

CSCI 2150 - Computer Organization

Fall 2026 Syllabus

Instructor(s)	Course details	Required Material	Schedule	Grading	Expectations	Other Policies
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NOTE: Updates to this syllabus will be made as changes occur in University or Department policies, student needs, instructor needs, or available content.

- Version 01: 08/11/2026 - Initial syllabus release.

Instructor(s)

Instructor: **David Tarnoff**

Office: James and Nellie Brinkley Center, room 154 (Building 904b on [ETSU Main Campus Map](#))

Office Hours: Mondays and Wednesdays from 9:15 a.m. to 11:15 a.m.
Tuesdays and Thursdays from 10:15 a.m. to 11:15 a.m.
or by appointment
[Click here for latest schedule](#)

Phone: 423.439.6404 (Office/voice mail)

e-mail: tarnoff@etsu.edu*

Web page: This course uses [ETSU's D2L server](#) for online content.

*** All attempts will be made to answer emails within one to two business days after receipt. Email is not monitored between the hours of 6:00 p.m. and 8:00 a.m. nor is it monitored on weekends.**

[BACK TO TOP](#)

Course Details:

Course Number: CSCI 2150

Course Title: Computer Organization

Meeting Time(s):

- Section 001: Tuesdays and Thursdays from 1:20 p.m. to 2:40 p.m. in Brinkley Center 137A

Catalog Description: Presents the physical implementation of the computer including mathematical and logical foundations, component-level design, and an introduction to machine architecture. Topics include Boolean algebra, data representation, logic gates, combinational and sequential circuit design, memory cells, memory subsystems, memory hierarchy, I/O subsystems, I/O handling, interrupts, instruction representation, error detection, and serial protocols.

Prerequisites: B- or better in CSCI 1250 and C- or better in CSCI 1900.

Credit: 3 credit hours

Outcomes: We expect students completing this course to be able to:

- perform mathematical and logic manipulations with numbers in binary format (Student Outcome 3*, 4a);
- convert between binary, decimal, hexadecimal, and BCD formats (Student Outcome 3*);
- demonstrate an understanding of the operation of combinational and sequential logic circuits (Student Outcome 3*, 4a);
- design combinational and sequential logic circuits (Student Outcome 3);
- demonstrate an understanding of the circuitry that comprises memory and other storage devices (Student Outcome 3*);
- design memory interface logic (Student Outcome 3*);
- demonstrate an understanding of the principles of microprocessor organization and interfacing (Student Outcome 3*, CS-1); and
- demonstrate an understanding of serial protocols (Student Outcome 3b).

Enabling D2L Alerts: Some of the material required for this course will be provided through the D2L learning management system. It can be difficult to keep up with deadlines for assignments, quizzes, and/or tests. Every effort will be made by the instructor to use the D2L news tool and D2L calendar, however, it is the responsibility of the student to keep up with due dates. **Please consider configuring D2L to notify you of course events via email, text message, or both.** Note that this does not replace the need for regular logins to D2L to monitor the calendar, assignments, and content.

To turn this option on, log into D2L, click on your profile in the upper right corner of the window, select "Notifications", and select the events for which you want to be notified. Additionally, you can register your mobile device to receive notifications there. It is important to note the options you select here are global for D2L and will affect all of your courses not included in the course exclusions at the bottom of the notifications screen.

The CSCI 2150 D2L course site will be organized so that each date/lesson is a module containing sub-modules for reading, podcasts, video, and/or assessments/quizzes. The readings or videos should be reviewed before coming to the scheduled class while the assessments/quizzes are to be completed by the assigned due date after the material is presented. The content in the reading, podcast, and video sections will overlap, and the student is encouraged to use the media with which they are most comfortable. That said, there are a couple of topics that might not be covered as completely with one or more of the available media. There will be a note in the modules indicating when this is the case.

BACK TO TOP

Required Materials:

All of the course material for this course is available online. Links to the content will be provided in the [D2L LMS](#).

