	ELET21N Advanced Digital Circuits Spring 2022
Department	Engineering and Computing Sciences
Instructor	Professor Susan Hughes
NCC Email	shughes@ccsnh.edu
Telephone Number	603-578-8900, x1582
Office Hours	See office hours posted on Canvas or contact instructor for appointment
Office Location	Room 312
Class Days/ Meeting Time	Lecture: Tuesday 3pm-5:50pm, Room 166 Lab: Thursday 3pm-5:50pm, Room 171

Ratio nale:

This course will build on the course ELET121N – Digital Fundamentals and provide the advanced topics that are expected of an Electronics Engineering A.S. Graduate to know.

Course Description:

This course is a continuation of the fundamental concepts in digital theory. The subject areas are flip-flop operations, applications, counter designs using state machine, state diagrams, shift registers and memory devices. Also covered will be CPLD design and development and the various types of media and data buses. Hands-on laboratory experiments, which augment the learning process, are an integral part of this course. The labs demonstrate real world implementation of otherwise abstract academic concepts and provide valuable experience in designing, testing, and debugging circuits. Note that ELET21N is a required course for all EET Majors.

Course Competencies:

At the successful completion of this course, the student should:

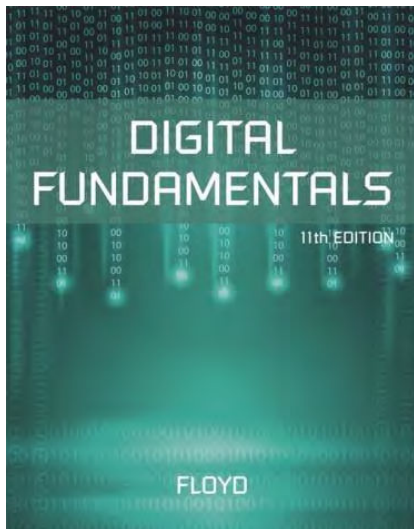
- Understand synchronous and asynchronous circuits by implementing various types of shift register (SR) circuits and using state machines and state diagrams to implement and apply circuits to real world applications.
- Understand memory basics including the various types of memory devices such as RAM, ROM, Flash, etc.
- Be able to design basic programmable devices such as CPLD's and FPGAs in a real world application.
- Be able to discuss the computer bus basics including the different types (parallel, serial, USB, etc).

Essential Questions:

- What is the difference between a synchronous and asynchronous circuit?
- What are the different types of memory?
- How do I program a CPLD/FPGA?
- How do each of the hardware buses work?

Required Materials:

Digital Fundamentals, 11/E Thomas L Floyd ISBN-10: 0132737965 • ISBN-13: 9780132737968 ©2015 • Prentice Hall • Published 07/14/2014



Click on this link to access the NCC bookstore's website

<https://www.bkstr.com/nashua bookstore/home>

Technology:

In order to be successful at NCC, all students need a laptop or personal computer (PC) as well as reliable internet access. It is recommended that students purchase a laptop for in-class use. Specifications can be found by clicking on the link below. If you do not have Internet access or the right kind of computer equipment (e.g., laptop, webcam, etc.) you may be eligible for the college's technology lending program, which is a first come first served program. Click on this link for more information <https://www.nashua.cc.edu/technology>

Laptops that meet NCC technology specifications are available for purchase at the NCC bookstore. Financial aid may be used for purchases made at the bookstore. Contact the bookstore for more information <https://www.bkstr.com/nashua bookstore/home>

Supplemental Materials:

Lab: Most lab materials are provided by NCC; however, tool & proto-board quality is not guaranteed. Students are encouraged to acquire some lab materials for their exclusive use during lab. For ELET221N, the materials are: (1) small/medium gauge wire strippers. (2) proto typing board (breadboard). These items will be discussed in lab and are available from a variety of sources. (3) USB flash drive is required for saving and submitting student work.

Course Expectations:

Canvas

All materials presented in class along with lab assignments can be found on Canvas. All assignments must be uploaded to canvas to be graded. Do not email your submissions or provide printed copies.

Homework / Lab Assignments:

Assigned homework will be due at the beginning of the next class (as stated on Canvas). No late submissions will be accepted except for extraordinary circumstances.

Notes Missed:

See a classmate so that you can copy their notes.

Tests:

A test must be made up ASAP and you must have a valid reason for missing it. It is the student's responsibility to make an appointment IN ADVANCE for a make-up. Only one test can be made up during the semester.

