

Syllabus

Computer architecture and machine language; internal data representation; symbolic coding and assembly systems; macros; program segmentation and linking; I/O devices; serial communication. Projects to illustrate basic machine structure and programming techniques. Prerequisite: CSCI-C201.

The Essentials of Computer Organization and Architecture, Fourth Edition, by
Linda Null & Julia Lobur, Jones and Bartlett Publishers, 2014.
ISBN: 978-128404561-1

ORGANIZATION: The course will meet in NS107 on Tuesday and Thursday mornings from 10:30am-12:20pm. A 10 minute break will usually occur somewhere near 11:20am.

The webpage for the course can be accessed through: **pages.iu.edu/~dsurma**
The syllabus, assignments, etc. will be posted there. Additionally, Canvas will be used. Please check these sites on a regular basis.

Assignments & Projects:

Each person must perform the assignments on **their own** unless a group assignment is given. Assignments and projects are due at the start of class on the due date or, if an upload is required, at the designated time. They will be accepted with a 25% penalty if submitted within 24 hours, a 50% late penalty if submitted after 24 hours but before the beginning of the next class meeting period. After this time they will not be accepted. Assignments are due even if you are unable to attend that day. One of the **attempted** assignments will be dropped - subject to stipulations given when the assignment is given. Note: If one fails to submit anything for an assignment the score will be zero and it cannot be dropped.

For programs, they **MUST** be properly commented and formatted. Details of acceptable style and formatting will be discussed in class. Assignments submitted without proper formatting **MAY** be returned with a score of **ZERO**. Also, submitted *programs* must **compile/assemble** for **any** credit to be granted.

If you wish to turn late assignments into the Computer Science Administrative Assistant, you may do so. However, it is **YOUR** responsibility to ask her to **timestamp** your assignment. Assignments received without a timestamp will be counted as being turned in when the Instructor receives them.

Conduct, Participation and Attendance:

Since you, or someone on your behalf, is paying for this course it is expected that you attend classes and actively participate in them. While this does not mean that you must raise your hand to answer every question, it means that you should attend, take an interest in the class and maintain a good attitude toward learning the course material. In order to participate one must be in attendance. Therefore, attendance is factored into this component of the grade. Along with participation and attendance you are required to treat the Instructor and your fellow students with respect. To encourage you to conduct yourself professionally and to participate in the class 5% of your final grade is assigned to this category. Additional details of what is expected will be provided by the Instructor at the first class meeting. The following is a note from the IUSB student handbook:

"Your conduct must conform to the Indiana University Code of Student Rights, Responsibilities and Conduct (<http://www.iu.edu/~code/code/index.shtml>). Part 2 of the Code defines academic and personal misconduct.

Instructor-Student Communication:

Always feel free to utilize the Instructor's office hours for questions and to address concerns. Also, the instructor will ***usually*** be available for a limited time after class periods. Otherwise, the use of Email is encouraged. Be advised that Emails received by the Instructor before 5pm will normally be answered by the end of the day (11:59pm). Emails received after 5pm (M-TH) will normally be answered by noon the following day. Emails received after 4pm on Fridays will normally be answered by noon on the following Mondays.

Quizzes :

Quizzes will be given regularly (typically weekly or bi-weekly) to check student progress in learning important concepts. These will be short (15-20 minutes) and will be announced at least one class period in advance either in class or from the course website. No make-ups will be given. However, one quiz score will be dropped.

Examinations:

Two in-class written tests will be given during the semester covering topics from the textbook, from reference materials cited, as well as from information given during lectures.

Policy on Incompletes:

The granting of an Incomplete in this course is highly discouraged. Thus, it will be done only in very rare cases and will conform fully to the college policy. Keep up with the course and notify the instructor promptly of any problems. You will receive more help if you act early.

Grading:

The following weights will be used to determine the final grade:

Homework & Programming Assignments:	30%
Quizzes:	15%
Conduct/Participation:	5%
Exams:	30%
Final Exam (Comprehensive):	20%

Final Examination:

The final exam is comprehensive and will be given during the university assigned time. If you have any special circumstances that might conflict with this time you **MUST** discuss it with the Instructor prior to **April 16th**. No changes from the scheduled exam time will be allowed for any reason after this date.

