<table>
<tr><td>Subject code:
P.1(3)</td><td colspan="3">Subject name: Parallel algorithms for multicore systems</td></tr>
<tr><td>Study load:
3 ECTS</td><td>Load of contact hours: 50</td><td>Study semester:
Autumn</td><td>Assessment:
5-points grade credit</td></tr>
<tr><td>Objectives:</td><td colspan="3">The goal of this course is to gain basic level knowledge on architecture of parallel data processing multiprocessor systems and technologies of parallel computing organization on distributed or shared memory multiprocessor systems.</td></tr>
<tr><td>Course outline:</td><td colspan="3">Topics covered:
1. Introduction to parallelism
2. Introduction to OpenMp
3. Introduction to MMP
4. Introduction to TBB
5. Introduction to Cilk Plus
6. Introduction to parallel programming tools usage based on Intel Parallel Studio as an example
7. Introduction to parallel algorithms based on the example of classical numeric methods sections
8. Principles of parallel computing systems architecture
9. Parallel programs modelling
10. Realization of various types of parallelism
11. Basic shared memory systems parallel programming tools usage

Contact lessons will be divided into two parts: lectures and parallel system development workshops with individual and team tasks.</td></tr>
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Learning Outcomes:	In the end of the course students have achieved following results: 1. Knowledge and basic skills on high-performance realization of known computational mathematics, data analyze and processing methods 2. Basic knowledge on parallel data processing multiprocessor computing systems architecture 3. Mastery of parallel computing on distributed or shared memory multiprocessor computing systems technologies 4. Skills on high-performance parallel computing software design and development
Assessment Methods:	Assessment includes ongoing and interim certification. Ongoing certification is delivered in form of the individual written-oral interview. Interim certification includes theoretical knowledge questionnaire and final project presentation.
Teacher(s):	Vyacheslav Tarasov
Prerequisite subject(s):	1. Operating Systems 2. Computer Architecture
Compulsory Literature:	Gergel V.P., Strongin R.G. Parallel Computing for Multiprocessor Systems. 2001 (2nd edition 2003)
Replacement Literature:	Voevodin V.V., Voevodin Vl.V. Parallel Computing. 2002.
Participation requirements:	None.
Independent work:	1. Definite integral solving 2. Prime numbers search 3. Sorting 4. Graph path search 5. Sparse matrix multiplication 6. Monte-Carlo parallel methods 7. Band matrix linear algebraic equation systems 8. Partial differential equations

Grading criteria scale or the minimal level necessary for passing the subject:	**Points distribution:** **Excellent** – Sufficient skills: correct and specific answers without major mistakes, several inaccuracies allowed; **Good** – Sufficient skills: correct and specific answers without major mistakes, two or three minor mistakes; **Satisfactory** – General understanding of the subject, several mistakes; **Unsatisfactory** – Insufficient understanding of the subject: wrong answer.
Information about the course:	Room ___, on ___ at ___
1) Date 1	**Lecture 1** Classroom presentation: Game definition, game designer responsibilities Classroom presentation: Game classification Homework: Game Development Companies overview
2) Date 2	**Game Design Workshop 1** Students presentations: Game Design Breakdown Classroom test: Game definition, game designer responsibilities (3 points)
3) Date 3	**Lecture 2** Classroom presentation: Game Elements Classroom presentation: Game Mechanics Homework: Game Design Breakdown
4) Date 4	**Game Design Workshop 2** Students presentation: Game Design Breakdown Classroom test: Game Elements, Game Mechanics (3 points)
5) Date 5	**Lecture 3** Classroom presentation: Roles in game development teams Classroom presentation: Ideation process in game design Homework: Ideation Challenge (5 points)
6) Date 6	**Game Design Workshop 3** Group classroom task: Game Ideas Generation Classroom test: Roles in game development teams (3 points)
7) Date 7	**Lecture 4** Classroom presentation: Game Ideas Assessment, GameCraft Homework: GameCraft for group projects

8) Date 8	**Game Design Workshop 4** Students presentations: GameCraft Analyses Report (10 points)
9) Date 9	**Lecture 5** Classroom presentation: Concept and design documents Homework: Writing concept and design documents (5 points)
10) Date 10	**Game Design Workshop 5** Students presentations: Concept and design documents Classroom test: Concept and design documents (3 points)
11) Date 11	**Lecture 6** Classroom presentation: Iterative game design Classroom presentation: Risks assessment Homework: Iteration plan for group projects (5 points)
12) Date 12	**Game Design Workshop 6** Students presentations: Iteration plan for group projects Classroom test: Risks assessment (3 points)
13) Date 13	**Lecture 7** Classroom presentation: Prototyping Homework: Prototypes for group projects
15) Date 14	**Lecture 8** Classroom presentation: Game genres specifics
16) Date 15	**Game Design Workshop 7** Classroom test: Game genres specifics (7 points) Group classroom task: Pen and Paper prototypes
17) Date 16	**Lecture 9** Classroom presentation: Player emotions and reactions Classroom presentation: Player goals and game pace Homework: Goals and Pace plan for group projects Homework: Analyses of well-known games pace and atmosphere
19) Date 17	**Lecture 10** Classroom presentation: Balancing Classroom presentation: Learning and difficulty curves Homework: Spreadsheet balancing
21) Date 18	**Lecture 11** Classroom presentation: Probability theory in game balancing
22) Date 19	**Game Design Workshop 8** Classroom test: Probability theory in game balancing Classroom individual task: Board game balancing (5 points)

23) Date 20	**Lecture 12** Classroom presentation: Level design in strategies, shooters, immersive sims Homework: Level analyses in genre specific games
24) Date 21	**Game Design Workshop 9** Classroom test: Level design basics Students presentations: Level analyses in genre specific games
25) Date 22	**Lecture 13** Classroom presentation: Level design in stealth games, rouge-like games, adventure games, Game Publishing Details Homework: Level analyses in genre specific games
27) Date 23	**Lecture 14** Classroom presentation: Digital Storytelling in Games Statistics in Game Design Homework: Storytelling analyses in well-known games
29) Date 24	**Lecture 15** Classroom presentation: Playtesting and Focus Groups, Overall group projects discussion
30) Date 25	**Game Design Workshop 10** Group classroom task: Project playtest session Homework: Playtest report (10 points), Overall group projects discussion