Zoom Policy:

We need to be able to see and hear you during Zoom classes. Therefore, when participating in a zoom class/lab, please leave your video turned on.

Grading:

There will be assignments, chapter exams, and a final. They will tentatively count toward the final grade as follows:

Quizzes and Homework	20%
Exams:	30%
Professionalism/Class Participation	5%
Labs	35%
Final Exam	10%

Grades will be assigned according to the following department scale:

Grading System:

A	93 -100	B	83-86.9	C	73-76.9	D	63 -66.9
A-	90 - 92.9	B-	80 - 82.9	C-	70 - 72.9	D-	60 - 62.9
B+	87 -89.9	C+	77 -79.9	D+	67 -69.9	F	0 - 59.9

Diversity, Equity, and Inclusion Statement:

We are all responsible for creating a diverse, equitable, inclusive, and just environment. Thus, we must treat individuals with respect by valuing all types of diversity. This is fundamental in creating a welcoming and inclusive learning environment. Diversity may include multiple ways of identifying ourselves, including, but not limited to race, color, national origin, language, sex, disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. These diverse identities, among many others not mentioned, influence the perspectives our students, faculty, and staff bring to the NCC community. Through use of various approaches that enhance

intellectually rich, respectful, safe, and inclusive learning environments, this dynamic process will demonstrate our sustained commitment at NCC. It is our core belief that diversity, equity, and inclusion promote excellence, collaboration, and innovation while also seeking justice.

Available Support Services

NCC Library: Get help with research for your papers and assignments from the NCC librarian and staff. Email ncclibrary@ccsnh.edu

Tutoring and Writing Center: The Tutoring and Writing Center, located in the library, offers free academic support services to all NCC students. Meet in-person or via Zoom with experts who can tutor you in math or accounting or help you with writing for any course. Tutoring is drop-in or by appointment. View the current tutoring schedule at <https://library.nashua.cc.edu/home/tutoring>

Online chat tutoring is also available 24/7 with Smarthinking. Find a link on the left navigation menu inside Canvas courses.

Disability & Accessibility (*Reasonable Accommodation Plan*): Students who think they may have or have a documented disability (*physical, learning, or mental health*) and/or had an IEP or 504 Plan in high school who may need classroom accommodations must meet with the Disability Services Coordinator to set up an NCC Reasonable Accommodation Plan (RAP). For more information view the Disability & Accessibility page: <https://www.nashua.cc.edu/student-services/disability-accessibility-information> and/or contact Jodi Quinn, Disability Services Coordinator (office located in the library), at jquinn@ccsnh.edu or (603) 578-8996.

In order to receive reasonable accommodations, it is the student's responsibility to email the current semester's RAP to each instructor and as needed meet with instructors to discuss the Plan. Each term the student wants to utilize accommodations, the RAP must be renewed and the student provides the current term Plan to instructors even if provided a Plan to an instructor for a previous term course.

Audio Record Classroom Lecture: Please note that as a student in this class, you may have a classmate who by permission can audio record class lectures for his/her learning purposes. **Only students with prior written permission** from the instructor or the Disabilities Services Coordinator may audio record class lectures - *for educational purposes only*. Students who audio record class lectures are prohibited from selling, transcribing, or distributing the recordings in *any manner* and are asked to delete the recordings when it is no longer essential for their learning purposes.

Instructors may record their own class lectures, activities, and discussions using electronic video, still photo, or audio recording for educational purposes,

including academic research, professional development, and recording of course content for access through online learning and other formats. Every student present will be informed by the instructor of any recording at the beginning of class.

CARE Team

If you need information or a referral to local resources in the areas of Mental Health or basic support services (such as food, clothing, shelter, substance abuse or others including domestic and sexual violence), you can email the NCC CARE team (NCCCare@ccsnh.edu) and we will assist you in connecting to community resources.

Department Policies

Professionalism includes the following:

Students are expected to adhere to the "NCC Student Code of Conduct" as described in the "NCC Student Handbook"

<https://www.nashuacc.edu/images/PDF/handbook/2021-2022-NCC-Student-Handbook.pdf>

Students are also expected to contribute to a cooperative and productive learning environment. To meet this objective, students are expected to show up for class on time, be attentive, not disrupt the instructor or other students, work quietly and use time in the lab time to complete assigned work, stay in lab until assigned work is complete, demonstrate respect for other people, demonstrate initiative and self-motivation, and take responsibility for academic success.

Attendance:

Attendance is vital to the student's success in this course. You are expected to attend all classes and laboratory sessions, and to be on time. It is extremely difficult to make up for lost hours of instruction time. You are responsible for all material and information given in class whether you are present or not.

