



Aalto University
School of Electrical
Engineering

ELEC-E7450

Performance Analysis P (5 cr)

Spring 2020

Pasi Lassila

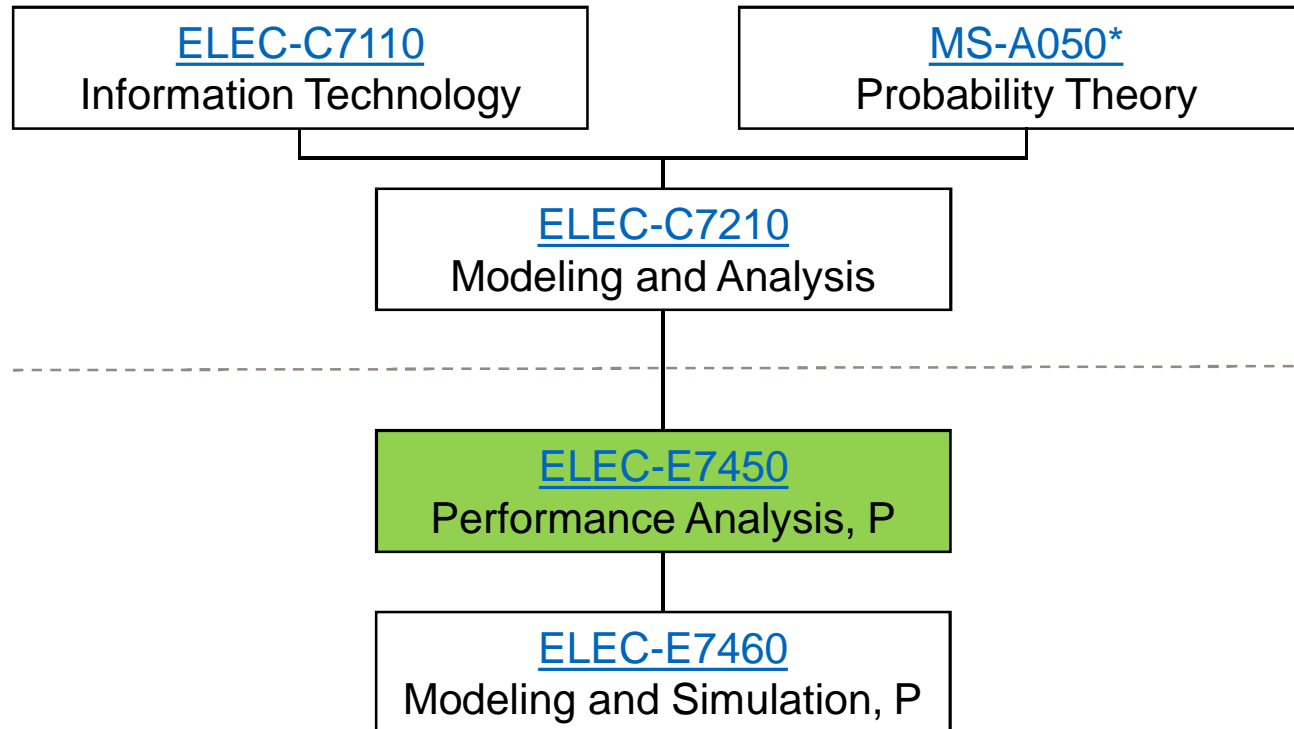
Department of Communications and Networking

General information

- Objective of the course:
 - *ELEC-E7450 Performance Analysis* covers basic queueing models (such as M/G/1) used to analyse and optimise the performance of various computer and communication systems.
 - It replaces earlier courses *S-38.3141 Teletraffic Theory* and *S-38.3143 Queueing Theory*
- Lectures and exercises:
 - Pasi Lassila, Pasi.Lassila@aalto.fi
- Course material:
 - lectures and exercises available on *MyCourses*

<https://mycourses.aalto.fi/course/view.php?id=24728>

Status



Learning outcomes

- After taking the course, the student ...
 - Is able to apply Markov processes and regenerative processes to model various computer and communication systems
 - Is able to construct, analyse and optimise stochastic queueing models to evaluate the performance of the system
 - Comprehends selected applications of the performance analysis of modern computer and communication systems

Lectures, exercises and exam

- All lectures and exercise sessions organized remotely using Zoom
 - You can find the schedule in MyCourses home page in Section “Schedule and lecture material”
 - Just click on the link in the schedule and you should be able to join the event through your browser (might require installing a plugin). Note, you can also install Zoom software through Aalto IT.
- **Lectures** (6 hours/week):
 - on Tuesdays at 9:15-12 (starting on **14 Apr**)
 - on Thursdays at 9:15-12
- **Exercises** (2 hours/week):
 - on Wednesdays at 16:15-18 (starting **already** on **15 Apr**)
- **Examination** (3 hours):
 - on Wednesday, **27 May**
 - 5 problems, max. 30 points
 - at least one retrieval examination (Aug/Sep)

More details on the exercises

- Homework exercises:
 - 6 problems per week
 - All problems are retrieved and graded
 - available on *MyCourses* about a week before the exercise class
- Retrieved problems:
 - Upload your solutions to the *exercise folder in MyCourses* before the beginning of the exercise session
 - Note the possibility to upload ends exactly 16:15 when the exercise session begins
 - Please make sure that your scans are readable so that grading is possible
 - Grading: {0, ½, 1} homework points per problem
 - Total maximum points from exercises: 36

More details on the exercises (cont.)

- Bonus points:
 - 12 homework points = minimum requirement to pass the course
 - 12 – 14 homework points = 0 bonus points in the examination
 - 15 – 17 homework points = 1 bonus point in the examination
 - 18 – 20 homework points = 2 bonus points in the examination
 - 21 – 23 homework points = 3 bonus points in the examination
 - 24 – 26 homework points = 4 bonus points in the examination
 - 27 – 29 homework points = 5 bonus points in the examination
 - 30 – 36 homework points = 6 bonus points in the examination
 - Bonus points valid until April 2021
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Course completion

- Get at least 12 homework points, and
- pass the examination
- Final evaluation and grading may still change!

Schedule

Week	16	17	18	19	20	21	22
Lectures	1,2	3,4	5,6	7,8	9,10	11 (Tue)	Exam
Exercise classes	1	2	3	4	5	6	

Planned contents

- Weeks 16-17: ELEC-C7210 recap
 - basic queueing models, Poisson process, Markov processes, M/M/1
- Weeks 17-18: Single server queue M/G/1
 - regenerative processes, analysis, FIFO, PS
- Weeks 18-19: Queueing networks
 - tandem queue, open queueing networks, closed queueing networks
- Weeks 19-20: Processor sharing networks
 - elastic traffic, fairness concepts, Whittle networks, balanced fairness
- Week 21: Summary
- Week 22: Exam