Course for students in Computer Science and Computer and Information Technologies programs, or having interest in computer architecture. This course will instruct students in the basic building blocks of digital computers, instruction sets, number representation, interrupts, RISC and CISC architectures, etc. Students will be required to complete programming projects in a high level language and in assembly language.

Prerequisites
CS 1410 with a C- or better

Fees
Computer lab fee: $20, used to assist in maintaining computing infrastructure.

Sections
One section:
1. TR 9:00–10:15 AM in Smith 108
   CRN: 41353
   Final exam: Tuesday, December 8 at 9:00 AM

Instructor
Instructor: Dr. Russ Ross
Email: russ@dixie.edu
Phone: 435-652-7971 (note: email preferred)
Office: North Burns 226
Office Hours: MWF 11:30 am–12:30 pm (via Zoom), TR 10:30–11:30 am (in person)

Course learning outcomes
At the successful conclusion of this course, students will be able to:
1. Convert between number systems including binary, hexadecimal, octal, and decimal.
2. Debate and compare the design of computer instruction sets and assembly languages.
3. Compose low-level solutions to programming problems that interact directly with the operating system.
4. Generate structured assembly language solutions to algorithmic problems.

Resources

Texts
There is one required text for this class:
- Computer Organization and Design ARM Edition: The Hardware Software Interface
  by David Patterson and John Hennessy
  ISBN: 9780128017333

Computers
You are required to bring a laptop to class every day with a charged, working battery. Any laptop is okay as long as it runs Windows 10, macOS, or Linux, and is connected to the university WiFi system. Chromebooks, iPads, and other tablets are NOT acceptable unless they run one of the three listed operating systems. You will be expected to complete work in class on a laptop that cannot be made up outside of class.
A limited number of laptops are available for students to check out for class in the event that your laptop is unavailable or you are unable to acquire a suitable machine. You should only rely on this option as a last resort.

You may use the computers in the Smith open computer lab. There will also be lab assistants in this lab.

You can also use your own personal computer for the assignments, though no support will be provided by the instructor. You are responsible for installing the necessary software and ensuring that it is compatible with the projects and assignments.

**Course Web Site**

This course has an accompanying website. You are responsible for announcements, the schedule, and other resources posted on the website. Grades will be managed using Canvas.

**Assignments and Exams**

**Assignments**

There will be a project due almost every week during the semester. Projects are designed to take 10+ hours of work for successful completion. These assignments will involve various activities to promote a deeper understanding of the course materials. Most of the projects build upon previous work, so students who fall behind will not be able to complete the course successfully.

**Exams**

This course has a midterm exam and a final exam. These exams will consist of questions based on the projects, reading, and lecture material.

**Grading**

Assignments, exams, and in-class activities each contribute to your point total. The assignments will comprise 60% of the total, the midterm exam 20%, and the final exam 20%.

Letter grades are assigned based on the percentage of possible points attained, according to the following chart:

<table>
<thead>
<tr>
<th>Minimum Percentage</th>
<th>Letter Grade</th>
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<tbody>
<tr>
<td>93</td>
<td>A</td>
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<tr>
<td>90</td>
<td>A-</td>
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<tr>
<td>87</td>
<td>B+</td>
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<tr>
<td>83</td>
<td>B</td>
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<td>80</td>
<td>B-</td>
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<td>C+</td>
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<td>C</td>
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<tr>
<td>60</td>
<td>D-</td>
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<td>0</td>
<td>F</td>
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**Course Policies**

**COVID-19**

All students attending class in person must wear a face covering that covers both mouth and nose for the entire class period and when working in the Smith Computing Center or visiting faculty offices. This is a state requirement, a university requirement, and a course requirement. Students who can not or will not wear a mask should stay off campus and attend class remotely. Any student attending class in person and refusing to wear a mask properly will receive a failing grade for the class and will not be permitted to continue.

If and when you attend class remotely and synchronously, you must turn on your video camera and give your full attention to the class just as you would in person. You may use an altered background image if you
prefer for privacy.

When attending in person, you must adhere to a seating chart to facilitate contact tracing. Once we have established the seating chart, you must sit in the same place every time you attend. In addition, attendance will be taken for the entire semester and the data shared with the Booth Wellness Center.

**Attendance**

Students are responsible for material covered and announcements made in class. School-related absences may be made up only if prior arrangements are made. The class schedule presented is approximate. The instructor reserves the right to modify the schedule according to class needs. Changes will be announced in class. Exams and quizzes cannot be made up unless arrangements are made prior to the scheduled time.

Occasional absences are acceptable as long as the student keeps up with assignment work. Students who miss more than two consecutive weeks of class or who miss more than 20% of scheduled classes during the semester without making prior arrangements will receive a failing grade. Students who miss any scheduled exam (including midterm exams and the final exam) or fail to complete a final project without making prior arrangements will receive a failing grade.

This course can only be completed by attending classes and completing all assigned work to a satisfactory level. There is no procedure for testing out of the class.

