Instructor: Michael Leverington, PhD

- E-mail: Use WebCampus Email
- Phone: (775) 784-1414
- Office: SEM 230
- Office hours:
  - Tuesday, 10:00 am – 12:00 n, 1:30 pm – 3:00 pm
- Class webpage: WebCampus

Teaching Assistants:

- Names
  - Iman Vakilinia
  - Nhan Pham

- TA Access:
  - E-mail: Use WebCampus Email
  - Office: LME 321
  - Office hours: In the ECC, with days and times posted in WebCampus

Lectures:

- Tuesday & Thursday, 4:00 pm - 5:15 pm, MIKC 124

Labs:

- No laboratory times are scheduled
- Programming problems will be assigned almost every week

Important Notes and Dates:

- Final Exam: Thursday, 5 May, 5:00 – 7:00 pm, MIKC 124

- Mid-Term Examination (presently scheduled, but subject to change):
  - Thursday, 16 March
• **Holidays (affecting this class or laboratory):**
  o Spring Break, 21 March
    ▪ No class on this week

**Required Textbooks:**


**Supplemental Books:**

• *Cracking the Code Interview* (6th edition), Gayle L McDowell, CareerCup, 2015

**Course Description:**

• **Catalog:**
  o Data structures and algorithms fundamental to computer science; abstract data-type concepts; measures of program running and time complexity; algorithm analysis and design techniques

**Prerequisites:**

• CS 202 (Computer Science II) with a grade of C or better
Outcomes and Objectives:

- CSE Student Learning Outcomes (SLOs). The CSE student learning outcomes are skills and abilities students should have acquired by the end of the course. These outcomes are defined in terms of the ABET Accreditation Criterion 3 Program Outcomes which are relevant to this course. The outcomes specifically satisfied by this course are:

  3. an ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs, within realistic constraints specific to the field
  4. an ability to function effectively on multi-disciplinary teams.
  7. an ability to communicate effectively with a range of audiences.
  9. a recognition of the need for, and an ability to engage in continuing professional development and life-long learning
  10. a knowledge of contemporary issues.

Assessment:

- The following table shows the student learning outcomes used for this course and how they are assessed. As a requirement of ABET accreditation, all of the following student learning outcomes are regularly assessed using the direct assessment methods and metrics provided in the table below.

<table>
<thead>
<tr>
<th>CSE SLOs</th>
<th>Course Specific SLOs</th>
<th>Assessment Methods/Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Students will be able to optimize program development and operation through the process of identifying or selecting appropriate data structures to be used, with consideration for efficiency, complexity, and the inherent constraints of the electronic devices used for computing</td>
<td>Items selected from quizzes, exams, and programming assignments will be used to assess student competence for this SLO</td>
</tr>
<tr>
<td>4</td>
<td>Students will be able to work effectively and efficiently in small groups primarily on programming assignments</td>
<td>Implementation of programming assignments in groups of varying sizes, written reports from these assignments</td>
</tr>
<tr>
<td>7</td>
<td>Students will be able to demonstrate effective verbal and written communication in a variety of reporting conditions</td>
<td>Assessment of written reports provided by students as a result of their work on programming projects in small groups; questions on quizzes and examinations will be assessed for the requirements of this SLO</td>
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</table>
Students improve their ability to engage in continuing professional development and life-long learning. Components of selected programming project reports will be assessed, as will reflection responses related to the study and preparation activities required by the course.

Students will be able to identify, analyze, and interpret contemporary issues related to the impact of Computer Science and Engineering at the local, regional, and global levels. Components of selected programming project reports, and other assignments related to the programming projects will be assessed; selected questions on quizzes and examinations will be assessed for the requirements of this SLO.

Course Topics:

- Introduction, Principles of Programming and Software Engineering
- Recursion Intro
- Data Abstraction (ADTs)
- Linked Lists
- Recursion Problem Solving
- Algorithm Efficiency and Sorting
- Advanced C++ Topics (Templates, Inheritance, Friends, Binding)
- Trees
- Tables (Heaps, Hash, Maps) and Priority Queues
- Advanced Tables
- Graphs

Course Schedule:

- While there is always variability in the course schedule, the following is the general plan and description of the course components.
  - Introduction, review of data managed through linked lists and arrays (~1 week, SLO 3)
  - Templated classes, advanced array management (~1 week, SLO 3)
  - Inheritance and exceptions (~1 week, SLO 3)
  - Sorting, empirical analysis of computer algorithm operations (~1 week, SLO 3)
  - Algorithm analysis of efficiency and growth (~1 week, SLO 3)
  - Binary trees (~1 week, SLO 3)
  - Balanced trees (~1 week, SLO 3)
  - Recursion, with and without backtracking (~1 week, SLO 3)
  - Heap data structure (~1 week, SLO 3)
  - Hashed data management (~1 week, SLO 3)
  - Graph data management (~1 week, SLO 3)
Introduction to STL, advanced data management (~1 week, SLO 3)
~ Twelve Weekly Laboratories (SLO 3, 4, 7, 9, 10)
Most classes and some programming assignments involve small student group work and interactions (SLO 4, 7, 9)
Most in-class or homework assignments involve reflective or responsive writing (SLO 7)
Some programming assignments will be related to the impact of using the identified data structures and data management operations at various levels in society (SLO 10)

Course Policies:

- Attendance. Students are expected to attend, and be on time, for every class. This demonstrates professionalism and consideration for your fellow students and your Instructor. While the course does not have an attendance policy, students who miss class and/or are late for class may experience an impact on their grade by missing classroom activities or homework submission opportunities.

