrical Drive System**

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| **Introduction:**  This program specification provides a concise summary of the main features of the MSc. of Electrical Machines and Electrical Drive System at Benha University. The Program Intended Learning Outcomes ILO’s are those that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. This specification provides a source of information for students seeking an understanding of the nature of the program, and to all other interested parties. |

1. **Basic Information**
2. **Awarding Institution : Benha University**
3. **Teaching Institution : Faculty of Engineering at Shoubra**
4. **Name of the Final Award :M.Sc. degree in Electrical Machines and Electrical Drive Systems**
5. **Program Title: M.Sc. in Electrical Machines and Electrical Drive Systems**
6. **Name of Department: Electrical Engineering**
7. **Coordinator: Professor Ibrahim Abdel-Moneim Abdel-Halim**
8. **Language of study: English**
9. **Date of production of Program Specification : June 2010**
10. **Relevant Benchmarks: Standards for Graduate Programs SGP NAQAAE (for master degree programs), August 2009.**

**B. Professional Information**

**1. Program Mission and Aims**

**1.1 Program Mission**

1. To produce full fledged electrical power engineers to cater to the needs of modern industrial electric drive systems.
2. To gain advanced knowledge and understanding of specialist topics in power electronics.
3. To give students increased capability so they may pursue challenging technological careers within the domain of power electronics.

**1.2 Program Aims**

Postgraduates of the electrical machines and electrical drive systems M. SC. program are able to apply their scientific and technical knowledge base as they progress along their career in electrical machines and electrical drive systems as evidenced by:

1. Excel and applying the basics of electrical machines and electrical drive systems research and utilize its diverse tools to develop a range of related transferable skills.
2. Foster the acquisition and implementation of broad research and analytical skills related to electrical machines and electrical drive systems.
3. To produce professional and highly proficient engineers to work in the field of electrical machines and electrical drive systems
4. To promote awareness of the role of numerical modeling in examining, understanding and predicting the behavior of electrical machines and electrical drive systems, drawing on an understanding of the underlying processes and knowledge of the characteristics of particular systems
5. To predict solution of electrical machines and electrical drive systems challenges, encouraging students to deal with complex issues both systematically and creatively and to show originality in tackling both familiar and unfamiliar problems.
6. To provide a sound scientific, technical and commercial understanding of electrical machines and electrical drive systems issues and practice.
7. Communicating effectively and develop leadership skills.
8. Being able to make decisions in various professional contexts
9. Being able to employ the available environmental resources in a manner that achieves the greatest electrical machines and electrical drive systems benefit and sustainability
10. Develop an understanding of how this knowledge may be applied in practice in an economic and environmentally sustainable manner.
11. Acting in a manner which reflects his/he honesty, discipline and ethicality.
12. To integrate continuing professional Development elements in the provision for students and employ a culture of life-long learning.

The Faculty of Engineering at Shoubra has adopted the “Standards for Graduate Programs SGP (for masters degree programs), March 2009”, Prepared by NAQAAE (National Authority for Quality Assurance and Accreditation of Education). As a result, the program in Electrical Engineering M.Sc. electrical machines and electrical drive systems must satisfy the following Intended Learning Outcomes:

**2. Intended Learning Outcomes (ILOs)**

**Upon completion of the program the students should be able to:**

**2.1 Knowledge and Understanding**

|  |  |
| --- | --- |
| **Program ILO’s** | **Teaching / learning methods and strategies** |
| 2.1.1 Identify theories, fundamentals and specialized knowledge in the area of power electronics as well as in related disciplines.  2.1.2 Describe the two way impact of the relationship between professional practice and its effect on the environment.  2.1.3 Outline the scientific developments in the area of power electronics.  2.1.4 Summarize the moral and legal principles of professional practice in the area of power electronics.  2.1.5 List the principles and fundamentals of quality in professional practice related to the area of power electronics.  2.1.6 Define the basics and the ethics of scientific research. | * Lectures, * Seminars, * Tutorials, * Directed reading, * Project work, and * Independent study. |
| **Assessment** | * Individual course work, * Assignments, * Quizzes, * Oral discussions, * Reports, and * Final written examinations. |

