CENG486 ADVANCED TOPICS IN NETWORKING
Tentative Syllabus v1 (February, 2024), 2023-2024 Spring

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Office Hour: TBD and by appointment
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Schedule: TBD
Communication: http://odtuclass.metu.edu.tr (CENG486)
Course Objectives: At the end of this course, you will be able to:
1. Compare and contrast various state-of-the-art or emerging network design and management approaches in software-defined networks (SDN), network function virtualization (NFV), Internet of things (IoT), 5G and beyond (5GB), and programmable data planes (PDP)
2. Analyze, design, implement and evaluate virtualized, software-defined network functions, services, or protocols using SDN and NFV
3. Define the emerging architectures of wireless mobile networks, and compare/contrast them with their wired counterparts
4. Analyze the performance of computer networks, design analytical models for performance evaluation and apply queueing theory for solving performance problems in emerging networks
Textbook: No textbooks, please refer to references
References: Recent papers on networks (ACM Sigcomm, IEEE Infocom, ICC, Globecom, WCNC)
- Bertsekas, Data Networks, 2nd Ed., Prentice Hall, 1992
Prerequisites: CENG435 (CENG222 will be of use).
Grading: Catalog grading will be employed.

Midterm Exam ................................................................. 25%
Final .............................................................................. 30%
Programming Assignment (PA) ....................................1 × 15%
Paper Critique (PC) Workshop .....................................3 × 5%
Queueing Theory Assignment (QTA) ..........................1 × 15%

Final Exam Entrance Condition: To be allowed to take the final exam, you MUST collect at least 25 points from course activities PA, PC, QTA.
Makeup policy: A makeup activity is possible only if a legally documented excuse (e.g., medical report approved by METU Medical enter) is provided.
Programming Assignment (PA): The programming assignment must be well documented and complete with test runs conforming to software engineering principles. Any work you submit must be your own. No ChatGPT or similar tools.
Paper Critique (PC) Workshop: Any work you submit must be your own. No cheating, collaboration. No ChatGPT or similar tools. We will employ peer assessment tool of Odtuclass.
Queueing Theory Assignment (QTA): Any work you submit must be your own. No cheating, collaboration. No ChatGPT or similar tools.
Late delivery: Late submission is not allowed.

Academic honesty: There will be no tolerance to cheating in the exam, to plagiarism (copying someone else’s work as if it is yours) and to taking advantage in (group) assignments and projects. The student who cheats will fail the course and be punished according to METU regulations.

**Tentative Course Outline:**

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<th>Week</th>
<th>Topic</th>
<th>Reading</th>
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<td>Courseware, Physical Layer</td>
<td>Ch1-6 Stallings</td>
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<td>2</td>
<td>Physical Layer</td>
<td>Ch1-6 Stallings</td>
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<td>Wireless Networks</td>
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<td>Wireless Mobile Networks</td>
<td>Ch. 7 Kurose-Ross</td>
<td>PC1</td>
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<td>Networking for Online Games</td>
<td>TBA</td>
<td>PA out</td>
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<td>6</td>
<td>SDN/NFV</td>
<td>Ch.7, 8 Stallings 5G</td>
<td>PC2</td>
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<td>7</td>
<td>Multimedia Networking</td>
<td>Ch.7 Kurose-Ross, 6 Ed.</td>
<td>PA in</td>
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<td>8</td>
<td>Quality of Service</td>
<td>Lundqvist</td>
<td>Midterm</td>
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<td>9</td>
<td>Quality of Service</td>
<td>Lundqvist</td>
<td>PC3</td>
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<td>10</td>
<td>Markov Chains</td>
<td>Hillier</td>
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<td>Birth-death Process (BDP)</td>
<td>Hillier</td>
<td>QTA out</td>
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<td>Simple Queues on BDP</td>
<td>Bertsekas, Hillier</td>
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<td>Non-exponential Queues</td>
<td>Hillier</td>
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<td>Queueing Networks or leftovers</td>
<td>Bertsekas, Hillier</td>
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