- Home and Class Work. Students are responsible for implementing all assigned activities, and for turning in all assigned materials as specified in the assignments. With very few, if any exceptions*, homework, class work, quizzes, and/or any other graded activities may not be made up, or turned in after their due date. *See Athletics and Illness topics below

- Electronic Devices - Noise. Students are expected to demonstrate professionalism and courtesy by either silencing or turning off all cell phones and/or other alarm or audible indicator devices. If any device causes a disturbance in the class, the student owned by this device may be asked to leave the class.

- Electronic Devices - Distractions. Students are expected to demonstrate professionalism and courtesy by coming to class prepared to be engaged and involved with the class activities, whatever they may be. Students using electronic devices such as cell phones, net books, laptops, etc., must be using them exclusively for classroom involvement. If it is observed that students are using any of these devices for reasons other than classroom involvement, a two-tiered response will be set in motion: 1) all students who use devices will be required to sit in the front one or two rows of the classroom; or, if this does not curtail the inappropriate behavior, 2) all electronic devices will be banned from the classroom. **Note:** If you appreciate the opportunity to use your electronic device(s) in the classroom and you notice someone else abusing the privilege, you may save yourself some difficulty by advising the individual to change his or her behavior.

- Student Engagement. There will be a great deal of interaction and class/group activity in this course. For that reason, students are expected to be engaged in, and focused on, the classroom discussion and/or activities. In addition, everyone involved with this class is expected to act in a professional manner, and interact with her or his peers with that same professional demeanor.
• Classwork Paper. As a result of many of the classroom activities, you are likely to be turning in some of your activities on paper. Unless otherwise specified, the paper should be 8½ x 11 inch (or close to this measurement), and it may not have shredded edges such as occurs when paper is torn from a spiral notebook. Since shredded edges and smaller sized paper are difficult to manage, and may easily be lost, your quiz, activity, or other response may not be accepted if your paper does not meet these specifications.

• WebCampus. It is expected that you have access to WebCampus on the first day of class. In addition, you are expected to check on WebCampus for news or updates, your grades, emails, announcements, and so on every week day. It is a really good idea to check it once or twice on weekends as well.

• Course/Policy Modification. The Instructor reserves the right to add to, and/or modify any of the above policies as needed to maintain an appropriate and effective educational atmosphere in the classroom and the laboratory. In the case that this occurs, all students will be notified in advance of implementation of the new and/or modified policy.

UNR Athletics:

• If you are involved with any university-sponsored athletic activities that will have an impact on your attendance, you must provide your Instructor with a letter from your coach and/or the UNR Athletic Department as soon as possible, but no later than the end of the second week of classes. This should include the official schedule of your activities which will impact your attendance throughout the semester. You must also advise the Instructor one week in advance of any absences related to the athletic activities.

Illness:

• If you are sick or have a health-related reason for not attending class, it will be very helpful to the Instructor and TAs if you let us know as soon as you are aware of the problem. You can do this via WebCampus email or by calling the Instructor. Most activities in both the class and the lab require special set up conditions, so it can be difficult to conduct make-up operations. However, if you contact the Instructor in a timely manner (i.e., prior to the class or the laboratory), we may be able to adapt to the circumstances.
Assignments, Examinations and Grading:

- **Homework Assignments:**
  - There will be a number of weekly programming projects, but in some cases they may not be announced during class. You are responsible to check WebCampus at least once a day and at least once or twice over the weekend to check for these assignments. Other than the source code documents themselves, all other writing homework components must be printed with at least 12 point Times New Roman font or equivalent; written artifacts that are difficult to read and/or hand written will likely not be graded.

- **Classwork Activities and Assignments:**
  - There will be a number of classwork activities, some of which will result in artifacts being turned in for credit.

- **Quizzes:**
  - There will be several quizzes during the course, with approximately one every week.

- **Exams:**
  - There will be one mid-term examination, and one final examination, as specified on the first page of this document.

