Instructor: Michael Leverington, PhD
- E-mail: Use WebCampus Email (only)
- Phone: (775) 784-1414
- Office: SEM 230
- Office hours:
  - Monday & Wednesday, 9:00 – 11:30 am
  - Tuesday, 9:30 – 10:30 am

Class webpage: WebCampus, with linked web pages

Teaching Assistants:
- Names
  - Ahmet Aksoy
  - Suman Bhunia
  - Mohammad Jafari
  - Deepak Tosh
- TA Access:
  - E-mail: Use WebCampus Email (only)
  - Office: SEM 323A

Lectures:
- Lecture Section: 1001
  - Days/Times: Tuesday & Thursday, 11:00 – 11:50 am
- Instructor: Michael Leverington
- Classroom: MIKC 124 (Wells Fargo Auditorium)

Labs:
- Laboratories will begin on Tuesday, 27 January
  - Section 1101: Tuesday, 4:00 – 6:00 pm, SEM 340
  - Section 1102: Tuesday, 6:00 – 8:00 pm, SEM 340
  - Section 1107: Wednesday, 2:00 – 4:00 pm, SEM 340
  - Section 1103: Wednesday, 4:00 – 6:00 pm, SEM 340
  - Section 1104: Wednesday, 6:00 – 8:00 pm, SEM 340
  - Section 1105: Thursday, 4:00 – 6:00 pm, SEM 340
  - Section 1106: Thursday, 6:00 – 8:00 pm, SEM 340
• Laboratory equipment (can be purchased at the Nevada Wolf Shop)
  o You must purchase a Jameco JE24 (or equivalent) board, shown here; a larger board is okay but you may want to check with your Instructor or TA

  ![Laboratory Equipment Image]  

  o You must also purchase a wire jumper kit, shown here

![Wire Jumper Kit Image]  

  o You must purchase these before attending the first laboratory
  o These components can also be used in CPE 301 as well

**Important Notes and Dates:**

- **Final Exam:** Thursday, 7 May 2015, 8:00 – 10:00 am, MIKC 124
  o Important Note: This date and time are fixed, and unless the student experiences a documented emergency, there are no alternatives

- **Mid-Term Examination (presently scheduled, but subject to change):**
  o Thursday, 26 March

**Holidays (affecting this class):**
  o None

**Required Textbooks:**


**Supplemental Books:**

- None specifically recommended
Course Description:

- **Catalog:**
  - Fundamentals of digital design. Topics include: number bases, binary arithmetic, Boolean logic, minimizations, combinational and sequential circuits, registers, counters, memory, programmable logic devices, register transfer.

Prerequisites:

- **Courses**
  - CS 135, with a grade of C or better

- **Topics**
  - programming
  - use and application of computer logic

Course Objective:

- Students will demonstrate understanding of foundational logic and logical operations at the theoretical and gate/circuit level. They will be able to analyze logical conditions and develop gate-level circuits

Course Outcomes:

- The course 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. All Criterion 3 Program Outcomes are listed in the next subsection and those relevant to this course are identified in the following Table

<table>
<thead>
<tr>
<th>Program Outcomes</th>
<th>Course Outcomes</th>
<th>Assessment Methods/Metrics</th>
<th>Program Objectives Impacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Students will identify the logical requirements of a given problem, be able to evaluate and optimize the logical requirements, and then design a circuit to execute the logical condition</td>
<td>Individual demonstration of competence in class quizzes and exams, and in laboratory activities</td>
<td>2, 3</td>
</tr>
</tbody>
</table>
### Program Outcomes:

- The following is a list of all the ABET outcomes. The bolded ones are fulfilled in this course:

1. an ability to apply knowledge of computing, mathematics, science, and engineering.
2. an ability to design and conduct experiments, as well as to analyze and interpret data.
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.
5. an ability to analyze a problem, and identify, formulate and use the appropriate computing and engineering requirements for obtaining its solution.
6. an understanding of professional, ethical, legal, security and social issues and responsibilities.
7. an ability to communicate effectively with a range of audiences.
8. the broad education necessary to analyze the local and global impact of computing and engineering solutions on individuals, organizations, and society.
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.
11. an ability to use current techniques, skills, and tools necessary for computing and engineering practice.
12. an ability to apply mathematical foundations, algorithmic principles, and computer science and engineering theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

13. an ability to apply design and development principles in the construction of software systems or computer systems of varying complexity.