Discrepancies:

If you have any questions regarding how any assignment or test/quiz is graded and you think that you deserve more points than you received, you must see the Instructor **within one week** of the time the assignment is **first** returned to the class. No claims, justifiable or not, will be considered after this deadline. Be advised that any assignment brought to the Instructor is subject to a **total** re-grading.

Final Note on Grades:

It is the opinion of the Instructor that a grade is to be **earned** - not bargained for or pleaded for at the end of the term. Therefore, keep up with the work during the entire semester and do not try to 'save' your grade during the final week(s) of the semester.

Important Dates:

Spring Break - no class:	March 11 th - March 15 th
Last Day to Withdraw with automatic W:	Sunday, March 10 th 11:59pm
Final Exam:	TBA
Last day of class:	Tuesday, April 23 rd

Tentative Dates for Exams: February 14th, April 4th
Exam dates will be confirmed one week in advance.

Tentative Dates for Quizzes: January 22, February 5, February 28, March 26,
April 16
Quiz dates will be confirmed at least one meeting period in advance.

Disabilities Note:

If you have a disability and need accommodation, contact the Disability Support Services office (Administration Building, room 113, phone: 574-520-4832) as soon as possible to establish your eligibility for disability support services. Once the DSS office has provided you with a letter identifying your needed accommodation(s) bring the letter to me, preferably during office hours or by scheduling an appointment. For more information, visit the DSS website: www.iusb.edu/disability-support/services.php

Course Webpage and course communication:

This class will make use of the WWW course page to post lab assignments and an occasional announcement. During the semester assignments will be posted sometime **AFTER** they are distributed to the class. In the event that a student has to miss a class, the assignment should be obtained from either this web site or from a classmate. Assignments will **NOT** be emailed to students. The course website is located at <http://pages.iu.edu/~dsurma>.

Also, Email sent to your IUSB account is considered by the university to be an **official form of communication**. Therefore, you need to check that Email account regularly or have that Email forwarded to a personal account that you do check on a daily basis. In short, you are responsible for any/all information that is sent to your IUSB account.

Use of cell phones, notebook computers and other electronic devices:

During lectures all cell phones and portable electronic devices must be turned off or put in "silent" mode and **be put away** (book bag, etc.) The use of computers and phones of any kind during lectures is not allowed unless special permission has been granted by the Instructor. If a cell phone/tablet is visible during lecture you will be counted absent for that day.

Required Item from IU/IUSB:

What you should know about sexual misconduct: IU South Bend does not tolerate acts of sexual misconduct, including sexual violence. If you have experienced sexual violence, or know someone who has, the University can help. It is important to understand that federal regulations and University policy require faculty to immediately report complaints of sexual misconduct known to them to the IU South Bend Deputy Title IX Coordinator to ensure that appropriate measures are taken and resources are made available. IU South Bend will work with you to protect your privacy by sharing information with only those that have a legitimate administrative or legal reason to know. If you are seeking help and would like to speak to someone confidentially, you can make an appointment with a Mental Health Counselor on campus through the Student Counseling Center. Find more information about sexual violence, including campus and community resources, at <http://stopsexualviolence.iu.edu/>.

IU South Bend Student Counseling Center (SCC)

If you find that life stressors are interfering with your academic or personal success, you are encouraged to contact the SCC as early in the semester as possible. SCC services can help with issues that range from coping with life's transitions to dealing with more serious emotional problems. Group counseling is available for issues such as test anxiety and ADHD. All enrolled students are eligible for personal and confidential short-term counseling services at no cost. Over 80% of students who utilize the SCC report that it helps them with their academic success. The best way to request services is by calling 520-4125. For more information visit their website at: <https://www.iusb.edu/student-counseling/index.php>

Academic Integrity and Academic Honesty Statement:

“As a student you have a right to learn in an environment that provides for intellectual and ethical growth. This is also your responsibility and requires you to behave in an **ethical manner**. Therefore, your conduct must conform to the Indiana University Code of Student Rights, Responsibilities, and Conduct (<http://studentcode.iu.edu/index.html>)

It is the responsibility of the student to know of the prohibited actions such as cheating, fabrication, plagiarism, academic, and personal misconduct, and thus, to avoid them. All students are held to the standards outline in the code. Please reference the entire code for a complete listing <http://www.iu.edu/~code/code/index.shtml>. Part 2 of the Code defines academic and personal misconduct. Any violation may result in serious academic penalty, ranging from receiving a warning, to failing the assignment, to failing the course, to expulsion from the University.

