Network Electronics

CIS-112 1 F

Fall Term 2023-2024 School Year   Section 1 F   2.00 Credits   08/21/2023 to 12/08/2023   Modified 08/16/2023

🕐 Meeting Times and Location

Tuesday, Thursday, 8:00 AM - 9:50 AM, Technology Center 117 (8/21/2023-12/8/2023)

👤 Contact Information

Scott Stubbe

Email: scott.stubbe@southeasttech.edu

Office: TC 117

Office Hours: 10am-1pm Tuesdays and Thursdays, 10am-2pm Fridays.

If you cannot meet during one of those times, please email me and I will do my best to accommodate your schedule with a MS Teams meeting.

💻 Course Description

This course will introduce students to basic electronics with an emphasis on electronics principals in computer networking. Topics cover basics like AC/DC voltage, current, resistance, frequency, analog signals, electronic components, safety, and wire / cabling specifications. Other advanced topics will include power supplies, fuses, PoE (Power over Ethernet), power calculations watts / dB, modulation, throughput calculations, digital signals, and an introduction to programming languages.

📊 Outcomes

- Describe the difference between voltage, current, and resistance.
- Use Ohms law to calculate voltage, current, and resistance.
- Demonstrate an understanding of electrical power, power calculations, signal interference, and power loss using watts and decibels.
- Identify the logic gates and describe their use in integrated circuits.

- Explain electronic frequencies, wavelengths, and the properties of different wave forms.
- Utilize electronic test equipment including multimeters, cable testers, tone and probe, and oscilloscopes.
- Distinguish different types of electronic components such as transformers, resistors, capacitors, diodes, relays, transistors, and ICs.
- Articulate the importance of electronics in networking and networking equipment.
- Be able to compare different types of Uninterruptible Power Supplies and select an appropriate type for a particular application.
- Explain how Power over Ethernet (PoE) works and determine its feasibility of use.
- Compare basic electronic circuit design such as parallel and series circuits.
- Convert numbers between the decimal, binary, and hexidecimal numbering systems.
- Demonstrate a basic understanding of Python code.

◎ Additional Outcomes

Student success is important to our faculty, and all faculty are involved in assessing learning. Upon completion of a degree, Southeast graduates will have demonstrated competence in the following areas:

Science and Technology: Technical competence including knowledge of technology and/or scientific principles as these apply to programs.

Problem Solving & Critical Thinking: The ability to select and use various approaches to solve a wide variety of problems – scientific, mathematical, social and personal. Graduates will also be able to evaluate information from a variety of perspectives, analyze data, and make appropriate judgments.

Communication: The ability to communicate effectively in several forms – oral, written, nonverbal and interpersonal. Graduates will also demonstrate knowledge of how to manage and access information.

Professionalism: Strong work ethic, including responsible attendance; skill in teamwork and collaboration, as well as an ability to work with others, respecting diversity; ability to adapt to change; commitment to lifelong learning; adherence to professional standards; and positive self-esteem and integrity.

▤ Course Materials

Southeast Tech Approved Laptop

No Textbook Required

CIS 112 Electronics Kit

Note: The night version of this course taught by Bryan Cox uses a different kit. Please verify when purchasing that you are getting the kit for the Flex (F) sections.

This kit contains the Adafruit Circuit Playground experimenter's board with data cable, an electronic parts kit, connection wires, and a multitester.

Availability: Campus Bookstore

Other Items

Safety Glasses

- Safety glasses will be provided in the classroom when necessary, and can be borrowed for remote work. You may also purchase your own as long as they meet the ANSI Z87 standard of protection. These can be purchased at the Campus Bookstore, online, or can be found at local retailers.

USB Power Supply / "Charging Brick"

- Most of our electronics experiments will use USB for a power source. Because some of these could potentially damage your computer's USB ports, we require that you have a separate USB power supply of some sort for use in remote labs.

Deliverables

Overview

Course objectives will be met by lectures, labs, problem solving demonstrations, homework, testing (both scheduled and unscheduled), students performing activities in classroom lab environment, and students researching, producing, and giving presentations to your peers.

