| | | | | |
|---|---|---|---|---|
| **Obuda University**<br>John von Neumann Faculty of Informatics | | | Institute of Applied Informatics | |
| **Name and code:** *Software Development in Parallel and Distributed Environment* (NAISPCENM) **Credits*: 4***<br><br>*2014/15 year I. semester* | | | | |
| | | | | |
| Subject lecturers: Dr. Miklós Kozlovszky, Balázs Kurtán | | | | |
| Prerequisites (with code): | | | | |
| Weekly hours: | Lecture: 2 | Seminar.: 0 | Lab. hours: 2 | Consultation: 0 |
| Way of assessment: | Project work & theoretical exam | | | |
| **Course description:** | | | | |
| *Goal*: The aim of the lecture is to deepen the knowledge of the students, regarding the design methods and questions for parallel computational systems, and the required programming skills. Students will learn, and obtain practical techniques used in parallel programming, such as thread handling, communication between threads, and synchronization. The lecture will give an additional overview on different programming variants of distributed systems. | | | | |
| *Course description:* See lecture schedule. | | | | |

| **Lecture schedule** | |
|---|---|
| *Education week* | *Topic* |
| 1. | Overview on parallel computational systems, and highlighted questions on their programming. Project work examples, ideas. (11.09.2014) |
| 2. | Design possibilities and methodologies of parallel algorithms. Processes. (18.09.2014) |
| 3. | Parallelism in modern operating systems. Thread handling I. (25.09.2014) |
| 4. | Basics of designing parallel algorithms. Thread handling II. (02.10.2014) |
| 5. | Parallel programming algorithms. Synchronization techniques. (09.10.2014) |
| 6. | Ordering, searching algorithms. Kernel level synchronization. (16.10.2014) |
| 7. | Holiday. (23.10.2014) |
| 8. | Discrete optimization. Producer-consumer problem. (30.10.2014) |
| 9. | Dynamic programming with parallelism. (06.11.2014) |
| 10. | Image processing with parallelized techniques. (13.11.2014) |
| 11. | Rector and Dean Holiday. (20.11.2014) |
| 12. | MPI Programming I. (27.11.2014) |
| 13. | MPI Programming II. (04.12.2014) |
| 14. | Defense of the project work. (11.12.2014) |

| **Project work schedule** | |
|---|---|
| *Education week* | *Topic* |
| 4. | Project work suggestion submission by the 5th of October. |
| 6. | Feedback from the lecturer. |
| 12. | Submission of project work with documentation by the 30th of November. |
| 14. | Presentation and defense of the project work. |

**Midterm requirements**

For the signature one must successfully complete the project work.

**Final grade calculation methods**

The final grade is formed from the project work grade and the exam grade.
Final grade = 50% project work + 50% exam
A minimum of 50% must be achieved at both parts.

| Achieved result | Grade |
|---|---|
| > 87% | excellent (5) |
| 75% - 87% | good (4) |
| 62% - 75% | average (3) |
| 50% - 62% | satisfactory (2) |
| < 50% | failed (1) |

A grade can be obtained in a different way (TVSZ 24.§), so that the lecturer offers a grade based on the Scientific Students Conference work of the student.

**Type of exam**

Theoretical test.

**Type of replacement**

In case of late project work submission, for an additional penalty fee, the work can be demonstrated. At the 14. week the student has to submit the project work AND write a replacement test. For the signature one must obtain at least 50% for each parts. If the project work is not finished until the last week of the semester, or the replacement test is failed, then the student can attend to a replacement exam in the first two weeks of the exam period.

**References**

Obligatory:
A. Grama, A. Gupta, G. Karypis, V. Kumar: Introduction to Parallel Computing, 2nd edition Addison-Wesley, 2003, ISBN 0-201-64865-2
B. Wilkinson, M. Allen, Parallel Programming, 2nd edition, Prentice Hall, 2005

Recommended:
J. Albahari: Threading in C#, http://www.albahari.com/threading/

Other materials: Lecture notes (download form https://elearning.uni-obuda.hu/)