

IC-UNICAMP

Courses from Institute of Computing

MC970/MO644 2s20

ATENÇÃO

Aula introdutória será ao vivo na Ter. 17/09 às 9h00. Favor ver link no calendário da disciplina ou [aqui \(http://meet.google.com/skk-isud-odh\)](http://meet.google.com/skk-isud-odh). (<https://docs.google.com/spreadsheets/d/1x2a8f2CqPD4EPD30WwIUnHb4aXCah5C9QVvcTCoc2mY/edit?usp=sharing>)

Links

- [Agenda](https://docs.google.com/spreadsheets/d/1x2a8f2CqPD4EPD30WwIUnHb4aXCah5C9QVvcTCoc2mY/edit?usp=sharing) (<https://docs.google.com/spreadsheets/d/1x2a8f2CqPD4EPD30WwIUnHb4aXCah5C9QVvcTCoc2mY/edit?usp=sharing>).
- [Slides](https://drive.google.com/drive/folders/1aV3rGci2hE4QCPt8T3fES91QtBTrHKBc?usp=sharing) (<https://drive.google.com/drive/folders/1aV3rGci2hE4QCPt8T3fES91QtBTrHKBc?usp=sharing>).
- [Videos](https://drive.google.com/drive/folders/1U2xumXu-xFh-nL_EZLK1PAPS65YgP5pP?usp=sharing) (https://drive.google.com/drive/folders/1U2xumXu-xFh-nL_EZLK1PAPS65YgP5pP?usp=sharing).
- [Meet class](http://meet.google.com/skk-isud-odh) (<http://meet.google.com/skk-isud-odh>).
- [Bulletin board](https://docs.google.com/spreadsheets/d/1x2a8f2CqPD4EPD30WwIUnHb4aXCah5C9QVvcTCoc2mY/edit#gid=0) (<https://docs.google.com/spreadsheets/d/1x2a8f2CqPD4EPD30WwIUnHb4aXCah5C9QVvcTCoc2mY/edit#gid=0>).
- [Grades](https://drive.google.com/file/d/1G8Zl2ANKlo57LmJslZ8V_vZhVtTqcZeq/view?usp=sharing) (https://drive.google.com/file/d/1G8Zl2ANKlo57LmJslZ8V_vZhVtTqcZeq/view?usp=sharing).

Adm

- Theory sessions: Tue. and Thu. (9h-10h)
- Lab sessions: TBD
- Professor: Guido Araujo
- TAs: Gustavo Leite, Carla Cusihualpa and Rodrigo Freitas

Bulletin board

The course has a [bulletin board](https://docs.google.com/spreadsheets/d/1x2a8f2CqPD4EPD30WwIUnHb4aXCah5C9QVvcTCoc2mY/edit#gid=0) (<https://docs.google.com/spreadsheets/d/1x2a8f2CqPD4EPD30WwIUnHb4aXCah5C9QVvcTCoc2mY/edit#gid=0>) for announcements and posts about the course progress. Students are required to closely follow the messages posted on the board, as they include very relevant courseware information.

Syllabus

Classes will use a set of [slides](https://drive.google.com/drive/folders/1aV3rGci2hE4QCPt8T3fES91QtBTrHKBc?usp=sharing) (<https://drive.google.com/drive/folders/1aV3rGci2hE4QCPt8T3fES91QtBTrHKBc?usp=sharing>) and [videos](https://drive.google.com/drive/folders/1U2xumXu-xFh-nL_EZLK1PAPS65YgP5pP?usp=sharing) (https://drive.google.com/drive/folders/1U2xumXu-xFh-nL_EZLK1PAPS65YgP5pP?usp=sharing), available through the course [agenda](https://docs.google.com/spreadsheets/d/1x2a8f2CqPD4EPD30WwIUnHb4aXCah5C9QVvcTCoc2mY/edit?usp=sharing) (<https://docs.google.com/spreadsheets/d/1x2a8f2CqPD4EPD30WwIUnHb4aXCah5C9QVvcTCoc2mY/edit?usp=sharing>). If necessary, additional lecture notes as well as articles discussed in class will be made available.

Slides and videos are intellectual property of the books' authors, instructors or UNICAMP, and cannot be distributed without their previous authorization.

The course will use material from the following books:

- [An Introduction to Parallel Programming](https://www.amazon.com.br/Introduction-Parallel-Programming-Peter-Pacheco/dp/0123742609) (<https://www.amazon.com.br/Introduction-Parallel-Programming-Peter-Pacheco/dp/0123742609>)
- [Professional CUDA C Programming](https://www.amazon.com.br/Professional-Cuda-Programming-John-Cheng/dp/1118739329/ref=sr_1_1?__mk_pt_BR=%C3%85M%C3%85%C5%BD%C3%95%C3%91&dchild=1&keywords=professional+cuda+c+programming&qid=1598899137&sr=8-1) (https://www.amazon.com.br/Professional-Cuda-Programming-John-Cheng/dp/1118739329/ref=sr_1_1?__mk_pt_BR=%C3%85M%C3%85%C5%BD%C3%95%C3%91&dchild=1&keywords=professional+cuda+c+programming&qid=1598899137&sr=8-1).
- [Programming Massively Parallel Processors](https://www.amazon.com.br/-/pt/Programming-Massively-Parallel-Processors-Hands-dp-0128119861/dp/0128119861/ref=dp_ob_title_bk) (https://www.amazon.com.br/-/pt/Programming-Massively-Parallel-Processors-Hands-dp-0128119861/dp/0128119861/ref=dp_ob_title_bk)

Assignments

The final course grade will be based on 7 programming projects, and 1 project distributed as follows:

- Tasks: 42% (6% each)
- Project: 58%

Tasks and project will use the GitHub Classroom environment, where each task/project has an associated template repository. Students have to pull the template repository locally to work, and push it for testing, and before the deadline for grading. The GitHub system will run the tests and automatically compute the assignment grade.