Program Objectives:

- Within 3 to 5 years of graduation our graduates will:
  1. be employed as computer science and engineering professionals beyond entry level positions or be making satisfactory progress in graduate programs.
  2. have peer-recognized expertise together with the ability to articulate that expertise as computer science and engineering professionals.
  3. apply good analytic, design, and implementation skills required to formulate and solve computer science and engineering problems.
  4. demonstrate that they can function, communicate, collaborate and continue to learn effectively as ethically and socially responsible computer science and engineering professionals.

Course Topics:

1. **Digital Systems and Binary Numbers**
   - Number representation systems and conversion
   - Binary numbers and arithmetic
   - Boolean logic

2. **Boolean Algebra and Logic Gates**
   - Boolean functions and operations
   - Axiomatic expression of Boolean logic
   - DeMorgan’s theorem
   - Logic gates
   - Minimization and minterms

3. **Gate-Level Minimization**
   - Simplification methods
     1. The Map method
     2. Products-of-Sums
   - Don’t care conditions
   - NAND and NOR gates

4. **Combinational Logic**
   - Analysis and design of logic circuits
   - Decoders
   - Encoders
   - Multiplexers
Synchronous Sequential Logic
  - Sequential circuits
  - Storage components
    1. Latches
    2. Flip-Flops
  - Clocked circuits
  - State reduction

6. Registers and Counters
  - Shift registers
  - Synchronous counters

7. Memory
  - Random Access Memory
  - Read Only Memory
  - Programmable Logic Devices
  - Memory Addressing

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. Note that in most cases, missing class means missing class credit, and in most cases, this credit cannot be made up. However, if you have a legitimate reason for missing class, you may be able to make up the credit for no more than three weeks after the missed day; check with the Instructor as soon as possible upon your return.

- Attendance. Due to the content and the quantity of material in this course, it is important that you are constantly involved with the learning in this course. There will be quite a few class activity components, and other small class projects. Miss a day; miss a lot! Notice that Attendance is noted twice.

- 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, laboratory assignments, 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 the 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, all classroom discussion and/or activities. One component of this class is that you will be required to read the textbook and view the online presentation materials in advance of each class so you are prepared for the class 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 may 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.

- Engineering Computing Center (ECC). The ECC facilities are available for your use since you are enrolled in this course. Your NetID will be used to log in to the ECC computers; you must come to the laboratory prepared to log in with this (i.e., make sure you remember your NetID login and password).

- Working with Others. With specific permission and/or direction from your Instructor or Teaching Assistant, you may be allowed to work with a partner on some of the laboratory or class assignments. However, unless you are otherwise informed, you are to assume that all your work is your own, and no one other than Instructors, Teaching Assistants, and/or designated CPE 201 staff may view it. Sharing any course-related materials under any circumstances not authorized by the Instructor will be considered a breach of academic integrity. See the Academic Integrity section below for a complete description and potential sanctions.
• Working with the Personal Response System (PRS, aka the “Clicker”). In order to make sure that you are getting the best experience possible with each class time, you must have your PRS ready to go, with a fresh battery, and registered with the system. With the number of students in the course, there will not be enough time to conduct class and try to diagnose inoperative devices. In addition, you must be sure that the PRS you have in your possession is your own. **If any student is found with a PRS device that is not her or his own, or a student is found in possession of more than one PRS at ANY time, he or she will be immediately dropped from the class, and awarded a grade of ‘F’**. This means that if you bring in your friend’s PRS and are caught with it, YOU will experience the consequences, not your “friend”. Please do not test this policy, and please don’t ask anyone else to test it for you. See the Academic Integrity section below for a complete description and potential sanctions.