One of the textbooks for the course is *Computer Organization and Design Fundamentals* by David Tarnoff. It is available in three formats: hardcopy, PDF of full text, and PDF of individual chapters. Both of the electronic formats are free, and if you are comfortable with e-books, one or the other should be all you need. If, however, you like to read from paper, the hardcopy should be cheaper than the ink cartridge you'd use printing out the PDFs (\$16.90 before shipping). The following links will direct you to URLs where you can obtain the different formats:



- PDFs of individual chapters: Log on to [ETSU's D2L site](#) and go to the readings page of the CSCI 2150 content page
- Hardcopy: <https://www.lulu.com/shop/david-tarnoff/computer-organization-and-design-fundamentals/paperback/product-14g7dj.html>
- Single PDF of entire book: <https://www.lulu.com/shop/david-tarnoff/computer-organization-and-design-fundamentals/ebook/product-18n2z8e2.html> **NOTE: The last time I looked, there were three downloads available. I'm not sure where the one that costs \$8.99 came from, but the link above should take you to the one that is free. There is also an older edition available, so be sure to get the one that has, "Revised First Edition," printed on the book cover.**

Throughout the semester, additional online resources will be used to supplement the primary textbook. When alternate resources are used, a link will be provided in the content portion of the course [D2L site](#) under the corresponding lecture and it will be referenced in the reading portion of the [course outline](#) presented later in this syllabus.

Most of the additional reading will be available through the University's subscription to O'Reilly Media, so access is free. You can use your ETSU login to access your personal account. By clicking on the link shown below for the textbook, you will be taken to the O'Reilly Media site. **Do not click on the sign-up or free trial link.** Instead, select the sign in link. This will take you to a page where you can log in via your ETSU credentials. After entering your email address (and possibly hitting tab to move to the next text field) you will be presented with an SSO login screen where you can enter your ETSU password. (Note that a mobile app is available.)

For the remainder of this syllabus, each reading will be identified with an acronym as presented in the bibliography below.

PIC - Kochan, Stephen G. (2015). *Programming in C, 4th Ed.* Upper Saddle River, NJ: Addison-Wesley, Retrieved July 16, 2024, from O'Reilly Media, Inc. <https://learning.oreilly.com/library/view/programming-in-c/9780132781206/>

ESA - Lacamera, Daniele (2018). *Embedded Systems Architecture.* Birmingham, UK: Packt Publishing, Retrieved November 20, 2022, from O'Reilly Media, Inc. <https://learning.oreilly.com/library/view/embedded-systems-architecture/9781788832502/>.

HSI - Patterson, D. A. and Hennessy, J. L. (2017). *Computer Organization and Design RISC-V Edition: The Hardware/Software Interface.* Morgan Kaufmann. Retrieved June 24, 2026, from O'Reilly Media, Inc. <https://learning.oreilly.com/library/view/computer-organization-and/9780128122761/>

FDC - Pu, Ida Mengyi (2005). *Fundamental Data Compression.* Oxford, UK: Butterworth-Heinemann, Retrieved June 28, 2026, from O'Reilly Media, Inc. <https://learning.oreilly.com/library/view/fundamental-data-compression/9780080530260/>.

CODF - Tarnoff, D. L. (2007). *Computer Organization and Design Fundamentals: Examining Computer Hardware from the Bottom to the Top (Rev. ed.).* David L. Tarnoff. Retrieved June 24, 2026, from Lulu Press, Inc. <https://www.lulu.com/shop/david-tarnoff/computer-organization-and-design-fundamentals/ebook/product-18n2z8e2.html>

ACA - Tarnoff, D. L. (n.d.). *Applied Computer Architecture.* Johnson City, TN, Access via [D2L site](#).

Students can also find more computer science research materials at Sherrod Library's Research Guide for Computer & Information Sciences.

Course outline:

The course outline is presented below. The instructor has the right to alter the outline at any time due to time constraints, unexpected scheduling conflicts, or overall benefit to class effectiveness. Links to the reading, podcast episodes, and videos will be provided in the content portion of the D2L website.

