Advanced Business Modeling Using Spreadsheets

Module		Advanced Business Modeling Using Spreadsheets					
Module Code		INF60100					
Module Coordinator		Roßbach, Peter					
Last Update		2015/12/16					
Target Group		Programme(s)			Bachelor of Science		
		Term			7th semester		
		Compulsory/Elective Module			Elective Module		
		Module Duration			1 Semester		
		Credits:			6		
		Frequency			Annually		
		Language of instruction			English		
Workload:	150 h	Contact hours:	44 h	Independent Learning:	66 h	Assignments:	40 h
Prerequisites		-					
Usability in other Modules/Programmes		-					
Intended Learning Outcomes		**Knowledge:** • The participants learn to apply spreadsheet software to solve business requirements. **Skills:** • Develop professional skills for the design and implementation of ambitious business and finance models using spreadsheets and programming techniques. **Competence:** • Successful participants in the module will become equipped with the necessary knowledge and tools to develop spreadsheet applications supporting managerial decisions.					
Module Structure		The module consists of two parts. In the first part, advanced techniques in Excel and Visual Basic for Applications (VBA) will be taught. In the second part, the modelling of managerial and business applications using Excel and VBA will be the subject of the lectures.					

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<tr><td>Module Overview</td><td>In today’s business many managerial decisions are based on decision models applying highly sophisticated algorithms. For the implementation of such models software tools are needed. One class of those tools is spreadsheet programmes, like Microsoft Excel, which provide the necessary functions and flexibility for the developer and user in one person.
The purpose of this module is to develop professional skills for the design and implementation of ambitious business and finance models using spreadsheets and programming techniques. The objective is to understand the models from conceptual and computational perspectives and to translate them into Microsoft Excel/VBA applications. For this, both the models and the manifold techniques for developing spreadsheet applications are subject of the lectures.

The topics of this module will mainly cover the following areas:
• Valuation; for example value-at-risk and valuation of securities and derivatives
• Optimization; for example cash-flow optimization, portfolio optimization, and heuristic optimization
• Simulation; e.g. Monte Carlo and what-if analysis
• Forecasting and Prediction; e.g. GARCH modelling and turnover forecasting

Accompanying the content-related modelling, specific spreadsheet techniques, like the usage of matrix functions, pivot functions, the solver, and building graphical user interfaces, are also subject of the lectures.</td></tr>
<tr><td>Forms of teaching, methods and support</td><td>Interactive lectures, business cases, in-class exercises, and home exercises.</td></tr>
<tr><td>Type of Assessment in the Module and Performance Points</td><td>
<table>
<tr><th>Type of examination</th><th>Duration or length</th><th>Performance points</th><th>Due date or date of exam</th></tr>
<tr><td>Assignments in form of spreadsheet applications in course and at home</td><td></td><td>120</td><td>During semester</td></tr>
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<u>Examination requirements:</u>
Computer with MS Excel installed (at least version 2010).</td></tr>
<tr><td>Recommended Literature</td><td>Will be announced in the lectures.</td></tr>
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Module Structure	Methods Areas of Application Discrete Event Simulation (DES) PERT/CPM Linear Programming (LP) Stochastic Modeling Analytic Modeling Process Design Inventory Management Demand Planning Scheduling Supply Chain Management Project Management (PM)
Module Overview	In this module students will learn a variety of (mostly quantitative) modelling techniques and management methods to solve Operations Management challenges. These challenges are drawn from various Operations Management areas including process design, supply chain management, scheduling, supply and demand planning, and project management. Students will learn how to develop models, analyse and provide data, solve models, conduct optimization and sensitivity analyses and interpret and communicate results. Both general software packages (for example Microsoft Excel) and specific simulation software (for example Arena) are used. By successfully passing this module participants will have the knowledge and tools at hand to conduct Operations Management consulting projects, specifically (discrete event) simulation studies.
Forms of teaching, methods and support	Teaching format consists of interactive lectures, workshop-style lectures, self-study elements, exercises, modeling challenges and a small-scale practice project. Participants will often work in small groups with close interaction with the lecturer. Teaching builds on the idea that modeling is best acquired through learning by doing, i.e. through applying it to various hands-on challenges. For the small-scale project, cooperation with a practice partner company is intended.

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<tr><th>Type of examination</th><th>Duration or length</th><th>Performance points</th><th>Due date or date of exam</th></tr>
<tr><td>Modeling and simulation exercises</td><td>16 h (workload)</td><td>20</td><td>Homework and in-class, tba</td></tr>
<tr><td>Modeling and simulation in-term exam</td><td>45 min</td><td>20</td><td>In class, tba</td></tr>
<tr><td>Small-scale modeling and simulation practice project</td><td>16 h (workload)</td><td>20</td><td>Last third of the semester, tba</td></tr>
<tr><td>Written Exam</td><td>60 min</td><td>60</td><td>End of semester</td></tr>
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<u>Examination requirements:</u>
For some assignments a computer with Windows 7 or higher will be needed. Discrete event simulation software will be provided.
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<td>Recommended Literature</td>
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Heizer, Jay; Render, Barry: Operations Management, Sustainability and Supply Chain Management, 11th ed., Pearson 2014 (Global Edition)
Alternatively: Heizer, Jay; Render, Barry: Operations Management, 10th ed., Pearson 2011 (Global Edition)
Kelton, W. David; Sadowski, Randall P.; Zupick, Nancy B.: Simulations with Arena, 6th ed: McGraw-Hill, 2014
Kelton, W. David; Smith, Jeffrey S.; Sturrock, David T.: Simio & Simulations, Modeling, Analysis, Aplications, 2nd ed., McGraw-Hill, 2011

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