Homework

This is a college level course, and it is assumed that the average student will spend a minimum of two hours outside of class for every hour spent in class. It is expected that you check your STI e-mail account daily. There may be email class announcements and homework assignments. All homework will have an enforced due date.

Evaluation Procedures and Grading

Criteria

The tests, documentation, final presentation, lab performance and quizzes are divided into points. Lab performance consists of active participation, lab projects, and timely completion of reading assignments and questions.

GRADE	PERCENTAGES

A	90% - 100%
B	80% - 89%
C	70% - 79%
D	60% - 69%

✳ Course Expectations

Tardiness / Absences / Late Work / Missed Test Policy

Communication: Just as would be the case with an employer, communication with the instructor is essential when it comes to missing class or missing an assignment deadline. Whenever possible notify the instructor in advance if you are going to be late or absent. If you cannot give advance notice, it is still best to notify as soon as you are able. These messages do not have to contain specific details of the reason for absence; simple explanations such as "illness" or "appointment" or "family emergency" are usually best.

Tardy: Tardiness begins the minute class starts, so plan to be on time. After four occurrences of tardiness, a student will receive one full class period absence. Students are responsible for checking attendance posted on MyTech.

Absence: In all cases of absence, it will be necessary to make up any missed coursework. Missed coursework is due within one week following the absence. Missed lab work that cannot be completed outside the classroom can be made up in another section or when the lab is available.

Unlike some other Flexible delivery classes, lecture portions of this class are not offered as Asynchronous learning – meaning there are no recordings of the lecture for you to view during other times of the week. To avoid being marked as absent you must attend either in person or remotely at the time of your class session. Under extenuating circumstances, you may be granted permission to attend another class session, but this must be requested before the alternate class session begins so that you can be given access to that remote session.

Late Work: Late labs and coursework may be penalized up to 50%. Coursework later than one school week may not be accepted. Failure to complete all assignments may result in an incomplete or a failing grade. It is very important to stay current to do well in this class.

- *Exceptions may be considered on a case-by-case basis.*

Safety

Safe operation of our lab environment is essential to completion of this course. Keep your lab area clean and organized to benefit you as well as other students working around you. If in doubt about a certain procedure, please ask your instructor. If you see an unsafe act, please bring it to the attention of the instructor so we can correct the situation. Violations of safety to self and others and/or violation of safe operating practices of equipment may result in: removal from class, reduction or loss of your final course grade; and/or disciplinary action. Students may lose their daily lab points if any violations of this policy occur.

Safety is also important when doing remote lab work. Your remote area should also be clean and organized, with all possible precautions against spilling drinks or food onto equipment. Any observed safety violations during remote attendance may be addressed with the same consequences as in-class violations.

Responsibility & Ethics

Besides the student's responsibility of completing assignments on time and attending classes, it is also their responsibility to participate in class and act in a professional, courteous manner <u>at all times</u>. Please keep in mind that the use of Southeast's computer equipment, e-mail, Internet, etc., should be considered a privilege. Any student found on the Internet or doing any non-class related computer activities (messenger, social networking sites, games…….) will be reprimanded the first offense and possibly dropped from the course on the second offense.

Headphones are strictly prohibited during class time (except for headsets used for remote attendance). Cellular phones are to be turned off or set to vibrate.

Cheating is strictly prohibited. A grade of ZERO will be given on the assignment for the first offense. Any further offense will result in an immediate course withdrawal.

Netiquette

The rules of netiquette are important to everyone in modern society, but it is especially important for students enrolled in HyFlex sessions.

- Treat instructors, classmates, and all others in a professional and respectful manner in all communications. A good rule of thumb is to only post what you would be willing to say to your reader's face.
- Sarcasm and humor can easily be misinterpreted. Online messages are lacking the non-verbal communication cues that face-to-face conversations allow. Please consider how your attempt at

humor might be misinterpreted.
- Never type when you are angry or frustrated. Please consider having a neutral third party read your message prior to sending, or else type a draft and reread it later before sending.
- Agree to Disagree: Remember you may not always have the same viewpoint as others. It is fine to disagree as long as you are respectful. There can be disagreement without disrespect.
- Allow for response time from other students and instructors. It is easy to forget that there are people on the other side of the online communication that also have busy lives. An immediate response is not always feasible. Please plan accordingly.

