**Minoufiya University,**

**Faculty of Engineering,**

**Electrical Eng. Dept.,**

**Post Graduate Studies and Research.**

**Course Specification**

**Minoufiya University**

Faculty of Engineering

***Title: Control of DC Machines***

***Code Symbol: ELE 524***

***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 study the characteristics of dc motor control system and their

types, teach students the suitable control method for each application. Also, explain

modern closed loop controllers of dc motors.

***B.2 Course Objectives***

**1.** **Explores the types of dc motors, the construction and characteristics for each type.**

**2.** **Derive the mathematical model for each type of dc motors.**

**3.** **Determine the dynamic model for each type of dc motors.**

**4.** **Apply the suitable control method.**

**5.** **Evaluate the performance of the dc control system under modern closed loop controllers**

**of dc motors like PLL controllers.**

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| --- | --- | --- |
| Field | Programme ILOs that the course  contribute in achieving | Course ILOs |
| Knowledge&  Understanding | A4. Understand the moral and legal  principles of professional practice in  engineering. | a4-1) Exlain the principles of  research and work with other. |
| Intellectual skills | B1. Identify and analyze problems in the  area of electrical power specialization  and rank the results according to their  priorities. | b1-1)      Identify      and      analyze  problems of speed and position  control in dc machines |
| Professional and  Practical Skills | C1. Apply the professional engineering  technologies in the field of electrical  machines specialization. | c1-1)            Apply            computer  programmers to solve problems of  electrical machines. |
| General and  Transferrable  Skills | D4.    Use    of    different    sources    for  information knowledge | d4-1) Refer to textbooks, and  databases information in lectures. |
| D7. Self- learning continuously specially  in electrical machines branch. | d7-1) Apply statistical reports and  weekly auctions. |

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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 | A4 | B1 | C1 | D4, D7 |

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| --- | --- | --- |
| Topic  No. | General Topics | Weeks |
| 1st | Characteristics of dc motors | 1-3 |
| 2nd | Mathematical models of dc motors | 4-6 |
| 3rd | Power electronic circuits | 7-8 |
| 4th | Control methos | 9-12 |
| 5th | Speed control of dc motors | 13-14 |

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

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

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***B.5 Course Topics.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Week***  ***No.*** | ***Sub. Topics*** | ***Total***  ***Hours*** | ***Contact hrs*** | | | ***Course ILOs***  ***Covered (By No.)*** |
| **Lec.** | **Tut.** | **Lab.** |
| *Week-1* | Characteristics of separately excited dc  motor | 3 | 3 | - | - | a4-1, b1-1, c1-1 |
| *Week-2* | Characteristics of shunt and series dc  motors | 3 | 3 | - | - | a4-1, b1-1, c1-1 |
| *Week-3* | Characteristics of cumulative compound  dc motor | 3 | 3 | - | - | a4-1, b1-1, c1-1 |
| *Week-4* | Mathematical    model    of     separately  excited dc motor | 3 | 3 | - | - | a4-1, b1-1, c1-1 |
| *Week-5* | Mathematical model of shunt and series  dc motor | 3 | 3 | - | - | a4-1, b1-1, c1-1 |
| *Week-6* | Mathematical model of cumulative  compound dc motor | 3 | 3 | - | - | a4-1, b1-1, c1-1 |
| *Week-7* | Single phase and three phase converters | 3 | 3 | - | - | a4-1, b1-1, c1-1,  d4-1, d7-1 |
| *Week-8* | Chopper circuits | 3 | 3 | - | - | a4-1, b1-1, c1-1,  d4-1, d7-1 |
| *Week-9* | Basic types of controllers | 3 | 3 | - | - | a4-1, b1-1, c1-1,  d4-1, d7-1 |
| *Week-*  *10* | Characteristics    of    P,    PI    and    PID  controllers | 3 | 3 | - | - | a4-1, b1-1, c1-1,  d4-1, d7-1 |
| *Week-*  *11* | Fuzzy logic controller | 3 | 3 | - | - | a4-1, b1-1, c1-1,  d4-1, d7-1 |
| *Week-*  *12* | PLL (phase locked loop) controller | 3 | 3 | - | - | a4-1, b1-1, c1-1,  d4-1, d7-1 |
| *Week-*  *13* | Speed control of dc motors | 3 | 3 | - | - | a4-1, b1-1, c1-1,  d4-1, d7-1 |
| *Week-*  *14* | Speed and position control of dc motors | 3 | 3 | - | - | a4-1, b1-1, c1-1,  d4-1, d7-1 |
| *Week-*  *15* | Course discussion | 3 | 3 | - | - | c1-1, d4-1, d7-1 |

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| **Course Intended**  **learning outcomes**  **(ILOs)** | |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Knowledge &**  **understanding** | **a1-1** | **x** |  | **x** |  | **x** | **x** |  |  | **x** |  |  | **x** |  |
| **Intellectual**  **Skills** | **b1-1** | **x** | **x** | **x** |  | **x** | **x** |  | **x** | **x** |  | **x** |  |  |
| **Professional**  **and Practical**  **Skills** | **c1-1** | **x** | **x** | **x** |  | **x** | **x** | **x** |  | **x** |  | **x** | **x** |  |



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**Selflearning**

**Presentation**

**andMovies**

**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:***

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

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| **General and**  **Transferrable**  **Skills** | **d4-1** | **x** | **x** |  |  |  | **x** | **x** |  | **x** |  |  |  |  |
| **d7-1** | **x** | **x** |  |  |  | **x** | **x** |  | **x** |  |  |  |  |



**B. 8*Assessments:***

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

***Weighting of assessments:***

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

preparation of reports.

***B.10 List of references:***

1-Richard Valentine,” Motor Control Electronics Handbook”, printed in May 1, 1998

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

**Prof. Dr. Sabry Abdellatif** **Prof. Dr. Gamal Morsi**

**Dr. Hady Elgendy**

**Date:**