**University: Benha University**

**Faculty: Faculty of Engineering at Shoubra**

**Department: Electrical Engineering Department**

**Program Specification for Master of Science**

**in Electronics**

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| **Introduction:**  This Program specification provides a concise summary of the mainfeatures of the MSc. In Electronics 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. in Electronics**
5. **Program Title: M.Sc. in Electronics**
6. **Name of Department: Electrical Engineering**
7. **Coordinator: Associate Prof. Mohamed Tarek Elewa**
8. **Language of study: English**
9. **Date of production of Program Specification : 2014-2015**
10. **Relevant Benchmarks: Standards for Graduate Programs SGP NAQAAE (for master degree programs), August 2009.**

**B: Professional Information**

1. **Program Mission and Aims**

**1.1Program Mission**

* To gain advanced Knowledge and understanding of specialized topics in Electronics Engineering.

**1.2 Program Aims:**

1. 1- To appreciate the value of scientific research as a tool for gathering information and developing techniques
2. To adopt an analytical style when facing problems and formulating solutions
3. To implement his acquired knowledge in his field of interest
4. To become aware with the problems and limitations of his discipline and find a way to combat them
5. To be able to troubleshoot problems and develop proper solutions for them
6. To acquire a diverse arsenal of technological tools and skills
7. To acquire effective communication and leadership traits
8. To excel in decision making in various professional situations
9. To exhibit great wisdom in resource acquisition and distribution in a manner that insures sustainabilitys

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

The National Academic Reference Standards (NARS) which have been issued in March 2009, are adopted and listed as followed:

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

**2.1- (A) Knowledge and Understanding**

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| **Program ILO’s** | **Teaching / learning methods and strategies** |
| a.1 Identify theories and fundamentals in the area of Electronics Engineering as well as in related disciplines.  a.2 Identify specialized knowledge in the area of Electronics Engineering as well as in related disciplines.  a.3 Describe the two way impact of the relationship between professional practice and its effect on the environment.  a.4 Outline the scientific developments in the area of Electronics Engineering.  a.5 Summarize the moral and legal principles of professional practice in the area of Electronics Engineering.  a.6 List the principles and fundamentals of quality in professional practice related to the area of Electronics Engineering.  a.7 Define the basics and the ethics of scientific research. | * Lectures * Seminars * Tutorials * Directed reading * Project work * Independent study. |
| **Assessment** | * Individual coursework * Assignments * Quizzes * Oral discussions * Reports * Final written examinations |

**2-2. (B) Intellectual Skills**

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| **Program ILO’s** | **Teaching / learning methods and strategies** |
| b.1 Analyze and assess information in the field of specialization.  b.2 Draw analogies to solve problems.  b.3 Solve problems in spite of the lack of some data.  b.4 Link different knowledge sources to solve problems.  b.5 Conduct a research study about a research problem.  b.6 Write a scientific essay about a research problem.  b.7 Assess risks in professional practices in.  b.8 Plan for performance development in the area of Electronics Engineering.  b.9 Make professional decisions in various professional contexts. | * Tutorial/problem sheets * Small group exercises. * Thesis preparation. |
| **Assessment** | * Oral and written examinations. * project write-ups, coursework and project reports * Presentations * Thesis. |

**2-3. (c) Professional and Practical Skills**

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| **Program ILO’s** | **Teaching / learning methods and strategies** |
| c.1 Master basic professional and modern skills in the area of specialization.  c.2 Write professional reports.  c.3 Evaluate professional reports.  c.4 Assess methods and current tools in the area of Electronics Engineering. | * Experiments * Demonstrations * Practical work * Laboratory visits * Thesis. |
| **Assessment** | * Laboratory experimentalwrite-ups * Coursework exercises reports * Project reports * Presentations * The methodology demonstrated in the work for the thesis. |

**2-4. (D) General and Transferable Skills**

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| **Transferable skills** | **Teaching / learning methods and strategies** |
| d.1 Communicate effectively using different means.  d.2 Use information technology in order to serve the development of professional practice.  d.3 Assess him/her self and identify his/her own personal learning needs.  d.4 Use different sources for obtaining information and knowledge.  d.5 Set basis and standards to assess the performance of others.  d.6 Work in a group and Lead a team in familiar professional contexts  d.7 Manage time effectively.  d.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**

