Course Information

Course Code 5675410
Course Section 1
Course Title HIGH-SPEED AND EMBEDDED COMPUTER NETWORKING
Course Credit 3
Course ECTS 8.0

Course Catalog Description

Prerequisites
No prerequisites

Schedule Monday, 13:40 - 16:30, EA207

Instructor Information

Name/Title Prof. Dr. ŞENAN ECE SCHMIDT
Office Address A-402
Email eguran@metu.edu.tr
Personal Website http://users.metu.edu.tr/eguran/
Office Phone 210 4405
Office Hours None

Course Objectives
The students will learn techniques for designing computer networks and network devices that work under real-time constraints.

Course Learning Outcomes
This course is designed to provide the students with a research-oriented point of view on computer networking under time/resource/performance constraints. The first part of the course is dedicated to high-speed router and switch design with Quality of Service support. We consider both switches in the backbone networks and on-chip networks. The second part of the course focuses on networks for embedded systems with real-time performance guarantees. Both parts of the course include scheduling algorithms to achieve performance guarantees. The course follows both fundamental and recent research papers. The students are expected to perform paper readings and reviews as well as a term project.

Tentative Weekly Outline

<table>
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<tr>
<th>Week</th>
<th>Topic</th>
<th>Relevant Reading</th>
<th>Assignments</th>
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### Tentative OUTLINE

- Introduction
- High-speed networking in the network backbone
  - Basic switch/router architectures
  - Data Plane QoS Support, Fair Scheduling Algorithms
  - Interconnection architectures
  - Fabric Arbitration and Scheduling
- On-chip switches and networking
- Packet processing and table look-up
- Networks for embedded systems
  - Basics of real-time networks
  - In-vehicle networking
  - CAN bus
  - FlexRay
- Real-time Ethernet
  - AFDX
  - TSN
- Other Topics according to available time

### Course Textbook(s)


### Supplementary Readings / Resources / E-Resources

**Readings**

- Selected journal and conference papers, online manuals, white papers, and specification information for commercial products

### Course Grading

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<tr>
<th>Deliverable</th>
<th>Grade Points</th>
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<tbody>
<tr>
<td>Midterms</td>
<td>40</td>
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<tr>
<td>Paper Review</td>
<td>5</td>
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<tr>
<td>Final</td>
<td>30</td>
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<tr>
<td>Project</td>
<td>25</td>
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<td><strong>Total</strong></td>
<td><strong>100</strong></td>
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