• It is a course requirement that you achieve a grade of 70% or better on the **class component** (any and all graded class activities), the **laboratory component** (any and all graded laboratory activities), the **mid-term examination**, and the **final examination** in order to earn a grade of ‘C’ or better in this course. Earning a grade less than 70% on any of these requirements may result in a final grade reduced below ‘C’.

• 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:**
  
  o 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:**
  
  o If you are sick or have a health-related reason for not attending class, it is in your best interest to find someone who attended the class and acquire class notes from her or him. In preparation for this condition, you would be wise to get the phone numbers of at least two other students in the class. You are invited to ask questions of the Instructor when you return to school, however there will not be enough time during office hours to go over previously conducted class activities.
Assignments, Examinations and Grading:

- **Laboratory Activities:**
  - Laboratory Class. You are required to attend each laboratory during the appropriately scheduled time. You may be able to change laboratory times with specific permission from your TA, but she or he holds the final authority on any changes.
  - Laboratory Responsibilities. In most cases, you will conduct and complete your laboratory during the laboratory time. Laboratory reports or other assigned activities will specify the dates and/or times they are due; generally speaking, these will be due on the Thursday of the week following the laboratory.

- **Class Activities:**
  - With few exceptions, every class will be a workshop dedicated to the study and application of the current topic. There will be problems to analyze and solve and some of these will be graded each class day. As mentioned above, you must come to each class having read the assigned materials and viewed the assigned online references.

- **Exams:**
  - There will be one mid-term examination and one final examination during this course.
  - The date for the final examination is specified at the beginning of this document. There are no alternatives for the date and time of this event.
  - The mid-term examination date is specified under Important Notes and Dates at the beginning of this document. If this date changes, you will be provided advance notice via WebCampus prior to the exam.

- **Late Submission Policy:**
  - Generally speaking, most materials will not be accepted if they are late. The specific conditions for assignments are stated under the previous Laboratory Activities section. You are invited to check with your class Instructor if special circumstances arise, but he will make the final decision.
- **Grading Structure:**

  - The final grade will be based on the following. The Instructor reserves the right to modify the grading weights to adapt to circumstances encountered during the semester.

<table>
<thead>
<tr>
<th>Course Activities</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Class Activities</td>
<td>20%</td>
</tr>
<tr>
<td>Laboratory Activities</td>
<td>20%</td>
</tr>
<tr>
<td>Mid-Term Examination</td>
<td>25%</td>
</tr>
<tr>
<td>Final Examination</td>
<td>35%</td>
</tr>
</tbody>
</table>

  - All students must pass all four parts of the course with a 70% or better in order to be assured of a grade of ‘C’ or better. Failure of any of these may result in a reduction of the calculated grade at the discretion of the Instructor.

  - 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). A C- grade or below is likely to be earned by students who do not achieve the minimum 70% in the course components specified in the table above.

  - 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 issue. 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:**

  o 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 graded activity (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 beyond these minimums may also be applied. In the case of inappropriate use of a PRS “Clicker” as described previously in this document, the letter to the Office of Student Conduct will be sent in addition to the student being dropped from the class with a grade of ‘F’.

• **Disability Statement:**

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

• **Academic Success Services:**

  o 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/), 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:**

  o 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 Thursday 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 course will be fun and engaging. We will be interacting in almost every class, and we will be playing with foundational computer hardware, either on paper or in the laboratory. As mentioned previously, you must come prepared for every class or you will fall behind.

You are always welcome to visit the Instructor and/or TAs if you need help outside of class. As you will find now and in the future, your learning is your responsibility, but we will help anywhere we can.

If you do your part, we promise to do our part, and you will gain a great deal from this course.