Faculty of Engineering
Mansoura University

Diploma of Protection of Power Networks

Program Specification

Contents

Electrical Power & Machines Engineering

Diploma of Protection of Power Networks

Program Specification

1. Introduction

1.1 Basic Information

Program Title: Electrical Power & Machines Engineering

Program Type: Single

Department: Electrical Engineering

Coordinator: Prof. Magdi Mohamed Ali Elsaadawi
Assistant Coordinator: Dr. Ebrahim Abdel-Ghaffar Badran

Dates of Program Specification Approval: 17-10 -2010

1.2 Staff Members:

The Electrical Power & Machines Engineering Program is taught by **26** highly qualified staff members. All of them are full time employed. **Appendix 1** shows the staff members' names, resume and the subjects taught by each of them.

1.3 Internal and External Evaluators:

The program was evaluated by external evaluator. His evaluation showed that the program specification agrees with the National Academic Reference Standards, **Appendix 2**.

2. Professional Data

2.1 Preamble

The Department of Electrical Engineering offers a wide selection of graduate courses and activities leading to the degrees of Specialist Diplomas

These programs allow students to choose a program of study suited to their interests, individual needs and talents. The programs are broad in perspective and maintain a balance between scholarly excellence and practical relevance.

The programs are oriented towards strengthening the student's background in the area of their specialization but are so designed as to deepen their understanding in one or more selected areas in electrical engineering. Particular emphasis is placed on developing research potential, fostering and encouraging original research and professional competence in the field of concentration The Department of Electrical Engineering currently offers graduate courses and research activities in a variety of areas that span the full breadth of Electrical Power and Machines.

2.2. Program mission and Aims

2.2.1 Program vision and mission and objectives

Vision:

To be a leading centre of excellence in the generation and application of electrical power and machine knowledge.

Mission

To provide:

(i) top quality education in electrical engineering at postgraduate level;

(ii) top quality applied research in electrical engineering with abundant publications in the best international journals; and

(iii) top quality professional service to industry and local community.

Objectives

The department commits itself to the achievement of objectives within the bounds provided by vision and goals of NARS. Major objectives set for the next five years are:-

- To provide quality education at Post Graduate levels
- To implement professionally accredited academic programs in electrical power and machine by using holistic curriculum through a learning process based on experience.
- To promote faculty as a well known reference centre through learning, research and consultancy activities in electrical power and machine field.
- To Assist in the creation of world class technologies by Egyptian Companies
- To Increase research intensity and become a leading product innovation centre in electrical Engineering area
- To Design optimization of power apparatus and develop energy management systems

2.2.2 Program Aims

The graduate of the postgraduate diploma programs must be able to:

1. Educate engineers to understand protection of power networks as an ordered academic discipline at the post-graduate level by providing them with extensive experience of recent industrial applications and the relevant theoretical background.
2. Provide candidates with a flexible learning environment which will increase access for employees and prepare them for lifelong learning
3. Increase the students skills of analysis, synthesis and evaluation in order to solve problems in the field of protection of power networks.
4. Develop the student's transferable skills (communications, planning, time management, report writing etc.)
5. Increase the pool of qualified engineers in protection of power networks in Egypt as required by the Egyptian power industry
6. Enhance the student's future career prospects
7. Provide a more detailed understanding of the advanced disciplines required by the protection engineer
8. Develop further the skills of communication, group work, analysis, synthesis, -line competencies.

2.3 Intended Learning Outcomes (ILO's)

2.3.1 Knowledge and Understanding

A successful student will have gained and be able to demonstrate:

A1 The student will understand the need for the mathematical representation of sinusoidal electrical quantities and be able to perform power system calculations using vectors, complex numbers and matrices.

A2 The student will have been educated to the best current practice in the core disciplines and the more advanced subjects of protection of power networks so that they have an understanding of the principles of power system protection.

A3 Describe the essential features of instrument transformers used in protection systems.

A4 Describe the essential operating features of specified feeder protection systems.

A5 Describe the essential operating features of specified transformer protection systems.

A6 Describe the essential operating features of specified busbar protection systems

A7 Describe the principles of surge protection as applied to power distribution systems.