Remote Work

Employers have been requesting that we familiarize students with the tools that are used to perform work remotely. In the modern workplace you will likely be expected to participate in video meetings and training. You may also be required to provide remote assistance to customers or coworkers.

For some labs you will be given the opportunity to complete those labs outside of class time. In sections that are marked as HyFlex, students will have the opportunity to attend lectures remotely. The ability to take this course outside the classroom will be dependent upon the work ethic and performance that a student shows. Students who do not maintain a grade average of C (70%+) or who have established a pattern of submitting late work may be required to attend lectures and labs in person. Just as you will find in the workplace, flexibility in your schedule will be taken away if abuse of it results in a reduced quality of work.

📑 Additional Items

📅 Course Outline

When	Topic	Notes
Week 1	Introductions and Safety	Class introduction, lab and workplace safety, protection of equipment.
Week 2-3	Computer Equipment	Becoming familiar with various computing and networking devices .
4-6	Logic and Computing Basics	Learning the underlying mechanisms of how computers function, logic, numbering systems, and an introduction to the Python programming language.
7-8	Basic Electronic Principles	Explanations and experiments demonstrating basic principles of electronics and electronic measurement.
9-12	Electronic Circuit Basics	Practical applications of electronic principles and logic, building and exploring computer programming, logic circuits, and troubleshooting.

When	Topic	Notes
13-15	Signal Propogation	Learning how signals work – propagation, signal loss, causes and prevention of interference, electronic frequencies and properties of different waveforms and wavelengths.

🏛 Institutional Policies

Course Subject to Change

The syllabus is a statement of intent and schedule of topics, activities, assessments, and requirements as well as an overall road map to ensure students will achieve both the course learning objectives and the program-level learning objectives.

The scheduled educational activities are subject to change with reasonable advance notice to students by either the instructor or academic administration. The grading and attendance policies are not subject to change once posted.

Students wishing to appeal changes to a course syllabus must first do so in writing to their instructor. If a successful resolution is not achieved after submitting the written appeal, the student has the option to file a written appeal to the appropriate Associate Dean of Curriculum and Instruction or Dean of Curriculum and Instruction. If the second level appeal does not result in a resolution, the student can submit a final appeal to the Vice President of Academic Affairs. The review and final decision of the Vice President of Academic Affairs is final and not subject to appeal.

Attendance

Administrative Withdraw for Non-Attendance

Students are expected to attend all sessions of courses for which they are enrolled. Absences do not excuse the student from meeting course requirements. Each instructor will evaluate the student's progress to determine how to handle outstanding assignments and assessments. Students attending 16 week courses who have a record of zero attendance for fourteen (14) calendar days will be administratively withdrawn from the course(s) the absence is occurring, resulting in a grade of "W" for the course. Students attending courses of less than a 16 week duration, who have a record of zero attendance for seven (7) calendar days will be administratively withdrawn. Students who receive financial aid may have their financial aid status affected. More information is located in the Southeast Tech Catalog (https://catalog.southeasttech.edu/index.php):

Course Recording Statement

Delivery of some courses at STC allows flexible participation options for students in time and location. Courses may be made available to properly enrolled students who are not physically in the classroom, and/or a time delayed recording made available to all properly enrolled students. In addition to

instructional content, remote delivery may include capture of all classroom audio and visual happenings during designated class times, including that of students who may be part of the class, but who are not physically in the classroom. By remaining in classes capturing audio and visual happenings, you are agreeing to this statement.

Student Learning Outcomes

Student success is important to Southeast Tech faculty, and all faculty are involved in assessing student learning. Upon graduation, Southeast students will have competence in the following four common learning outcomes:

Technical Skills: Students will be able to explain industry-relevant concepts (knowledge) and demonstrate industry-relevant technical skills (performance).

