Course: Energy Management (BAE 4124)
2 SWS, 3 credits,
Tuesday 13:45 – 17:00 only the introductory lesson is finished at 15.15
Room: Östliche Karl-Friedrich-Straße G2.3.03

Instructor: Dipl.-Ing. Dipl.-Ing. (FH) Jens Buchgeister
(For more details: https://www.hs-pforzheim.de/De-de/Technik/Wirtschaftsingenieurwesen/Wirtschaftsingenieurwesen/Studierende/Kurskatalog_GM/Seiten/Kurskatalog.aspx?kennung=BAE4124

Office Room: G2.3.03, office hours: Di. 17.00 - according to prior consultation
E-Mail: jens.buchgeister@kit.edu (preferred communication)

Your education is important to me, therefore I would like to support you. Please feel free to contact me via email if you have any questions or problems regarding the course. I will respond as soon as possible and if necessary make an appointment with you.

Overview:
Climate change holds new challenges and requirements for companies. Producers, consumers and governments are developing a responsibility for sustainability. Sustainable product development is playing an increasingly important role, resource- and energy consumption as well as emissions are playing an important role for the development of new products, but not only in the development but also during their use and at the end of the product life cycle are these aspects highly important.

Learning Objectives:

Course Topics:
I. Introductory meeting
II. System approach : Energy and Energy Management - From global perspective to applications in industry
III. Excursion to KIT Campus North (bioliq®-Plant) http://www.bioliq.de/
IV. Energy transition in Germany (Team 1)

Literature:
- Billinton, Roy; Karki, Rajesh; Verma, Ajit Kumar; Editors; “Reliability and Risk Evaluation of Wind Integrated Power Systems”, Springer India 2013.
- Chancen für die deutsche Energiewende – Was kann Deutschland aus ausgewählten internationalen Fallbeispielen lernen? mckinsey-studie-chancen-fuer-die-deutsche-energiewendle
- “An Ambitious Triple Target for 2030”; Comment to the Commission’s Green Paper; A 2030 Framework for Climate and Energy Policies (COM(2013) 169 final); in: Comment on Environmental Policy No. 12; June 2013
- Internet:
V. Energy efficient Production and use of goods (Team 2)

- Pehnt, Martin; „Energieeffizienz – Ein Lehr- und Handbuch”; Wiesbaden: Springer. 2010.

Internet:

- [http://www.greencarcongress.com/2011/06/lowcvp-20110608.html]

VI. Lightweight design as a driver of innovation: improving energy efficiency and emissions of GHG (Team 3)

- [http://www.energieeffizienz-online.info/rechtliche-rahmenbedingungen/energieeffizienz-richtlinien.html]
- [http://www.springer.com/chemistry/journal/35726]

VII. Innovative techniques in production, transport and storage of energy (Team 4)

VIII. Material efficiency and Circular economy (Team 5)


Extra Literature:


- Internet:


  - http://www.energie.kit.edu/129%20Rahmenseite%20Intelligentes%20Energiemanagement.php

  - Drehscheibe Nachhaltigkeit http://www.drehscheibe-nachhaltigkeit.de/index.html

  - Umweltdialog: http://www.umweltdialog.de/umweltdialog/rubrikverteiler/index.php

  - Weltwirtschaft und Entwicklung: http://www.weltwirtschaft-und-entwicklung.org/

  - Wuppertal Institut:
In order to obtain all credits, every lecture has to be attended. The 5 Teams will present their topic and organize an interactive workshop with the students. Each Team as 2 1/2 hours. The written report (8 pages per team member) is due by the 30.06.2016.

The teacher is always available to give feedback, support and advice. Communication takes place in person or via e-mail.

Learning with teamwork.

The presentation, organization of the workshop, active participation of students during the workshops and the submission of the written report will be evaluated as follows:

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Students demonstrate key knowledge in Technical Basics.</td>
<td>Introduction to and communication of interdependencies between technical, business and environmental requirements</td>
</tr>
<tr>
<td>1.2 Students demonstrate key knowledge in Mechanical Engineering.</td>
<td>The principles of the most relevant thermal and electricity generation processes are discussed</td>
</tr>
<tr>
<td>1.3 Students demonstrate key knowledge in Business Administration.</td>
<td>Reading a wide variety of texts form business and technical journals and newspapers to gain an insight into diverse topics</td>
</tr>
<tr>
<td>1.4 Students demonstrate key knowledge in Economics.</td>
<td>Economic effects on projects are considered during project environment analysis</td>
</tr>
<tr>
<td>1.5 Students demonstrate key knowledge in Mathematics.</td>
<td>Laws of conservation of energy and mass are applied as mathematical basis for quantitative economic and environmental analysis of energy processes</td>
</tr>
<tr>
<td>1.6 Students demonstrate key knowledge in Quantitative Methods.</td>
<td>For the assessment of different technologies a quantitative economic and/or environmental analysis is carried out</td>
</tr>
<tr>
<td>1.7 Students demonstrate key knowledge in Computer Science.</td>
<td>Application of standard office software</td>
</tr>
<tr>
<td>2.1 Students demonstrate proficiency in using current computer programs to solve business and technical problems.</td>
<td>Students will be encouraged to look up a variety of internet sources to research the various topics</td>
</tr>
<tr>
<td>2.2 Students demonstrate the ability to use information systems effectively in real world business settings.</td>
<td>Students will be encouraged to look up a variety of internet sources to research the various topics</td>
</tr>
<tr>
<td>3. Students are able to apply analytical and critical thinking skills to complex problems.</td>
<td>Finding Solutions for problems on a scientific basis (specialization/application)</td>
</tr>
<tr>
<td>4. Students are able to develop business ethics-based strategies and are able to apply them to typical business decision-making problems.</td>
<td>The results of a presented topic have to be documented scientifically and in detail</td>
</tr>
<tr>
<td>5.1 Students demonstrate their ability to express complex issues in writing.</td>
<td>Role-plays, contributions to discussion of critical incidents/case studies.</td>
</tr>
<tr>
<td>5.2 Students demonstrate their oral communication skills in presentations and lectures.</td>
<td>Role-plays, discussions in groups of 3-4 students. Class participation in discussions/role plays</td>
</tr>
<tr>
<td>6. Students show that they are able to work successfully in a team by performing practical tasks.</td>
<td>Course provides an introduction to Business Administration, Marketing, Advertising courses Sustainability which the students will have attended</td>
</tr>
<tr>
<td>7. Students demonstrate their ability to develop and present complex interdisciplinary solutions by means of an application oriented assignment. (GPM)</td>
<td>The team presentation (including international students) of a topic have to be organized and also an interactive workshop with the other participants</td>
</tr>
</tbody>
</table>

Project will be assigned as part of the Lecture which each team of the students will have to present. The results of this project will have to be documented scientifically and written down in detail. The concept of learning combines interactive and independent learning with teamwork.

The teacher is always available to give feedback, support and advice. Communication takes place in person or via e-mail.

**Final Examination:**

No Final written Exam

In order to obtain all credits, every lecture has to be attended. The 5 Teams will present their topic and organize an interactive workshop with the students. Each Team as 2 1/2 hours. The written report (8 pages per team member) is due by the 30.06.2016. The written report should be made uniform and formally follow all the guidelines of a bachelor thesis.

The presentation, organization of the workshop, active participation of students during the workshops and the submission of the written report will be evaluated as follows:

<table>
<thead>
<tr>
<th>Contribution</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation and organization of the workshop</td>
<td>30%</td>
</tr>
<tr>
<td>Active participation during the discussion</td>
<td>30%</td>
</tr>
<tr>
<td>Written report by the end of the semester</td>
<td>40%</td>
</tr>
</tbody>
</table>

If a student wants a separate grade, a separate grade for each Team member will be given!
My teaching philosophy:

The contribution of the lecture is to understand the interdependencies of globalization, sustainable development and technical requirements of an international directed energy management. Due to different learning methods (lecture, simulation, presentations, workshops, dynamic interaction within the group) I want to design an interesting and diversified course, which helps to find the right way in the working environment. Your comments and contributions are welcome to serve the knowledge of all. My goal is that you can finish the course successfully, but the main part of the work is yours.

My expectation for students:
- Read Syllabus
- Pay attention and involve yourself in the discussion
- Ask questions
- Do not disturb the lecture, by conversation with your neighbors, eating or drinking
- Arrive on time to the lecture and do not leave earlier

Cours Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.03.2016</td>
<td>13:45-15:15</td>
<td>I. Introductory meeting - Presenting and discussing the topics, topics assignments,</td>
</tr>
<tr>
<td>29.03.2016</td>
<td>13:45-17:00</td>
<td>II. System approach I: Energy Management - From a global perspective to applications in industry</td>
</tr>
<tr>
<td>12.04.2016</td>
<td>13:45-17:00</td>
<td>III. Excursion to Karlsruhe Institute of Technology, Campus North (bioliq®-Plant) <a href="http://www.boliq.de">http://www.boliq.de</a></td>
</tr>
<tr>
<td>19.04.2016</td>
<td>13:45-17:00</td>
<td>IV. Energy transition in Germany (Team 1)</td>
</tr>
<tr>
<td>26.04.2016</td>
<td>13:45-17:00</td>
<td>V. Energy efficient Production and use of goods (Team 2)</td>
</tr>
<tr>
<td>03.05.2016</td>
<td>13:45-17:00</td>
<td>VI. Lightweight design as a driver of innovation: improving energy efficiency and emissions of GHG (Team 3)</td>
</tr>
<tr>
<td>10.05.2016</td>
<td>13:45-17:00</td>
<td>VII. Innovative techniques in production, transport or storage of energy (Team 4)</td>
</tr>
<tr>
<td>17.05.2016</td>
<td>13:45-17:00</td>
<td>VII. Material efficiency and Circular economy (Team 5)</td>
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</tbody>
</table>