**Distractions**

Electronics—including laptops—in class have been demonstrated to have a negative impact on student learning (see [Shriram Krishnamurthi's writeup for background](#)). This class has a NO DISTRACTIONS policy, with a few exceptions:

1. When I ask you to use your laptop (or phone) for a specific activity in class. In this case you are permitted to use it for the duration of the activity, but not during the rest of the class.
2. If you need a laptop to accommodate a disability. If this is the case, please talk to me in advance and please visit the Disability Resource Center to document your need. To help other students in the class, please sit near one of the edges so your laptop does not distract other students more than necessary.

This policy extends to phones, tablets, and other electronic devices. I encourage you to pay full attention to class and take notes on paper.

**Time Commitment**

Courses should require about 45 hours of work per credit hour of class. This class will require about 135 hours of work on the part of the student to achieve a passing grade, which is approximately 9 hours per week. If you do not have the time to spend on this course, you should probably rethink your schedule.

**Late Policy**

Assignments are due on the date specified in the schedule. Handing them in or passing them off after the specified time is considered one day late. You may turn them in up to two school days late with penalties as described below. After two days late, you receive zero points.

For example: if an assignment is due at noon on Thursday:

- Before noon Friday the assignment is considered 1 day late.
- Before noon Monday the assignment is considered 2 days late.
- After noon on Monday the assignment will not be accepted.

Saturdays, Sundays, and school holidays do not count as late days. Late days do not extend beyond the last day of class.

Each student is given five free late days to use over the course of the semester. The lateness of an assignment will be determined according to the rules given above, and the first five late days used during the semester will be forgiven. After that, each late day will result in a 10% penalty.

Important notes:

- Even using free late days, students cannot submit assignments more than two days late and receive credit. No assignments will be accepted more than two days past the original deadline.
- Free late days are applied to the first five late days during the semester. Students cannot control which late days are penalized and which ones forgiven; the first five late days in the semester are forgiven,
and the rest are penalized.

- Free late days only apply to students who submit *every* assignment within the two-day cutoff period. For example, if you fail to submit the fifth assignment, or submit it more than two days late, you will forfeit all free late days, *including those used for earlier assignments*.

- No other extensions will be granted, except under exceptional circumstances. Students should reserve their free late days to use in the event of illness, emergencies, traveling, sports conflicts, etc. Students are advised not to use their free late days early in the semester, as assignments tend to get more difficult and schedules tighter as the semester progresses.

**Collaboration**

Limited collaboration with other students in the course is permitted. Students may seek help learning concepts and developing programming skills from whatever sources they have available, and are encouraged to do so. Collaboration on assignments, however, must be confined to course instructors, lab assistants, and other students in the course. Students are free to discuss strategies for solving programming assignments with each other, but this must not extend to the level of programming code. Each student must code his/her own solution to each assignment. See the section on cheating.

**Cheating**

Cheating will not be tolerated, and will result in a failing grade for the students involved as well as possible disciplinary action from the college. Cheating includes, but is not limited to, turning in homework assignments that are not the student’s own work. It is okay to seek help from others and from reference materials, but only if you learn the material. As a general rule, if you cannot delete your assignment, start over, and re-create it successfully without further help, then your homework is not considered your own work.

You are encouraged to work in groups while studying for tests, discussing class lectures, discussing algorithms for homework solutions, and helping each other identify errors in your homework solutions. If you are unsure if collaboration is appropriate, contact the instructor. Also, note exactly what you did. If your actions are determined to be inappropriate, the response will be much more favorable if you are honest and complete in your disclosure.

Where collaboration is permitted, each student must still create and type in his/her own solution. Any kind of copying and pasting is *not* okay. If you need help understanding concepts, get it from the instructor or fellow classmates, but never copy another’s code or written work, either electronically or visually. The line between collaborating and cheating is generally one of language: talking about solutions in English or other natural languages is usually okay, while discussions that take place in programming languages are usually not okay. It is a good idea to wait at least 30 minutes after any discussion to start your independent write-up. This will help you commit what you have learned to long-term memory as well as help to avoid crossing the line to cheating.

**College Policies**

Click on this link: [https://academics.dixie.edu/syllabus/](https://academics.dixie.edu/syllabus/) for comprehensive information on the Semester Dates, the Final Exam Schedule, University resources such as the library, Disability Resource Center, IT Student Help Desk, Online Writing Lab, Testing Center, Tutoring Center, Wellness Center and Writing Center. In addition, please review DSU policies and statements with regards to Academic Integrity, Disruptive Behavior and Absences related to university functions.

If you are a student with a medical, psychological, or learning disability or think you might have a disability and would like accommodations, contact the Disability Resource Center (652-7516) in the North Plaza. The Disability Resource Center ([http://dixie.edu/drcenter/](http://dixie.edu/drcenter/)) will determine eligibility of the student requesting special services and determine the appropriate accommodations related to their disability.