**3 a- 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**

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| --- | --- | --- | --- |
|  | **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** |
|  | 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. | **a1, a2, a3**  **a4** |
|  | 1.2 Apply the analytic approach and use it in the area of Electronics Engineering. | 1.2 Apply the analytic approach and use it in the area of specialization. | **b1, b2**  **c1** |
|  | 1. 3 Apply specialized knowledge and combine it with relevant knowledge related to Electronics Engineering. | 1. 3 Apply specialized knowledge and combine it with relevant knowledge related to professional practice. | **a5, a6**  **b3, b4, b5, b6, b7**  **b8, b9, b10**  **c4, c5** |
|  | 1. 4 Show an awareness of current problems and modern perspectives in the area of Electronics Engineering. | 1. 4 Show an awareness of current problems and modern perspectives in the area of specialization. | **b3, b4, b5, b6, b7**  **c1, c4, c5** |
|  | 1.5 Specify professional problems and find solutions for them. | 1.5 Specify professional problems and find solutions for them. | **b3, b4**  **c4, c5** |
|  | 1.6 Showdistinction in a proper range of specialized professional skills and use of appropriate technological means to serve his professional practice. | 1.6 Showdistinction in a proper range of specialized professional skills and use of appropriate technological means to serve his professional practice. | **b7, b8**  **c1 , c4, c5** |
|  | 1. 7 Communicate effectively and demonstrate ability to lead teams. | 1. 7 Communicate effectively and demonstrate ability to lead teams. | **d1, d2, d3, d4**  **d7, d8, d9** |
|  | 1. 8 Make decisions in various professional contexts. | 1. 8 Make decisions in various professional contexts. | **b8, b10**  **c2**  **d6** |
|  | 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. | **b2, b4, c1, c4** |
|  | 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. | **b7, b9**  **d1, d2** |
|  | 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. | **d1, d7** |
|  | 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. | **b5, b9**  **c2**  **d5, d6** |

1. **Program Structure and Award Requirements**
2. **4-a- Program duration:** Three semesters
3. **4-b- Program structure:**

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| **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 |

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

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

**5-Program Structure and Award Requirements**

1. **Curriculum**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **(CommonPreliminarycourses delivered by staffmembers from outside the department)** | | | | | | | | | | |
| **Test Time** | **Grades** | | | | **Credit Hours** | **Pre-requisite** | **Course Name** | **Course Code** | **Serial** | |
| **Total** | **Written Exam** | **Oral or Practical** | **Course Work** |
| **Compulsory Courses** | | | | | | | | | | |
| 3 | 300 | 210 | - | 90 | 3 |  | Advanced programming | ENG505 | 1 | |
| 3 | 300 | 210 | - | 90 | 3 |  | Engineering communication skills | ENG\*\*\* | 2 | |
| **Elective Courses** | | | | | | | | | | |
| 3 | 300 | 210 | - | 90 | 3 |  | Advanced engineering mathematics | ENG501 | 1 | |
| 3 | 300 | 210 | - | 90 | 3 |  | Engineering mathematical methods | ENG502 | 2 | |
| 3 | 300 | 210 | - | 90 | 3 |  | Engineering trial methods | ENG503 | 3 | |
| 3 | 300 | 210 | - | 90 | 3 |  | Analysis and design engineering systems | ENG504 | 4 | |
| 3 | 300 | 210 | - | 90 | 3 |  | Statistics and probabilities | ENG506 | 5 | |

* Students holding B.sc in Electrical Engineering from Egyptian Universities or a degree accredited by the Egyptian Supreme Council of Universities, who scored at least good, are admitted to this program.
* Number of required credit hours are 12. Six credit hours are to be selected from Table 6 and the remainder are selected from either Table 6 or from subjects with a code 500 offered by the department or related departments.
* To join the postgraduate studies Diploma the student should complete a minimum of 9 credit hours of preparatory courses with a grade point average not less than (C+).
* To join the M.Sc. Program, the student should complete 12 credit hours of preparatory courses with a grade point average not less than (C+).

