IC2011 Struktur och dynamik i nätverk 7,5 hp

Structure and Dynamics of Networks

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Fastställande

Kursplan för IC2011 gäller från och med HT08

Betygsskala

A, B, C, D, E, FX, F

Utbildningsnivå

Avancerad nivå

Huvudområden

Särskild behörighet

Eligibility for "free movers" applying to single courses:

Completed upper secondary schooling incl documented proficiency in English

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

Course goals

On completion of this course, you will be able to, regarding?

knowledge and understanding:

· identify, describe, and classify basic facts and concepts of network theory, abilities that facilitate the use of higher cognitive skills, such as creativity.

· describe course core content and its basic contextual application.

· relate fundamentals of network theory to real world instances.

· generalize basic terms, concepts, and principles of network theory to a few (possibly) real instances.

· relate or interconnect the different subsections of the course to each other as cohesively as the subject matter permits.

skills and capacities

· translate a simple mathematical description of a network, or part of the mathematical description, to a function/algorithm amenable to computer modelling.

· communicate your understanding to others and follow others? arguments regarding, or related to, basic ideas and concepts of network theory in written and spoken English.

· summarize course content, showing good sense for essential points, leaving out lesser ones.

· to participate constructively in a team project where peer assessment constitutes an integral part. Hopefully the evaluation of others? work on the same task will deepen the understanding of understanding itself and how it is communicated, strengthening the learning process.

· generate innovative, good ideas, imaginative ideas, or ?good mistakes? (which will be necessary for the highest grade).

values and attitudes

· shoulder social responsibility.

· take necessary creative risks with the intent to extend current level of understanding and knowledge base.

· reflect on whether your newly acquired understanding of networks affects your view of the functions of society, environmental issues, and life at large (learning outcome for higher grades).

Kursinnehåll

Course contents

- Basics of network theory
- Power law degree distributions of links
- Scale-free networks
- The small-world effect
- Agent based social simulation
- Spatial epidemiological processes and modelling
- Network resilience and percolation theory
- Random graphs

Kursupplägg

Course disposition

Lectures, assignments, seminars.

Kurslitteratur

Course literature

Mark Newman, Albert-Laszlo Barabasi, Duncan J. Watts: The Structure and Dynamics of Networks

Upplaga : 1 ISBN 0691113572

M.E.J. Newman: "The structure and function of complex networks", SIAM Review 45, 167-256 (2003). Review article, 58 pages, 16 figures, 3 tables, 429 references. PDF at: http://www.arxiv.org/abs/cond-mat/0303516

(572 k)

Lighter reading:

Albert-László Barabási: "Linked - The New Science of Networks",

Perseus Publishing; ISBN: 0738206679.

or

Mark Buchanan: "Nexus - Small Worlds and the Groundbreaking Science of

Networks", W.W. Norton & Company; ISBN: 0393041530.

Examination

- INL1 - Inlämningsuppgift, 2,0 hp, betygsskala: P, F
- TEN1 - Tentamen, 5,5 hp, betygsskala: A, B, C, D, E, FX, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

Examination comment

The examination consists of two parts. One part is a team project which can be awarded the grades pass or fail, making up 2 hp. The other part is a portfolio consisting of the written exam and a home assignment. The different parts of the portfolio will contribute about 50 per cent each to the final grade, but the weighting may vary as the portfolio will be regarded as an integral whole. The portfolio can be given the grades A/B/C/D/E/Fx/F, which also will be the final grade of the whole course if the team project has been cleared.

Övriga krav för slutbetyg

Requirements for final grade

The portfolio can be given the grades A/B/C/D/E/Fx/F, which also will be the final grade of the whole course if the team project has been cleared.

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.