**Supply Chain Dynamics (SCD)**

Summer term 2018, version: 09/04/2018

Please note: This document reflects our planning before the term started; it will **not** be updated regularly. For short-term changes regarding rooms or times, see Campus. Changes regarding the content will be discussed in class and, if appropriate, communicated via Ilias.

Technicalities

One semester course, taught every second semester in the summer term.

Six credit points; on average, four contact hours per week. Taught in English.

Course coordinator and lecturer: Prof Dr Andreas Größler; tutorials: Ivan Ðula and Manuel Brauch

Part of the MSc study programme in (technically oriented) business administration.

Time and location

Classes: Mondays, 15:45–17:15 in KII M 17.12 and Thursdays, 17:30–19:00 in KII M 17.73

First class: Monday, 16 April, 15:45, then every week on Monday and Thursday until term ends (details see time table)

Recommended requirements

Introductory bachelor level course in operations management and/or logistics.

Short description and learning goals

The course starts with discussing the nature of supply chains, in particular their dynamic aspects. Students acquire first-hand experience on effects of dynamic behaviour. A major part of the course is devoted to learning a methodology for better understanding and controlling supply chains, system dynamics. It is used to analyse some real world cases of dynamic supply chain issues.

After successfully finishing the course, students can:

* name and discuss sources and effects of dynamics in supply chains;
* analyse simple supply chain structures with the help of dynamic models;
* understand and evaluate complex dynamic supply chain models.

Course design

Although officially split into lectures and tutorial sessions, all classes consist of theoretical and practical parts. Thus, the content will run over the two sessions per week with teacher presentations, case study work, modelling exercises, and experiential learning elements. Assessment will be carried out by means of a written exam (90%) and a multiple-choice mid-term assessment during a regular class (10%; see timetable for date). The mid-term assessment cannot be retaken or be written at another time.

Depending on the total number of students not being too big, 20% of points (from the written exam) can be substituted by a classroom presentation of one of the cases from Ackermann’s book (dates see timetable) in groups of two or three students. This includes that groups submit a presentation file before class, update it based on feedback received in class, and upload it to Ilias.

In total, 50% of all points are necessary to pass the course with 6 credit points. The content of the exam comprises all topics discussed in class plus all required reading assignments (see timetable).

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| --- | --- | --- | --- |
| **Course element** | **Quantity** | **Time required** | **Total [h]** |
| Contact hours |  |  |  |
| Interactive lectures | 23 | 2 h | 46 |
|  |  |  |  |
| Self-study |  |  |  |
| Reading assignments | 430 pp. | 98.5 h | 98.5 |
| Preparation of modelling cases | 7 | 2 h | 14 |
| Exam preparation | 1 | 20 h | 20 |
|  |  |  | *132.5* |
| Examination |  |  |  |
| Written exam | 1 | 1.5 h | 1.5 |
|  |  |  |  |
| **Total** |  |  | **180** |

Time table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Week** | | **Date** | **Topic** | **Teacher(s)** | **(Reading) assignment** |
| 16 | C1 | Mon, 16/04 | Introduction to and motivation for course | AG | Akkermans, ch. 1 |
| C2 | Thu, 19/04 | Experience dynamics: The Beer Game | AG/ID/MB |  |
| 17 | C3 | Mon, 23/04 | Beer Game debriefing | AG | Senge, ch. 3 |
| C4 | Thu, 26/04 | Dynamic decision making and its shortcomings | AG | Akkermans, ch. 3 |
| 18 | C5 | Thu, 03/05 | An introduction to system dynamics | AG | Akkermans, ch. 2 |
| 19 | C6 | Mon, 07/05 | Hands on session: getting to know Vensim | AG | Sterman, ch. 3; Vensim tutorial |
| 20 | C7 | Mon, 14/05 | Business cycles and oscillations  Managing cyclical industries: Modelling the Philipps case | AG | Akkermans, ch. 4; prepare Model |
| C8 | Thu, 17/05 | Practice session: identifying stocks and flows, feedback loops | ID/MB |  |
| 21 | No classes: Pentecost holidays | | | | |
| 22 | C9 | Mon, 28/05 | Aging chain models and their behaviour  Information sharing in the supply chain: Modelling the ASML case | AG | Akkermans, ch. 5; prepare model |
| 23 | C10 | Mon, 04/06 | Mid-term assessment; student evaluation  Miscellaneous modelling issues (initialization, lookup graphs, co-flows, GMB) | AG |  |
| C11 | Thu, 07/06 | Practice session: modelling exercises I | ID/MB |  |
| 24 | C12 | Mon, 11/06 | Growth dynamics  Managing market growth dynamics: Modelling the Interpolis case | AG | Akkermans, ch. 6; Prepare model |
| C13 | Thu, 14/06 | Practice session: modelling exercises II | ID/MB |  |
| 25 | C14 | Mon, 18/06 | Archetypal dynamic behaviour and modelling modules  Decision traps in projects: Modelling the TechCo case | AG | Akkermans, ch. 7; Prepare model |
| C15 | Thu, 21/06 | Practice session: modelling exercises III | ID/MB |  |
| 26 | C16 | Mon, 25/06 | Validity of system dynamics models  Capacity building and quality issues: Modelling the first KPN case | ID | Akkermans, ch. 9; Prepare model |
| C17 | Thu, 28/06 | *Guest lecture: Alexander Zock, PhD -- Irrelevance, irrationality and irresponsibility, the three curses of the organizational use of System Dynamics* | | |
| 27 | C18 | Mon, 02/07 | Implementation issues  Managing buyer-supplier collaboration: Modelling the second KPN case | AG | Akkermans, ch. 12; Prepare model |
| C19 | Thu, 05/07 | Practice session: modelling exercises IV | ID/MB |  |
| 28 | C20 | Mon, 09/07 | Synopsis of the remaining models in the textbook | AG | Akkermans,  chs. 8, 10, 11 |
| C21 | Thu, 12/07 | Practice session: modelling exercises V | ID/MB |  |
| 29 | C22 | Mon, 16/07 | Course summary | AG | Akkermans, ch. 13 |
| C23 | Thu, 19/07 | Q&A | ID/MB |  |

Structure

Classes C1–C6 set the scene by making clear that dynamic complexity is tricky to understand for humans. Modelling and simulation is advocated as a way to better deal with dynamic issues in supply chain management. This part also addresses the basics of Vensim and makes use of an experiential learning exercise (the Beer Game).

Classes C7–C21 deal with specific topics of supply chain dynamics. General information about the issues is provided; then, a specific case is modelled with system dynamics and analysed regarding its general insights. Furthermore, students’ modelling skills are enhanced by practice tutorials.

C22 and C23 conclude the course with a summary and Q&A session.

References to readings

Akkermans, H.: Supply Chain Dynamics – Mastering Disruptive Change in Innovation-Driven Industries, 2014, Uitgeversgroep [ISBN 978-94-002-1608-2], pp. 1–378.

Senge, P.M.: The Fifth Discipline – The Art and Practice of the Learning Organization, 1990, Currency Doubleday, pp. 27–54.

Sterman, J.D.: Business Dynamics – System Thinking and Modeling for a Complex World, 2000, Irwin McGraw-Hill, pp. 83–105.

Software

Download and install Vensim PLE on your computer: <http://vensim.com/free-download/>.

A tutorial for Vensim PLE by Craig Kirkwood is available at [http://www.public.asu.edu/~kirkwood/sysdyn/SDRes.htm](http://www.public.asu.edu/%7Ekirkwood/sysdyn/SDRes.htm).