**2.2 Intellectual Skills**

|  |  |
| --- | --- |
| **Program ILO’s** | **Teaching / learning methods and strategies** |
| 2.2.1 Analyze and assess information in the field of specialization and draw analogies to solve problems.  2.2.2 Solve problems in spite of the lack of some data.  2.2.3 Link different knowledge sources to solve problems.  2.2.4 Conduct a research study and/or write a scientific essay about a research problem.  2.2.5 Assess risks in professional practice.  2.2.6 Plan for performance development in the area of power electronics.  2.2.7 Make professional decisions in various professional contexts. | * Tutorial/problem sheets, * Small group exercises, and * Thesis preparation. |
| **Assessment** | * Oral and written examinations, * Project write-ups, * Coursework and project reports, * Presentations, and * Final thesis. |

**2.3 Professional and Practical Skills**

|  |  |
| --- | --- |
| **Program ILO’s** | **Teaching / learning methods and strategies** |
| 2.3.1 Master basic professional and modern skills in the area of specialization.  2.3.2 Write and evaluate professional reports.  2.3.3 Assess methods and current tools in the area of specialization. | * Experiments, * Demonstrations, * Practical work, * Laboratory visits, and * Final thesis. |
| **Assessment** | * Laboratory experimental write-ups, * Coursework exercises and reports, * Project reports and presentations and * The methodology demonstrated in the work for the thesis. |

**2.4 General and Transferable Skills**

|  |  |
| --- | --- |
| **Transferable skills** | **Teaching / learning methods and strategies** |
| 2.4.1 Communicate effectively using different means.  2.4.2 Use information technology in order to serve the development of professional practice.  2.4.3 Assess him/her self and identify his/her own personal learning needs.  2.4.4 Use different sources for obtaining information and knowledge.  2.4.5 Set basis and standards to assess the performance of others.  2.4.6 Work in a group and Lead a team in familiar professional contexts  2.4.7 Manage time effectively.  2.4.8 Conduct self learning and continuous education practices. | * Presentations in annual seminars (compulsory to be attended by a panel of departmental staff and other students). * Attendance of workshops or conferences or internal seminars. * Writing scientific paper/s (compulsory before obtaining the degree). * Thesis preparation. |

1. **Academic Standards**

**3a- External References for Standards (Benchmarks)**

Reference Standards for Masters Degree Programs, **in general,** were prepared by the National Authority for Quality Assurance and Accreditation of Education, Egypt. **These standards were translated for preparing these program specifications.**