A8 An understanding of the issues concerned with the maintenance and operation of power system equipment

A9 A familiarity with the use of a variety of monitoring techniques to assess the condition and maintenance requirements of plant and equipment

2.3.2 Intellectual Skills

On completing the program students should be able to:

B1 Select and apply appropriate methods for modeling and analyzing problems in protection of power networks.
B2 Develop and produce appropriate solutions for protection of power networks problems through the application of knowledge and understanding in power system protection.
B3 Simulate and analyze power systems with different protection schemes
B4 Create power system protection designs through the synthesis of ideas and information from a wide range of relevant sources
B5 Undertake critical appraisal of information from a wide range of sources relevant to the field.
B6 Take technical decisions based upon available information.

2.3.3 Professional Skills

With the completion of the post graduate diploma program, the graduate will be able to:

C1 Use power system analysis software packages to perform network load flow calculations, fault level calculations, suitable earthing arrangements, etc.
C2 Use evaluation and problem solving skills relevant to protection of power networks.
C3 Search for, retrieve and evaluate information from a wide range of relevant sources and be able to summarize and draw appropriate conclusions from that information
C4 Plan, execute and report a detailed research project related to an area of protection of power networks.

2.3.4 General and Transferable Skills

With the completion of the post graduate diploma program, the graduate will be able to:

D1 Communicate effectively in different aspects.
D2 Obtain distance learning, computer literacy and on-line competencies
D3 Adopt self-assessment and specify his personal learning needs and continuous self-learning
D4 Use different resources for information and knowledge.
D5 Collaborate effectively within multidisciplinary team with good time management.
D6 Lead a team in familiar professional contexts.

2.4 Curriculum Structure and Contents

2.4.1 Program Contents:

The program duration is **two** years. The following are the subjects taught during this program.

Year	Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking			
			Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total
First Year	5541	Numerical Analysis and Programming	3			3	3	30		70	100
	5542	Power Engineering and networks	3			3	3	30		70	100
	5543	High voltage Technology	3			3	3	30		70	100
	5544	Protection of power systems I	3			3	3	30		70	100
	First Year Total		12			12		120		280	400
Second Year	5645	Power electronics	3			3	3	30		70	100
	5646	Transients in electrical networks	3			3	3	30		70	100
	5647	Protection of power systems II	3			3	3	30		70	100
	5648	Independent Study	3			3	discussion	50		50	100
	Second Year Total		12			12		140		260	400
	Total		24			24		260		540	800

2.4.2 Curriculum Mapping

Appendix 3 gives the contribution of the individual courses to the program Intended Learning Outcomes in a matrix form. This matrix was developed by the program coordinator, assistant coordinators and professional staff members. The mapping matrix shows that the program courses present balanced contribution to the program ILO's includes also two tables summarizing the program ILO's contributed by the individual courses and the courses contributing to the individual ILO's.

2.4.3 Courses Specifications

The detailed program courses specifications are shown in the Curriculum mapping. These courses specifications were revised and approved on 2010. The contribution of each course to the program ILO's were considered during this revision and illustrated in **Appendix 4**.

3. Program Admission Requirements

1. Graduates of college of engineering (electrical engineering or electrical power and machines engineering or any relevant department) are eligible to join this program.
2. The study period is 2 years for the students who have 2-days per week availability to attend classes.
3. If the student doesn't work and available for classes 4-days per week, he can combine the courses of the 2 years in one year.

4. Regulations for Progression and Program Completion

1. During the study, a minimum of 75% student attendance per course is conditional for taking the final exams in accordance with the faculty rules.
2. The school year work of any course has a weight of 30% from the total points of this course.
3. The "pass" grade of any course is 60%, "good" grade is 70 %, "very good" is 80%, "excellent grade is 90 % all from the total points
4. The student who fails to pass on any course (s) has only one chance on the summer to re-examine on these course.
5. If the total points of all the courses in any year is less than 60% from the maximum point, the student has to re- examine all courses on summer as only one chance.
6. One of the faculty members is assigned for the independent study in which the student is required to prepare report on a research topic and pass an oral examination with 2-staff members from the department.

Appendix 5 gives the details of program progression and grades evaluation.

5. Student Assessment (Methods and rules for student assessment)

Method (tool)	Assessed ILO's
1- Written exam	A, B & C
2- Quizzes and reports	A, B & C
3- Oral exams	A, B & C
4- Practical	A & C
5- Project applied on a practical field problem	A, B, C & D

6. Program Evaluation

Evaluator	Tool
1- Senior students	questionnaire
2- Alumni	questionnaire
3- Stakeholders	questionnaire
4- External Evaluator(s) (External Examiner (s))	report
5- Other societal parties	Non