

Syllabus  
**MLICS5104 Advanced Technology & Innovation Management**  
Prof. Dr.-Ing. Claus Lang-Koetz  
Winter Semester 2021/22

<b>Level</b>	Master	
<b>Credits</b>	3	
<b>Student Contact Hours</b>	2	
<b>Workload</b>	90 hours	
<b>Prerequisites</b>	Basic lecture on innovation management is recommended (such as BREM 3113 Technology and Innovation Management), but not required	
<b>Time</b>	See LSF	
<b>Room</b>	See LSF	
<b>Start Date</b>	See LSF	
<b>Lecturer</b>	<b>Name</b>	Prof. Dr.-Ing. Claus Lang-Koetz
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## Outline of the Course

The students are taught advanced topics within technology and innovation management, the respective theoretic background, practical application and relevance for companies. The lecture is a mixture of a classical lecture by the professor, group discussions and seminar. Concepts, process and methods are taught, seminar topics are researched and presented by the students. At the end, the re results are delivered in a written seminar paper.

The students learn how an innovation management can be built up and which methods can be used for it. This comprises of activities for strategic planning, the generation of ideas, their assessment and selection, followed by their implementation into products and processes suitable for the market (see also preliminary schedule below).

A special focus is put on a strategic component (working with market and technology trends and future scenarios), the sources of innovations (taking open innovation approaches and collaboration with other organizations into account) and how to deal with ideas in the company and how to implement them (assessment and selection, technical implementation and market launch). Also, important aspects of sustainability in innovation will be addressed.

The course consists of lectures in order to convey concepts, processes and methods, group discussions and working independently (in groups) on case studies on innovation strategy and innovation management.

## Course Intended Learning Outcomes and their Contribution to Program Intended Learning Outcomes / Program Goals

Program Intended Learning Outcomes		Course Intended Learning Outcomes	Assessment Methods	
After completion of the program the students will be able...		After completion of the course the students will be able...	Presentation	Term Paper
			50%	50%
			Collective	Individual
<b>1</b>	<b>Extending and consolidating Knowledge related to concepts and practical applications in Life Cycle Assessment and Sustainability Sciences</b>			
1.1	The students have enlarged their knowledge of the bachelor study program concerning the basics of the sustainability approach including characteristics of the relevant ecologic, economic and social perspectives.	<ul style="list-style-type: none"> <li>- explain the basic concepts of technology &amp; innovation management, their relevance for companies and sustainable development and the most important concepts, methods and process,</li> </ul>	x	x
1.2	They know important fields of application from technology and society and are able to formulate questions related to a sustainable development and to establish action strategies.	<ul style="list-style-type: none"> <li>- explain the basic concepts of technology &amp; innovation management, their relevance for companies and sustainable development and the most important concepts, methods and process,</li> <li>- display how creativity and openness for new topics and ideas on the one hand and a well-structured methodological procedure on the other hand can contribute to the implementation of successful and sustainable innovations,</li> <li>- link company topics (such as sales, marketing, production, development, ...) to innovation management and will have learned about their perspective on innovation,</li> <li>- to apply selected concepts and methods to practical examples and know their strengths and weaknesses,</li> <li>- to assume different perspectives on the topic in order to select suitable methods and concepts case by case.</li> </ul>	x	x

<b>2</b>	<b>Systemic, analytic and instrumental/conceptual competences for the solution of theoretic and / or practice-oriented tasks in Life Cycle Assessments.</b>			
<b>3</b>	<b>Communicative and social competences to convince third parties of the proposed solutions.</b>			
3.1	MLICS Master students are able to provide the independently elaborated solution approaches to third parties in a clear, concise and stylistically appropriate way,	- to frame a complex problem and describe solution approaches in a sound way.	x	x
3.3	argue in a convincing manner by presenting their solution approaches comprehensible, differentiated and sufficiently documented.	- to communicate with technical and marketing experts and present solution approaches in a convincing way.	x	x

## Teaching and Learning Approach

The course is organized as a lecture with seminar elements. Throughout the course special emphasis is met on discussion and interaction with the students. We will critically discuss the theory, its practical application and its implications for use in an industrial company. An emphasis will be used on case studies on innovation strategy and innovation management.

