Computer Networks and Distributed Systems (CS 576) - Timetable

Location: ISU, STEM building; Room: T302; Time: 15^{00} - 16^{15}

Date	Day	Type	Details
20.01.2020	Monday	Lecture	Introduction to the course syllabus and policies, Introduction to Computer Networks
22.01.2020	Wednesday	Lecture	Introduction to Networking Concepts and Distributed Systems
27.01.2020	Monday	Lecture	Ethernet Link
29.01.2020	Wednesday	Lecture	Basic Routing
03.02.2020	Monday	Lecture	Advanced Routing
05.02.2020	Wednesday	Lecture	Network Devices
10.02.2020	Monday	Lecture	Transport Layer
12.02.2020	Wednesday	Lecture	Network Congestion and control
17.02.2020	Monday	Lecture	UDP Protocol, Protocol Specifications and Examples
19.02.2020	Wednesday	Lecture	TCP/IP Protocol, Protocol Specifications and Examples
24.02.2020	Monday	**Midterm Exam 1 (1 hour 15 minutes)**	

26.02.2020	Wednesday	Lecture	Introduction to parallel computing, Shared and distributed memory, The von Neumann architecture, Processes, multitasking, and threads, The basics of caching, Cache mappings, Caches and programs: an example, Virtual memory, Instruction-level parallelism, Hardware multithreading
02.03.2020	Monday	Lecture	Parallel Hardware, SIMD systems, MIMD systems, Interconnection networks, Cache coherence, Shared-memory versus distributed-memory, Parallel Software, Caveats, Coordinating the processes/threads, Shared-memory, Distributed-memory, Programming hybrid systems, Input and Output,
04.03.2020	Wednesday	Lecture	Performance, Speedup and efficiency, Amdahl's law, Scalability, Taking timings, Parallel Program Design, An example, Writing and Running Parallel Programs, Assumptions, Summary: Serial systems, Parallel hardware, Parallel software, Input and output, Performance, Parallel program design, Assumptions
09.03.2020	Monday	Lecture	Distributed-Memory Programming with MPI: Compilation and execution, MPI programs, MPI Init and MPI Finalize, Communicators, MPI Comm size and MPI Comm rank, SPMD programs
11.03.2020	Wednesday	Workshop	Parallelisation of fundamental algorithms in numerical linear algebra and scientific computing: matrix-vector multiplication, matrix-matrix multiplication, Problem solving using MPI, **Home Work 1**
16.03.2020	Monday	Lecture	Discussion of solving the System of Linear Equations using the Gauss Method, **Discussion of solutionts of Home Work 1**
18.03.2020	Wednesday	Workshop	Implementation of solution the system of linear equations using the Gauss method, using the MPI library, **Home Work 2**
23.03.2020	Monday	Lecture	Introduction with PyMPI, multihost parallelisation over networks, **Discussion of solutions of Home Work 2**
25.03.2020	Wednesday	Workshop	Hands on examples using the PyMPI, **Home Work 3**
30.03.2020	Monday	Lecture	Examples of Distributed Systems: Batch Systems, Torque, **Discussion of solutions of Home Work 3**
01.04.2020	Wednesday	**Midterm Exam 2 (1 hour 15 minutes)**	

06.04.2020	Monday	Lecture	Structure and scheduling strategies of Batch Systems, **Home Work 4**
08.04.2020	Wednesday	Workshop	Hands on deployment of Torque batch system and running the batch jobs
13.04.2020	Monday	Lecture	Apache Hadoop and HDFS, MapReduce Algorithm, **Discussion of Solutions of Home Work 4**
15.04.2020	Wednesday	Workshop	Deployment of Apache Hadoop/HDFS system and running the mapreduce tasks, **Home Work 5**
20.04.2020	Monday	Holiday	Orthodox Easter Monday
22.04.2020	Wednesday	Lecture	Introduction of Apache Spark, **Discussion of Solutions of Home Work 5**
27.04.2020	Monday	Workshop	Deployment of Apache Spark cluster on a single host and submitting the jobs
29.04.2020	Wednesday	Lecture	Introduction to GPU programming using CUDA
04.05.2020	Monday	Workshop	Introduction to PyCUDA and running examples using PyCUDA
06.05.2020	Wednesday	Lecture	Summary of the course, Answering the questions, Preparation for the Final Exam

Final Exam (2 hours)

There will be 5 homeworks - in total there will be **30 points**, each homework will be evaluated maximum by **6 points -** 30% of total score

Midterm Exam I - maximum **20 points -** 20% of total score

Midterm Exam II - maximum **20 points -** 20% of total score

Final Exam - **30 Points -** 30% of total score

Total - 100 Points