Notes Missed:

See a classmate so that you can copy their notes.

Lab / Homework Assignments:

Assigned homework will be due as specified in the write-up of the assignment. Your homework will be checked for effort and completeness.

All work during the scheduled lab time must be submitted before the student leaves the lab, even if only partially completed. The student will automatically receive a "0" for that lab if they don't. This applies even if additional files or updates to the lab are to be uploaded later. For those labs where students work

with a partner (specifically in engineering courses), the final lab write up describing the results needs to be individually written and submitted.

Exams:

The exams and final project presentations (if applicable) must be given on the date announced by the instructor. Only in an extreme case will a make-up be permitted. The student also must provide documentation for the absence, and it is the student's responsibility to notify the instructor of the absence prior to the exam. In addition, the instructor may choose to move the seating assignments for exams / quizzes.

Cell Phones/ Laptops:

DO NOT TEXT OR TALK ON THE PHONE DURING CLASS. It is rude and will not be tolerated. If something important should arise and you need to use your cell phone for personal matters you are expected to excuse yourself from the room before completing the call or text.

Please let the instructor know before class starts that you may be expecting an important call, etc. If you need to leave your cell phone on, please use the vibrate mode. Penalties will be applied as designated by the instructor if you are caught using it or if your phone rings. Laptop computers are also not to be used during class without first getting instructor permission.

College Policies

Non-Discrimination Policy: The NCC Equity Committee is designated to coordinate compliance with the Non-Discrimination Policy and handles all concerns of discrimination that occur on campus that are not covered under Title IX. View more information here [No-n-Discrimination Policy and Grievance Procedure](#)

Title IX Policy: Classroom instructors at Nashua Community College are encouraged to create and maintain a safe learning environment in which students feel able to share opinions and related life experiences in classroom discussions, in written work, and in meetings with professors. To the greatest extent possible, this information will be kept private. However, staff and faculty have a legal obligation to report information concerning sexual misconduct, violence and exploitation of individuals per federal statute and in compliance with established policies and procedures at Nashua Community College. If you have been subjected to sexual misconduct, violence or exploitation, we encourage you to contact your Title IX Coordinator, Vice President Lizbeth Gonzalez, for support and assistance. She can be reached at Nashua Community College, 505 Amherst Street, Nashua, NH, 603-578-8928 or lgonzalez@ccsnh.edu. View more information here [Title IX Policy and Grievance Procedure](#)

Attendance: Regular attendance and active participation are essential for academic success. Every student should carefully review the department and

college attendance requirements posted in the Department and College Policies Sections of this syllabus.

If a student must be absent from class, the student should contact his/her professor and follow the professor's make up policy listed in the syllabus under Course Expectations. In an online or hybrid class, measures of attendance and active participation include contributing to discussion board, submitting an assignment, taking a test or quiz on Canvas, etc. Logging into Canvas does not count as class attendance or participation. (For a complete definition of active participation, see regular and substantive interaction statement in student handbook.)

Rarely, a student may experience a serious situation that prevents that student from attending class for an extended period. This could be for reasons such as illness/hospitalization, loss of child care, or lack of transportation. In these situations, the student should notify his/her professor as soon as possible and contact the advising center for assistance NCCAcademicAdvisingCenter@ccsnh.edu.

AF Policy: In all cases, faculty will issue an AF grade if a student has 1) missed more than two consecutive weeks of class and 2) failed to communicate with the instructor by responding to EAB attendance alerts and other outreach. Students should also refer to department attendance policy under the Department Policies section of the syllabus.

In addition, an instructor or administrator may issue an AF grade if a student's behavior violates the Student Code of Conduct and disrupts classroom instruction.

Please be advised that if the behavior of any student (or students) disrupts the learning of his/her classmates, the following steps will be taken by the instructor: 1) verbal warning; 2) meeting with instructor and department chair; 3) filing of written complaint and referral to Vice President of Academic Affairs for possible removal from the course with AF grade.


An AF grade may also be issued if a student registered in a clinic, practicum, internship, or lab is deemed unsafe or performing in an unsatisfactory manner as determined by an evaluation by a faculty member/agency supervisor in accordance with department criteria and procedure.

An "AF" grade is calculated in the GPA as an "F". Students should refer to the student handbook for additional information about the AF policy.

