**COURSE TITLE: Fundtamentals of Wind Technology (March 2013)**

**Lecturer(s) :**

* **Prof. Kostas Rados, Dr. Vasilis Riziotis (week 1)**
* **Prof. Diakoulaki Danai, Prof. Kostas Rados, George Caralis (week 2)**

**Introduction to the Course:**

This Course provides an introduction to the Fundamentals of Wind energy. The course provides an overview of the wind market, of the wind technology, and focus on Wind Resource, Wind turbine aerodynamics and design, Economics and the role of externalities and Applications.

**Course Aims:** The aims of this Course are to:

* Study wind market, wind potential, aerodynamics of Wind turbines, Wind farms and economics
* Develop skills on wind potential evaluation, estimation of energy production, understanding of basic aerodynamic aspects of wind turbines, design of wind farms and understanding the basic economical parameters.
* Environmental Externalities

**Learning Outcomes**

By the end of this Course students should have gained:

* Knowledge and Understanding: Wind resource, Aerodynamics of WT, Wind farms issues, Economics, Externalities
* Intellectual Skills:
* Professional Practice Skills: Evaluation of wind potential, drawing wind rose, processing wind measurements, calculation of wind energy output, recognizing types and designs of wind turbines, basic financial calculations, cost benefit analysis.
* Transferable Skills:

**Course Book:**

* Wind Energy Explained. Theory, design and application, MANWELL, MCGOWAN, ROGERS

**Teaching Methods**

* Presentations, theory, solved problems and exercises

**Lectures**

* Lectures will introduce students to the fundamentals of wind energy

**Exercises**

* Students will have the opportunity to apply and understand theory, solve practical problems and make advanced calculations. All the exercises and solved problems will be based on the theory to be presented.

**Schedule**

**The minimum teaching hour is 16H in each week.**

**1st Week**\*

weekly Timetable

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Teaching room:** **West 5 Building 217** | **Monday**  | **Tuesday** | **Wednesday**  | **Thursday** | **Friday**  |
| **8:30-10:00am. (session one)** | **Introduction****(KR, VR)**  | **Wind resource (KR)**  | **Wind turbine Aerodynamics (VR)**  | **Wind Farms (KR)**  | **Workshop on Aerodynamics (VR)** |
| **10:00-10:15am.** | Break time  | Break time  | Break time  | Break time  | Break time  |
| **10:15 -11:45am. (session two)** | **Introduction to Wind energy technology (VR )**  | **Wind resource (KR)**  | **Wind turbine Aerodynamics (VR)**  | **Exercises (VR)**  | **Workshop on Aerodynamics (VR)** |
| **11:30-2:00pm.** | Lunch Hour  | Lunch Hour  | Lunch Hour  | Lunch Hour  | Lunch Hour  |
| **2:00 -3:30pm. (session three)** | **Technology Trends (VR, KR)**  | **Project – Exercises (KR,VR)**  | **Exercises on wind resource (KR)**  | **Exercises (VR)**  | **Presentation of students’ project on Wind Resource (KR)**  |
| **3:30-3:45 pm.** | Break time  | Break time  | Break time  | Break time  | Break time  |
| **3:45-5:15pm. (session four)** | **Introduction to Aerodynamics (VR, KR)** | -  | -  | -  | -  |

\*It can be adjusted according to the meeting date between Chinese and European professors.

\*\*Learning assessment will be conducted by the end of lessons and grading list will be presented

 **2nd Week**\*

weekly Timetable

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| --- | --- | --- | --- | --- | --- |
| **Teaching room:** **West 5 Building 217** | **Monday**  | **Tuesday** | **Wednesday**  | **Thursday** | **Friday**  |
| **8:30-10:00am. (session one)** | **Wind market (GC)**  | **Economics (GC)**  | **Wind Farms (KR)**  | **Aerodynamics – Vertical Axis WT (KR)**  | **Exam**  |
| **10:00-10:15am.** | Break time  | Break time  | Break time  | Break time  | Break time  |
| **10:15 -11:45am. (session two)** | **Exercises** **(GC, KR)**  | **Market and environment (DD)**  | **Cost-Benefit Analysis (DD)**  | **Revision (KR, GC)**  | **Revision – Discussion of the Exam**  |
| **11:30-2:00 pm.** | Lunch Hour  | Lunch Hour  | Lunch Hour  | Lunch Hour  | Lunch Hour  |
| **2:00 -3:30pm. (session three)** | **Exercises** **(GC, KR)**  | **Externalities (DD)**  | **Exercises (GC)**  | **Revision (KR, GC)**  | **-**  |
| **3:30-3:45 pm.** | Break time  | Break time  | Break time  | Break time  | -  |
| **3:45-5:15pm. (session four)** | **-**  | **Exercises (GC)**  | **-**  | **-**  | **-**  |

\*It can be adjusted according to the meeting date between Chinese and European professors.

\*\*Learning assessment will be conducted by the end of lessons and grading list will be presented

**Assessment**

Close-booked exam

**Grading System\***

|  |  |  |
| --- | --- | --- |
| **Percentage** | **Scale** | **Description**  |
| 100-90 | Outstanding | Outstanding performance |
| 89-80 | Very Good | Performance is considerably above average |
| 79-70 | Good | More than average performance |
| 69-60 | Satisfactory | performance meets the requirements |
| Below 60 | Insufficient | Due to considerable deficiencies performance does not meet the requirements |

**\*No other grading system is accepted.**