“Since dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced with zero tolerance.”

- Basic Descriptions:
 - Cheating: Copying, communicating, giving or seeking aid, buying/using answer keys, during exams/quizzes is cheating.
 - Collusion: Sharing/showing your code/assignment answers with another student, even temporarily, is collusion.
 - Plagiarism: Copying code/assignment answers (e.g. from a tutor, the Internet, another student, or from a previous semester) without appropriate acknowledgement is plagiarism.
- In all, if your name is on the assignment that you submit to the Instructor, make sure it is your own answers!
- Violators of the ethics code will be reported accordingly.

Class Atmosphere:

Class time is a precious commodity. Therefore, please be on time and when in class be courteous to your fellow students. The students in the class bring with them a wide range of backgrounds and competencies. The goal is to provide everyone with an opportunity to learn as much as they desire. Always feel free to ask questions and to take part in discussions.

KEYS TO SUCCESS:

Students who will get the most out of this course will be the ones who put in the most effort. To obtain a high final grade, the following are some time-tested techniques that should help.

- * Come to class and be on time. Believe it or not, even if you are not at your best, just being in class always helps.
- * Keep up with the work. Do not fall behind and think that you will be able to catch up later in the course. If you cannot turn in an assignment for credit it is still important to do it. Assignments typically build upon previous assignments.
- * Do ALL of the homework and projects. Try to do especially well on the early ones. They usually are easier than the later ones.
- * Notify the Instructor **immediately** if something happens which causes you to miss class, lab, etc. Informing the Instructor a week or more after the fact will not be received well and penalties accrue until the Instructor is notified. The Instructor can be contacted via telephone (his or through the secretary), e-mail, or fax. Not being able to *reach* the Instructor will not be accepted as an excuse.
- * Remember that if you miss class, it is **YOUR** responsibility to find out what you missed and to get caught up with the work. Therefore, if you can, call a classmate as soon as possible to learn what was covered that day.

- * Missing a class is NO excuse for late work. You MUST get the assignment turned in when it is due. This might require you to turn it in early, send it with a classmate, or even fax it or e-mail it in.
- * If you find that you will not be able to complete the course, do yourself a favor and formally withdraw. The process is simple and a “W” on your transcript is far better than an “F” or “FN”. Also, while the university does allow late withdrawals, the instructor may exercise the option to grant this late withdrawal but with a grade of “F”. Therefore, do not simply stop coming to class unless you have formally withdrawn – and by the posted deadline.
- * Remember that late work is only accepted with a steep penalty. Late is defined as when the Instructor calls for the assignment at the beginning of the period when the work is due (or the exact time for electronically submitted assignment). Always submit assignments on time. This will also require you to come to Class on time.
- * Check the course website frequently (at least daily), read Canvas Emails/Announcements, and check your IUSB Email at least daily.
- * Have a good attitude. This class should be enjoyable as well as being informative. The Instructor strives to make the class environment one where learning can occur in a relaxed atmosphere.
- * Be respectful of your fellow students and the Instructor.

Partial List of Topics: - (not necessarily covered in this order)

Computer Abstractions and Technology

Instructions: The Language of the Computer

- introduction to the MIPS instruction set
- addressing in MIPS
- relating architecture and instructions sets

Assemblers, Linkers and the SPIM Simulator

- procedure call conventions
- MIPS assembly language

Logic Design

- combinational logic and logic design
- sequential logic, memory and the datapath

Arithmetic elements and the datapath

- numbers and their representation (integers and reals)
- design of simple datapath elements and an ALU

Designing a processor

- a single-cycle datapath implementation
- implementing the control unit
- pipelining
- data and resource dependencies
- hazards

Exploiting Memory Hierarchy

- basics of cache
- measuring and improving cache performance

Basics of I/O

Exceptions and Interrupts