

Course

Strategic behavior in service systems

Date:	Thursday February 22 and Friday February 23
Time:	Morning session (2 hours) and afternoon session (2 hours) on both days
Location:	Eindhoven University of Technology, Building Paviljoen U56
Course director:	Prof. Moshe Haviv
ECTS:	0.5 (attendance) – 2 (attendance + assignment)
Course fee:	Free for TRAIL/Beta/OML members; others contact the TRAIL office
Registration:	Via Research School Beta

Objectives:

- to rehearse the basics on queues and congestion
- to make familiar the model of non-cooperative games and to learn of the solution concept of Nash equilibrium
- to incorporate the above two in the subject of strategic decision making in models which involve waiting
- to make familiar via a number of examples how the actual strategic behavior is being formed
- to deal with social (as opposed to individual) optimization and show how it can be reached even when decision making is decentralized

Course Description:

1. Single server models: The M/M/1 and M/G/1 queues. Waiting times and externalities. The inspection paradox.
2. The foundations of non-cooperative games: Strategy profiles, rewards, Nash equilibrium. Symmetric games.
3. Decision making in queues.
Examples:
 - whether to join or not
 - whether to seek for priority or not
 - public vs. private service
 - server selection and routing
 - paradoxes in service systems
4. Optimization in service systems via regulation
Examples:
 - charging entry fees
 - contracts
 - auctioning for position or priority
 - moving away from the first-come first-serve regime

Assignments:

Two sets of homework exercises (one set per day)

Course Materials:

Hassin, R. and M. Haviv (2003), *To queue or not to queue: Equilibrium behavior in queueing systems*, Klower. Also in <http://www.math.tau.ac.il/~hassin/main.pdf>

Prerequisites:

Basics in probability: discrete and continuous random variables. The exponential distribution and the Poisson process.

Reading:

It is recommended to read on queues from operations research in introductory text such as Winston's *Operations Research: Applications and Algorithm*, Chapter 22.

Notes:

- The maximum number of participants is 20.
- It is possible to attend the first meeting only, but to attend the second meeting you must have attended the first meeting. Priority will be given to participants who are attending both meetings and will do the course assignments.
- Participants are asked to subscribe by January 31.

Hotel suggestions in Eindhoven:

- Sandton Eindhoven Centre, Stratumseind 23D, 5611 NA Eindhoven, 040-212 1330
- Boutique Hotel Glow, Keizersgracht 13 A-B, 5611 GC Eindhoven, 040-782 0078
- Hotel La Reine, Wilhelminaplein 3, 5611 HE Eindhoven, 040-820 0311
- The Student Hotel Eindhoven, Stationsweg 1, 5611 AA Eindhoven, 040-231 9792
- Crown Inn, Markt 35, 5611 EC Eindhoven, 040-245 4545
- Queen Hotel, Markt 7, 5611 EB Eindhoven, 040-245 2480
- Holiday Inn Eindhoven, Veldmaarschalk Montgomerylaan 1, 5612 BA Eindhoven, 040- 235 8235
- Park Plaza Eindhoven, Geldropseweg 17, 5611 SC Eindhoven, 040-241 6500