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| **Specialized Courses:** | | | | | | | | | |
| **Test Time** | **Grades** | | | | **Credit Hours** | **Pre-requisite** | **Course Name** | **Course Code** | **Serial** |
| **Total** | **Written Exam** | **Oral or Practical** | **Course Work** |
| **Compulsory Courses** | | | | | | | | | |
| 3 | 300 | 210 | - | 90 | 3 | ENG506 | Active Circuits | CME601 | 1 |
| 3 | 300 | 210 | - | 90 | 3 | ENG506 | Digital Electronics | CME602 | 2 |
| 3 | 300 | 210 | - | 90 | 3 | ENG501 | Robotic Engineering | CME603 | 3 |
| **Elective Courses** | | | | | | | | | |
| 3 | 300 | 210 | - | 90 | 3 |  | Electronic Devices | CME604 | 1 |
| 3 | 300 | 210 | - | 90 | 3 | ENG506 | Distributed Networks | CME605 | 2 |
| 3 | 300 | 210 | - | 90 | 3 | ENG501 | Computer Aided Design | CME606 | 3 |
| 3 | 300 | 210 | - | 90 | 3 |  | Sonic and Ultrasonic Engineering | CME607 | 4 |

**6-Program Admission Requirements:**

1. Student can enroll to M. Eng., if the time from bachelor's degree less than 10 years or equivalent in credit hours system, and excluded from this requirement whose obtaining higher specialist diploma with an estimate (C+) at least.
2. Student can enroll to study Master of Engineering with condition of receiving an estimate of good at least in undergraduate or equivalent in credit hours system and completed a preliminary study with average points of (C+) at least or after receiving a Graduate Diploma with average points of (C+) at least.
3. The student at this stage study 18 credit hours from level 600 of courses available in the faculty curriculum (according to his specialty). And this may include some courses hours of level 500 which has never studied with a maximum of 6 credit hours after the approval of the department and the adoption of the faculty board.
4. A student is granted a master's degree in engineering after he has been successfully completed the study requirements with an average of at least (C).
5. This degree is a terminated stage, and does not allow for progress holders to enroll for the degree of Doctor of Philosophy in Engineering Sciences.

**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 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% |  |  |  |  |  |

**2. Criteria for Admission:**

The student should hold a (good) grade in the undergraduate B.Sc. degree to join the Masters program. Alternatively, the student may join the Masters program if he/she holds a postgraduate Diploma. Further details of the admission criteria are outlined in the internal postgraduate prospectus for the Faculty of Engineering at Shoubra.

**3. Regulation for Progression and Program Completion**

Different rules pertaining to the progression and completion of the degrees are outlined in the internal postgraduate prospectus for the Faculty of Engineering at Shoubra.

**4. English Language Requirement:**

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

**5. 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:**

* The postgraduate office staff-help the students with any inquiries regarding faculty regulations related to postgraduate programs.
* An open door policy is exercised whereby students can inform head of department of any complaints or requests either verbally or in writing.
* 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

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| **Course Code** | **Knowledge & Understanding** | | | | | | | **Intellectual Skills** | | | | | | | | | **Professional Skills** | | | | **General and Transferable Skills** | | | | | | | |
|  | **a.1** | **a.2** | **a.3** | **a.4** | **a.5** | **a.6** | **a.7** | **b.1** | **b.2** | **b.3** | **b.4** | **b.5** | **b.6** | **b.7** | **b.8** | **b.9** | **c.1** | **c.2** | **c.3** | **c.4** | **d.1** | **d.2** | **d.3** | **d.4** | **d.5** | **d.6** | **d.7** | **d.8** |
| CME601 | X | X |  | X |  |  | X | X | X |  |  |  |  |  | X |  |  | X | X | X |  |  | X | X |  |  |  | X |
| CME602 | X | X | X | X |  | X |  | X | X |  |  |  |  |  | X |  |  | X | X | X |  | X | X | X |  |  |  | X |
| CME603 | X | X |  |  |  |  |  |  |  | X | X |  |  |  |  |  | X |  |  |  |  |  |  | X |  |  |  |  |
| CME604 | X | X |  | X |  |  |  | X |  |  |  |  |  |  | X |  |  | X | X | X |  |  | X | X |  |  |  | X |
| CME605 | X | X |  | X |  |  |  | X | X |  |  |  |  |  | X |  |  | X | X | X |  |  | X | X |  |  |  | X |
| CME606 | X |  | X |  |  | X |  |  |  | X |  |  |  | X |  |  | X | X |  |  |  | X |  | X | X |  |  |  |
| CME607 | X | X |  | X |  |  |  | X | X |  |  |  |  |  | X |  |  | X | X | X |  |  | X | X |  |  |  | X |

**\* Matrix of Program aims versus Program ILOs**

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

**\*Matrix of Program aims versus NAQAAE student attributes:**

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

\***Matrix of program aims and mission of Faculty of Engineering at Shoubra:**

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| --- | --- | --- | --- | --- |
| **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 |  |  | **√** |  |