Canvas: Canvas is the online learning management system used by instructors and learners at Nashua Community College. Instructors will post syllabi, course related documents and grades in Canvas. Students may be required to submit assignments and/or take assessments through Canvas and/or participate in

discussion boards. **If class is ever cancelled because of instructor illness or inclement weather, students will need to check Canvas for their assignment.**

24/7 Canvas Support: To access support through email, phone or chat

click on the  icon. Students can also find guides, videos, and a Canvas community by clicking on the *CCSNH Resources* icon on the toolbar at the left of the Canvas screen then choosing Canvas Resources.

If you have forgotten your Easy Login Password information, please visit the following link: <https://password.ccsnh.edu/accounts/Reset>

EAB Alerts Faculty can issue "Alerts" for students at any time. The administration at NCC encourages professors to issue alerts for any student who may be having difficulty in the course. When a faculty member raises an alert, both the student and student's advisor receive an automated email based on the alert raised. Faculty can issue an alert through EAB Navigate on the college website or directly using the following link: <https://nashua.ccsnh.edu/eab.com>

College Email System: Nashua Community College has established a College email system as a means of the College sending official information to enrolled students, and for students to send communication to their instructors and College personnel. All students registered at NCC will be assigned a College email account/address to be used as the only email address for all email communication: 1) sent to the students from their instructors and from all College personnel; and, 2) sent by the students to their instructors and to all College personnel.

In addition:

- Students should check their College email account regularly to ensure they are staying current with all official communications. Official communication includes, but is not limited to, policy announcements, registration and billing information, schedule changes, emergency notifications and other critical and time sensitive information.
- Students should also check their college email account to be sure that they are current with all email communication from their faculty.
- The student email account/address should be the only e-mail address students use to send email to faculty and College personnel so that student email is recognized and opened.
- This service is provided exclusively to the students of NCC. Accounts are for individual use only, and are not transferable or to be used by any other individual.
- Students using their College email account do so under the policies set forth in the Student Handbook under "Student Computer Conduct Code".

Sensitive Materials Policy: During the semester, in order to cover certain academic topics, there may be occasions to view or discuss material which may not meet the student's own personal definition of appropriateness. At such times, every student has the right to decide not to participate. Every effort will be made by the instructor to notify students in advance of when such sensitive material will be used so that students can make alternative arrangements. Faculty will guide students in the identification of alternative learning opportunities consistent with relevant course objectives so that students opting out of scheduled "sensitive" learning experiences will not be penalized academically in any way. Please note the opportunity to leave the classroom discreetly is always available to each student when such sensitive material is being discussed. The student then has the responsibility before the next class meeting to inform the instructor as to the reason for leaving.

Plagiarism Policy: Plagiarism is a serious violation of a student's academic integrity and the trust between a student and his or her teachers. Plagiarism is the act of a person presenting another person's work as if it were his or her own original work. Such acts of plagiarism include, but are not limited to:

1. A student submitting as his or her own work an entire essay or other assignment written by another person.
2. A student submitting as his or her own creation the artwork (including but not limited to a painting, drawing, photograph, object, digital representation) of another person.
3. A student taking word for word a section or sections of another person's work without proper acknowledgment of the source and quotation.
4. A student using statistics or other such facts or insights as if they were the result of the student's efforts and thus lacking proper acknowledgment of the original source.
5. The paraphrasing of another person's unique work with no acknowledgment of the original source.
6. Copying another student's work on a quiz or test.

Some instructors may consider self-plagiarism to be a form of plagiarism. Self-plagiarism includes **submitting the same paper** in response to **two different** assignments. Please consult with your instructor and carefully review instructor expectations posted on your syllabus if you have any questions.

When a student is found to have plagiarized an academic assignment, it will be up to each instructor to determine the grading penalty. **Depending on the severity of the incident**, this could range from a warning to a loss of credit for the course. In all cases of plagiarism, the instructor will notify the student's advisor by posting an alert on EAB Navigate. The advisor will then document the incident on EAB using a advisor notes. If any further incidents of plagiarism are reported to the student's advisor, the advisor or VPAA will file a complaint with the appropriate college Judicial Body. Additional sanctions may be imposed. For other examples of Academic Misconduct and a full description of the Student Disciplinary Process, please refer to the NCC Student Handbook

<https://www.nashua.cc.edu/images/PDF/handbook/2021-2022-NCC-Student-Handbook.pdf>

Credit Hour Guidelines


1. A credit hour shall be the equivalent of one (1) hour of classroom or direct faculty instruction and a minimum of two (2) hours of out-of-class student work each week for 15 or 16 weeks.
2. A credit hour shall be allocated based on the following:

Category	Contact Hours per Week	Contact Hours per Sem. (based on minimum 15 week semester)
Class	1	15
Laboratory	2 or 3	30-45
Clinical	3 to 5	45-75
Practicum, Fieldwork	3	45
Internship	3 to 6	45-90
Co-op	Variable by Dept.	Variable by Dept.

