Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	Solarenergiesysteme
Course code	45522
Scientific sector	ING-IND/11
Degree	Master in Energy Engineering
Semester	Summer School
Year	*Summer School*
Academic year	2018/2019
Credits	6 CP
Modular	*Yes / no*

Total lecturing hours	40
Total lab hours	
Total exercise hours	20
Attendance	Strongly recommended
Prerequisites	
Course page	

Specific educational objectives	*The course aims to introduce students to different aspects of solar energy. The course starts with an introduction to the properties of solar radiation. Fundamental properties such as energy content and spectral distribution and air mass will be defined. From there, the course explores the different strategies to harvest this vastly abundant source of energy.* *The topics covered range from the fundamentals and latest advances in photovoltaics to the thermal uses of solar energy such as solar heating and cooling as well as concentrated solar thermal power plants. Additionally an overview of chemical usage of solar energy will be given.* *The students will learn the fundamental principles and the system design indications of the each of the covered technologies.*

Lecturer	*Philip Ingenhoven, office: philip.ingenhoven@unibz.it, tel., lecturer's page*
Scientific sector of the lecturer	Senior Researcher for the *Institute of renewable Energies* at EURAC. Working group: PV systems
Teaching language	German
Office hours	*t.b.d.*
Teaching assistant ***(if any)***	*Name, office, e-mail, tel., lecturer's page*
Office hours	
List of topics covered	Solar energy Solar Radiation Photovoltaics Passive and Active Solar heating Solar thermal power plants

	Solar Chemistry
Teaching format	*Frontal lectures, exercises, seminar talks by the students.*

Learning outcomes	*The students will learn:* • *the fundamentals of solar radiation and the measuring techniques used to monitor these;* • *the basic working principles of a photovoltaic (PV) cell, its limitations and concepts on how to possibly overcome these problems (3rd generation PV)* • *system design for a PV plant, including shading considerations as well as tracking systems;* • *special aspects of building and product integrated PV (BIPV and PIPV);* • *the basic working principles of solar thermal collection and its different applications such as solar heating (passive vs. active), solar heat for industrial processes as well as solar cooling applications;* • *the working principles of concentrating solar thermal power plants.* • *Overview of chemical usages of solar energy* • *The students will learn how to estimate the efficiency for each of the covered systems as well as be introduced to different ways to simulate the respective systems.*

Assessment	*Indicate the types of assessment (according to the table) and check the coherence with the Dublin descriptors* *Energy system programming project during exercise hours* • *Oral exam with review questions and to test knowledge application skills...*
Assessment language	*German*
Evaluation criteria and criteria for awarding marks	*Admission, final mark, sum of marks from partial assessments, etc.* *In case of partial assessments: weighting of parts (e.g., 50% oral and 50% project;* *Examples:* • *relevant for assessment 1: clarity of answers, mastery of language (also with respect to teaching language), ability to summarize, evaluate, and establish relationships between topics;* • *relevant for assessment 2: creativity, skills in critical thinking, ability to summarize in own words*

Required readings	
Supplementary readings	