Communication: Students will be able to define the purpose of the communication; organize and structure the communication; provide supporting material; demonstrate precision of language; and professionally deliver and format the communication.

Problem Solving & Critical Thinking: Students will be able to define the problem; analyze the problem; generate solutions; evaluate solutions; and select the best solution.

Professionalism: Students will be able to demonstrate positive work ethic; collaborate as part of a team; adapt to change; adhere to professional standards; and model integrity and ethics.

Student Conduct, Cheating and Plagiarism

Students attending Southeast Technical College are expected to follow policies and requirements in the Southeast Technical College Student Handbook: STC Student Handbook (https://catalog.southeasttech.edu/index.php). In addition, some departments have academic handbooks for their areas that outline expected student conduct.

Southeast policies authorize the Vice President of Academic Affairs to suspend or terminate any student from the college for misconduct as outlined in the rules of this policy. The following student misconduct shall constitute grounds for student discipline, suspension, or termination when such activity occurs on school grounds, in the online course environment or during an educational function under the auspices of the school board: acts of dishonesty, including cheating and plagiarism or other forms of dishonesty relating to academic achievement such as the misuse of technology, software, apps, or other computer-assisted or artificial intelligence in violation of individual course or assignment policies as defined by instructors.

Test Proctoring

The Southeast Testing Center offers test proctoring located in the Wood Center Building, Room 103. Online instructors will communicate details regarding required test proctoring and how to sign up to take these assessments. Testing Center contact information: 605.367.6014 or testing@southeasttech.edu

Academic Resource Center (ARC)

Your success is important to us! In addition to meeting with your instructor for academic assistance, STC students are encouraged to use the free tutoring and other support services in the Academic Resource Center (ARC) to reinforce understanding of course concepts and improve performance in courses. ARC offers one-on-one tutoring for course assignments or skill building (e.g., test-taking strategies, note-taking, memorization, etc.) with faculty or peer tutors. Learn more about these services by visiting the ARC page found in the Student tab of myTech.

Student Mental Health

Mental health and overall well-being are significant predictors of academic success. As such it is essential that during your college experience you develop the skills and optimize resources effectively to navigate stress, anxiety, depression, and other mental health concerns. Please familiarize yourself with the range of resources Southeast Tech provides and seek out support for mental health concerns as needed. Individual counseling services are available in the Sullivan Health Science Center or virtually via Teams-based video, Telephone, or Email. Please visit Personal Counseling on myTech (https://my.southeasttech.edu/ICS/Student/Student_Support__Services/Student_Success_Center/Personal_Counseling.jnz) to complete the Personal Counseling form. Contact the counselor at counseling@southeasttech.edu (mailto:counseling@southeasttech.edu) or 605-367-4821 for more information and to schedule a session. Crisis Counseling is available nationwide by calling 988, and in the Sioux Falls area via the Helpline Center at Helpline Center Website (https://www.helplinecenter.org/)

Safety

Violation of safety to self and others and/or violations of safe operating practices of equipment may result in the reduction or loss of a daily grade, removal from class, and/or other disciplinary action.

ADA and Accessibility Services

It is the policy and practice of Southeast Technical College and the instructor of this course to act with integrity, engage in equitable conduct with respect to differences in age, gender, race, disability, and religion, and to create inclusive and accessible learning environments consistent with federal and state laws. In accordance with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990, and the Americans with Disabilities Amendment Act of 2008, Southeast Technical College ensures that no student with a disability will be discriminated against or denied access to participate in, or benefit from, programs, services and activities. If you are a student with a documented disability, think you may have a disability, or have a temporary health condition that requires accommodations, please visit the Accessibility Services (https://www.southeasttech.edu/student-life/accessibility-services.php) website, call 605-367-6110, or email access@southeasttech.edu (mailto:access@southeasttech.edu). All students are encouraged to discuss access-related needs with their instructors and the Accessibility Services Office as soon as possible in their academic career.

