SBS5433 Renewable Energy

(Last major revision: 14 Oct 2014; last minor revision: 8 Sep 2017)

A. QF Level 5

B. Credit Points 3

C. Year 4

D. Pre-requisite Nil

E. Co-requisite Nil

F. Module Aim(s)

The module introduces the concepts of renewable energy resources and potential applications. It also enables students to design and test major renewable energy application systems, as well as the awareness of renewable energy as alternatives to solve the environmental problems associated with the use of conventional fossil fuels.

G. Module Learning Outcomes

On completion of this module, students are expected to be able to:

1. analyse the energy performance of main renewable energy systems;

2. design and test major renewable energy systems; and

3. be able to apply the basic knowledge for promoting renewable energy applications.

H. Module Outline

The following topics/areas will be covered:

1. Energy use and environment
   - climate change and human activity; Carbon dioxide and greenhouse effect; renewable energy use and environment

2. Solar thermal applications
   - solar radiation data; active systems and passive systems

3. Solar electricity generation
   - solar concentrators; solar cells; thin films; photovoltaic systems; building integrated photovoltaics

4. Geothermal energy
   - geothermal resources; thermal application and power generation

5. Wind energy
   - wind resource; wind characteristics; wind turbine types and wind power generation

6. Biomass energy
   - various resources; biomass for fuels; direct application for cooking and power generation

7. Ocean energy
   - ocean thermal energy; wave power and tidal power

I. Class Contact Hours

- Lecture/Seminar : 28 hours
- Tutorial : 8 hours
- Practice/Laboratory work/Field work : 6 hours

J. Learning and Teaching Strategies

A mixture of learning and teaching approaches and strategies would be adopted to equip students with knowledge on renewable energy resources and potential applications for them to analyse renewable energy issues, and design and testing of systems. Lectures will be used to facilitate an effective transmission of basic knowledge from tutors to students. Tutorials will be used to facilitate students' analytical and problem-solving skills through discussion and group activities with tutors and peers.

K. Assessment Strategies

Assessment will be criteria-based and will enable students to demonstrate the achievements of the module learning outcomes. They would be delivered in assignment and examination to reflect the achievement of module learning outcomes comprehensively. The following abilities will be assessed:

1. The ability to analyse the energy performance of main renewable energy systems;

2. The ability to design and test major renewable energy systems; and

3. The ability to relate renewable energy to climate change and the society.

The percentage contributions of the different assessment items to the overall module assessment are:

- Assignment : 40%
- Examination : 60%

Assessment methods for the module are summarised as follows:

Assessment Methods	MLO 1	MLO 2	MLO 3
Assignment	✓	✓	✓
Examination	✓	✓	✓

L. Reading List

Textbook

1. Duffie J.A. & William, A.B. (1991). *Solar Engineering of Thermal Process*. John Wiley & Sons, Inc.

References

2. Athienitis, A.K. & Santamouris, M. (2002). *Thermal Analysis and Design of Passive Solar Building*s. James & James (Science Publishers) Ltd.

3. Bowen, R. (1979). *Geothermal Resources*. Applied Science Publishers.

4. Foster, R., Ghassemi, M & Cota, A. (2010). *Solar Energy-Renewable Energy and the Environment.* CRC Press.

5. Ross, D. (1995). *Power from the Waves*. Oxford University Press.

6. Manwell, J.F., McGowan J.G. & Rogers, A.L. (2003). *Wind Energy Explained Theory, Design and Application*. John Wiley & Sons, Inc.