**3b-Comparison of Provision to External References**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Attributes of current program graduates** | **Attributes of program graduates as per NAQAAE Requirements for Master programs, in general** | **Corresponding ILO's in Current Program which satisfy the NAQAAE Requirements for Master programs, in general** | Codes for Courses that Satisfy the ILO’s |
|  | 1.1 Master the application of the fundamentals and methodologies of scientific research and use its different tools. | 1.1 Master the application of the fundamentals and methodologies of scientific research and use its different tools. | **2.1.1**  **2.1.3** | EEP601  EEP602  EEP603  EEP609  EEP610 |
|  | 1.2 Apply the analytic approach and use it in the area of power electronics. | 1.2 Apply the analytic approach and use it in the area of specialization. | **2.2.1**  **2.3.2**  **2.3.3** | EEP602  EEP603  EEP604  EEP606 |
|  | 1.3 Apply specialized knowledge and combine it with relevant knowledge related to professional practice in the area of power electronics. | 1.3 Apply specialized knowledge and combine it with relevant knowledge related to professional practice. | **2.2.2**  **2.2.3** | EEP602  EEP603  EEP606 |
|  | 1.4 Show an awareness of current problems and modern perspectives in the area of power electronics. | 1.4 Show an awareness of current problems and modern perspectives in the area of specialization. | **2.1.3**  **2.2.2**  **2.2.3**  **2.4.4** | EEP601  EEP602  EEP604  EEP605  EEP609  EEP610 |
|  | 1.5 Specify professional problems and find solutions for them. | 1.5 Specify professional problems and find solutions for them. | **2.2.6**  **2.4.4** | EEP601  EEP602  EEP604  EEP605  EEP609  EEP610 |
|  | 1.6 Show distinction in a proper range of specialized professional skills and use of appropriate technological means to serve his professional practice. | 1.6 Show distinction in a proper range of specialized professional skills and use of appropriate technological means to serve his professional practice. | **2.1.3**  **2.4.2** | EEP601  EEP609  EEP610 |
|  | 1.7 Communicate effectively and demonstrate ability to lead teams. | 1.7 Communicate effectively and demonstrate ability to lead teams. | **2.2.4**  **2.3.2**  **2.4.1**  **2.4.5**  **2.4.6**  **2.4.7** | EEP602  EEP603  EEP604  EEP608 |
|  | 1.8 Make decisions in various professional contexts. | 1.8 Make decisions in various professional contexts. | **2.2.2**  **2.2.7**  **2.4.7** | EEP602  EEP603  EEP604  EEP607 |
|  | 1.9 Utilize available resources to maximize their benefit and keep resources maintained. | 1.9 Utilize available resources to maximize their benefit and keep resources maintained. | **2.1.2**  **2.1.3** | EEP601  EEP604  EEP610 |
|  | 1.10 Display awareness of his/her role in community development and environmental conservation in light of global and regional variations. | 1.10 Display awareness of his/her role in community development and environmental conservation in light of global and regional variations. | **2.1.2**  **2.1.5**  **2.2.5** | EEP602  EEP606  EEP607 |
|  | 1.11 Act in a way that reflects the commitment to integrity, credibility and in accordance with the rules of the profession. | 1.11 Act in a way that reflects the commitment to integrity, credibility and in accordance with the rules of the profession. | **2.1.4**  **2.1.6**  **2.3.1** | EEP601  EEP603  EEP604  EEP609 |
|  | 1.12 Develop him/her self academically and professionally and carry out continuous education. | 1.12 Develop him/her self academically and professionally and carry out continuous education. | **2.4.2**  **2.4.3**  **2.4.4**  **2.4.8** | EEP601  EEP605  EEP609  EEP610 |

1. **Program Structure and Award Requirements**

**4-a- Program duration:** Three semesters followed by dissertation.

**4-b- Program structure:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **4.b.(i)** | **No. of Contact hours per week** | | | |
| **Level** | **Lectures** | **Lab./Exercise** | **total** |
| 1st Semester | 12 | 0 | 12 |
| 2 nd Semester | 18 | 0 | 18 |

|  |  |  |  |
| --- | --- | --- | --- |
| **4.b.(ii)** | **No. of credit hours** | | |
| **Level** | **Compulsory** | **Elective** |
| 1st Semester | 6 | 6 |
| 2 nd Semester | 6 | 12 |

|  |  |  |  |
| --- | --- | --- | --- |
| **4.b.(iii)** | **Program Credit hours/Level** | | |
| **Level 1** | **Level 2** | **Dissertation** |
| 12 | 18 | 18 |

1. **Curriculum**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 1-1 Preparatory Studies (Basic Courses)** | | | | | | | |  |
| **Test Time** | **Grades** | | | | **Credit Hours** | **Course Name** | **Course Code\*** | **Serial** |
| **Total** | **Written Exam** | **Oral / Practical** | **Course Work** |
| 3 | 300 | 200 | -- | 100 | 3 | Advanced Engineering Mathematics | ENG 501 | 1 |
| 3 | 300 | 200 | -- | 100 | 3 | Advanced Programming | ENG 505 | 2 |
| 3 | 300 | 210 | -- | 90 | 3 | Introduction to Power Electronics | EPM 501 | 3 |
| 3 | 300 | 210 | -- | 90 | 3 | Theory of Electrical Machines | EPM502 | 4 |

**\*(These courses were chosen from the full Table 6 in the “Postgraduate Faculty Bylaw” as they are relevant to Electrical engineering postgraduate studies)**