- **Late Submission Policy:**
  - Generally speaking, most materials will not be accepted if they are late. However, if the Instructor is advised ahead of time that a student will miss class or an activity for a legitimate and verifiable reason, this policy may be waived. You are responsible to conduct and turn in all assignments made in class and on WebCampus, but if you have a question on this, ask the Instructor.
• Grading Structure:

  o The final grade will be based on (Tentative, subject to change):

<table>
<thead>
<tr>
<th>Course Activities</th>
<th>Weight</th>
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<tbody>
<tr>
<td>*Weekly Activities (assignments, in-class exercises, quizzes, etc.)</td>
<td>25%</td>
</tr>
<tr>
<td>*Programming Projects</td>
<td>25%</td>
</tr>
<tr>
<td>*Mid-Term Examination</td>
<td>25%</td>
</tr>
<tr>
<td>*Final Examination</td>
<td>25%</td>
</tr>
</tbody>
</table>

*to be assured of a 'C' or better in the class, a 70% or better grade is required for each of these

  o Each graded item will be scored on a simple rubric, scores will be added and normalized to a percentage, and then multiplied by the appropriate weight specified above. Letter grades are earned as follows: A: 90% and above, B: 80% and above, C: 70% and above, D: 60% and above, F: below 60%. A plus/minus (+/-) grade will only be assigned when it accurately represents a grade very near a cutoff point, and there is no automatic rounding (in either direction)

  o Note that the final calculated grade is used as a consideration, but not necessarily the absolute standard, when grading is finalized; all four course components are considered prior to awarding the final letter grade. A C- grade or below may be earned by students who do not achieve the minimum 70% in the course components specified in the table above

  o You will be provided your ongoing grade on WebCampus which, barring unusual circumstances, will never be more than 5 weekdays behind. Check this regularly for errors and/or omissions. If we make a mistake, we will be glad to fix it as long as we can verify the problem. Grades posted and not challenged for three weeks after a graded activity date will be considered correct, and are unlikely to be subject to modification.
Academic Integrity:

- All rights and regulations concerning academic honesty and plagiarism, as they appear in the current University catalog, will be upheld in this course. Please review the definition of academic integrity on the University Web Page. In addition to the stated University standards, any student-generated artifact found to have more in common with any other source (e.g., one or more fellow students, any online reference, etc.) than is considered reasonable or acceptable by the course Instructor will be considered to be academic dishonesty. Note that, like the University policy, this definition includes the person who provided the material(s) in question. Per Computer Science and Engineering Department policy, any student who has demonstrated academic dishonesty in this course will receive a minimum academic penalty of: 1) failure of the assignment (i.e., assigned grade will be zero), and 2) a letter indicating the academic integrity breach and the associated sanction will be forwarded to the Office of Student Conduct to be placed in the student’s permanent file. Depending on the egregiousness of the activity and the discretion of the Instructor, sanctions may be applied in place of, or in addition to, the above specified minimum actions.

Disability Statement:

- If you have a disability for which you will need to request accommodations, please contact the Instructor or someone at the Disability Resource Center (Thompson Building, Suite 101), as soon as possible to arrange for appropriate accommodations.

Academic Success Services:

- Your student fees cover usage of the Math Center (784-4433 or www.unr.edu/mathcenter/), tutoring Center (784-6801 or www.unr.edu/tutoring/), (784-6801 or www.unr.edu/tutoring/), and University Writing Center (784-6030 or www.unr.edu/writing_center). These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student

Video or Audio Recording of Lectures or Course Activities:

- Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy

- This class or any parts of it may be recorded to video or audio media ONLY with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.
• **Campus Safety (from the Campus Police Department):**

  o Make personal safety your number one priority. Awareness, Avoidance and Risk Reduction is the best way to not be a victim.

  o Travel in groups of two or more and always travel in well-lit, heavily traveled areas.

  o Tell someone where you are going and when you will return.

  o Carry a whistle or noise maker. This can serve as a reminder to exercise caution, and can alert someone in the area that you need help.

  o Be alert! Look around you; be aware of who is on the street and in the area. Make it difficult for anyone to take you by surprise.

  o If listening to music, keep the volume low so you can hear what is going on around you.

  o If you know you are going to be working late, plan ahead as to how you will get to your vehicle or home safely.

  o Use Campus Escort or University Police Cadets to get you to your vehicle safely. Campus Escort operates 7 days a week during academic semesters from 7:00 P.M. – 1:00 A.M and can be contacted at 742-6808. Police Services Cadets operate Monday through Wednesday from 6:00 P.M. – 12:00 A.M. during academic semesters. Student cadets can be contacted at 745-5921 or 745-7505. When these services are not operating, contact the duty officer through regional dispatch at 334-COPS (2677) and request an escort.
Epilogue:

- This is an advanced programming course. This assumes that you start the class with the fundamental programming skills and abilities specified by the UNR CSE department for CS 135 and CS 202, whether you took those courses at UNR or not. While there is a large amount of programming in this course, the focus of the learning will be on the programming strategies and data structures, and knowledge of their impact on the development and operation of a program. You are responsible for bringing the necessary programming skills and abilities to each of these new circumstances. If you have any question about your potential for success in the course as pertains to your programming abilities, please see the Instructor.

- The course will involve a great deal of classroom interaction, and it will require students to come to class prepared for these interactions. Given the specified requirements each week, you must conduct this preparation in an effective way so that you are a contributing member of the class, and so you can acquire the credit necessary to pass the course. (This is an ABET requirement)

- Finally, another ABET requirement is that you learn to work in groups. This class is by definition a group, large as it might be. We are all in this together, and we will all gain what we will work to gain from the course. For your own benefit, and that of your fellow classmates, you must give all the course activities and assignments your best effort.