**University:** Benha University

**Faculty:** Faculty of Engineering at Shoubra

**Department:** Electrical Engineering Department

**Program Specification for Doctor of Philosophy**

**In Communications**

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| **Introduction:**  This Program specification provides a concise summary of the mainfeatures of the Ph.D. in Communications 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 : Ph.D. in Communications**
5. **Program Title: M.Sc. in Electrical Communications**
6. **Name of Department: Electrical Engineering**
7. **Coordinator: Associate Prof. Mohamed Lotfi Rabeh**
8. **External evaluator: Prof. Dr. Abdel MaksoudTaalab**
9. **Date of production of Program Specification : Jan./june 2015**
10. **Relevant Benchmarks: Standards for Graduate Programs SGP NAQAAE (for PhD 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 Electrical Communications.
* To increase the students capabilities to face the challenging careers.

**1.2 Program Aims:**

In pursuit of this mission, the educational objectives of the PhD. Program in Communications are develop the students’ research skills and techniques and support students’ personal effectiveness in order to be able to:

* + - 1. To gain knowledge and mastering research techniques in the domain of electrical communications, including major topics in modern communications engineering such as: Information theory, digital Communications, Antennas, Optical fibers, Radar and Microwaves.
      2. Empower the student with the skills of Communications engineering
      3. Acquire an analytical and critical background in the Communicationsengineering and related disciplines
      4. .Analyze critically and evaluate one's findings and those of others.
      5. Express a deep concern regarding modern issues and theories in Communicationsengineering.
      6. Justify the principles and experimental techniques used in one's own research and develop innovative solutions for them
      7. Create and innovate.
      8. Acquire a varied set of professional and technical skills in their disciplines
      9. Utilize the modern technological tools available in their professional practice
      10. Develop communication and leadership skills required for their professional conduct
      11. Making effective decisions based on the available information
      12. . Develop an awareness of what transpires in the community and preserve the environment
      13. Identify and access appropriate bibliographical resources, archives, and other sources of relevant information. Use information technology appropriately for database management, recording and presenting information.
      14. Act in a professional, respectable, truthful and ethical manner
      15. Adhere to a culture of self-improvement and pass on his expertise and knowledge to his colleagues

**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- 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 study.  **a.2** Identify specialized knowledge in the area of study 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 Electrical communications.  **a.5** Summarize the moral and legal principles of professional practice in the area of Electrical communications.  **a.6** List the principles and fundamentals of quality in professional practice related to the area of Electrical communications.  **a.7** Define the basics and the ethics of scientific research. | * Lectures, * Seminars, * Tutorials, * Directed reading, * Project work, and * Independent study. |
| **Assessment** | * Individual coursework, * Assignments, * Quizzes, * Oral discussions, * Reports, and * Final written examinations. |

**2-2. 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 Electrical communications.  **b.9** 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:**

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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 Electrical communications. | * 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:**

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| **Program ILO’s** | **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. |

**Academic Standards**

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

Reference Standards for PhD 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 Ph.D. program -University of Nevada – Las Vegas** | **Attributes of program graduates as per NAQAAE Requirements for PhD programs, in general** | **Corresponding ILO's in Current Program which satisfy the NAQAAE Requirements for PhD programs, in general** |
|  | 1.1 Demonstrate a strong technical knowledge in electrical engineering field by successfully completing course work. | 1.1 Master the application of the fundamentals and methodologies of scientific research and use its different tools. | **a.1**  **b.1** |
|  | 1.2 passing a qualifying exam and a comprehensive exam. | 1.2 Apply the analytic approach and use it in the area of specialization. | **a.1**  **a.2** |
|  | 1. 3 integrating knowledge learned in this course work into a dissertation. | 1. 3 Apply specialized knowledge and combine it with relevant knowledge related to professional practice. | **a.2**  **a.3**  **a.4**  **a.5**  **a.6**  **a.7**  **b.1**  **b.2** |
|  | 1. 4 Demonstrate the ability to learn independently. | 1. 4 Show an awareness of current problems and modern perspectives in the area of specialization. | **c.1**  **d.1** |
|  | 1.5 generates new knowledge by completing creative novel work. | 1.5 Specify professional problems and find solutions for them. | **b.2**  **b.3**  **b.4**  **b.5**  **b.6**  **b.7**  **b.8**  **c.1**  **d.1** |
|  | 1.6 reporting on this work in a dissertation which should include:  •A hypothesis (or hypotheses)  •A set of objectives and goals  •A critical literature review  •A theoretical, experimental and/or modelling study  •A conclusion. | 1.6 Showdistinction in a proper range of specialized professional skills and use of appropriate technological means to serve his professional practice. | **d.1**  **d.2**  **d.3**  **d.4**  **d.5**  **d.6**  **d.7**  **d.8** |
|  | 1. 7 Demonstrate the ability to communicate technical information both orally and in writing at an acceptable level of proficiency. | 1. 7 Communicate effectively and demonstrate ability to lead teams. | **c.2**  **c.3**  **c.4**  **d.1**  **d.2** |
|  | 1. 8 completing a well written dissertation. | 1. 8 Make decisions in various professional contexts. | **b.1**  **b.2** |
|  | 1.9 presenting the work in a dissertation during an oral dissertation exam. | 1.9 Utilize available resources to maximize their benefit and keep resources maintained. | **b.1**  **d.1** |