**Table 2-1 Master of Science (M. Sc) -Electrical Machines and Electrical Drive**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Time** | **Grades** | | | | **Credit Hours** | **Course Name** | **Course Code\*** | **Serial** |
| **Total** | **Written Exam** | **Oral / Practical** | **Course Work** |
| **Compulsory Courses** | | | | | | | | |
| 3 | 300 | 210 | -- | 90 | 3 | Advanced study in electrical drive systems (1) | EEP 601 | 1 |
| 3 | 300 | 210 | -- | 90 | 3 | Analysis of power electronic circuits | EEP 602 | 2 |
| Discussion |  |  |  |  | 12 | M.Sc. Thesis | EEP 603 | 3 |
| **Elective Courses(1)** | | | | | | | | |
| 3 | 300 | 210 | -- | 90 | 3 | Technical specifications of electrical machines | EEP 604 | 4 |
| 3 | 300 | 210 | -- | 90 | 3 | Advanced study in electrical machines | EEP 605 | 5 |
| 3 | 300 | 210 | -- | 90 | 3 | Transient performance of electrical machines | EEP 606 | 6 |
| 3 | 300 | 210 | -- | 90 | 3 | Electromagnetic interference in electrical drive systems | EEP 607 | 7 |
| 3 | 300 | 210 | -- | 90 | 3 | Methods of testing electrical machines | EEP 608 | 8 |
| 3 | 300 | 210 | -- | 90 | 3 | Advanced study in electrical drive systems (2)\* | EEP 609 | 9 |
| 3 | 300 | 210 | -- | 90 | 3 | Advanced study in power electronics | EEP 610 | 10 |

(1) The student should choose 6 credit hours.

\* Can be chosen only after passing (EEP601).

* To join this program the student should complete 12 credit hours of preparatory courses with a grade point average not less than (C+). Alternatively, the student may join this program if he/she holds a postgraduate diploma grade point average not less than (C+).
* Total number of required credit hours is 18 hours. The studied subjects should have a code 600. The student should also complete a master thesis (18 credit hours).
* The student should score at least 500 in the TOEFEL exam or equivalent certificate before commencing work on the thesis.
* At the start of work in the thesis the student should register at least 6 credit hours in the study semester (subject name: Thesis preparation). The thesis preparation should be carried over at least 2 study semesters.

**6. Program Admission Requirements:**

1. The student should hold a (good) grade in the undergraduate B.sc. degree from Egyptian universities or faculties and foreign universities recognized by the Supreme Council of Universities, to join the Master’s program.
2. Alternatively, the student may join the Masters program if he/she holds a postgraduate Diploma with an average GPA with an estimate (C+) at least.

Further details of the admission criteria are outlined in the internal postgraduate prospectus for the Faculty of Engineering at Shoubra, issued 2012.

**7. Regulation for Progression and Program Completion:**

1. Student can enroll to study Master of Engineering Science, if he obtained an estimate of a good at least in undergraduate or equivalent in the credit hour system (with no more 10 years from graduation) and completed a preliminary study with at least an average points of (C+) or after receiving a Graduate Diploma with at least average points of (C+).
2. Student's applicants to the Master of Engineering Science degree in Engineering Mathematics and Engineering Physics must complete preliminary studies with at least average cumulative points of (C) and pass the preparatory study with average points of (C+) at least.
3. The student at Preliminary stage study 12 credit hours at least distributed as follows:
   1. 6 credit hours from the main courses of table (6).
   2. 6 credit hours completed by the student from table (6) or from specialized courses at level 500 available in scientific department or other academic departments.
4. The student at M. SC. stage study 18 credit hours at least from level 600 of available courses in the faculty curriculum (according to his specialty).
5. Before starting the preparation of a Master thesis it is required for the student to certificate TOEFEL in English with a minimum of 500 points or equivalent certificates recognized in English language.
6. At the beginning of the preparation of the scientific thesis the student must register credit hours under the name (follow-up master's thesis) with a minimum of six credit hours per semester for at least two semesters.
7. The student prepares a scientific thesis which scored as 18 credit hours.
8. The student cannot discuss his thesis before passing all courses successfully and with average cumulative points of (C) at least.
9. Required for the formation of the judging and discussion panel of MSc thesis that the researcher published a one scientific paper at least in a specialized scientific journal or a scientific conference. Paper must extract from the Master's thesis and provides a statement of publishing or acceptance for publication.
10. The grades of the successful student in a course and in the general grade are evaluated as follows:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Points | Estimate | Percentage Obtained by student | Equivalent degrees range | | | | |
| 4.00 | A | 94% - 100% |  |  |  |  |  |
| 3.70 | A- | 90% - 93% | - | 90 | 91 | 92 | 93 |
| 3.30 | B+ | 85% - 89% | 85 | 86 | 87 | 88 | 89 |
| 3.00 | B | 80% - 84% | 80 | 81 | 82 | 83 | 84 |
| 2.70 | B- | 76% - 79% | - | 76 | 77 | 78 | 79 |
| 2.30 | C+ | 73% - 75% | - | 73 | 74 | 75 | - |
| 2.00 | C | 70% - 72% | - | 70 | 71 | 72 | - |
| 1.70 | C- | 67% - 69% | - | 67 | 68 | 69 | - |
| 1.30 | D+ | 64% - 66% | - | 64 | 65 | 66 | - |
| 1 | D | 60% - 63% | - | 60 | 61 | 62 | 63 |
| 0 | F | Less than 60% |  |  |  |  |  |