Course Calendar **Course + Semester/ Term**

Posted on the Canvas Calendar.

The schedule is subject to change. In the event of class cancellation due to inclement weather or instructor illness, students are directed to the course Canvas site for an alternate assignment for that day.

 Nashua Community College	ELET245N – Communication Theory
Department	Engineering and Computing Sciences
Instructor	Professor Ali Hammoodi
NCC Email	ahammoodi@ccsnh.edu
Telephone Number	
Office Hours	By appointment: See Professor
Office Location	Room 100A
Class Days/ Meeting Time	Lecture/Lab: Tu 6:00 – 9:40 PM
Class Location	Lecture/Lab: Rm 207

Rationale:

Communication theory helps in developing understanding about the technical aspects of communication. This field of study is aimed at developing knowledge on how people communicate. Communication theory uses mathematics and information to develop insights into the complex nature of the different types of human communication. This field of study has played an important role in the current development of communication technologies and computer science.

Course Description:

Study of principles of radio frequency communication, modulation systems, pulse, digital modulation circuits, transmission line and propagation. This course is offered in the evening only. Prerequisite: A grade of 'C-' or better in ELET241N.

Course Competencies: – Key Points of Learning (POL):

At the conclusion of this course, students will be able to:

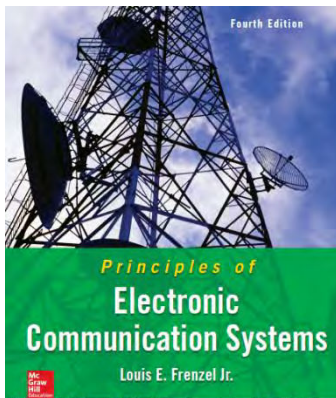
1. Understand the basics of Electronic Communications and Digital Communications.

2. Explain the fundamentals of Amplitude Modulation (AM), Frequency Modulation (FM) and know the differences between time division multiplexing, frequency division multiplexing and digital modulation.
3. Explain the basics of transmission line theory and perform communication circuit analysis using computer simulations.
4. Understand principles of Data Communications.

Essential Questions:

- How does your understanding of communications networks serve to improve our understanding of electronics?
- How does knowing the principles of communications theory affect your daily life?
- Describe something in today's world that has become more compelling because of an understanding of how telecommunications work.
- Is it possible to describe how complex electronic networks function with a small amount of communications theory principles? If so, how?

Required Textbook(s):



Frenzel, Electronic Communication Systems, 4th Edition, 2016

ISBN-13: 978-0-07-337385-0

Supplemental Materials:

- USB flash drive will be required for saving and submitting student work.
- Calculator: The TI-84 or better Graphing Calculator is recommended but any scientific calculator with the following keys: () (parentheses), \wedge or y^x , and a square root key will also suffice.
- **YOUR CELLPHONE CANNOT BE USED AS A CALCULATOR IN THIS CLASS.**
- Loaned by EET Dept. - Most lab materials are provided by NCC; however, tool & proto-board quality is not guaranteed.
- Students are encouraged to acquire some lab materials for their exclusive use during

lab. For ELET245N, these materials are: (1) small/medium gauge wire strippers. (2) Prototyping board (breadboard). These items will be discussed in lab and are available from a variety of sources.

Course Expectations:

Canvas

All materials presented in class along with assignments can be found on Canvas. All assignments must be uploaded to canvas to be graded. Do not email your submissions or provide printed copies.

Homework / Lab Assignments:

Assigned homework will be due at the beginning of the next class (as stated on Canvas).

Acceptable formats include .pdf or .jpg or .png.

Lab reports must be uploaded in Microsoft WORD format with the grading rubric on the cover page. Note that scanned figures can be easily integrated into a WORD document if needed.

No late submissions will be accepted except in extraordinary circumstances.

Notes Missed:

See a classmate so that you can copy their notes.

Tests:

A test must be made up ASAP and you must have a valid reason for missing it. It is the student's responsibility to make an appointment IN ADVANCE for a make-up. Only one test can be made up during the semester.

