CS 4330, Spring 2022
Methods of Computer Science

General Information
Time and Place: MWF, 9:00-9:50, Lang 222
Class Websites:
- http://www.cs.uni.edu/~schafer/4330/ (most lesson materials)
- Blackboard (Grades and Competency Demos)
Credit Hours: Three (3). This course meets the Course Credit Hour Expectation outlined in the Course Catalog.
Instructor: Dr. Ben Schafer
Email: schafer@cs.uni.edu

Student Hours:
Due to an abundance of caution, I prefer to limit my face-to-face meetings. However, I am very willing to meet with you. To accomplish this, we will use online student hours via Zoom by default. My hours this spring are:
- MWF 10-11 AM
- MWF 12-1 PM
- T/Th 9:30-10:30 AM
To meet with me during one of these time slots you should set up an appointment using my online calendar.
Then at the appropriate time, you can log on to the following Zoom room:
  - https://uni.zoom.us/j/3192732187 [password UNI]
If those times don't work for you, or you prefer to meet with me face-to-face, PLEASE, send me an email and propose a specific alternative. I want to meet with you at a time/place that is best for both of us and am very willing to work things out.

Course Information
Course Catalog Description
Students will learn effective strategies for teaching computer science. Students will develop a project, either in a classroom or during an after-school or similar experience that seeks to teach a section of the CS standards targeted at the student population with which they are working. Projects should stress inclusivity and appeal to a diverse group of students.

Course Philosophy/Design
This course is designed to:
- provide participants with experiences and knowledge (both pedagogical and content) to be effective computer science teachers in high school.
- support computer science teachers in understanding computer science instruction such that they are comfortable designing instruction for their own students.
- explore/consider effective strategies for teaching and retaining students who are diverse learners. This includes planning instruction for active learning and problem-solving contexts.
- inform teachers about current Iowa/CSTA teaching standards so they are aware of what leaders in this community expect students will know and be able to do by the end of their K-12 education.
- provide teachers with experiences planning for appropriate feedback and assessments to measure student progress and use that information to inform next steps with individual students.
**Course Learning Outcomes**

Upon completion of this course, participants should be able to:

- Use the national high school computer science model curriculum; analyze potential learning difficulties and plan teaching for students with different needs.
- Describe a variety of instructional outcomes included in middle and high school computer science.
- Describe a variety of methods in the teaching process, including meaningful learning, collaborative learning, inquiry learning, etc. as well as identify the CS instructional outcomes for which each is useful.
- For a variety of general CS topics/areas (e.g., programming; the internet—operation and society; computer & system operation and society; data collection, analysis, and society; artificial intelligence and society) propose:
  - Appropriate student outcomes
  - Assessments for each outcome
  - Appropriate learning activities for each outcome
  - Mechanisms for providing student feedback
  - A grading process for the topic/area and its fit into overall course grading
- Describe a reasonable instructional environment for computer science and its utilization for a variety of CS content in middle and high school.
- Establish a bank of resources for teaching computer science in high school, including possible materials, lab assignments, class activities, and websites.
- Actively participate in professional communities such as CSTA and ACM. Keep up with research in the area of computer science education, and apply it to the teaching process.

**2011 ISTE Teaching Standards Addressed**

- Analyze the contributions of computer science to current and future innovations in sciences, humanities, the arts and commerce [1.d.ii]
- Select a variety of real-world computing problems and project-based methodologies that support active and authentic learning and provide opportunities for creative and innovative thinking and problem solving [2.a.i]
- Demonstrate the use of a variety of collaborative groupings in lesson plans/units and assessments [2.a.ii]
- Design activities that require students to effectively describe computing artifacts and communicate results using multiple forms of media [2.a.iii]
- Develop lessons and methods that engage and empower learners from diverse cultural and linguistic backgrounds [2.a.iv]
- Identify problematic concepts and constructs in computer science and appropriate strategies to address them [2.a.v]
- Design and implement developmentally appropriate learning opportunities supporting the diverse needs of all learners [2.a.vi]
- Create and implement multiple forms of assessment and use resulting data to capture student learning, provide remediation and shape classroom instruction [2.a.vii]
- Promote and model the safe and effective use of computer hardware, software, peripherals and networks [3.a.i]
- Plan for equitable and accessible classroom, lab and online environments that support effective and engaging learning [3.a.ii]
- Identify and participate in professional computer science and computer science education societies, organizations and groups that provide professional growth opportunities and resources [4.a.i]
• Demonstrate knowledge of evolving social and research issues relating to computer science and computer science education [4.a.ii]

• Identify local, state, and national content and professional standards and requirements affecting the teaching of secondary computer science [4.a.iii]

Course Grading

[Note: The following is my intentions regarding how I will be grading/evaluating your work and assigning final grades. However, in an effort to be responsive to your needs I reserve the right to modify the structure of this course as we are in progress. If there is significant deviation from the policies described below the new policy will be openly and clearly discussed with you and in a timeframe that gives you a time to plan accordingly.]