All test inputs are open, and there are no closed tests. The correct output for each test is open, and their evaluation will take into consideration not only the execution correctness but also performance.

GitHub will automatically close the submission system after each project deadline, and there will be **no extensions**. Hence, we **strongly** recommend that the student submit its work even if the testing is incomplete.

A link to each task/project, containing a detailed description, programming guidelines, code snippets, etc. can be found in the appropriate entry of the course [agenda](#)

(<https://docs.google.com/spreadsheets/d/1x2a8f2CqPD4EPD30WwIUHb4aXCah5C9QVvcTCoc2mY/edit?usp=sharing>).

(https://docs.google.com/spreadsheets/d/1yculltZMJjpmQdZoO6D_SlgMkjquGvldL62GBzOBN88/edit#gid=0).

Grades

[Grades](https://drive.google.com/file/d/1G8ZI2ANKlo57LmJslZ8V_vZhVtTqCZeq/view?usp=sharing) (https://drive.google.com/file/d/1G8ZI2ANKlo57LmJslZ8V_vZhVtTqCZeq/view?usp=sharing).

will be available at most 15 days after the task/project due date.

Regarding the calculation of the course final grade, the following rules apply:

- The average of the tasks will be computed as $TA = \sum(T_i * 0.06, i = 1-3)$.
- The average grade of the course is $A = TA + P * 0.58$.
- Students with any $T_i < 5.0$ ($E_i, i = 1-3$) will be required to take the Final Exam (F).
- Students with $P < 5.0$ will be required to take the Final Exam (F).
- The final course grade $G = \min(5.0, A)$, if $A < 5.0$, or $(A + F) / 2$ otherwise.

Grade review requests must follow the rules below:

- Review requests must be made exclusively through this [form](#) (https://docs.google.com/forms/d/1_3mHwXBibTS9pqR49OZRNtb6mMxwR53NhZfg5etFX-U/edit).
- Review requests will be received only within 48 hours after the grade is released. After that, it will not be considered.
- The review will be done within 10 days after the request is received, and the result will be informed to the student via his/her DAC/Unicamp e-mail.

Collaboration policy

Projects are individual assignments. Students can collaborate with the goals of understanding and discussing the assignment solution. Nevertheless, code sharing and copying are not allowed, and will be considered fraud.

Exams are individual assignments, and collaboration for their execution is not permitted. Any violation will be considered fraud.

Frauds will not be accepted, $G = 0.0$ will be assigned to everyone involved, and the case will be brought to the Undergraduate Dean.

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BLOG AT WORDPRESS.COM.

#	Date	Syllabus	Slides	Videos	Available	Due	Notes
1	17/9	Background: Parallel architectures and programming (1/2)	Link	Link			
2	22/9	Background: Parallel architectures and programming (2/2)	Link	Link			
3	24/9	OpenMP: overview and introduction	Link	Link	T0		
4	29/9	OpenMP: parallel directive	Link	Link			
5	1/10	OpenMP: parallel for, critical, atomic	Link	Link	T1	T0	
6	6/10	OpenMP: schedule, static, dynamic e lock	Link	Link			
7	8/10	Profiling: Intel VTune e Perf	Link	Link	T2	T1	
8	13/10	GPU: CUDA Programming Model	Link	Link			
9	15/10	GPU: NVIDIA Architecture	Link	Link	T3	T2	
10	20/10	GPU: CUDA Execution Model	Link	Link			
11	22/10	GPU: Profiling (Nsight Systems and Nsight Compute)	Link	Link	T4	T3	
12	27/10	GPU: Memory Access and Coalescing (1/2)	Link	Link			
13	29/10	GPU: Memory Access and Coalescing (2/2)	Link	Link	T5	T4	
14	3/11	GPU: Matrix Multiplication with CUDA	Link	Link			
15	5/11	GPU: Histogram and stencil with CUDA	Link	Link			
16	10/11	OpenMP: task and depend	Link	Link	T6	T5	
17	12/11	OpenMP: devices, target and map, nowait	Link	Link			
18	17/11	OmpCluster: cluster architecture and example	Link	Link	T7	T6	
19	19/11	OmpCluster: project guidelines	Link	Link	P		
20	24/11	Project: Q&A and follow-up	Link	Link		T7	
21	26/11	Project: Q&A and follow-up	Link	Link			
22	1/12	Project: Q&A and follow-up	Link	Link			
23	3/12	Project: Q&A and follow-up	Link	Link			
24	8/12	Holiday					
25	10/12	Project: Q&A and follow-up	Link	Link			
26	15/12	Project: Q&A and follow-up	Link	Link			
27	17/12	Project: Q&A and follow-up	Link	Link	E	P	
28	21/1	Final Exam				E	