Day	Date	Lesson Topic	Reading
<i>Data Representation & Operations</i>			
1	25-Aug	Digital Signal Terminology & Pulse-Width Modulation	CODF Ch. 1
2	27-Aug	Unsigned Binary, Hex, & BCD	CODF Sec. 2.0 - 2.4, 2.7, 2.8
3	1-Sep	Representing Analog Values & Gray Codes	CODF Sec. 2.5 - 2.6, 2.9
4	3-Sep	Signed Representations	CODF Sec. 3.3 except 3.3.4
5	8-Sep	Binary Arithmetic & Overflow	CODF Sec. 3.1 - 2 & 3.7 - 9
6	10-Sep	Floating-Point & Character Encoding	CODF 3.4 & "Character Encoding"
7	15-Sep	Logic Review and Bitwise/Shift Operations	CODF Ch. 4 & Sec. 9.1-2
8	17-Sep	Compression Basics - Coding Symbolic Data & Run-Length	FDC Ch. 2-4
9	22-Sep	Test 1 Review	N/A
10	24-Sep	Test 1	N/A
<i>Memory and Low-Level System Support</i>			
11	29-Sep	Parity, SEC/DED, and Hamming Code Design	CODF Sec. 9.3 & 9.6
12	1-Oct	Checksums and Cyclic Redundancy Check	CODF Sec. 9.4 & 9.5
13	6-Oct	Memory hierarchy, Bus Theory, & Memory-Mapping	CODF Sec. 13.1, 12.3-4 & 15.9.1
14	8-Oct	Caches, Endianess, & Data Structure Alignment	CODF 13.4, 15.7, & Web Reading
-	13-Oct	Fall Break - No Class	N/A
15	15-Oct	Virtual Memory	HSI 5.7
16	20-Oct	Polled I/O, Interrupts, and DMA	CODF 15.9
17	22-Oct	Stack Frames and Function Calls	HSI 2.8
18	27-Oct	Test 2 Review	N/A
19	29-Oct	Test 2	N/A
<i>Performance Measurements & Architectures</i>			
20	3-Nov	Processor Architecture Fundamentals & Abstraction	CODF Sec. 15.2-15.5, & 15.8
21	5-Nov	Instruction Set Architecture	HSI 2.2 or ACA Ch. 4
22	10-Nov	Operands and Addressing Modes	HSI 2.3 or ACA Ch. 3
23	12-Nov	Performance Measurements	ACA Ch. 2 & HSI 1.6
24	17-Nov	Pipelining, Pipelining Hazards, and Branch Prediction	HSI 4.6-8
25	19-Nov	Instruction- and Data-Level Parallelism & Data Dependencies	HSI 4.10
26	24-Nov	Parallelism Fundamentals and Cache Coherence	HSI 6.3 & 5.12
-	26-Nov	Thanksgiving Holiday - No Class	N/A
27	1-Dec	SMP versus Clusters	HSI 6.5 & 6.7
28	3-Dec	Test 3 Review	N/A
29	10-Dec	Test 3 (taken during final exams - 1:20 p.m. - 3:20 p.m.)	N/A

Final Exam (Test 3) Time(s):

The following is the time slot assigned by the University for the final exams for our sections of CSCI 2150. If there are multiple sections, please be sure you identify the correct section in which you are enrolled! This is when Test 3 will be given. You can verify these times with the [University's Final Exam Schedule](#)

- Section 001**: Thursday, December 10, 1:20 p.m. to 3:20 p.m.

** - Section 001 is the section that regularly meets Tuesdays and Thursdays from 1:20 p.m. to 2:40 p.m.

Grading Policy:

The following is a description of the assessments to be used to calculate a student's final grade in this course.

Exit Tickets: At the end of each class period, all students will complete a short quiz (2 to 5 questions) or "exit ticket". These assessments are designed to take 5 minutes or less to complete and may be completed individually or as a group. ***Students are not, however, permitted to use online resources such as AI to complete the assignment. Any use of AI to complete the assignment will result in an automatic zero for the assignment grade for all students involved.***

Each submitted exit ticket is worth 5 points. If there are no schedule modifications throughout the semester, this should result in 23 submitted exit tickets for each student. A perfect score on all 23 exit tickets would result in a final score of 115 points. This raw score will be included in the calculation of the final grade thereby providing each student with a 15% potential extra credit points or the opportunity to miss 3 exit tickets and still receive a perfect score. Note that the first of these exit tickets will actually be an [online syllabus quiz described later](#).

