



CSCI 4677/5677 - Internet of Things Spring 2025 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: 12/18/2024 - 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 9:00 a.m. to 10:15 a.m.
Tuesdays and Thursdays from 8:30 a.m. to 9:15 a.m.
Tuesdays and Thursdays from 2:00 p.m. to 3:00 p.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.**

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Course Details

Course Number: CSCI 4677/5677

Course Title: Internet of Things

Catalog Description: Presents networking and security concepts related to Internet of Things(IoT), placing special emphasis on IoT hardware and data analytics.

Prerequisites: C- or higher in either CSCI 2210 - Data Structures, CSCI 3110 - Advanced Topics in Web Development, or CSCI 4767 - Enterprise Programming and a C- or higher in CSCI 3400 - Networking Fundamentals

Credits: 3 credit hours

Outcomes: Internet of Things provides exposure to Computing students in a field with high contemporary interest. It's designed to allow students to apply programming and analytical skills taught in its prerequisite courses to the development of complex real-world systems using connected devices. Its incorporation into the curriculum adds a new area of opportunity to the undergraduate concentration in cybersecurity and, more broadly, to the Department; makes the curriculum more attractive to students; and provides more opportunities for employment by Department's professional partners and employers.

This course is designed to enable students to:

- Demonstrate hands-on knowledge of an IoT platform and development environment (Student Outcome 3, 5c, CS-1)
- Interface to common IoT sensors, actuators, and board-level protocols (Student Outcome 3, 3b, 5c, CS-2)
- Describe and employ architectures and design principles for IoT platforms (Student Outcome 3, CS-1)
- Evaluate fundamental security mechanisms within the IoT realms (Student Outcome 5b, Cyber-1)
- Describe and employ architectures and design principles for cloud platforms (Student Outcome 3b, CS-1, Cyber-3, IT-2)

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 online 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.

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Required Materials

Every effort has been made to use online reference material for this course. The vast majority of the reading will come from the textbook *Developing IoT Projects with ESP32* by Vedat Ozan Oner with a few chapters coming from *Designing Embedded Hardware* by John Catsoulis. Other readings may be used to supplement the main texts, the links to which will be provided in the content portion of the course D2L site.

The textbook is available online through O'Reilly Media. Sherrod Library has an O'Reilly subscription, so access to these books is free. There is a mobile app available or 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.



- Vedat Ozan Oner (2021). *Developing IoT Projects with ESP32*. Birmingham, UK: Packt Publishing, Retrieved December 17, 2024, from O'Reilly Media, Inc. (<https://learning.oreilly.com/library/view/developing-iot-projects/9781838641160/>).
- AWS Open Source. (2024). *Beginner's Guides to FreeRTOS*. Retrieved December 17, 2024, from <https://www.freertos.org/Documentation/01-FreeRTOS-quick-start/01-Beginners-guide/00-Overview>.
- Catsoulis, John (2005). *Designing Embedded Hardware*, 2nd Edition. Surrey, UK: O'Reilly Media, Inc. Retrieved December 17, 2024, from O'Reilly Media, Inc. (<https://learning.oreilly.com/library/view/designing-embedded-hardware/0596007558/>).
- Espressif Systems (2024). *ESP-IDF Programming Guide*. Shanghai, China: Espressif Systems. Retrieved December 17, 2024, from <https://docs.espressif.com/projects/esp-idf/en/stable/esp32/esp-idf-en-v5.3.2-esp32.pdf>.
- Espressif Systems (2024). *ESP32-C6-DevKitC-1 User Guide*. Shanghai, China: Espressif Systems. Retrieved December 17, 2024, from <https://espressif-docs.readthedocs-hosted.com/projects/esp-dev-kits/en/latest/esp32c6/esp32-c6-devkitc-1/index.html>.
- Rao, Maneesh (2018). *Internet of Things with Raspberry Pi 3*. Birmingham, UK: O'Reilly Media, Inc. Retrieved December 17, 2024, from O'Reilly Media, Inc. (<https://learning.oreilly.com/library/view/internet-of-things/9781788627405/>).
- Tarnoff, David (N/A). *Embedded System Design for CS Majors*. ([Electronic copies will be made available through D2L](#)).
- Townsend, K., Cuff, C., Akiba, & Davidson, R. (2014). *Getting started with Bluetooth low energy: Tools and techniques for low-power networking*. O'Reilly Media, Inc. (<https://learning.oreilly.com/library/view/getting-started-with/9781491900550/>).

