

Course:**BAE 2171 (LV)/ BAE 2172 (Lab) Sustainable Product Development 1**

LV: 1 hr per week, 1 credit

Lab: 1 hr per week, 1 credit

Language: English

Level: advanced (B2-C1)

SG WI International, 4. Semester

Location and schedule

Please check LSF for lecture dates.

COVID 19 Information:

As of August 24, 2020, it is expected that the **lecture** will be held online. MOOC videos will be made available for an initial part of the lecture, and it will be complemented with live online teaching on the regular lecture date later the semester. The online classroom is

<https://app.alfaview.com/#/join/alfaview-technik/c15e2587-db1c-4395-a2f4-1b1478ba456b/a11ad794-74a2-41a7-a631-d8d17c59ed1d>

We will try to offer a physical lab part. Please check the LSF on dates and venues.

In case only online **lab activities** will be possible, the initial lab date will be used for organisation of the lab. In that case, a combination of online teaching and individual experiments at home will be carried out. It might be required to form groups for these experiments. The topic of these experiments will be material flow analysis, followed by an environmental assessment.

In case a physical lab will be possible: For the Lab experiments, groups will be formed which will be allotted specific lab dates. These dates may be retrieved from the moodle/e-learning course.

Lab participation is compulsory in all cases.

Please check presentation uploads in the e-learning tool to retrieve most recent information on dates and venues.

	VL	LAB
No.	NPE1 VL	NPE1 Lab (compulsory participation, participants list has to be signed)
1	Introduction	Introduction, Requirements, Lab group formation
2	The limits of growth	Experiments on dismantling, characterization, recycling
3	The process model	Experiments on dismantling, characterization, recycling
4	Re-use approaches	Experiments on dismantling, characterization, recycling
5	Obsolescence	Experiments on dismantling, characterization, recycling
6	Life cycle Assessment 1	LCA introduction 1
7	Life cycle Assessment 2	LCA introduction 2

Participation in the lab lectures is compulsory. To pass the non-graded assignment, it is necessary to have been present in all dates (signature in participants list), and to submit the final lab report as part of a group working on the lab topics.

Excuses to the lab have to be made in advance and in writing, medical certificate may be required.

The physical lab will require to bring an obsolete electrical or electronic device with a polymer mass more than 200 g. Characterisation of this product will be carried out by dismantling. Its polymer share will be converted into tensile testing bars, and thus the material properties of recycled polymers will be identified. Moreover, an environmental assessment of this device will be generated following life cycle assessment/ISO 14040 requirements .

Lecturer:

Prof. Dr.-Ing. Jörg Woidasky

e-mail: joerg.woidasky@hs-pforzheim.de

Office hours according to appointment in list in front of the lecturers room (T2.2.14) or as identified in LSF.

Please do not hesitate in case you have any questions regarding the course. You are also welcome to make suggestions on the course.

Overview (catalogue description):

During this seminar, students learn about procedures for product development, the requirements of sustainability, and learn and apply miscellaneous methods for structuring the work and assessment in product design.

Prerequisites:

You should have good command over the English language.

Learning Objectives:

After completing this course students

- know the sustainability concept
- are able to allocate environmental impacts during the product life cycle
- have learned about and applied different problem solving schemes, FMEA, QFD, and creativity techniques

Course topics:

- Introduction to sustainability
- life cycle thinking
- Life cycle Assessment
- environmental impact categories
- process model and its application
- examples of sustainable products

Teaching and learning approach:

Learning will be achieved through presentation and through group discussion. In the lab, practical work is required, plus lab report writing and discussion.

Contribution to program goals:

	Learning outcome	Contribution	Assessment
1.3	Students demonstrate key knowledge in Business Administration.	Strategic decisions, theories and instruments of International Management	Participation in class + outcome of assignment
1.4	Students demonstrate key knowledge in Economics.	Background to international economics and international trade	Participation in class + outcome of assignment
2.2	Students demonstrate the ability to use information systems effectively in real world business settings.	Research on different countries	Participation in class + outcome of assignment
3.1	Students are able to apply analytical and critical thinking skills to complex problems.	Develop own case study in international business	Class work, presentations
4.1	Students are able to develop business ethics-based strategies and are able to apply them to typical business decision-making problems	Ethical decision making in international management	Discussion in Class + outcome of assignment
5.1	Students demonstrate their ability to express complex issues in writing.	assignments	assignments
5.2	Students demonstrate their oral communication skills in presentations and lectures.	Communication of knowledge in International Management and Cross-Cultural Management	Discussion in class
6.1	Students show that they are able to work successfully in a team by performing practical tasks.	Conducting group work	Outcome of group work

Course Material:

- Handouts (e-learning based)

Background reading:

- Wimmer, W. et al.: ECODESIGN – The competitive advantage. Springer Verlag, Dordrecht/Heidelberg, 2010, ~60 €
- Engeln, W.: Methoden der Produktentwicklung. Oldenbourg Industrieverlag, München, 2011, ~25 €
- Schäppi, B., et al.: Handbuch Produktentwicklung. Hanser Verlag, München, 2005, ~150 €
- Martens, H.: Recyclingtechnik. Spektrum Verlag, Heidelberg, 2011, ~35 €
- Ponn, J.; Lindemann, U.: Konzeptentwicklung und Gestaltung technischer Produkte. 2. Aufl. Springer VDI-Verlag. Berlin/Heidelberg, 2011, ~70 €
- Fleischer, G. (Hrsg.): Eco-Design – Effiziente Entwicklung nachhaltiger Produkte mit euroMat. Springer Verlag, Berlin, 2000
- Behrend, S. et al.: Umweltgerechte Produktgestaltung – ECO Design in der elektronischen Industrie. Spinger Verlag, Berlin, 1996
- VDI-Richtlinien, u. a.
2206 (V-Modell/Mechatronik),
2221 (Entwicklungsmethodik),
2243 (Recyclinggerechte Produktentwicklung)
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Assessment (Lecture and lab are independent classes):

Of the lecture:

- by written exam (lecture)

Of the Lab

- Lab Report has to be formally accepted by the lecturer. Rejection of lab report will lead to lab failure.
- Lab Report requirements will be clearly identified in the lecture and in the upload materials in moodle.
- Regular intermediate coaching on lab report writing will be provided.
- Full lab participation (all dates minus one date) is required.

Grading: based on seminar / assignment results

- 'Sehr gut' represents exceptional work, far above average.
- 'Gut' represents good work, above average.
- 'Befriedigend' represents average work.
- 'Ausreichend' represents below average work with considerable shortcomings.
- And 'mangelhaft' is just exceptional work in the wrong direction or with unacceptable shortcomings.