

CS 576 – Computer Networks and Distributed Systems

Mo 15:00-16:15, Wed: 15:00-16:15

Instructor: Dr. Erekle Magradze

Office Hours: Upon in advance agreement

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Course Web Page: Corresponding Page on Blackboard

## Materials

Required:

- Required text: Peterson and Davie, "Computer Networks, A Systems Approach", 5th. Edition, Morgan Kaufman, ISBN: 978-0123850591.2.
- CS 576 lecture notes/slides (available on Blackboard)

Optional:

- Peter S. Pacheco An introduction to parallel programming / Peter S. Pacheco. p. cm. ISBN 978-0-12-374260-5
- CUDA by example : an introduction to general-purpose GPU programming/Jason Sanders, Edward Kandrot. p. cm. Includes index. Addison-Wesley ISBN 978-0-13-138768-3 (pbk. : alk. paper)

## Course Information:

**Catalog description:** Basic networking concepts such as seven-layer reference model, transmission media, addressing, sub netting and super netting, networking devices, LANs and WANs, internetworking, distributed processing, and client-server model. Basic concepts and protocols of TCP/IP protocol suite and basic Internet services.

**Prerequisites:** Credit or concurrent registration in Computer Science 570 (OS).

## Goals:

After successful completion of the course, students will be able to:

- Ability to state the name of each layer in OSI and TCP/IP protocol stacks.
- Ability to explain how local and wide area networks operate.
- Ability to estimate the performance (e.g. throughput or latency) of a network based on certain environmental and system settings.
- Ability to recommend a suitable solution of IP addresses and network masks based on specific requirements.
- Ability to describe and analyze different network topologies, and find the shortest path based on certain routing algorithms.
- Ability to use MPI package for writing the parallel algorithms.
- Ability to deploy and submit the distributed computing system - batch system.
- Ability to write simple programs using GPU programming platform CUDA.

## **Relationship to CS Program Course Outcomes**

CS 576 addresses the following CS Program course outcomes:

- b) An ability to analyze a problem, and identify and define the computing requirements
- j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices. Topics Covered

## **Topics Covered:**

- Introduction of Networks and Computer Communications
- Link Layer Technologies: LAN, Ethernet and Multiple Access Collision Control
- Network Layer Routing Algorithms, Protocols and Technologies
- Internet Protocols v4 and v6, Multicast, Border Gateway Protocol
- Transport Layer Protocols: TCP and UDP
- End to End Rate and Congestion Control
- Fragmentation and Retransmission
- Data Presentation and Application Layer Protocols
- Concepts and Practices of Parallel Programming
- Distributed Computing systems - Batch System
- Basics of GPU Programming

## **Course Schedule:**

A week by week schedule may be found on the blackboard. There will be five problem sets, will be assigned with deadlines varying from few days to one week depending upon the complexity. Problem sets consist of a combination of short answer prose and programming. Work must be shown for programs, one must use appropriate levels of abstraction and be well commented. See the course guidelines provided during the first lecture on appropriate program structure. Solution of each homework will be discussed in detail after the deadline.

Midterm dates are specified in the detailed course schedule available on blackboard.

## **Grading policies:**

Maximum points for each homework assignment is 6 points, there are 5 homework assignments during the course. Total contribution of homework assignments grades to the final mark is 30%.

Midterm Exam I - 20% of total grade

Midterm Exam II - 20% of total grade

Final Exam - 30% of total grade

**Grading Scale:**

A: 100%-93%; A-: 92.99%-90%;  
B+: 89.99%-87%; B: 86.99%-83%; B-: 82.99%-80%;  
C+: 79.99%-77%; C: 76.99%-73%; C-: 72.99%-70%;  
D+: 69.99%-67%; D: 66.99%-63%; D-: 62.99%-60%;  
F: 59.99%-0%.

**Accommodation of disabilities**

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from Student Disability Services. Your cooperation is appreciated.

**Academic Honesty:**

You are free to discuss ideas and strategies for approaching problems with others, but students must complete work on their own. Using other people's work in any form (i.e. the web, other students) will result in disciplinary action and failing the course. Note that pair programming teams are an exception to this rule. Plagiarism is unacceptable and will not be tolerated. You are responsible for understanding plagiarism; the library has a tutorial at <http://library.sdsu.edu/guides/tutorial.php?id=28>. If you have any questions about plagiarism after taking the tutorial, I will be happy to assist you.