There are no provisions for making up an exit ticket. The excess points given for the exit ticket and quiz assessments are meant to provide a mechanism for unexcused absences. If a student does have a [properly documented excused absence](#) and wishes to make up an exit ticket, they may do so during office hours up to seven (7) days after the absence. If there are schedule modifications or other issues causing one or more exit tickets to be missed, an [online quiz \(also discussed later\)](#) will be used to supplement the student's score.

Syllabus Quiz: The first week of class, a required syllabus quiz will be given covering the contents of this syllabus. This quiz will not have a time limit nor a limit on the number of attempts, but will be due at 11:59 p.m. on the Monday immediately following the first week of class.

Timed Online Quizzes: If scheduling or other situations do not permit the use of an in-class assessment, a required online quiz may be given for a topic. In this case, the online quiz will be conducted via D2L and contain questions comparable to questions found on the written test. Below are some of the details regarding the quizzes if given.

- ***Each quiz will be open at the completion of the class for which the topic is presented.***
- ***Each quiz will be due at 11:59 PM four (4) days after being open.***
- ***Each quiz will have an enforced time limit of four hours.***
- ***Each quiz will have the number of attempts set to one.***
- ***There will be no provisions for missed or late work.***
- ***Without exception, all quizzes are to be done on an individual basis.***

Written Tests: There will be three tests given during the semester, each graded on a 100-point scale and carrying equal weight toward the calculation of the student's final grade. The tests will consist of a number of short and long answer questions. Additional details regarding each exam will be provided during the scheduled review days. The exams may include any material covered in lectures, assigned readings, or exercises even if the material was not covered directly in lecture.

The first two exams will take place during a scheduled class period while the third test will be held during the assigned final exam time for the class. All three exams will be in-class and timed.

Assessment Weighting: The table below shows the weights carried by each assignment toward calculating a student's final grade.

Assignment	Portion of final grade
Exit Tickets & Quizzes	16 %
Test 1	28 %
Test 2	28 %
Test 3	28 %
Total	100 %

The table below presents the translation between a student's total score and their final grade.

Percent cutoff (Minimum score to receive grade)	Grade
93	A
90	A-
87	B+
83	B
80	B-

77	C+
73	C
70	C-
67	D+
60	D
0 to less than 60	F

Attendance policy: Attendance and participation are important; students with poor attendance generally do poorly. Missing material from one class makes it difficult to understand new material and, once behind, it is difficult to catch up. Students are encouraged to ask appropriate questions and to participate in class discussions and activities. Students may learn as much from one another as from the instructor. If anyone is confused about some point, chances are that others are also confused and will appreciate that someone has asked for clarification.

Since the exit tickets are only provided during class

Posting of grades: As soon as grades are available, they will be posted to the grades section of the course's [D2L site](#). Due to the unsecure nature of email, this is the only method outside of work returned directly to the student where grades will be discussed or posted.

Note that the majority of the assignments are either hand graded or require validation of scoring after online submission. Please do not email grading questions to the instructor until after the answers have been posted.

Make-up Work: Make-up assignments are only available for in-class assignments missed due to university-approved absences. **Due to their vast flexibility, no extensions or make-ups are available for online assignments.** As for the in-class assignments, the [University's provost office specifies that the only recognized excuses for absence are the following](#), all of which require appropriate documentation:

- Absences Due to Participation in University-Sponsored Events
- Absences Due to Military Service
- Absences Due to Religious Observance
- Absences Due to Death of an Immediate Family Member
- Absences Due to Hospitalizations
- Absences Due to Childbirth or Adoption
- Absences Due to Imposed Court Appearance
- Absences Due to Illness
- Absences Due to Disability Registered with the Office of Disabilities Services

The student must present suitable documentation explaining the absence to the instructor prior to the scheduled test time or due date. The instructor reserves the right to disapprove any explanations for absences presented without prior notice and not provide the opportunity for a make-up test or other assignment. ***Students knowing they will be absent from an announced test due to a recognized absence are required to inform the instructor before the absence.*** In some cases, a make-up test or other assignment may be given early.

Late Penalties: No allowances will be made for work submitted late without suitable documentation explaining the university-approved absence to the instructor.

