



Supply Chain Dynamics (SCD)

Summer term 2020, version: 16/04/2020

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: Dr Matin Mohaghegh; tutorials: Ivan Đula 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 17.73 and Thursdays, 17:30–19:00 in KII M 17.73 or online (see below)

First class: Thursday, 16 April, 17:30, then every week on Monday and Thursday until term ends (details see timetable)

Recommended requirements

Introductory bachelor level course in operations management and/or supply chain management

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;
- apply and develop simple supply chain models built with system dynamics;
- 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. Students are expected to attend all sessions and actively engage in classroom discussions. They are supposed to study the reading assignments before class.

Important note: at the time of this writing, it is unclear which part of the lecture period needs to be conducted online in the summer term 2020 due to the Corona crisis. During the online teaching period, pre-recorded lectures will be provided that—together with the mandatory reading assignments—lay the foundation of this course. The teachers will be available via a forum on Ilias to answer any questions remaining. The hands-on and practice sessions (see timetable) will be held as interactive online events (tool to be announced) at the times indicated below. The Beer Distribution Game [C2] will be played online (further information will be communicated soon).

Examination

Student examination 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.

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).

Important note: at the time of this writing, it is unclear how examinations can be conducted in the summer term 2020 due to the Corona crisis. How the mid-term assessment and the final exam can be administered, will be communicated later.

Timetable

Week		Date	Topic	Reading assignment
17	C1	Mon, 20/04	Introduction to and motivation for course	
	C2	Thu, 23/04	Experience dynamics! The Beer Distribution Game I	
18	C3	Mon, 27/04	The Beer Distribution Game II Beer Distribution Game: debriefing Systemic causes of supply chain dynamics	Senge (1990), ch. 3

	C4	Thu, 30/04	Behavioural and operational causes of supply chain dynamics The case for modelling and simulation	Sterman (2000), ch. 1; Lee et al. (1997)
19	C5	Mon, 04/05	An introduction to system dynamics	Sterman (2000), ch. 4
	C6	Thu, 07/05	Practice session: identifying stocks and flows, feedback loops	Sterman (2000), ch. 6
20	C7	Mon, 11/05	Simple dynamic inventory models	Sterman (2000), ch. 7.1&8.3
	C8	Thu, 14/05	Hands on session: getting to know Vensim	Kirkwood (2005)
21	C9	Mon, 18/05	Growth dynamics of organizations	Sterman (2000), ch. 8.1, 8.2, 8.4, 8.5
22	C10	Mon, 25/05	Aging chain models and their behaviour	Sterman (2000), ch. 12.1
	C11	Thu, 28/05	Practice session: modelling exercises I	
23	<i>Pentecost holidays, no classes</i>			
24	C12	Mon, 08/06	Mid-term assessment Business cycles and oscillations	Sterman (2000), ch. 17
25	C13	Mon, 15/06	Course evaluation Dynamic production/supply chain models	Sterman (2000), ch. 18
	C14	Thu, 18/06	Practice session: modelling exercises II	
26	C15	Mon, 22/06	Validity of system dynamics models and implementation issues	Sterman (2000), ch. 21
	C16	Thu, 25/06	Practice session: modelling exercises III	
27	C17	Mon, 29/06	A current research project based on system dynamics	
	C18	Thu, 02/07	Practice session: modelling exercises IV	
28	C19	Mon, 06/07	Archetypal dynamic behaviour and modelling modules	Senge (1990), app. 2
	C20	Thu, 09/07	Practice session: modelling exercises V	

29	C21	Mon, 13/07	Summary: Modelling and simulation as research methods	Sterman (2000), ch. 22
	C22	Thu, 16/07	Q&A	

References to readings/cases

Kirkwood, C.W. (2005): Vensim PLE Quick Reference and Tutorial, available at <http://www.public.asu.edu/~kirkwood/sysdyn/SDRes.htm>.

Lee, H. L., Padmanabhan, V., & Whang, S. (1997). Information distortion in a supply chain: the Bullwhip effect. *Management Science*, 43(4), 546-558.

Senge, P.M. (1990): *The Fifth Discipline – The Art and Practice of the Learning Organization*, Currency Doubleday.

Sterman, J.D. (2000): *Business Dynamics – System Thinking and Modeling for a Complex World*, Irwin McGraw-Hill.

Software

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