**Minoufiya University,**

**Faculty of Engineering,**

**Electrical Eng. Dept.,**

**Post Graduate Studies and Research.**

**Minoufiya University**

Faculty of Engineering

**Course Specification**

***Title: Power Generation from Renewable Sources***

***Code Symbol: ELE 527***

***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 provide the student, upon completing the electrical engineering

programme, with the basic knowledge and skills of how to design and operating renewable energy

systems (RESs). This course will also provide students with the ability to assess the generation of

these RESs and economy. The skill of installing and coordinating of different RESs configurations

are also provided. It is also aimed that the student will get acquainted with the applications of

various RES types to accommodate the load energy requirements considering the meteorological

data at the installation site

***B.2 Course Objectives***

**1. Demonstration of the knowledge and understanding of the importance of operating RESs**

**(solar photovoltaic, solar thermal and wind generators).**

**2. Definition of requirements for installing, operation and generation of RESs.**

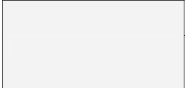
**3. Evaluation the energy generation and its economy of the RESs.**

**4. Comparison of types RES at different region of Egypt**

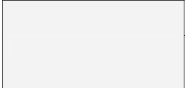
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| Field | Programme ILOs that the course  contribute in achieving | Course ILOs |
| Knowledge&  Understanding | A1.            Integrate            theories,  fundamentals                    and  knowledge     of     electrical  power in practice. | a1-1) Integrate the definitions of  solar photovoltaic, solar  thermal        and        wind  generators. |
| 2. Understand the basics of quality  in professional engineering  practice       according       to  electrical                      power  specialization. | a2-1)      Illustrate      the      basic  principles    of operation  and generation of RESs |
| 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 formulate the  problems      of      energy  generation        and        its  economy for RESs. |
| B2. Solve electrical engineering  problems in the area of  electrical                      power  specialization. | b2-1)           Solve           electrical  engineering problems for  installing, operation and  generation of RESs |
| Professional and  Practical Skills | C1.      Apply      the      professional  engineering technologies in  the field of electrical power  specialization. | c1-1)          Apply          computer  programmers    to    solve  problems      of      energy  generation. |
| General and  Transferrable Skills | D1. Effective communication of all  kinds and sharing ideas with  different relevant teams. | d1-1) Effective communication  and collaborative learning  affords                  students  enormous       to       solve  problems. |
| D2. Use of information technology  to serve the development of | d2-1)            Use            electronic  communication           and |

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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, A2 | B1, B2 | C1 | D1, D2, D3,  D4, D7 |



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

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

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|  | engineering       professional  practice. | computer-based systems  of hardware and software  and associated processes  through emphasis on the  information     basis     for  engineering. |
| D3. Self-assessment to    identify  personal learning needs. | d3-1) Use a wide range of formal  ways of identifying their  own learning needs like  ordinary investigations. |
| 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 power  branch. | d7-1) Apply statistical reports  and weekly auctions. |

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| ***Week***  ***No.*** | ***Sub. Topics*** | ***Total***  ***Hours*** | ***Contact hrs*** | | | ***Course ILOs***  ***Covered (By No.)*** |
| **Lec.** | **Tut.** | **Lab.** |
| *Week-1* |     The importance of operating  RESs.      Solar photovoltaic (PV) power  plant construction | 3 | 3 | - | - | a1-1, a2-1 |
| *Week-2* | Solar PV power plant | 3 | 3 | - | - | a1-1, a2-1 |
| *Week-3* | Solar PV power plant generation | 3 | 3 | - | - | a1-1, a2-1, b2-1,  c1-1 |
| *Week-4* | Operating and economy of solar PV  power plant | 3 | 3 | - | - | a1-1, a2-1, b2-1,  c1-1, d3-1, d4-1,  d7-1 |
| *Week-5* | Applications on solar PV power plant | 3 | 3 | - | - | d1-1, d2-1 d3-1,  d4-1, d7-1 |
| *Week-6* | Solar thermal power plant construction. | 3 | 3 | - | - | a1-1, a2-1, b2-1,  c1-1 |

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| Topic  No. | General Topics | Weeks |
| 1st | Solar photovoltaic (PV) power plant construction | 1 |
| 2nd | Solar PV power plant generation. | 2-3 |
| 3rd | Operating and economy of solar PV power plant | 4-5 |
| 4th | Solar thermal power plant construction and operation. | 6-7 |
| 5th | Solar thermal plant generation and economy | 8-9 |
| 6th | Generation of wind energy | 10-11 |
| 7th | Optimizing wind generators at the installation site | 11-12 |
| 8th | Generation and economy wind farms. | 13-14 |