You will earn a total of eleven (11) "competency scores" over this course. Each competency score will be a value from 1-4 based on the following assessment:

<table>
<thead>
<tr>
<th>Score</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>You submitted the deliverables or attempted the activity but you show little understanding of the standards of the activity. [NOTE, you cannot pass this course (grade of C or higher) with any 1s in your grades]</td>
</tr>
<tr>
<td>2</td>
<td>You have made significant progress towards demonstrating competency but there are limited items that remain unsatisfied.</td>
</tr>
<tr>
<td>3</td>
<td>You have &quot;met&quot; the standards of the activity. [You have displayed minimum acceptable competency on this activity.]</td>
</tr>
<tr>
<td>4</td>
<td>You have &quot;exceeded&quot; the standards of the activity. [You have met the standards of competency and shown considerable understanding/knowledge of the material.]</td>
</tr>
</tbody>
</table>

The 11 scores used to determine your grade consist of the following activities:

• Four (4) Competency Demos (one each after Modules 1-4)
  o Competency Demos can be thought of as similar to tests/exams in other courses
  o You will complete each competency demo within Blackboard. In order to be eligible to attempt a competency demo you must first all of the "check point" writing activities from that module.
  o If you are unsatisfied with your grade on any competency demo, you may talk to me, restudy the material, and attempt a second version of the CD.

• One (1) Individual Instructional Design Deliverable
  o In Module 4, you will complete the beginnings of an Instructional Design document for a CS course of your selection.
  o You will have the opportunity to receive feedback on this deliverable and to resubmit for potential grade improvement.

• One (1) Group Instructional Design Deliverable
  o In the second half of the course you will be working with a group of peers to create a more detailed course design product than the one created in Module 4.
  o You will have the opportunity to receive feedback on this deliverable and to resubmit for potential grade improvement.
• Four (4) Individual evaluation documents of your group’s instructional design deliverable
  o You will complete four individual deliverables that allow you to reflect and expand on the work done in the Group project.
  o You will have the opportunity to receive feedback on this deliverable and to resubmit for potential grade improvement.
• In-Unit “Check-points” and Small Group Participation
  o I firmly believe that in order to really learn in this course you need to participate in consistent and ongoing interaction with the material and with your peers. I think you rob yourself, and your peers, if you are not willing to participate in classroom discussions on a daily basis. As such, I will assign some points for this interaction and the daily work.
  o I predict that this course will have 10-15 deliverables other than the ones listed previously. Having said that, this course will evolve and it is hard for me to know for sure what I will collect/mark or not.
    ▪ In MOST cases I will not be assigning differentiated grades on these beyond 1 point each for turned in “on-time” and shows meaningful effort for completion. If I feel that people are abusing this system (that is, people are submitting documents on time but showing the bare minimum of effort) I may modify this policy to have more levels of grading [or simply become very picky about what is needed to get the 1 point of credit]
  o The four-point grade for this section of the course will be assigned based on a formula CLOSE to:

<table>
<thead>
<tr>
<th>Score</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>3</td>
<td>70</td>
</tr>
<tr>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td>1</td>
<td>30-60</td>
</tr>
<tr>
<td>0</td>
<td>0-20</td>
</tr>
</tbody>
</table>

The following evaluation criteria are used to determine the final course grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>All scores are 3 or 4 AND more 4s than 3s</td>
</tr>
</tbody>
</table>
| B     | All scores are 3 or 4  
OR  
No more than two scores of 2 AND an overall average of 3.25 or higher |
| C     | No more than two scores of 2 AND an overall average of 3.00 or higher |
| D     | More (3s and 4s) than (1s and 2s). |
| F     | Any situation not handled above. |
Additional Policies and Statements

Scholastic Conduct
You are responsible for being familiar with the University's Academic Ethics Policies:

https://www.uni.edu/policies/301

Copying from other students is expressly forbidden. Doing so on CDs will be penalized every time it is discovered. The penalty can vary from zero credit for the copied items (first offense) up to a failing grade for the course. If an assignment makes you realize you do not understand the material, ask a fellow student a question designed to improve your understanding, not one designed to get the assignment done. Your final submission for assignments should be individual, original work unless otherwise specified. Any substantive contribution to your solution by another person or taken from a publication should be properly acknowledged in writing. Failure to do so is plagiarism and will necessitate disciplinary action. In addition to the activities we can all agree are cheating (plagiarism, bringing notes to a closed book exam, etc), assisting or collaborating on cheating is cheating. Cheating can result in failing the course and/or more severe disciplinary actions. Remember: Discussing assignments is good. Copying code or answers is not.

