SYLLABUS
Old Dominion University ● College of Sciences ● Department of Computer Science
CS 478/578 ● Computational Geometry, Methods and Applications ● Spring 2020

Instructor
Dr. Andrey Chernikov
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Office hours: MW 2:00pm to 3:00pm and 4:30pm to 5:30pm, and by appointment

Course Information
The discipline of Computational Geometry is devoted to the study of algorithms which are formulated in terms of spatially embedded arrangements of objects, such as points, lines, surfaces, and solids. Computational Geometry algorithms have a wide range of applications in science and engineering, including computer-aided design and manufacturing, computer graphics and games, robotics, solid mechanics and fluid dynamics, medical image analysis, cartography and terrain modeling, database queries, and others. Students taking this course study algorithms and data structures for geometric objects, focusing on exact algorithms that are asymptotically fast. Today there is a rich collection of geometric algorithms that are efficient, and relatively easy to understand and implement. This course covers fundamental algorithms of Computational Geometry including convex hulls, polygon triangulations, point location, Voronoi diagrams, Delaunay triangulations, binary space partitions, quadtrees, and other topics. The course has a significant implementation component.

Meeting location & hours Dragas 1117, MW 5:45 pm – 7:00 pm

Current course information and assignments https://www.blackboard.odu.edu (check frequently)


Course objectives:
• to learn the major algorithmic paradigms of computational geometry
• to develop the ability to recognize and to solve frequently encountered geometric problems
• to master the proof techniques used in the analysis of geometric algorithms
• to practice implementing geometric algorithms

Prerequisites:
• CS 361 and MATH 211 (for CS 478)
• familiarity with basic algorithms and data structures
• ability to use an imperative-style programming language (C/C++ is recommended)
• desire to learn
• willingness to work hard

Assignments
Homework track (default)
• 80% all homeworks including programming projects
• 20% final take-home exam

The final percentage score will be computed as follows:

$$\text{final score} = \frac{\text{individual total homework score} - x}{\text{maximum total homework score}} \times 80 + \frac{\text{your final exam score}}{\text{maximum final exam score}} \times 20,$$

where $x$ is student’s lowest homework score, and $y$ is the number of points allocated for this homework. The letter grade will be looked up from the following table.

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<th>CS 578 final score:</th>
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<td>C-</td>
<td>C</td>
<td>C+</td>
<td>B-</td>
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<td>C+</td>
<td>B-</td>
<td>B</td>
<td>B+</td>
</tr>
</tbody>
</table>

**Project track (optional)**

A student can elect to perform a significant semester-long project instead of the regular assignments and exam outlined above. Instructor approval for this track is required.

**Policies**

• All assignments will be published and submitted through the Blackboard system. No other medium will be accepted without prior instructor’s permission.

• Late assignments will not be accepted, unless accompanied by a documented evidence (e.g., doctor’s note) of student’s inability to complete them. An interruption in the internet connection will not be recognized as a reason to retake the test, unless accompanied by a note from the university IT department. Therefore, it is strongly advised to complete the assignments before the deadline.

• Homeworks will have a specified interval of submission (about one or two weeks long). Once the interval expires, the Blackboard link will close automatically.

• Either typed or handwritten (and then scanned) answers can be uploaded. However, appeals of low grades based on misread handwriting will not be accepted. The portable document format (pdf) is preferred as formulas and charts sometimes do not render correctly across platforms when native formats are used.

• The writing must be clear and concise. Points will be taken off for unnecessarily wordy or incomprehensible solutions.

• All assignments must be completed individually. No person, except the instructor or the teaching assistant, can be asked for help with solving the assignments.

• The internet and any printed materials can be consulted as needed. However, all sources used in the graded work must be cited.

• If a cited source has to be quoted verbatim, quotation marks and indentation must be used.

• Problem solutions found on the internet are sometimes incorrect and often poorly written. The goal of the class is developing individual proficiency in the material. The instructor may question the student to determine if submitted work corresponds to student’s proficiency and assign the grade accordingly.

• Class attendance is not factored into the grade. However, class meetings are important as they provide a helpful environment to stay focused and to ask questions.

• Students must be familiar with and abide by the University Honor Code: https://www.odu.edu/about/monarchcitizenship/student-conduct/code.

**Disability:** Students are encouraged to self-disclose disabilities that have been verified by the Office of Educational Accessibility by providing Accommodation Letters to their instructors early in the semester in order to start receiving accommodations. Accommodations will not be made until the Accommodation Letters are provided to instructors each semester.