Freedom of Speech

Southeast Tech strives to create an environment in which diverse opinions can be expressed and heard. Students have the right to peacefully express their views and opinions, regardless of whether others may disagree, but not in such a way as to interfere with the rights of others or the operation of the college. Views expressed should not violate any of Southeast Tech policies or core values.

Southeast Technical College students are both citizens and members of the Southeast Tech community. Students should enjoy the same freedom of speech, peaceful assembly, and right to petition that other citizens enjoy and should abide by the obligations and expectations as members of the Southeast Tech community.

Notice of Nondiscriminatory Policy

Southeast Tech is committed to a policy of equal opportunity for all in every aspect of its operations. Southeast Tech does not discriminate on the basis of race, color, creed, religion, age, gender (including pregnancy), sexual orientation, disability, national origin or ancestry, military/veteran status, genetic information, or any other category protected by law in its educational programs, admissions policies, employment policies, financial aid, or other institute-administered programs. Click this link for more information: Non-Discriminatory Policy and Contact Information (https://catalog.southeasttech.edu/index.php)

Title IX/Sexual Misconduct/Sexual Assault/Sexual Offense

Southeast Tech is committed to providing a learning and working environment free of unlawful harassment based on an individual's race, color, religion, creed, ancestry, national origin, gender, sexual orientation, disability, age, protected military/veteran status, genetic information or any other basis protected by law. Concerns may be reported directly to this individual in person, by calling 605-367-4670, or by emailing Brett.Arenz@k12.sd.us. Individuals with immediate concerns should call campus security at 605-941-9003. For more information, click this link: Title IX in Student Catalog (https://catalog.southeasttech.edu/index.php)

Sexual Misconduct

Southeast Tech is committed to providing a learning and working environment that emphasizes the dignity and worth of every member of its community, free from discriminatory conduct. Sexual harassment in any form or context is contrary to this commitment and will not be tolerated. Sexual harassment subverts the mission and the work of Southeast Tech and can threaten the career, educational experience, and well-being of students, faculty, and staff.

Southeast Tech recognizes that sexual harassment includes harassment based on gender, sexual orientation, gender identity, or gender expression and may occur regardless of the formal position or status of each person involved. Sexual harassment is especially offensive, however, when it occurs in relationship between an instructor and student or between supervisor and subordinate. In those situations, sexual harassment exploits unfairly the power inherent in the position of the faculty member or supervisor.

Sexual harassment also constitutes a form of sexual discrimination that is illegal under Title VII of the Civil Rights Act of 1964, Title IX of the Elementary/Secondary Education Act of 1972, as amended, and state law. Southeast Tech also recognizes that sexual assault, domestic violence, dating violence, and stalking may also be considered sexual harassment.

Students have the right to be free of sexual misconduct while pursuing their education at Southeast Tech which would include participating in any off-campus activity such as internships, clinical experiences, and preceptor experiences.

Students should immediately report any form of sexual misconduct to their instructor or the designated contact at Southeast Tech.

Student Right-to-Know/Campus Security Act

Southeast Tech is required under Public Law 101-542 to encourage students to report all crimes (murder, rape, forcible or non-forcible sex offenses, robbery, aggravated assault, burglary, motor vehicle and other thefts or crimes) which occur on the Southeast Tech Campus to the local law enforcement offices and to the Southeast Tech Student Success Center or campus security. For more information on Student Right to Know/Campus Security Act, click this link: Student Right to Know - Campus Security Act (https://catalog.southeasttech.edu/index.php)

Family Educational Rights & Privacy Act

FERPA stands for the Family Educational Rights and Privacy Act of 1974. It is a federal law governing the privacy and handling of educational records and giving specific rights to students. You can find more information about the law at FERPA Website (https://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html)

Student Communications

Southeast Tech's student email accounts will be used as Southeast Tech's official means of communications with students. Southeast Tech students should also use the myTech Student and Campus Life tabs for information regarding important upcoming events and required dates for fee payment, etc. The Student and Campus Life tabs will also inform students about job opportunities, scholarship information, and other important announcements.