**4. Curriculum structure and contents**

**4-a- Program duration:** 12 credit hour courses study followed by a dissertation of 30 hours.

**4-b- Program structures**

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| --- | --- | --- | --- |
| **4.b.(i)** | **No. of Contact hours per week** | | |
| **Lectures** | **Lab./Exercise** | **total** |
| 12 | 0 | 12 |

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| --- | --- | --- |
| **4.b.(ii)** | **No. of credit hours** | |
| **Compulsory** | **Elective** |
| 0 | 12 |

|  |  |  |
| --- | --- | --- |
| **4.c.(iii)** | **Program Credit hours/Level** | |
| **Level 1** | **Dissertation** |
| 12 | 30 |

**4-c - Program Courses:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Time** | **Grades** | | | | **Credit Hours** | **Pre-requisit** | **Course Name** | **Course Code** | **Serial** |
| **Total** | **Written Exam** | **Oral or Practical** | **Course Work** |
| **Compulsory Courses** | | | | | | | | | |
| 3 | 300 | 210 | - | 90 | 3 | ENG506 | Statistical signal processing | CME701 | 1 |
| 3 | 300 | 210 | - | 90 | 3 | ENG506 | Soft Computing | CME702 | 2 |
| 3 | 300 | 210 | - | 90 | 3 |  | Power line carrier Communication | CME705 | 3 |
| 3 | 300 | 210 | - | 90 | 3 |  | Selected topics in advanced communications | CME706 | 4 |
|  | - | - | - | - | 36 |  | Doctoral thesis |  | 5 |

* To join this program, the student should have a master of science and also pass the comprehensive exam.
* The student should score at least 500 in the TOEFL exam before registration for the degree.
* Total number of required credit hours is 12 hours from level 700 or code 700 from the subjects offered by the department and not studied before by the student. The student should also complete a PhD thesis (36 credit hours).
* The student should acquire an average not less than (C) in the courses to discuss 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 4 study semesters.

**4-d- P.HD. Program Admission Requirements:**

Required to enroll in PhD program that a student has a master's degree in engineering sciences from Egyptian universities or equivalent degree from the Supreme Council of Universities in the same engineering specialty that he want to study with an estimate of (C+) at least.

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

**6 - a – Qualifying Exam**

1) The PhD student must pass a qualifying exam and not allowed to study PhD courses except after his success in this exam. This exam is equivalent to 6 credit hours.

2) The department council identifies a committee from five members of professors and are chosen of varied disciplines in the major domain of the search point of the student with at least two of them from another university. The oldest professor be the committee chairman.

3) Committee will meet at the invitation of its chairman to determine the topics of the student exam and it must include the basic disciplines on the public field, and a level suitable with a doctoral degree.

4) The student submits a request for the written exam and the committee determines the date and the time required for it.

5) After the written exam the committee determines the date of the oral exam in the presence of all its members to discuss the student in the specialty. At the end of the session, the Commission declare the success or failure of the student in this test.

6) Students can reapply the qualifying exam by the same committee, after the payment of registration fees for this stage again

**6 - b - Ph.D. Courses**

1) Enroll in this stage who's completed successfully the qualifying.

2) Required prior to registration of the courses of this stage to get a certificate of TOEFEL in English with a minimum of 500 points or equivalent certificates recognized in the English language.

3) Required prior to registration of the Courses to get an ICDL certificate in the computer.

4) The student at this stage study 12 credit hours at least from level 700 or 600 courses available in scientific specialization that the student has never studied.

5) The student must achieve in PhD courses average points of (C) at least.

6) 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% |  |  |  |  |  |

**6 - c - preparing of doctoral thesis**

1) At the beginning of the preparation of the scientific thesis the student register credit hours under the name of (follow-up doctoral thesis) with a minimum of 6 credit hours per semester for four semesters at least.