**8. English Language Requirement:**

The English language proficiency of all students shall be tested in accordance with the university requirements.

**9. Role of External Examiner**

External examiners (from other universities and research institutes) are nominated by the main supervisor of the student and approved by the department. Their duties include revising the final manuscript of the student dissertation or thesis and indicating if the reported work is up to the standard. Subsequently a viva-voce examination is held where the examiner get the opportunity to question the student regarding his work**.**

1. **Support for Students and their Learning:**
   1. The Council of Scientific department nominates an academic advisor for each student at the start of the study and continues with him until the end of the study of diploma and a master's degree in engineering.
   2. The main supervisor replaces academic advisor in the state of progress of the recording to study of Master of Engineering Science or PhD.
   3. The postgraduate office staff-help the students with any inquiries regarding faculty regulations related to postgraduate programs.
   4. An open door policy is exercised whereby students can inform head of department of any complaints or requests either verbally or in writing.
   5. After completing the courses each student is assigned with a panel of supervisors (either faculty members or members of other faculties) to help the student with undertaking the research work.
2. **Assessment Methods of Program Intended Learning Outcomes:**

|  |  |
| --- | --- |
| Assessment Method | Intended Learning Outcomes |
| 1. Assignments | Knowledge and understanding, Intellectual skills, Professional and Practical Skills. |
| 1. Quizzes | Knowledge and understanding, Intellectual skills |
| 1. Oral discussions | Knowledge and understanding, Professional and Practical Skills, General and transferable skills. |
| 1. Reports | Knowledge and understanding, Intellectual skills, Intellectual skills, General and transferable skills. |
| 1. Written examinations | Knowledge and understanding, Intellectual skills |
| 1. Project write-up | Intellectual skills, Intellectual skills, Professional and Practical Skills, |
| 1. Presentations | Intellectual skills, Professional and Practical Skills, General and transferable skills |
| 1. Laboratory excremental write-up | Professional and Practical Skills. |
| 1. Seminars | General and transferable skills. |
| 1. Work-shop | General and transferable skills. |

1. **Program Assessment methods**

|  |  |  |
| --- | --- | --- |
| Evaluator | Tool | Sample |
| 1-Senior students | Questionnaire | 50 % |
| 2-Alumni | Questionnaire & online assessment | 5% |
| 3-Stakeholders ( Employers) | Questionnaire & interview | 5 |
| 4-External Evaluator(s) (External Examiner(s)) | Report | 2 |