Grading:

There will be assignments, chapter exams and a final. They will tentatively count toward the final grade as follows:

In class Quizzes / Exams:	35%
HW	15%
Lab Assignments	35%
Class/Lab Professionalism (See Department Policies)	5%
Final Exam	10%

Grades will be assigned according to the department scale:

Grading System:

A	93 - 100	B	83 - 86.9	C	73 - 76.9	D	63 - 66.9
A-	90 - 92.9	B-	80 - 82.9	C-	70 - 72.9	D-	60 - 62.9
B+	87 - 89.9	C+	77 - 79.9	D+	67 - 69.9	F	0 - 59.9

Available Support Services

Tutoring, the Writing Center, Available Academic Services:

The Academic Success Center | in the library offers academic support services which are open to all NCC students looking for additional help with their college assignments. Math tutoring and writing assistance are available. The Writing Center is for any student seeking assistance with the writing process for any class, not just College Composition. For more information and to view the tutoring schedule view here: <http://www.nashua.cc.edu/student-services/academic-success-center>

Classroom Accommodations:

Students who have a documented disability (physical, learning, or mental health) and require reasonable classroom accommodations must meet with the Disabilities Support Coordinator to set up an NCC Reasonable Accommodation Plan (RAP). If you had an IEP or 504 in high school, you may qualify for a plan. If you would like more information or if you are not sure if you qualify for a plan, please contact Jodi Quinn, Disabilities Support Coordinator, located in The Academic Success Center (Room 100), 603-578-8900 ext. 1451. View additional information and the application here: <http://www.nashua.cc.edu/student-services/academic-success-center/disability-services> In order to receive classroom accommodations, it is the student's responsibility to meet with his/her instructor privately and provide a hard copy of the signed Reasonable Accommodation Plan (RAP) each term the student wants to utilize classroom accommodations even if the student has had that instructor in a previous term.

Audio Record Classroom Lecture:

Please note that as a student in this class, you may have a classmate who by permission can audio record class lectures for his/her learning purposes. **Only students with prior written permission** from the instructor or the Disabilities Support Coordinator may audio record class lectures - *for educational purposes only*. Students who audio record class lectures are prohibited from selling, transcribing, or distributing the recordings in *any manner* and are asked to delete the recordings when it is no longer essential for their learning purposes.

Title IX Statement:

Classroom instructors at Nashua Community College are encouraged to create and maintain a safe learning environment in which students feel able to share opinions and related life experiences in classroom discussions, in written work, and in meetings with professors. To the greatest extent possible, this information will be kept private. However, staff and faculty have a legal obligation to report information concerning sexual misconduct, violence and exploitation

of individuals per federal statute and in compliance with established policies and procedures at Nashua Community College. If you have been subjected to sexual misconduct, violence or exploitation, we encourage you to contact your NCC Title IX representative Lizbeth Gonzalez, 603-578-8900 x1528_ or lgonzalez@ccsnh.edu for support and assistance. You may also contact Bridges, the local crisis center, for free and confidential services at their 24hr support line 603-883-3044. You do not need to be in crisis to call.

Additional information including resources can be found at:

New Hampshire Coalition Against Domestic and Sexual Violence:

https://www.nhcadsv.org/uploads/1/0/7/5/107511883/nhcadsv_attachment_map.pdf

uSafe US <https://usafe.us.org/app3/webviewer.html>

Bridges <https://www.bridgesnh.org/>

Additional Student Support Services:

Information on additional support services for NCC students can be found at

<http://nashua.cc.edu/student-services/where-to-find-assistance-at-ncc>

Department Policies

Professionalism includes the following:

Students are expected to adhere to the "NCC Student Code of Conduct" as described in the "NCC Student Handbook" (<https://nashua.cc.edu/images/PDF/handbook/2019-2020-NCC-Student-Handbook.pdf>). Students are also expected to contribute to a cooperative and productive learning environment. To meet this objective, students are expected to show up for class on time, be attentive, not disrupt the instructor or other students, work quietly and use time in the lab time to complete assigned work, stay in lab until assigned work is complete, demonstrate respect for other people, demonstrate initiative and self-motivation, and take responsibility for academic success.

Attendance:

Attendance is vital to the student's success in this course. You are expected to attend all classes and laboratory sessions, and to be on time. It is extremely difficult to make up for lost hours of instruction time. You are responsible for all material and information given in class whether present or not.

Notes Missed:

See a classmate so that you can copy their notes.

Lab / Homework Assignments:

Assigned homework will be due as specified in the write-up of the assignment. Your homework will be checked for effort and completeness.