Students will have to work independently in groups with the case studies provided (with a focus on different topics to be specified in class) and present their results in class.

The materials – slides and questions & problems – will be distributed to the students on the e-learning platform.

I appreciate the interaction with students in class very much – it helps me to understand your thoughts and it helps you to better understand the topic. I invite you to actively “think along”, ask questions and discuss with me in the lecture!

## Literature and Course Materials

Recommended literature:

- Tidd, J.; Bessant, J. (2013): Managing Innovation: Integrating Technological, Market and Organizational Change, Wiley
- Smith, D. (2009): Exploring Innovation, McGraw-Hill Higher Education; 2nd edition
- Trott, P. (2012): Innovation Management and New Product Development, 5th edition, Financial Times Press
- Spath, D. et al. (2011): Technologiemanagement. Grundlagen, Konzepte, Methoden, Fraunhofer Verlag.

## Assessment

The grading will be based upon

- two group presentations on one of the case studies provided
- a short paper on the relevant findings from the case study
- active participation in class discussion

These elements are graded based on the following criteria:

Presentation 1 (25% of total grade)

- Addressed topic and examined it from different perspectives (20%)
- Connections to methods / theories of innovation management presented (40%)
- Plausible explanation of the derivation of the results / clear lines of argument (20%)
- Professional presentation of the results (20%)

Presentation 2 (25% of total grade)

- Addressed topic and examined it from different perspectives (20%)
- Plausible explanation of the derivation of the results / clear lines of argument (60%)
- Professional presentation of the results (20%)

Paper (50% of total grade):

- Addressed topic and examined it from different perspectives (20%)
- Connections to methods / theories of innovation management presented (20%)
- Plausible explanation of the derivation of the results / clear lines of argument (40%)
- Professional presentation of the results (20%)

The following assessment scheme is applied:

- '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 work in the wrong direction or with unacceptable shortcomings.

It is my objective to grade everybody in the same, fair way. Equal performances are equally graded, no matter who the person is. Grade changes subsequently to their official publication are your disadvantage.

## **Schedule**

The following schedule is planned for the lecture (final schedule to be announced in class):

- Foundations of technology and innovation management
- *Introduction to case study work*
- Future topics of innovation
- Innovation strategy and methods to develop an innovation strategy: environment analysis, benchmarking, SWOT, technology and product lifecycle, portfolio Approaches, Technology Readiness Level, Business Model Canvas
- *Q&A session case studies*
- Organization of innovation: the innovation function, innovation Process, in-house innovation activities, Open Innovation, corporate culture and innovation
- *Q&A session case studies*
- Sustainability and innovation: introduction into life cycle thinking, sustainability and innovation in R&D projects and in industrial companies
- *Q&A session case studies*
- Sources of innovation: triggers for innovation, users and their needs, idea generation, creativity and creativity techniques
- *Q&A session case studies*
- Idea assessment and selection: idea assessment in practice, qualitative and quantitative methods, practical example, idea selection
- *Case studies: Presentation of results by students (part 1) and discussion*
- Idea implementation: introduction to product development, approach in product development, technical implementation, prototypes and tests. project management in product development
- Marketing of innovations and market introduction: internal and external innovation communication, market launch
- *Case studies: Presentation of results by students (part 2) and discussion*

## **Additional Information**

### About the lecturer

Prof. Dr.-Ing. Claus Lang-Koetz is an Environmental Engineer and holds a PhD from the faculty of Mechanical Engineering at the University of Stuttgart. He worked in applied science at University of Stuttgart and Fraunhofer Institute for Industrial Engineering IAO in Stuttgart for 9 years. He then was Head of Innovation Management at Eisenmann SE, an international company making plant equipment and turnkey solutions for the automotive industry and the general industry.

Since Sept 2014, he is professor for sustainable technology and innovation management at Pforzheim University. He conducts his research at the Institute for Industrial Ecology, there, in research projects funded with grants by the German Federal Ministry for Education and Research or other organizations.