General

The SolNET project is about education of PhD students in the solar thermal field. The courses are an essential element of it as is the building up of a strong network of young researchers.

The course consists of several elements:

- Main thematic of course (dynamic simulation), including presentation of PhD projects and technical tour (2.25 ECTS credits).
- Cultural context of energy systems including preparation work in advance (1.5 ECTS credits).
- Simulation project (2.25 ECTS credits) carried out after the intensive period in Borlänge.

The aim of the simulation project is to give the students the opportunity to make a clearly defined simulation project with supervision, where the emphasis is on structuring and planning the work. The idea is that the project is something that is necessary for your PhD project. Although the detailed teaching is for the tool TRNSYS, the simulation project could be using another simulation tool.

If you do not have TRNSYS in your group you will either have to make the project using another simulation tool, or stay longer to complete the project in Borlänge using TRNSYS (roughly two weeks). It is not possible for you to “take” TRNSYS back with you unless you already have a license.

Dates and Timetable

The course as such starts at 10:00 on Monday 22nd January 2007 in room A11 (see map below) of the Sopranen building (see separate map). The SolNET PhD students will start earlier (at 08:00) with an internal SolNET meeting, also in room A11. The first day will concern the SolNET PhD projects and the working groups they are in. This will finish at around 18:00. The second day is a technical tour to solar thermal installations and companies. This will be followed by presentations from the other participants. Wednesday will start with practical details such as swipe cards for access to the buildings and computer rooms, computer accounts etc. Thereafter the teaching part of the course starts.
<table>
<thead>
<tr>
<th>Day</th>
<th>8-9</th>
<th>9-10</th>
<th>10-11</th>
<th>11-12</th>
<th>12-13</th>
<th>13-14</th>
<th>14-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday 22nd</td>
<td>Solnet internal meeting</td>
<td>Presentation of PhD projects</td>
<td>Lunch</td>
<td>Presentation of PhD projects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuesday 23rd</td>
<td>Technical tour in local area (optional): district heating system, solar company, small scale systems</td>
<td>Presentation PhD projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday 24th</td>
<td>Practical details</td>
<td>Introduction</td>
<td>Lunch</td>
<td>Dynamic simulation basics</td>
<td>Seminar on simulation tools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday 25th</td>
<td>Seminar on simulation tools</td>
<td>TRNSYS basics</td>
<td>TRNSYS basics</td>
<td>Lunch</td>
<td>TRNSYS basics</td>
<td>TRNSYS basics</td>
<td></td>
</tr>
<tr>
<td>Friday 26th</td>
<td>Standard components</td>
<td>Time dependent input</td>
<td>Standard components</td>
<td>Non-standard components</td>
<td>Lunch</td>
<td>Fault finding</td>
<td>Energy balances Convergence Fault finding</td>
</tr>
<tr>
<td>Monday 29th</td>
<td>Building simulation</td>
<td>Building simulation</td>
<td>Climate data &amp; web information</td>
<td>Lunch</td>
<td>Planning simulation studies</td>
<td>Defining project proposals &amp; creating system models</td>
<td></td>
</tr>
<tr>
<td>Tuesday 30th</td>
<td>Developing new components</td>
<td>Continuation: project proposals &amp; system models</td>
<td>Other useful tools</td>
<td>Lunch</td>
<td>IEA-SHC Task 32 boundary conditions</td>
<td>Project proposals</td>
<td></td>
</tr>
<tr>
<td>Wednesday 31st</td>
<td>Energy technology in cultural systems</td>
<td>Presentations of literature surveys and discussion</td>
<td>Lunch</td>
<td>Seminar on course literature</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Preparation for Course

There is a significant amount of preparation work to do before the course.

1. Several sections of the TRNSYS manual are to be read as an introduction to the tool. A pdf file with the relevant sections will be sent to you.
2. Preparation of a presentation of the PhD project and the group you are working in. For SolNET students this will be a longer presentation and you will receive separate instructions about this. All other students will prepare a maximum of 5 OH transparencies (we will not show them by computer as it will take too long).
3. Preparation of a presentation for a seminar on simulation tools on Thursday (see separate document).
4. Preparation for the seminars on the cultural context of energy systems (see separate document).

Practical Issues

Accommodation

The whole of the Haga hostel (http://www.haga.just.nu/) has been booked for the course participants for the whole of the course (Sunday 21st January until morning of Wednesday 31st January). There are 12 rooms. Of these one has one bed, several have two beds and the rest have 4 beds. There should be a maximum of two people per room so that it will not be too crowded. It will cost 2000 kr for 10 nights (~21 €/night). 10 of the places are reserved for the SolNET students, the others are available to the other participants. We are assuming that all students will stay at the hostel, apart from four who live in Borlänge.

Please confirm with Janne Paavilainen (jip@du.se) that you will be staying at the hostel.

Travel to Borlänge

Borlänge is on a main railway line from Stockholm that goes via the main airport (Arlanda). Tickets can be bought on the train (more expensive), at the station or online via internet (www.sj.se) where you can pay by credit/debit card. You do not get your tickets direct, rather have to fetch them from a ticket machine at the station (you will need your booking number with you). It is cheapest to book online choosing the “just nu” ticket.

There are two types of train to Borlänge: intercity (cheapest) and X2000 (fast train which is much more expensive).

Computers

It is best for you to come with a notebook with TRNSYS already installed. If you cannot do this, please let Janne Paavilainen (jip@du.se). There will be computers available for the hands-on parts, but we want to know how many will need them to decide which computer room we will use.