[BACK TO TOP](#)

Expectations and Participation:

Both students and instructors have expectations of one another, many of which are mutual. Students should expect the instructor to be in class on time, to be prepared, to be attentive to students, to be available to provide help related to the course, and to make a genuine effort to help students achieve the course objectives. On those rare occasions when the instructor must miss class, students should expect suitable arrangements for the class to continue in the instructor's absence. Students should expect the instructor to devote considerable time and effort to the course.

The instructor has similar expectations of students: that students come to class on time, are prepared, are attentive and participate in class, complete class assignments and submit them on time, and make a genuine effort to meet the course objectives. The instructor expects students to devote considerable time and effort to the course.

Although videos are available for much of the course material, students are expected to attend all class periods unless they have an excused absence according to the requirements outlined by the University's provost office.

Student Responsibility for Work: Regardless of whether a student is able to come to class or not, every student is still responsible for material, assignments, and anything else that occurs in class. If a student must miss class, that student is responsible for finding out what was missed, making sure that any work due that day gets to the instructor, and acquiring any assignments or materials handed out during the absence so that they can prepare for the next class. ***This is a 3 credit-hour course and each student should be prepared to spend a minimum of 3 to 4 hours outside of class for each hour in-class.***

Instructor Communication Outside Office Hours: In this age of instant communication, it is common to think that everyone is accessible for 24/7 feedback. Please understand that the instructor has other obligations and may not be able to respond immediately to questions submitted by e-mail or voice mail. Be sure to take advantage of other resources to answer your questions if the instructor has not responded to your message in a timely manner. The student should not take this as an attempt to discourage questions, only to let the student understand that there will be times when the instructor is not available to immediately answer your questions.

Academic Integrity:

Without exception, all submitted work for this class is to be done on an individual basis. Student-teacher relationships are built on trust. For example, students must trust that teachers have made responsible decisions about the structure and content of the course, and teachers must trust that work submitted by a student was indeed done by the student. Acts which violate this trust undermine the educational process and are inconsistent with our very reason for being at ETSU.

You are encouraged to discuss the material and issues addressed in the course with members of the class and others. Helping one another understand the process for problem solving is permitted as long as submitted work is done as an individual attempt. Everyone must do his/her own work. Completing an assignment "by committee" and submitting it as an individual work is academic misconduct unless the assignment has been clearly designated as a team assignment. **Your name on submitted work is an affirmation that the work is yours.**

The following is taken from section 5.7 "Academic Misconduct" of the East Tennessee State University Faculty Handbook, June 1, 2001:

"Academic misconduct will be subject to disciplinary action. Any act of dishonesty in academic work constitutes academic misconduct. This includes plagiarism, the changing of falsifying of any academic documents or materials, cheating, and the giving or receiving of unauthorized aid in tests, examinations, or other assigned school work. Penalties for academic misconduct will vary with the seriousness of the offense and may include, but are not limited to: a grade of 'F' on the work in question, a grade of 'F' of the course, reprimand, probation, suspension, and expulsion. For a second academic offense the penalty is permanent expulsion.

"Plagiarism is defined as follows by Black, Henry Campbell, Black's Law Dictionary, West Publishing Company, St. Paul, Minnesota, 1968 (p. 1308): 'The act of appropriating the literary composition of another, or parts or passages of his writings, or the ideas or language of the same, and passing them off as the product of one's own mind.'

"Moreover, 'To be liable for plagiarism it is not necessarily to exactly duplicate another's literary work it being sufficient if unfair use of such work is made by lifting of substantial portion thereof, but even an exact counterpart of another's work does not constitute 'plagiarism' if such counterpart was arrived at independently' (O'Rourke vs. RKO Radio Pictures, D. C., Mass., 44F. Supp. 480, 482, 483)."

Details pertaining to definitions and procedures applicable to the academic integrity and honor code policies can be found at <https://www.etsu.edu/academicintegrity/>

AI Use Policy:

Generative AI can provide outstanding support for creativity and learning. When used to generate all or most of the content of exercises submitted for this class, however, student learning is substantially harmed. Therefore, any unacknowledged content generated by AI will be considered academic misconduct. Furthermore, excessive AI-generated content in submitted assignments - even if properly cited - may result in a grade penalty. The term "excessive" in this context refers to AI use that replaces substantial portions of the student's original thinking, problem solving, or implementation. When in doubt about whether a particular use of AI is permitted, students should ask the instructor before submitting the assignment.