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

Required ESP32 Development Board: All laboratory exercises and the project for the course will be performed on the ESP32 "system on a chip" microcontroller with integrated Wi-Fi and dual-mode Bluetooth. **Students will need to purchase their own ESP32-based development board.**

The board we will be using in class is the ESP32-C6-WROOM-1 DevKit. This board allows the developer to connect via USB data cable to a computer for downloading, monitoring, and debugging of code. In addition, pins along the edges of this board allow the developer to connect small circuits. There are multiple versions of this board including some with more memory. The link given below for this board runs about \$9 each. **Note that the chance of damaging a board is not insignificant. Therefore, it is recommended that each student purchase two boards.**

Spring 2025 Hardware Development Kit:

- ESP32-C6-DevKitC-1-N8 Development Board (about \$9, but it might not be a bad idea to get 2) - https://www.amazon.com/Espressif-ESP32-C6-DevKitC-1-N8-Development-Board/dp/B0BRMSDR4R/ref=sr_1_3

You will also need a USB-C to USB cable to connect to the development machine that is capable of transmitting data. A charging cable alone will not work as it does not contain the data connections. If you do not already have one of these, you will need to purchase one for around \$9 or \$10.

In addition to the development board, you will need the following components to complete the laboratories. In some cases, you can get a discount for purchasing multiple components. Feel free to share with classmates to reduce cost, **but be sure you are purchasing the correct part numbers.**

- Jumper wires (about \$7): <https://www.amazon.com/Elegoo-EL-CP-004-Multicolored-Breadboard-arduino/dp/B01EV70C78/>
- I2C LCD display (about \$10): <https://www.amazon.com/gp/product/B019K5X53O/>
- 4-Channel Bi-Directional 5V to 3.3V Logic Level Converter (about \$6): <https://www.amazon.com/gp/product/B07QTKZSBT/>
- MAX98357 I2S Class D Mono Amplifier Module (about \$6): <https://www.amazon.com/WWZMDiB-MAX98357-Amplifier-Unfiltered-Raspberry/dp/B0BTBS5NW2/>

- 4 Ohm, 3 Watt speaker (about \$8 for 2, but you will only need 1): <https://www.amazon.com/Gikfun-Speaker-Stereo-Loudspeaker-Arduino/dp/B01LN8ONG4/>

A solderless breadboard will also be helpful, but not necessary. They offer a bit of protection to your circuit boards and help organize wiring. Three solderless breadboards will run about \$9. You can share, but it's kind of nice to leave your old circuits wired - <https://www.amazon.com/EL-CP-003-Breadboard-Solderless-Distribution-Connecting/dp/B01EV6LJ7G/>

Below is a summary of the total cost at the time of this writing based on the different ways you could purchase the items. Remember that the textbook is online, so this should reflect the total resource cost for the course.

- Approximate cost for a single development board and no breadboards: \$46
- Approximate cost for two development boards and no breadboards: \$55
- Approximate cost for two development boards and solderless breadboards: \$64

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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. Unless otherwise noted, all assigned readings are to come from *Developing IoT Projects with ESP32* by Oner.

For links to the most up-to-date and accurate reading assignments, please refer to the module in the content portion of the course D2L site corresponding to the class meeting day.