All work during the scheduled lab time must be submitted before the student leaves the lab, even if only partially completed. The student will automatically receive a "0" for that lab if they don't. This applies even if additional files or updates to the lab are to be uploaded later. For those labs where students work with a partner (specifically in engineering courses), the final lab writeup describing the results needs to be individually written and submitted.

Exams:

The exams and final project presentations (if applicable) must be given on the date announced by the instructor. Only in an extreme case will a make-up be permitted. The student also must provide documentation for the absence, and it is the student's responsibility to notify the instructor of the absence prior to the exam. In addition, the instructor may choose to move the seating assignments for exams / quizzes.

Cell Phones/ Laptops:

DO NOT TEXT OR TALK ON THE PHONE DURING CLASS. It is rude and will not be tolerated. If something important should arise and you need to use your cell phone for personal matters, you are expected to excuse yourself from the room before completing the call or text. Please let the instructor know before class starts that you may be expecting an important call, etc. If you need to leave your cell phone on, please use the vibrate mode. Penalties will be applied as designated by the instructor if you are caught using it or if your phone rings. Laptop computers are also not to be used during class without first getting instructor permission.

College Policies

AF Policy:

If a student misses more than the number of hours the course meets during a two-week period (e.g. six hours for a three-credit course), the faculty may withdraw a student from the course with an "AF" grade. Please note that absences, tardiness, and leaving class early all count towards "missed class time."

Students should also understand an AF grade can be assigned by an instructor or an administrator at any time for reasons other than poor grade performance or failure to meet attendance requirements e.g., violation of the Student Code of Conduct, disruptive behavior, etc.

Please be advised that if the behavior of any student (or students) continually disrupts the learning of his/her classmates, the following steps will be taken 1) verbal warning; 2) meeting with instructor and department chair; 3) referral to Vice President of Academic Affairs and/or removal from the course with AF grade.

An "AF" grade is calculated in the GPA as an "F". Students should refer to the student handbook for additional information about the AF policy.

Canvas:

All instructors at NCC will be using Canvas. Canvas is the online learning management system used by instructors and learners at Nashua Community College. Instructors may post syllabi, course related documents and grades in Canvas. Students may be required to submit assignments and/or take assessments through Canvas and/or participate in discussion boards.

To directly link to Canvas On Demand tutorials, please visit the following link:

https://community.canvaslms.com/community/answers/guides/video-guide#jive_content_id_Students

If you have forgotten your Easy Login Password information, please visit the following link: <https://password.ccsnh.edu/accounts/Reset>

If class is ever cancelled because of instructor illness or inclement weather, students will need to check Canvas for their assignments.

College Email System:

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In addition:

- Students should check their College email account regularly to ensure they are staying current with all official communications. Official communication includes, but is not limited to, policy announcements, registration and billing information, schedule changes, emergency notifications and other critical and time sensitive information.
- Students should also check their college email account to be sure that they are current with all email communication from their faculty.

- The student email account/address should be the only e-mail address students use to send email to faculty and College personnel so that student email is recognized and opened.
- This service is provided exclusively to the students of NCC. Accounts are for individual use only, and are not transferable or to be used by any other individual.
- Students using their College email account do so under the policies set forth in the Student Handbook under "Student Computer Conduct Code".

Sensitive Materials Policy:

During the semester, in order to cover certain academic topics, there may be occasions to view or discuss material which may not meet the student's own personal definition of appropriateness. At such times, every student has the right to decide not to participate. Every effort will be made by the instructor to notify students in advance of when such sensitive material will be used so that students can make alternative arrangements. Faculty will guide students in the identification of alternative learning opportunities consistent with relevant course objectives so that students opting out of scheduled "sensitive" learning experiences will not be penalized academically in any way. Please note the opportunity to leave the classroom discreetly is always available to each student when such sensitive material is being discussed. The student then has the responsibility before the next class meeting to inform the instructor as to the reason for leaving.

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1. A student submitting as his or her own work an entire essay or other assignment written by another person.
2. A student taking word for word a section or sections of another person's work without proper acknowledgment of the source and that the material is quoted.
3. A student using statistics or other such facts or insights as if they were the result of the student's efforts and thus lacking proper acknowledgment of the original source.
4. The paraphrasing of another person's unique work with no acknowledgment of the original source.
5. Copying another student's work on a quiz or test.

