**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 coursecontribute in achieving | Course ILOs |
| Knowledge&Understanding | A1.            Integrate            theories,fundamentals                    andknowledge     of     electricalpower in practice. | a1-1) Integrate the definitions ofsolar photovoltaic, solarthermal        and        windgenerators. |
| 2. Understand the basics of qualityin professional engineeringpractice       according       toelectrical                      powerspecialization. | a2-1)      Illustrate      the      basicprinciples    of operationand generation of RESs |
| Intellectual skills | B1. Identify and analyze problemsin the area of electricalpower    specialization    andrank the results according totheir priorities. | b1-1) Identify and formulate theproblems      of      energygeneration        and        itseconomy for RESs. |
| B2. Solve electrical engineeringproblems in the area ofelectrical                      powerspecialization. | b2-1)           Solve           electricalengineering problems forinstalling, operation andgeneration of RESs |
| Professional andPractical Skills | C1.      Apply      the      professionalengineering technologies inthe field of electrical powerspecialization. | c1-1)          Apply          computerprogrammers    to    solveproblems      of      energygeneration. |
| General andTransferrable Skills | D1. Effective communication of allkinds and sharing ideas withdifferent relevant teams. | d1-1) Effective communicationand collaborative learningaffords                  studentsenormous       to       solveproblems. |
| D2. Use of information technologyto serve the development of | d2-1)            Use            electroniccommunication           and |

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| Field | Academic Reference Standards For Electrical EngineeringPostgraduates (ARSEP-ELE) |
| Knowledge &Understanding | IntellectualSkills | Professionaland PracticalSkills | General andTransferrableSkills |
| Programme AcademicStandards that the coursecontribute 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       professionalpractice. | computer-based systemsof hardware and softwareand associated processesthrough emphasis on theinformation     basis     forengineering. |
| D3. Self-assessment to    identifypersonal learning needs. | d3-1) Use a wide range of formalways of identifying theirown learning needs likeordinary investigations. |
| D4. Use of different sources forinformation knowledge | d4-1) Refer to textbooks, anddatabases information inlectures. |
| D7. Self- learning continuouslyspecially in electrical powerbranch. | d7-1) Apply statistical reportsand 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 operatingRESs.    Solar photovoltaic (PV) powerplant 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 PVpower 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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| TopicNo. | 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    theinstallation 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 differentregion 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**

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**Date:**