Week	Date	Room	Topic	Reading
1	Jan 20	230 Lab	Martin Luther King, Jr., Day - No class	N/A
	Jan 22	225 Lect	Intro to IoT and Development Platform	Ch. 1: Getting Started with ESP32
2	Jan 27	230 Lab	Intro to C & Verifying Lab Setup	Ch. 2 up to Debugging the Application
	Jan 29	225 Lect	Basic Electrical Principles & GPIO	Catsoulis - Sect. 4.1-4.7 & ESP32 User Guide - Getting Started
3	Feb 3	230 Lab	Error Handling and Debugging	ESP-IDF Programming Guide - Error Handling
	Feb 5	225 Lect	FreeRTOS	RTOS Fundamentals from freertos.org
4	Feb 10	230 Lab	FreeRTOS & Interrupt Intro	Ch. 2 - Warming up - Basic I/O w/buttons, pots, & LEDs
	Feb 12	225 Lect	Board Level Communication (UART, SPI, I2C, and JTAG)	Sparkfun reading
5	Feb 17	230 Lab	I2C to LCD Lab and Test 1 Review	Ch. 3: Liquid Crystal Displays (LCDs)
	Feb 19	225 Lect	Test 1	N/A
6	Feb 24	230 Lab	Non-Volatile Storage (NVS) Lab	Web Assigned
	Feb 26	225 Lect	Embedded System Memory Technologies	Web Assigned
7	Mar 3	230 Lab	Audio processing (I2S) Lab	Ch. 4: Adding a speaker with I ² S
	Mar 5	225 Lect	Developing low-power applications and sleep modes	Web Assigned
8	Mar 10	230 Lab	Software-Based Wi-Fi AP	Ch. 6: A Good Old Friend - Wi-Fi
	Mar 12	225 Lect	ESP32 Built-In Security Support	Ch. 7: Security First!
9	Mar 17	N/A	Spring Break - No class	N/A
	Mar 19	N/A	Spring Break - No class	N/A

10	Mar 24	230 Lab	Wi-Fi POST HTTP Request Lab and Test 2 Review	Rao - Sect. HTTP
	Mar 26	225 Lect	Test 2	N/A
11	Mar 31	230 Lab	Wi-Fi Connection Enhancements	Online Lab Instructions
	Apr 2	225 Lect	Low-Energy Bluetooth (BLE)	Ch. 8: I Can Speak BLE
12	Apr 7	230 Lab	BLE Beacon Lab	Online Lab Instructions
	Apr 9	225 Lect	MQTT Protocol Basics	Rao - All Sections on MQTT
13	Apr 14	230 Lab	MQTT Lab	Online Lab Instructions
	Apr 16	225 Lect	Intro to IoT Cloud Services	Web Assigned
14	Apr 21	230 Lab	Cloud Platform Lab - Part I	Online Lab Instructions
	Apr 23	225 Lect	Intro to AWS S3 and Lambda Services	Web Assigned
15	Apr 28	230 Lab	Open Lab	N/A
	Apr 30	225 Lect	Graduate Presentations and Test 3 Review	N/A
	May 5	230 Lab	Test 3 (3:50 p.m. to 5:50 p.m.)	

Final Exam Time

The following is the time slot assigned by the University for the final exam for this section of CSCI 4677. This is when the third test is to be taken. Please verify these times with the [University's Final Exam Schedule](#)

- Section 001: Monday, May 5 - 3:50 p.m. to 5:50 p.m.

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Grading Policy

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 along with some short coding problems. 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. All three exams will be timed and take place during a scheduled class period.

Laboratory Exercises: The majority of the topics will have an associated laboratory exercise used to support the material. Each exercise will involve the development of code to be run on the ESP32 platform. Some of the exercises will also require the setup of external hardware. Points will be assigned representing how well each student achieved the laboratory's objectives.

Quizzes/Homework: In addition to the laboratory exercises, weekly quizzes or homework will be given to support the material covered during the week. Typically, but not always, this will be a D2L quiz.

Online Quizzes: For all but a few topics, a weekly online quiz will be given. These quizzes 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.

- **Each quiz will be due at 11:59 p.m. four days after the lecture where the material was first presented.** This should give each student the motivation to stay current with the material while also providing an opportunity for students to resolve any issues they are having with the lecture material.
- **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.**

Graduate Student Final Project: Graduate students enrolled in CSCI 5677 have the additional requirement of designing a working prototype of a final project. Suitable categories include, but are not limited to, the following:

- home automation
- productivity
- interactive art
- gaming
- security systems

Graduate students may brainstorm with others to enhance their project idea, but each project must be a unique, individual effort. More details will be presented as needed throughout the semester.

