**Minoufiya University,**

**Faculty of Engineering,**

**Electrical Eng. Dept.,**

**Post Graduate Studies and Research.**

**Course Specification**

**Minoufiya University**

Faculty of Engineering

***Title: Electrical Drive***

***Code Symbol: ELE 523***

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

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

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

***B.1 Course Aims:***

***B - Professional Information***

This course aims to prepare students for the processes of design and operation for

electric drive systems, provide the required knowledge for modeling electric motors,

anlayze and study new methods of closed loop control systems for electric drives. Also, to

develop the performance characteristics of different electric drive systems.

***B.2 Course Objectives***

**1.** **Define the components of electric drive system.**

**2.** **Know the characteristics of electric motors applied in electric drives.**

**3.** **Study the different control systems.**

**4.** **Determine the torque/speed characteristics for electric motors and loads.**

**5.** **Apply the suitable drive system for each load.**

**6.** **Evaluate the performance of the electric drive system.**

1/ELE 523

|  |  |  |
| --- | --- | --- |
| Field | Programme ILOs that the coursecontribute in achieving | Course ILOs |
| Knowledge&Understanding | A1. Integrate theories, fundamentalsand knowledge of electrical machinein practice. | a1-1) Integrate machine, powerelectronic, control and load to buildthe electric drive system |
| Intellectual skills | B5. Make career decisions in the lightof available engineering information. | b5-1) Choose the suitable drive systemfor    each    load    according    to    theavailable information |
| Professional andPractical Skills | C1.       Apply       the       professionalengineering technologies inthe      field      of      electricalmachines specialization. | c1-1)     Apply    the    recent    controltechniques     and     power     electronictechnology in the electric drive system |
|  | D2. Use of information technology toserve the development of engineeringprofessional practice. | d2-1) Use of information technologyto improve the performance of electricdrive system |

|  |  |  |
| --- | --- | --- |
| TopicNo. | General Topics | Weeks |
| 1st | Electric drive system | 1 |
| 2nd | Characteristics of Electric Motors Applied in Electric Drives | 2-5 |
| 3rd | Power electronic circuits | 6-8 |
| 4th | Braking methods | 9-10 |
| 5th | Motor power rating | 11-12 |
| 6th | Control for elecrtic drive systems | 13-14 |

|  |  |
| --- | --- |
| Field | Academic Reference Standards For Electrical EngineeringPostgraduates (ARSEP-ELE) |
| Knowledge &Understanding | IntellectualSkills | Professionaland PracticalSkills | General andTransferrableSkills |
| Programme AcademicStandards that the coursecontribute in achieving | A1 | B5 | C1 | D2 |



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

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

2/ELE 523

***B.5 Course Topics.***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Week******No.*** | ***Sub. Topics*** | ***Total******Hours*** | ***Contact hrs*** | ***Course ILOs******Covered (By No.)*** |
| **Lec.** | **Tut.** | **Lab.** |
| *Week-1* | Electric drive system component | 3 | 3 | - | - | a1-1, b5-1, c1-1 |
| *Week-2* | Torque / speed Characteristics of DCand motors | 3 | 3 | - | - | a1-1, b5-1, c1-1 |
| *Week-3* | Control of DC and AC servo motors | 3 | 3 | - | - | a1-1, b5-1, c1-1 |
| *Week-4* | Operation of DC and AC tachgenerators | 3 | 3 | - | - | a1-1, b5-1, c1-1 |
| *Week-5* | Torque / speed characteristics of loads | 3 | 3 | - | - | a1-1, b5-1, c1-1 |
| *Week-6* | Single phase converter | 3 | 3 | - | - | a1-1, b5-1, c1-1 |
| *Week-7* | Three phase converter | 3 | 3 | - | - | a1-1, b5-1, c1-1,d2-1 |
| *Week-8* | Chopper circuits | 3 | 3 | - | - | a1-1, b5-1, c1-1,d2-1 |
| *Week-9* | Braking methods of dc motor | 3 | 3 | - | - | a1-1, b5-1, c1-1,d2-1 |
| *Week-**10* | Braking methods of induction motor | 3 | 3 | - | - | a1-1, b5-1, c1-1,d2-1 |
| *Week-**11* | Select suitable motor | 3 | 3 | - | - | a1-1, b5-1, c1-1,d2-1 |
| *Week-**12* | Motor power rating | 3 | 3 | - | - | a1-1, b5-1, c1-1,d2-1 |
| *Week-**13* | Control methods | 3 | 3 | - | - | a1-1, b5-1, c1-1,d2-1 |
| *Week-**14* | Closed loop drive system control | 3 | 3 | - | - | a1-1, b5-1, c1-1,d2-1 |
| *Week-**15* | Course discussion | 3 | 3 | - | - | c1-1, d2-1 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Intended****learning outcomes****(ILOs)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Knowledge &****understanding** | **a1-1** | **x** |  | **x** |  | **x** | **x** |  |  | **x** |  |  | **x** |  |
| **Intellectual****Skills** | **b5-1** | **x** | **x** | **x** |  | **x** | **x** |  | **x** | **x** |  | **x** |  |  |
| **Professional****and Practical****Skills** | **c1-1** | **x** | **x** | **x** |  | **x** | **x** | **x** |  | **x** |  | **x** | **x** |  |



**Presentation**

**andMovies**

**Selflearning**

**Cooperative**

**Discovering**

**Discussion**

**Modelling**

**Sitevisits**

**Problem**

**solving**

**Brain**

**storming**

**Tutorial**

**Projects**

**Lecture**

**Playing**

***B.6 Course Topics/hours/ILOS***

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

3/ELE 523

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

**General and**

**Transferrable**

**d2-1**     **x**    **x**                  **x**   **x**        **x**

**Skills**

**B. 8 Assessments*:***

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

***Weighting of assessments:***

**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.

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Course Coordinators** **Head of the Department**

**Prof. Dr. Fathy Abdel-kader** **Prof. Dr. Gamal Morsi**

**Dr. Hady Elgendy**

**Date:**