



COURSE INFORMATION

SOLNET PhD Course **System Integration of solar thermal plants** **Computational thermal engineering**

June 27th – June 30th 2017

Deadline for Accommodation Reservation: more details in April 2017
Deadline for Application: March 31st 2017

About SOLNET

Shine 2 - Solar Heat Integration Network – is a coordinated international PhD education program on Solar Thermal Engineering led by the University of Kassel. It is a Marie Curie Initial Training Networks under the European Union FP 7 from 2013 – 2017. Such a PhD School was held already twice and was a high success. It was decided by the SHINE partners to start a new round of lectures within this school. This course is the first of the new round.

About this Course

This course will give 2.5 ECTS credit points and is offered within the official PhD courses of Innsbruck University. In order to get an official certificate for the course the student has to register as “außerordentliche Studierende”. Details on this procedure will follow.

The course is limited to 30 course-participants.

The course consists of two main elements:

- **System integration of solar thermal plants**
- **Computational thermal engineering**

The aim of the course on **system integration** is to show the interaction of different elements in a solar thermal system. The topics include components, guidelines, characterization, analysis of applications, hydraulics, control systems, dimensioning and optimization, design exercise and an excursion to build examples. The different elements are solar collector, solar loop and its components, storage, auxiliary heater, building and space heating system, domestic hot water demand, the climate and the control system. The course should give insight in how to optimize these elements with respect to their function in the system. “Very good components can be put together to a very bad system”.

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In the **computational thermal engineering** lecture the following items will be addressed:

- Overview on the finite difference method and the stability of different procedures
- Simulation approaches to transient heat conduction and heat transport including boundary conditions
- Simulation of tubes, heat stores (Water and PCM materials)
- General description of modules for a simulation
- Preprocessing, processing, postprocessing, how to detect errors
- Exercise (simulation of the same plant with different simulation tools)

Dates and Timetables (tentative, not fixed yet)

SHINE PhD students are expected to arrive on Monday-evening, June 26th, or early Tuesday morning, June 27th

Day	Morning	Afternoon	Evening
Tuesday 27 th June	Seminar on Systems Integration (Part 1, Streicher)	Seminar on Systems Integration (Part 2, Streicher)	
Wednesday 28 th June	Seminar on Systems Integration (Part 3, Streicher)	Seminar on Systems Integration (Part 4, Streicher)	
Thursday 29 th June	Seminar Computational Thermal Engineering (Streicher)	Seminar Computational Thermal Engineering (Streicher)	Roundtrip through Labs of UIBK
Friday 30 th June	Excursion (options: TISUN, roboter based solar collector production, SICO: Solar collectors and PV plants company, large solar installations at Passive-Multifamily houses)		
Sat / Sun 1 st / 2 nd July	Voluntarily: Mountain tour (please bring mountain boots and cloth)		

Course Application

Application deadline is March 31st 2017. In order to be able to participate in this course, all applicants (SOLNET PhD or not) must send an email to silke.habel@uibk.ac.at with name, email-address, name of Institute, stating that he/she would like to participate in this course

Special Requirements for Applicants

Applicants must be in possession of a University or University of Applied science Master in a technical direction (preferably, physics, mechanical or chemical engineering). Please send a copy of your master's degree, electronic or hardcopy, to:

Univ. Prof. DI Wolfgang Streicher
 Institut für Konstruktion und Materialwissenschaften
 Arbeitsbereich Energieeffizientes Bauen
 Technikerstrasse 13
 6020 Innsbruck, Austria
wolfgang.streicher@uibk.ac.at

All accepted applicants will have to prepare a paper on a topic given at the course in order to get a certificate for their ECTS credits (PhD students present their work). Further information will be given after acceptance of your application.

PhD students should bring a Laptop with preferably some simulation tools already installed (TSol, PolySun). The free of charge solar thermal plant simulation tool SHW will mainly be used in the course (<https://www.uibk.ac.at/bauphysik/forschung/shw.html.de>). This should be also installed.

Accommodation

More detailed information in April 2017 for the ones that registered.

Visa

Those who hold a Passport of the European Union or are in the possession of a valid Schengen-Visa do definitely not need an extra Visa to travel to Austria. Others please check the website <http://www.bmi.gv.at/einreise/> or call the embassy of your home country for Visa-requirements.

Cost

The registration fee at the University of Innsbruck is only the "ÖH-Beitrag": 19.2- €. However, you must pay for your accommodation, meals, etc.



Steiermark EFH Solar Combisystem



Innsbruck Passivhouses O3 with solar thermal plants



Heat delivery station for flat



Solar combisystem - insight

Figures 1 – 3: examples for hydraulic layouts of the freeware Simulation Tool SHW (<https://www.uibk.ac.at/bauphysik/forschung/shw.html.de>).

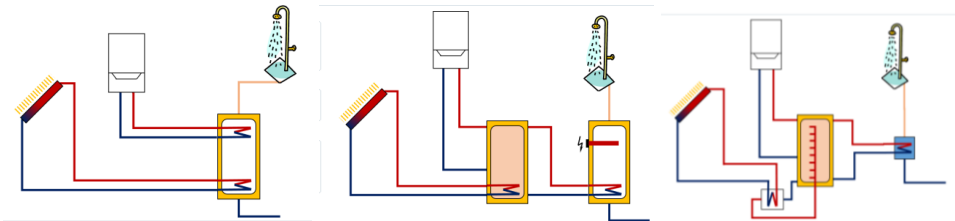


Fig. 1: Examples for hydraulics for domestic hot water (DHW) systems

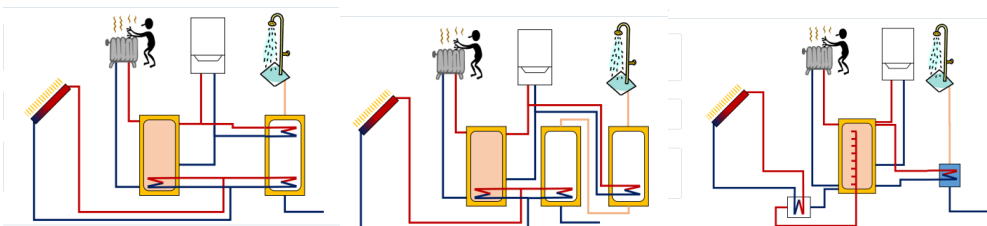


Fig. 2: Examples for hydraulics for domestic hot water and space heating systems (Combisystems)

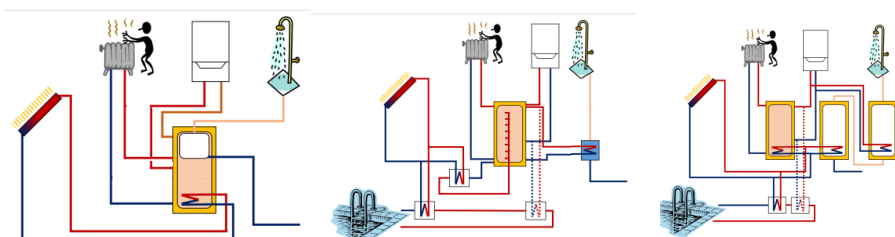


Fig. 3: Examples for hydraulics for domestic hot water, space heating and swimming pool systems