**Minoufiya University,**

**Faculty of Engineering,**

**Electrical Eng. Dept.,**

**Post Graduate Studies and Research.**

**Course Specification**

**Minoufiya University**

Faculty of Engineering

***Title: Power Electronics***

***Code Symbol: ELE 519***

***Department offering the course: Electrical Eng. Dept***

***Date of specification approval: / /2012***

***A- COURSE IDENTIFICATION AND INFORMATION:***

***B - Professional Information***

***B.1 Course Aims:***

This course aims to study the characteristics of modern semiconductor power

electronic devices for best selection in a given application.Upon completion of this unit,

students will have studied the application and the design of power electronic circuits in the

fields of AC and DC drives with static load.

***B.2 Course Objectives***

**1.** **Know the thyristors characteristics.**

**2.** **Understand the thyristors turn off, power transistors protection.**

**3.** **Understand single-phase and three-phase converters.**

**4.** **Apply DC chopper with static loads.**

**5.** **Apply AC chopper with phase control and period control.**

**6.** **Apply single phase and three phases inverters with static loads.**

**7.** **Design frequency converter with static load.**

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| Field | Programme ILOs that the course  contribute in achieving | Course ILOs |
| Knowledge&  Understanding | A1. Integrate theories, fundamentals and  knowledge    of    electrical    power    in  practice. | a1-1)        Explain        construction,  characteristics,    turn on and turn  off methods for power electronic  devices |
| Intellectual skills | B3. Read and analyze researches and  topics related to the electrical power  specialization. | b3-1) Read and analyze recent  researches in converters, choppers  and inverters |
| Professional and  Practical Skills | C1. Apply the professional engineering  technologies in the field of electrical  power specialization. | c1-1) Apply the professional engin  technology    using    chopper    and  inverter circuits with static load |
|  | D2. Use of information technology to  serve the development of engineering  professional practice. | d2-1) Use the different method for  power    factor    improvement    of  power systems |

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| Field | Academic Reference Standards For Electrical Engineering  Postgraduates (ARSEP-ELE) | | | |
| Knowledge &  Understanding | Intellectual  Skills | Professional  and Practical  Skills | General and  Transferrable  Skills |
| Programme Academic  Standards that the course  contribute in achieving | A1 | B3 | C1 | D2 |

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| Topic  No. | General Topics | Weeks |
| 1st | Single phase and three phases converter | 1-6 |
| 2nd | Power factor improvement | 7-8 |
| 3rd | DC chopper | 9-10 |
| 4th | AC chopper | 11-12 |
| 5th | Single phase and three phases inverter | 13-14 |

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| ***Week***  ***No.*** | ***Sub. Topics*** | ***Total***  ***Hours*** | ***Contact hrs*** | | | ***Course ILOs***  ***Covered (By No.)*** |
| **Lec.** | **Tut.** | **Lab.** |
| *Week-1* | Characteristics of diodes and thyristors | 3 | 3 | - | - | a1-1 |
| *Week-2* | Characteristics of transistors | 3 | 3 | - | - | a1-1 |

***B.4 Course Intended Learning Outcomes (ILOs)***

***B.3 Relationship between the course and the programme***

***B.5 Course Topics.***

***B.6 Course Topics/hours/ILOS***

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| *Week-3* | Turn on and turn off of thyristors | 3 | 3 | - | - | a1-1 |
| *Week-4* | Trun on and turn off of transistors | 3 | 3 | - | - | a1-1 |
| *Week-5* | Single phase converter | 3 | 3 | - | - | b3-1, c1-1 |
| *Week-6* | Three phase converter | 3 | 3 | - | - | b3-1, c1-1 |
| *Week-7* | Power factor improvement of single  phase converter | 3 | 3 | - | - | d2-1 |
| *Week-8* | Power factor improvement of three  phase converter | 3 | 3 | - | - | d2-1 |
| *Week-9* | DC step down chopper | 3 | 3 | - | - | b3-1, c1-1 |
| *Week-*  *10* | DC step up chopper | 3 | 3 | - | - | b3-1, c1-1 |
| *Week-*  *11* | Single phase ac chopper | 3 | 3 | - | - | b3-1, c1-1 |
| *Week-*  *12* | Three phase ac chopper | 3 | 3 | - | - | b3-1, c1-1 |
| *Week-*  *13* | Single phase inverter | 3 | 3 | - | - | b3-1, c1-1 |
| *Week-*  *14* | Three phase inverer | 3 | 3 | - | - | b3-1, c1-1 |
| *Week-*  *15* | Course discussion | 3 | 3 | - | - | c1-1, d2-1 |

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| **Course Intended**  **learning outcomes**  **(ILOs)** | |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Knowledge &**  **understanding** | **a1-1** | **x** |  | **x** |  |  |  |  |  |  |  |  |  |  |
| **Intellectual**  **Skills** | **b3-1** | **x** | **x** | **x** |  | **x** | **x** |  |  | **x** |  |  |  |  |
| **Professional**  **and Practical**  **Skills** | **c1-1** | **x** | **x** | **x** |  | **x** | **x** |  |  | **x** |  |  | **x** |  |
| **General and**  **Transferrable**  **Skills** | **d2-1** | **x** | **x** | **x** |  | **x** | **x** |  |  | **x** |  |  | **x** |  |

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| **Assessment Method** | **Mark** | **Percentage** |
| **Final Examination (*written*)** | **100** | **100%** |
| **Total** | **100** | **100%** |



**B.7*Teaching and Learning Method:***

**Selflearning**

**Presentation**

**andMovies**

**Cooperative**

**Discovering**

**Discussion**

**Modelling**

**Sitevisits**

**Problem**

**solving**

**Brain**

**storming**

**Tutorial**

**Projects**

**Lecture**

**Playing**

**B. 8*Assessments:***

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***Weighting of assessments:***

***B.9 Facilities required for teaching and learning:***

**A. Library Usage:** Students should be encouraged to use library technical resources in the

preparation of reports.

***B.10 List of references:***

1. B.K. Bose,” Modern Power Electronics and AC Drives”, prentice-hall, 2002.

2. Muhammad Rashid, "Power Electronics circuits, devices and applications," book, Third

Edition, Prentice Hall, 2004.

3. Scientific papers using IEEE Transactions on Power Electronics.

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**Course Coordinators:** **Head of Department**

**Prof. Dr. Azza Lashine** **Prof. Dr. Gamal Morsi**

**Dr. Hady Elgendy**

**Date:**