

- **Course:**

BAE4191 Product Service Systems 1

2 SWS, 3 credits, English, advanced level

Tuesday: 13:45–15:00

Room: T2.4.10 (or alternatively – depending on the development of Covid 19 – in the virtual lecture room <https://app.alfaview.com/#/join/alfaview-technik/e3e39c6e-a1f1-4d93-b8c7-9c3bf7561d1c/470a3143-fc60-4bca-aa3b-e6cbe1022f50>)

Further details to be announced via e-learning (sign in and check regularly)

- **Instructor:**

Prof. Dr. Bernhard Kölmel

(for more details: <https://www.hs-pforzheim.de/profile/bernhardkoelmel/>)

Office: T2.3.14,

Office hours: Thursday 11:30 pm – 13:00 pm

E-Mail: bernhard.koelmel@hs-pforzheim.de (preferred mode of communication)

- **Overview:**

The course – a combination of lecture, workshops, case studies, and students' presentations - provides an advanced knowledge in Product Service Systems.

- **Prerequisites:**

Completion of section 1 of study programm.

- **Learning objectives:**

Due to increasing competition in globalized markets companies are forced to search for new business models to get a competitive advantage. One of the trends is to shift from selling products to offering product-service systems (PSS). PSS including, e.g. hardware, services, software and electronics are efficient and competitive only if developed for the specific purpose with features such as easy to maintain, upgradeable, with built-in sensors for collecting in-use and service data, and easy to use. This changes the requirements on the manufacturing firm's development process. However, such shift requires significant changes in the business processes and related information systems. The lecture is based on the analysis and modification of the information management processes related to Product Service Systems (PSS). In order to respond to the industrial trend towards PSS and frame the related research, the state-of-the-art of PSS research and development are reported. The course investigates the problem of PSS engineering information management in a customer-oriented way. Implementing such an application-system view addresses the problem of designing the customer view on PSS selection, configuration and usage.

In more detail:

This lecture is dedicated to the issues and complexities of industrial services management. It analyzes how the transition from products to services can be managed, and how supply chains can be adjusted to reflect this new status quo. The lecture begins with theoretical concepts examining product-service systems structures and servitization – the services infusion process. The focus shifts to service delivery. The lecture describes the transition from ownership to subscriptions. Then the value chain effects are presented with an overview of the mechanisms through which industrial companies are shortening the distance to end-users and aim for a better position in the value chain. Finally the lecture addresses theoretical and real-life implications in the industrial services supply chain management.

- **Course topics:**

- Designing and Managing Industrial Product-Service Systems
- Definition of Servitization
- Manufacturing and Service Organizations
- New Service Development
- Product Life Cycle
- The Servitization Paradox
- Service Delivery & Managing Service Delivery
- Employing the business model concept to support the adoption of product–service systems (PSS)

Contribution to program goals

	Learning Objective	Contribution
1.1	Students demonstrate key knowledge in Technical Basics.	Transfer theoretical Knowledge of PSS in real application cases in the manufacturing domain.
1.3	Students demonstrate key knowledge in Business Administration.	Use advanced concepts like Business Model Canvas etc. in order to evaluate
3.	Students are able to apply analytical and critical thinking skills to complex problems.	Transformation and adaptation of new concepts in PSS
4.	Students are able to develop business ethics-based strategies and are able to apply them to typical business decision-making problems.	International and global effects on the strategy and the organization of PSS are considered from ethical and social responsibility perspectives.
5.1	Students demonstrate their ability to express complex issues in writing.	Working out of tasks and case studies, and of a term paper
5.2	Students demonstrate their oral communication skills in presentations and lectures.	Working out and presentation of tasks and case studies in front of the class
6.	Students show that they are able to work successfully in a team by performing practical tasks.	Working out of tasks and problems and presentation of the solutions in teams

- **Teaching and learning approach**

The teaching and learning approach is based on 3 didactical methods:

The theoretical key knowledge and the basic concepts are thought at the lecture. The students gain the methodology and the guidance to know and to implement the introduced concepts and tools. Questions and comments of the students are welcome during the lecture.

After the lecture the students should reflect and sum up the content of the lecture based on course materials provided.

The theoretical knowledge is enlarged and converted into a practical role by workshops and case studies. An active participation in class is an important part of the teaching and learning approach.

The students can always communicate with the instructor and get support and advice by talking or mailing.

- **Exam Requirements**

There is an optional written exam at the end of the semester.

Basically, the following requirements will be graded each separately, and on that basis an average grade per person will be built by the professor:

Active general participation during lectures, and especially in brainstormings, workshops, and case studies.

Individual roles prepared and actively performed in group(s) during workshops and case studies, as defined by and agreed with the professor.

Individual or group voluntary activities/ presentations, as required by or agreed with the professor – as far as reasonably possible.

Maximum 2 lectures (90 minutes each) missed during the course. More absence must be agreed with the professor and be compensated.

Grading, based on exam 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.

„Mangelhaft“ is just exceptional work in the wrong direction or with unacceptable shortcomings.

- **Course materials:**

- Petri Helo, Angappa Gunasekaran, Anna Rymaszewska, Designing and Managing Industrial Product-Service Systems, Springer 2017
- Vogel-Heuser, B., Lindemann, U. und Reinhart, G. (2014): Innovationsprozesse zyklensorientiert managen: Verzahnte Entwicklung von Produkt-Service Systemen. Vieweg+Teubner: Berlin, Heidelberg.
- Mannweiler, C., Aurich, J.C. und Clement, M.H. (2010): Produkt-Service Systeme: Gestaltung und Realisierung. Springer: Berlin, Heidelberg.
- Spiller, M. et al. (2013): Dienstleistungsmodellierung: Product-Service Systems und Produktivität. Gabler: Wiesbaden.

- Class handouts will be available in the LMS.

- **My teaching philosophy**

In the classes we consider the important concepts, models, principles and phases of strategic and operational management and apply them on a real world situation. I will assist you to develop a self-contained strategic thinking, based on the acquired basic skills, and to evaluate the opportunities and the threats of different strategies and management methods. When you don't understand a learning step, you should pose a question during the lesson. I want to support every student who is committed to take the required knowledge and to pass the exams successfully.

- **Tentative Schedule (changes tba)**

Date	Theme
Lecture 1	Topic Introduction
Lecture 2	Designing and Managing Industrial Product-Service Systems
Lecture 3	Manufacturing and Service Organizations
Lecture 4	New Service Development
Lecture 5	The Servitization Paradox
Lecture 6	Employing the business model concept to support the adoption of product-service systems
Lecture 7	Case Presentations
Lecture 8	Case Presentations
Lecture 9	Case Presentations
Lecture 10	Case Presentations
Lecture 11	Case Presentations
Lecture 12	Case Presentations