***B.5 Course Topics.***

***B.6 Course Topics/hours/ILOS***

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| *Week-7* | Solar thermal power plant operation. | 3 | 3 | - | - | a1-1, a2-1, b2-1,  c1-1 |
| *Week-8* | Solar thermal plant generation | 3 | 3 | - | - | a1-1, a2-1, b2-1,  c1-1, d3-1, d4-1,  d7-1 |
| *Week-9* | Solar thermal plant economy. | 3 | 3 | - | - | a1-1, a2-1, b2-1,  c1-1, d3-1, d4-1,  d7-1 |
| *Week-*  *10* | Introduction to wind energy | 3 | 3 | - | - | a1-1, a2-1, b2-1,  c1-1, d3-1, d4-1,  d7-1 |
| *Week-*  *11* | Generation of wind energy. | 3 | 3 | - | - | a1-1, a2-1, b2-1,  c1-1, d3-1, d4-1,  d7-1 |
| *Week-*  *12* | Optimizing    wind    generators    at    the  installation site | 3 | 3 | - | - | a1-1, a2-1, b2-1,  c1-1 |
| *Week-*  *13* | Generation wind farms. | 3 | 3 | - | - | b1-1, b2-1, c1-1,  d1-1, d2-1 d3-1,  d4-1, d7-1 |
| *Week-*  *14* | Economy of wind farms. | 3 | 3 | - | - | b1-1, b2-1, c1-1,  d1-1, d2-1 d3-1,  d4-1, d7-1 |
| *Week-*  *15* | Comparison of types RES at different  region of Egypt | 3 | 3 | - | - | d1-1, d2-1 d3-1,  d4-1, d7-1 |

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| **Course Intended**  **learning outcomes**  **(ILOs)** | |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Knowledge &**  **understanding** | **a1-1** | **x** | **x** |  |  |  |  |  |  |  |  |  |  |  |
| **a2-1** | **x** | **x** |  |  |  | **x** |  |  |  |  |  |  |  |
| **Intellectual**  **Skills** | **b1-1** | **x** |  | **x** | **x** | **x** | **x** |  |  | **x** |  |  | **x** |  |
| **b2-1** | **x** |  | **x** | **x** | **x** | **x** |  |  | **x** |  |  | **x** |  |
| **Professional**  **and Practical**  **Skills** | **c1-1** | **x** |  |  | **x** | **x** | **x** | **x** |  | **x** |  |  | **x** |  |
| **General and**  **Transferrable**  **Skills** | **d1-1** | **x** |  | **x** | **x** | **x** |  | **x** |  | **x** | **x** |  | **x** |  |
| **d2-1** | **x** |  | **x** | **x** | **x** |  | **x** |  | **x** | **x** |  | **x** |  |
| **d3-1** | **x** |  | **x** | **x** | **x** |  | **x** |  | **x** | **x** |  | **x** |  |
| **d4-1** | **x** |  | **x** | **x** | **x** |  | **x** |  | **x** | **x** |  |  |  |
| **d7-1** | **x** |  | **x** | **x** | **x** |  | **x** |  | **x** | **x** |  | **x** |  |



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

**Presentation**

**andMovies**

**Selflearning**

**Cooperative**

**Discovering**

**Discussion**

**Modelling**

**Sitevisits**

**Problem**

**solving**

**Brain**

**storming**

**Tutorial**

**Projects**

**Lecture**

**Playing**

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



**B. 8 Assessments*:***

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

***Weighting of assessments:***

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

preparation of laboratory reports and oral presentation. At least one oral presentation should

involve a significant component of library research to encourage this component of study.

***B.10 List of references:***

**1- M.M.EL Saied, I.S.Taha and J.A.Sabbagh;" Design of solar Themal Systems**

**Scientific Publishing Center" King Abdul-Aziz university, Jeddah ,KSA 1994**

**2- D.R Mills ;"Solar Thermal Electricity" Solar Energy,ISES,2001,pp557-651**

**3- 3-Siegfrid Heirer , "Wind Energy Conversion systems" "Johan Wiley and sons**

**publications,UK,1998**

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

**Prof. Dr. Abdel-Mohsen Kinawy** **Prof. Dr. Gamal Morsi**

**Prof. Dr. Atef Abd El-Hakim El-Zeftawy**

**Dr. Hala .S El-Sayed**

**Date:**