The following uses of AI are encouraged, provided that any use is properly cited (e.g., tool name, date, and a description or screenshot of how it was used) when included in submitted work:

- Brainstorming ideas aimed at improving projects or assignments
- Receiving guidance to support learning
- Obtaining feedback on student-generated content

Unless otherwise specified in the assignment requirements, the use of AI to generate any of the following is prohibited and will be considered academic misconduct:

- Answers (partial or full) to assignment, quiz, or test problems
- Assignment or project design documentation
- Source code
- Digital content

During examinations, students may not use any device that records, transmits, receives, analyzes, or displays information unless explicitly authorized. This includes but is not limited to smart glasses, wearable displays, AI-assisted devices, and concealed audio or visual technology. Students requiring accommodations such as smart glasses for vision must coordinate with Disability Services to approve specific configurations and submit required documentation to the instructor at least one week prior to the required use of the device(s). Violation of this policy will be considered academic misconduct.

When AI tools are used in approved circumstances, students are responsible for verifying that all AI-generated content is factually accurate, grammatically correct, and appropriate for the assignment.

[BACK TO TOP](#)

Other Policies:

Accessibility: If you have any accessibility concerns or experience barriers related to the content, materials, activities, or assessments in this course, please contact the instructor as early as possible. Students who have documented disabilities are encouraged to register with the University's Disability Services office to ensure that approved accommodations are communicated and implemented in a timely manner.

Special Accommodations: Students registered with Disability Services for note taking or test taking accommodations should make arrangements with the instructor during the first week of the term. If a student wishes to take advantage of university-approved accommodations for a test, they must initiate the process at least 5 days, but no more than 10 days before the scheduled test date. This includes informing the instructor that they will be taking advantage of the accommodation and contacting Disability Services to schedule a time to take the test in the Disability Services facilities.

Laptop Policy: The use of laptops or smart devices in class for the purpose of note taking or viewing the online course reading is encouraged. **All other uses are prohibited.** Any student found to violate this policy will be asked to discontinue use of the device for the remainder of the class period. A second offense will result in the removal of the student's laptop privileges for the remainder of the semester.

Snow/Ice: Classes are seldom cancelled; use your better judgement if main roads are snow-covered or icy. Please listen to the radio (WETS) or visit the [University's Advisories Page](#) if there is any doubt about early morning classes being cancelled or delayed.

The following is an excerpt from the University Inclement weather policy as it relates to delayed openings:

"Students are expected to report to their regularly scheduled class only if there are 30 or more minutes remaining in the session. For example, if a delayed opening is set for 10 a.m. students who have classes from 9:45 a.m. to 11:05 a.m. should report to that class at 10 a.m. Students who have classes from 9:20 a.m. to 10:15 a.m. should not report to class. In a delayed opening, all classes scheduled prior to the set time of opening and those that have less than 30 minutes remaining after the set opening time are cancelled for the day."

The policy goes on to state what the student's responsibility is if they miss class because of severe weather.

"Students will be responsible for any academic work they miss due to absences caused by severe weather conditions. It is the individual student's responsibility to take the initiative to make up any missed work, and it is the instructor's responsibility to provide a reasonable opportunity for students to complete assignments or exams missed due to such absences. Faculty members have discretion in determining whether an additional session will be added for the class or if additional work is assigned due to the closure or delayed opening."

The inclement weather policy may be accessed at https://www.etsu.edu/safety/campus_emergency/policy.php.

Use of Tobacco Products: The use of tobacco products of any type is prohibited inside all ETSU campus buildings. ETSU is a non-smoking campus. Smoking is permitted on campus only in private vehicles.

Please make sure to see the [syllabus attachment](#) provided by ETSU's [Curriculum Innovation Center](#) regarding key dates and other information.

[BACK TO TOP](#)

Use of this document is restricted to students enrolled in David Tarnoff's sections of CSCI 2150 at East Tennessee State University