2) The student prepares a scientific thesis calculated as 30 credit hours.

**6 – d - Studying Duration:**

1) The minimum duration of the study for a Ph.D. is 6 semesters not including the summer semester.

2) The maximum duration of the study for the degree of Doctor of Philosophy is 12 semesters not including summer semester from the date of success in the qualifying exam. It includes study of doctoral courses and preparation of a thesis.

3) The maximum duration limit of PhD can be extended for two semesters not including the summer semester according to the report of the main supervisor (supervisory committee) and the approval of the Department Council and the adoption of the faculty Board

1. **Study Program**

**6. 1. Supervisory Panel**

The student is assigned a supervisory panel as soon as he joins the program. The supervisory panel should have at least one member of the department (professor or assistant professor) and may have up to four members in total either from the department or from other Egyptian or International Universities approved by the supreme council of universities.

**6. 2. Study Plan**

The study plan of the student is drawn up by the supervisory panel. The title of study should be approved by the department. The study should contribute to the current knowledge in the area of specialization. The title of the study may be changed once during the course of the program.

**6. 3. Comprehensive Exam**

The student should sit for a comprehensive exam given by a panel of professors or assistant professors, who specialize in the general area of the students’ research topic. The panel should include the main supervisor and half of its members should be from other faculties. The exam should include a written section, equivalent to four credit hours, and an oral section to examine the general skills of the student, which is equivalent to one credit hour. The student can re-sit the comprehensive exam only once if he/she fails. Further details about the comprehensive exam can be found in the internal postgraduate prospectus for the Faculty of Engineering at Shoubra, issued 2012.

1. **Thesis Preparation**

The student should undertake a research project leading to the preparation of a thesis having the previously agreed title. The thesis should be presented having a format in accordance with the faculty requirements. The thesis should include the following sections:

Introduction

Literature Review

Experimental and / or analytical program.

Results and discussion

Conclusion and recommendations

References

Upon the completion of thesis and revision by supervisors, an examining panel is set up for the student including an internal and an external examiner.

1. **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, issued 2000-2001 (in Arabic).

The student should choose 6 credit hours at least, from the elective courses

Thesis is prepared as part of the requirement to fulfill the M.Sc. degree. The student should pass all subjects with at least 60% score in order to receive the degree.

**a**) The student should prepare and present an annual seminar to show the progress in his research project. The student is allowed to continue his work only if the departmental panel attending the seminar acknowledges the student progress.

b) The student should publish at least two scientific papers, which can be proven to be acceptable for publication in a local specialized journal or international conference.

c) The student is issued the degree if the thesis is approved by the panel of examiners and the student is able to defend it in a public viva-voce examination.

d) Different rules pertaining to the progression and completion of the degree are outlined in the internal postgraduate prospectus for the Faculty of Engineering at Shoubra, issued 2012.

**9 . English Language Requirement:**

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

**10. 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 studentatthestartofthestudyandcontinueswithhimuntiltheendofthestudy of diplomaandamaster's degreeinengineering.
   2. Themainsupervisorreplacesacademic advisorinthestateofprogressoftherecordingto studyof MasterofEngineeringScienceorPhD.
   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:**

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| 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**

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| 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**

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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** | **c.1** | **c.2** | **c.3** | **c.4** | **d.1** | **d.2** | **d.3** | **d.4** | **d.5** | **d.6** | **d.7** | **d.8** |
| CME701 | x |  |  | x |  |  | x | x |  | x | x |  |  |  |  | x |  |  | x |  | x |  | x |  |  | x | x |
| CME702 | x | x |  |  |  |  |  |  |  | x | x | x |  |  |  | x |  |  |  |  |  |  | x |  |  |  |  |
| CME606 | x | x |  |  |  |  |  | x | x | x |  |  |  |  |  | x | x | x | x | x |  | x |  |  | x | x |  |
| CME705 |  |  | x |  | x | x |  |  |  |  |  |  | x | x | x |  | x | x |  |  |  |  |  | x |  |  |  |
| CME706 | x | x |  |  |  |  |  |  |  | x | x | x |  |  |  | x |  |  |  |  |  |  | x |  |  |  |  |

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

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| Program  Aims | **Students’ Attributes as per NAQAAE** | | | | | | | | | | | | | | |
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1. **Matrix of program aims and mission of Faculty of Engineering at Shoubra**

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| **Program aims** | **Learning mission** | **Postgraduate and research mission** | **Society and environmental affairs mission** | **Ethics** |
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