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

Assignment	Portion of final grade	
	CSCI 4677	CSCI 5677
Labs/Quizzes/Homework	28 %	24 %
Test 1	24 %	22 %
Test 2	24 %	22 %
Test 3	24 %	22 %
Project Presentation	-	10 %
Total	100 %	100 %

The table below presents the translation between a student's total score and his or her 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

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 unsecured 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 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, extensions or make-ups for on-line assignments will not be offered. 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 illness
- Absences occasioned by university-sponsored events
- Absences due to military service
- Absences due to religious observance
- Absences due to the death of an immediate family member

Make up work will be accepted for authorized university absences **only** if a student presents 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.

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Expectations, Attendance, 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.

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 he or she 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.***

Attendance and participation is 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.

Any asynchronous content intended for remote access should be reviewed in a timely manner. The tendency to, "get around to it eventually," may result in the student getting too far behind to catch up.

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. ***All attempts will be made to answer emails within one business day 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.***

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. Other resources include the reading, podcasts, and videos, and when issues of academic integrity are not in question, other students. Please do not take this as an attempt to discourage questions, only to let you understand that there will be times when the instructor is not available to immediately answer your questions.

Health and Safety

This class has been designated to have a face-to-face delivery method. With respect to policy regarding safety in the classroom, the University has released the following statement:

"In accordance with CDC guidelines, we strongly encourage you to wear a mask or other appropriate face covering to class. Wearing a mask that covers your nose and mouth communicates the care and respect you have for yourself, the care and respect you have for those you live with, and the care and respect you have for other members of this classroom community. The best evidence we have, from public health professionals, is that wearing masks is one of the best ways to protect against the spread of COVID-19 and other airborne illnesses."

If you have tested positive for COVID-19, have symptoms consistent with COVID-19, or been exposed to a positive case, please read [the University's guidance for when to quarantine and when to return to work or class](#). As a reminder, all employees have been provided with up to five additional days of leave for use in the event of a COVID-19 diagnosis or exposure.

Each student is responsible for all academic work missed as a result of their absence. Contact the instructor as soon as you know that you will not be attending class to make arrangements to access course material and complete your assignments.

Academic Integrity

Without exception, all 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 or 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)."

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Special Accommodations: Students with needs for note taking or test taking accommodations should make arrangements with the instructor during the first week of the term.

According to University policy, the instructor is prohibited from assuming a student who has been granted accommodations wishes to take advantage for them. Anyone registered with Disability Services who wishes to receive their specific accommodation must request that accommodation 5 days prior to any scheduled test or other assessment. This is according to ETSU's Disability Services' statement, which states, "Please note that if you fail to schedule your exam 5 days prior, and fail to contact your instructor 5 days prior, you may not be allowed to take your exam. Instructors require ample time to get the exam to our office, and we have to have enough notice to reserve space."

Laptop Policy: The use of laptops or other electronic devices for the purpose of note taking or viewing the online course material is permitted. **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 Alert Page](#) if there is any doubt about early morning classes being cancelled or delayed.

The following is an excerpt from the University Indement 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 indement weather policy may be accessed at http://www.etsu.edu/safety/campus_emergency/policy.aspx.

Use of CSCI Laboratories: Below is a subset of the full list of lab policies that pertain to this course.

- No food of any kind in the labs. All beverages must be in fully sealable containers.
- Keep labs clean at all times. Pick up after yourself when you leave the lab.
- Do not, under any circumstances, share any ETSU or ETSUCS account with any other user.
- Do not attempt to install any hardware or software in the labs. Direct all requests for additional hardware or software to the Systems Manager or Assistant Systems Manager.
- Do not attempt to use the C: drive for permanent file storage. You may store files in C:\temp for use during your current lab session. All user files are removed from the lab systems regularly and cannot be recovered.

- Avoid saving files to your desktop. Use the Z: drive instead.
- You may use your laptop in a departmental lab. You may NOT disconnect power, hardwired lab ports, network connections, keyboards, mice, or monitors from lab systems to connect personal computers.
- Do NOT lock the computers for more than 15 minutes. Violators may have their lab privileges revoked.

A complete list of CSCI lab policies can be found [here](#).

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 see the [syllabus attachment](#) to access key dates or to find additional information regarding the policies outlined in this syllabus.

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Use of this document is restricted to students enrolled in Tarnoff's sections of CSCI 4677/5677 at ETSU.