1. **Courses versus Program ILOs matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Knowledge & Understanding** | | | | | | **Intellectual Skills** | | | | | | | **Professional Skills** | | | **General and Transferable Skills** | | | | | | | |
| **2.1.1** | **2.1.2** | **2.1.3** | **2.1.4** | **2.1.5** | **2.1.6** | **2.2.1** | **2.2.2** | **2.2.3** | **2.2.4** | **2.2.5** | **2.2.6** | **2.2.7** | **2.3.1** | **2.3.2** | **2.3.3** | **2.4.1** | **2.4.2** | **2.4.3** | **2.4.4** | **2.4.5** | **2.4.6** | **2.4.7** | **2.4.8** |
| **EEP601** | ✓ | ✓ | ✓ | ✓ |  | ✓ |  | ✓ | ✓ |  |  | ✓ |  | ✓ |  |  |  | ✓ | ✓ | ✓ |  |  |  | ✓ |
| **EEP602** | ✓ | ✓ | ✓ |  | ✓ |  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  |  | ✓ | ✓ | ✓ |  |  | ✓ | ✓ | ✓ | ✓ |  |
| **EEP603** | ✓ |  | ✓ | ✓ |  | ✓ | ✓ | ✓ | ✓ | ✓ |  |  | ✓ | ✓ | ✓ | ✓ | ✓ |  |  |  | ✓ | ✓ | ✓ |  |
| **EEP604** |  | ✓ | ✓ | ✓ |  | ✓ | ✓ | ✓ | ✓ | ✓ |  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  |  | ✓ | ✓ | ✓ | ✓ |  |
| **EEP605** |  |  | ✓ |  |  |  |  | ✓ | ✓ |  |  | ✓ |  |  |  |  |  | ✓ | ✓ | ✓ |  |  |  | ✓ |
| **EEP606** |  | ✓ |  |  | ✓ |  | ✓ | ✓ | ✓ |  | ✓ |  |  |  | ✓ | ✓ |  |  |  |  |  |  |  |  |
| **EEP607** |  | ✓ |  |  | ✓ |  |  | ✓ |  |  | ✓ |  | ✓ |  |  |  |  |  |  |  |  |  | ✓ |  |
| **EEP608** |  |  |  |  |  |  |  |  |  | ✓ |  |  |  |  | ✓ |  | ✓ |  |  |  | ✓ | ✓ | ✓ |  |
| **EEP609** | ✓ |  | ✓ |  |  | ✓ |  | ✓ | ✓ |  |  | ✓ |  | ✓ |  |  |  | ✓ | ✓ | ✓ |  |  |  | ✓ |
| **EEP610** | ✓ | ✓ | ✓ |  | ✓ |  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  |  | ✓ | ✓ | ✓ |  |  | ✓ | ✓ | ✓ | ✓ |  |
| **EEP611** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

1. **Matrix of Program aims versus Program ILOs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Program Aims** | **Program ILOs** | | | |
| **Knowledge and understanding** | **Intellectual skills** | **Professional and Practical Skills** | **General and transferable skills** |
|  | √ |  |  |  |
|  |  | √ |  |  |
|  | √ |  |  |  |
|  |  |  | √ |  |
|  |  |  | √ |  |
|  |  |  | √ | √ |
|  |  |  |  | √ |
|  |  |  | √ | √ |
|  |  |  | √ |  |
|  |  |  | √ | √ |
|  |  |  |  | √ |
|  |  |  |  | √ |

1. **Matrix of Program aims versus NAQAAE student attributes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Program**  **Aims** | **Students’ attributes as per NAQAAE** | | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  | √ |  |  |  |  |  |  |  |  |  |  |  |
|  |  | √ |  |  |  |  |  |  |  |  |  |  |
|  |  |  | √ |  |  |  |  |  |  |  |  |  |
|  |  |  |  | √ |  |  |  |  |  |  |  |  |
|  |  |  |  |  | √ |  |  |  |  |  |  |  |
|  |  |  |  |  |  | √ |  |  |  |  |  |  |
|  |  |  |  |  |  |  | √ |  |  |  |  |  |
|  |  |  |  |  |  |  |  | √ |  |  |  |  |
|  |  |  |  |  |  |  |  |  | √ |  |  |  |
|  |  |  |  |  |  |  |  |  |  | √ |  |  |
|  |  |  |  |  |  |  |  |  |  |  | √ |  |
|  |  |  |  |  |  |  |  |  |  |  |  | √ |

1. **Matrix of program aims and mission of Faculty of Engineering at Shoubra**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Program aims** | **Mission of Faculty of Engineering at Shoubra** | | | |
| **Learning mission** | **Postgraduate and research mission** | **Society and environmental affairs mission** | **Ethics** |
| 1 |  | **√** |  |  |
| 2 | **√** |  |  |  |
| 3 | **√** |  |  |  |
| 4 | **√** |  |  |  |
| 5 | **√** |  |  |  |
| 6 | **√** | **√** |  |  |
| 7 |  |  | **√** |  |
| 8 | **√** | **√** |  |  |
| 9 |  |  | **√** |  |
| 10 |  |  | **√** |  |
| 11 |  |  |  | **√** |
| 12 |  | **√** |  |  |

**Head of Department:** Prof. Dr. Sayed A. Ward