Accessibility
The University of Northern Iowa (UNI) complies with the Americans with Disabilities Act Amendments Act of 2008 (ADAAA), Section 504 of the Rehabilitation Act of 1973, the Fair Housing Act, and other applicable federal and state laws and regulations that prohibit discrimination on the basis of disability. Students with disabilities experiencing a barrier to access should connect with Student Accessibility Services (SAS) to request accommodations. For more information about the accommodation process, please contact SAS at (319) 273-2677 Relay 711, accessibilityservices@uni.edu, or GIL 118. Additional information is also available at sas.uni.edu.

The Learning Center
The Learning Center @ Rod Library provides free tutoring for a variety of different areas (i.e. writing, math, science, business, Spanish, college reading and learning strategies). The Learning Center @ Rod Library is open for walk-in assistance Monday-Thursday 10am-10pm and is free of charge for all UNI students. If you are unavailable during normal tutoring hours, online tutoring is also available through Smarthinking. You will need your CATID and passphrase to gain access. To access the Smarthinking platform go to https://tlc.uni.edu/online. For more information, go to https://tlc.uni.edu, email TheLearningCenter@uni.edu, call 319-273-6023, or visit the TLC desk located on the main floor of Rod Library.

Free Speech
The University of Northern Iowa supports and upholds the First Amendment protection of freedom of speech and the principles of academic and artistic freedom. We encourage the free and responsible exchange of diverse ideas on our campus. The University is committed to open inquiry and the spirited and thoughtful debate of such ideas.

Absences related to COVID-19 illness, self-isolation, or quarantine.
Faculty must be prepared to have assignment alternatives for individual students who are unable to attend class due to COVID-related health issues. To utilize these alternative assignments, students must report the issue by completing the Panther Health Survey; students directed not to come to campus or who are unable to participate in class due to COVID-19 related illness, self-isolation, or quarantine should utilize the information provided in the survey to have their faculty notified of their need to be absent. These same instruction/assignment alternatives should also extend to field experiences that students may not be able to attend for the same reasons. Questions related to COVID-19 testing should be directed to the Student Health Center COVID line (319) 273-2100, Monday-Friday, 8:00 am - 4:30 pm.
Students who have concerns about an underlying health condition(s) and the risks of attending classes, living in a residence hall, or any other aspect of the educational experience due to COVID-19 should consult with their health care provider. Please connect with Student Accessibility Services as soon as possible to discuss accommodations specific to your access needs.

Office of Compliance and Equity Management
Non-discrimination in Employment or Education
Content in this class has the potential to be disturbing to some individuals based on life experiences. If you ever feel the need to step out of the classroom or decline participation in an activity, please request an alternative learning experience.

UNI Policy 13.02 Discrimination, Harassment, and Sexual Misconduct states: "The University is committed to providing a workplace and educational environment, as well as other benefits, programs, and activities, that are free from discrimination and harassment based on a protected class, as well as retaliation."

Policy 13.02 outlines prohibited conduct and reporting processes. All University employees who are aware of or witness discrimination, harassment, sexual misconduct, or retaliation are required to promptly report to the Title IX Officer or Title IX Deputy Coordinator.

- Title IX Officer Leah Gutknecht, Assistant to the President for Compliance and Equity Management, 117 Gilchrist, 319.273.2846, leah.gutknecht@uni.edu
- Title IX deputy coordinator: Christina Roybal, Sr. Associate Athletic Director Athletics Administration, North DOME 319.273.2556, christina.roybal@uni.edu

If you or someone you know has been harassed or assaulted, you can find the appropriate resources at safety.uni.edu and equity.uni.edu. Resources that provide free, confidential counseling are also detailed at safety.uni.edu.

For additional information, contact the Office of Compliance and Equity Management, 117 Gilchrist Hall, 273-2846, equity@uni.edu.