

IDENTIFICATION

Course code : E3BE5PR1
ECTS : 1

DURATION

Lectures : 3
Tutorial classes : 9
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

1 continuous assessment grade

TEACHING MATERIALS

Course and TD booklet, Jupyter notebooks

LANGUAGE

English

CONTACT

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UE : UE5.4-PROEN

COURSE : Solar resource

SCOPE OF THE COURSE

OBJECTIVES

Students are able to calculate the coordinates of the sun's path in the sky and determine the solar energy received by any surface using a Python-based calculation code.

COMPETENCE AND SKILLS

Characterising a site's renewable energy potential

PROGRAM

The sun as a black body Solar radiation at ground level : Atmospheric composition, Absorption and scattering by the atmosphere, Components of ground-level radiation. Getting started with the pvlib library in a collaborative and online Python environment (Jupyter Notebook) Solar coordinates : Time references and the equation of time, Solar declination, hour angle, solar altitude and azimuth, Solar diagram. Radiation and energy incident on any surface

BIBLIOGRAPHY

Energie Solaire, J.B. Blaisot, Master GSI Maîtrise de l'Energie, Université de Rouen, 2010 Solar Engineering of Thermal Processes, J.A. Duffie and W.A. Beckman, 3rd Edition, John Wiley and Sons, USA, 2006 An introduction to Solar Radiation, M. Iqbal, Academic Press, Toronto, 1984 Gisement solaire et transferts énergétiques, A. Ricaud, Master Energies Renouvelables, Université de Cergy Pontoise, 2011 Workshop TwInSolar : Modelling individual components and a whole energy system, which integrates a large share of variable renewables - Part 1 : PV system modelling (<https://twinsolar.eu/en/online-workshops/>)

REQUIREMENTS

Heat transfer Programming for building and energy