Course Description
This course will expose students to problems of the current Internet and introduce the main concepts and approaches of a new alternative approach: Information-Centric Networking.

We will study a set of research papers on the origins of the Internet, the issues it is facing today in various areas and the various approaches taken to rectify them in an Information-Centric manner. The course is designed as an advanced course in computer/communication networks and to prepare students for research in the areas of Computer Communications, Networking, and Distributed Systems.

The course is targeted to both graduate students and advanced undergraduates. I will also adjust content, format, assignments, and project to the interests and goals of the participants.

Please email me if you are (even if somewhat) interested (to keep you informed of any developments in the course offering), or if you have questions, requests, or suggestions.

Prerequisites
There are no formal prerequisites for the course. However, the course is to students who have mastered the material of at least one networks course and will address advanced networks topics.

Course Material
There will be no textbook used in the course; course material is or will be made available online, mostly:
- journal articles and conference papers
- presentations

Grading
Grading will be based on the following:
- Active participation in class (this will require reading papers in advance).
- Presentations of papers in class and directing the discussion (with the help of the instructor).
- Brief written review of one of the areas covered, summarizing the state-of-the-art or current research (or other similar paper).
- A term project, broadly related to the class, to be proposed by students (with ideas and suggestions provided by the instructor) and accepted by the instructor.

There will be no formal exams.

Overview of Information-Centric Networking
The current Internet architecture is founded upon a host-centric communication model, which was appropriate for coping with the needs of the early Internet users. Internet usage has evolved however, with most users not mainly interested in communicating with a specific host anymore; they are instead interested, most of the time, in accessing (often vast amounts of) information, irrespective of its physical location. This paradigm shift in the usage model of the Internet, along with the pressing needs for better security, mobility support etc. has led researchers into considering a radical change of the Internet
architecture. Information-Centric Networking (ICN) has emerged as a new, promising, paradigm for the Future Internet. Inspired by the fact that the Internet is increasingly used for the dissemination of information, rather than for pair-wise communication between end hosts, ICN aims to reflect current and future needs better than the existing Internet architecture. By naming information at the network layer, ICN favors the deployment of in-network caching (or storage more generally) and multicast mechanisms, thus facilitating the efficient and timely delivery of content to the users. However, ICN is more than a new networking paradigm for content distribution, with related research initiatives employing information-awareness as the means for addressing a series of limitations in the current Internet architecture and fulfilling the already identified requirements and objectives for the Future Internet.

**Related Terms**—Content-Centric Networking, Named Data Networking, Publish-Subscribe, Future Internet, Internet Architecture

Two key research projects, whose architectures will be studied (and their platforms used for projects, if desired), are:

(b) Publish Subscribe Internet Technology (PURSUIT): [http://www.fp7-pursuit.eu/PursuitWeb/](http://www.fp7-pursuit.eu/PursuitWeb/)

**Related Courses**

There have been similar, but different, courses already offered; e.g.:

- One semester elective cross-listed (grad/ugrad) course at AUEB by a colleague and collaborator (and UCSD PhD—G. Xylomenos): [http://www.fp7-pursuit.eu/PursuitWeb/?page_id=736](http://www.fp7-pursuit.eu/PursuitWeb/?page_id=736)
- One week intensive course offered by my group at AUEB as part of the Euro-NF Network of Excellence: [http://icn-phd-course.euro-nf.net/index.php/presentations](http://icn-phd-course.euro-nf.net/index.php/presentations)
- A PURSUIT Summer School on ICN: [http://www.fp7-pursuit.eu/PursuitWeb/?page_id=463](http://www.fp7-pursuit.eu/PursuitWeb/?page_id=463)

**Related Workshops and Journal Special Issues**

- [ICN 2011](http://www.fp7-pursuit.eu/PursuitWeb/?page_id=463), with ACM SIGCOMM 2011, in Toronto, ON, Canada,
- [ICN 2012](http://www.fp7-pursuit.eu/PursuitWeb/?page_id=463), with ACM SIGCOMM 2012, in Helsinki, Finland,
- [NOMEN 2012](http://www.fp7-pursuit.eu/PursuitWeb/?page_id=463), with IEEE INFOCOM 2012, in Orlando, FL, USA,
- *IEEE Communications Magazine*, vol. 50, no. 7, feature topic on ICN, July 2012,
  and others.