

## Seminar: Business Analytics: Bayesian Modeling and Advanced Topics in Optimization

Winter Term 2017/2018

### Course Description:

Prior to the start of the Information Age in the late 20th century, companies were forced to collect data from non-automated sources manually. Companies back then lacked the computing capabilities necessary for data to be analyzed, and as a result, decisions primarily originated not from knowledge but from intuition. With the emergence of ubiquitous computing technology, company decisions nowadays rely strongly on computer-aided “**Data Mining**”.

In this seminar, we will focus on what distinguishes the varying capabilities across Data Mining – namely the underlying methods. We will review different strategies for data collection, data analysis, and data visualization. Sample approaches include dimension reduction of big data, data visualization, model selection, clustering and forecasting.

In particular, the seminar will address the following topics:

- **Bayes-Statistics:** We will look into the methodological basics of Bayesian statistics, computational procedures (Markov-Chain Monte Carlo, etc.) and implementations thereof.
- **Optimization:** We will look into advanced topics in optimization, such as dynamic programming, optimization of network structures and solution heuristics.

Individual assignments will consist of a specific problem from out of the two mentioned fields. Participants will be asked to summarize methodological foundations and implement sample problems, e.g. in R, Python or STAN.

### Target Group:

This Seminar specifically addresses students all IMP disciplines, as well as in the M.Sc. Economics and M.Sc. VWL programs. Interested and committed B.Sc. VWL and BWL students may also participate.

### Organization:

Registration: from August 28, 2017 to October 26, 2017

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Application via email to [gunther.gust@is.uni-freiburg.de](mailto:gunther.gust@is.uni-freiburg.de) with the following details:

- First name, last name
- Matriculation number (Matrikelnummer)
- Email, phone number
- Study program, semester
- Transcript of records (Leistungsübersicht)
- Curriculum Vitae (Lebenslauf)

Response whether application was successful will be sent out shortly after the registration deadline

First meeting: **November 13, 2017 at 10ct**

Room 2330

Paper draft due: January 22, 2018

Final presentation: January 29, 2018, room 2330, KG2, 1pm

Final paper due: March 16, 2018

### **Communication:**

All announcements, handouts, etc. will be sent via email.

### **Topics:**

Exact topics along with hints on literature will be announced together with the response to your application.

### **Policies and Procedures:**

Grading: Draft of seminar paper (33%), presentation (33%), final paper (about 10 to 15 pages, 33%). In addition, you have to hand in your programming code (if applicable). The grading will take into account the study level (Bachelor/Master) of the individual participant.

Credit points: 4 for Bachelor, 6 for Master  
Study program will be considered in topic assignment

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Applicable to:

- B.Sc. BWL PNPM: Allgemeine BWL
- B.Sc. VWL: BWL, Wirtschaftsinformatik
- M.Sc. BWL PNPM: Allgemeine BWL, Wirtschaftsinformatik
- M.Sc. VWL (2011): BWL, Wirtschaftsinformatik
- M.Sc. VWL (2014): Business Analytics
- M.Sc. Economics: Elective in Information Systems and Network Economics profile
- M.Sc. Computer Science: Wahlmodule BWL und VWL

**Communication:**

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