When a student is found to have plagiarized an academic assignment, it will be up to each instructor to determine the penalty. Depending on the severity of the incident, this could range from a warning to a loss of credit for the assignment. In all cases of plagiarism,

the student's advisor will be notified, and the incident will be documented. If any further incidents of plagiarism are reported to the student's advisor, additional sanctions will be imposed. These may include notification of the Vice President of Academic Affairs; loss of credit for the course; suspension or dismissal from a department program; academic probation; and/or expulsion from the College.

Credit Hour Guidelines

1. A credit hour shall be the equivalent of one (1) hour of classroom or direct faculty instruction and a minimum of two (2) hours of out-of-class student work each week for 15 or 16 weeks.
2. A credit hour shall be allocated based on the following:

Category	Contact Hours per Week	Contact Hours per Sem. (based on minimum 15-week semester)
Class	1	15
Laboratory	2 or 3	30-45
Clinical	3 to 5	45-75
Practicum, Fieldwork	3	45
Internship	3 to 6	45-90
Co-op	Variable by Dept.	Variable by Dept.

Course Calendar


Updated version with more specifics is posted on the Canvas Calendar

Week	Topic	Assignment Due	Targeted Competencies *
1	TBD	On Canvas	
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			

12			
13			
14			
15	Review for Final Final Exam (tp) = Time Permitting		

* Targeted competencies refer to the established course competencies listed above.

The above schedule is subject (and likely) to change. In the event of class cancellation due to inclement weather or instructor illness, students are directed to the course Canvas site for an alternate assignment for that day.

	ELEI274N EET Capstone Project Spring 2022
Department	Engineering and Computing Sciences
Instructor	Professor Susan Hughes
NCC Email	shughes@ccsnh.edu
Telephone Number	603-578-8900, x1582
Office Hours	See office hours posted on Canvas or contact instructor for appointment
Office Location	Room 312
Class Days/ Meeting Time	Wednesday 6pm-9:30pm, Room 171

Rationale:

The EET Capstone course is meant to be an opportunity to show the technical and workplace skills students have developed and practiced in the courses leading to the Associate degree in the Engineering and Computing Sciences Department. The student will perform an independent lab project using their knowledge of digital/analog electronic circuits and microprocessors. Students will design and build a working model of their selected project. The project will be built, debugged, and demonstrated by the end of the semester.

When you successfully complete the Capstone course, you will have demonstrated your mastery of basic technician skills. As entry-level technicians, employers expect you to have these skills and to know these principles. They have these expectations because basic technical skills are fundamental to understanding the operation of more sophisticated pieces of electronic hardware. This not only includes the hardware itself, but also the computers, software and networking systems that control the hardware's operation.

Employers tell us that technical skills are not enough. They expect that students will have been taught a Code of Ethics (we will present the industry accepted IEEE Code of Ethics) and how to perform a root cause analysis of a design gone badly. We will go over several examples of

engineering design disasters followed by a root cause analysis of why these failures occurred.

In this course, you will practice and develop employability skills, including written and verbal technical communication, problem solving, teamwork, and others that will help you succeed in the workplace. At the end of the semester, each student will have 15 minutes to make a PowerPoint presentation describing his/her project and demonstrate it to peers, other instructors, and invited industry personnel.

Course Description:

An independent lab project using the student's knowledge of digital/analog electronic circuits and microprocessors. Students will design and build a working model of their selected project. The project will be built, debugged, and demonstrated by the end of the semester. This course is offered in the evening only.

Prerequisite s: **ELET132N**, **ELET250N**.

Course Competencies:

At the conclusion of this course, students will be able to:

1. Create a Project Plan which includes but is not limited to the project proposal, circuit design, simulation, test plans, bill of materials, flowcharts, and software code (where applicable), and demonstration of a working prototype.
2. Create a project test evaluation plan to assure the project works as initially specified.
3. Apply formal communication skills with client / customer (if applicable), instructor, teammates in both oral and written form. This includes but is not limited to regular status reports and formal public presentation.
4. Demonstrate teamwork which includes professional, ethical, and social responsibilities.

Essential Questions:

- How does a capstone course serve to improve your understanding of electronics?
- How does knowing the principles of electronics technology affect your daily life?
- Describe something in today's world that has become more compelling because of an understanding of the field of electronics.
- Is it possible to describe how complex electronic circuits function with a small number of analytical principles? If so, how?

Required Materials:

Textbook:

None

Technology:

In order to be successful at NCC, all students need a laptop or personal computer (PC) as well as reliable internet access. It is recommended that students purchase a laptop for in-class use. Specifications can be found by clicking on the link below. If you do not have Internet access or the right kind of computer equipment (e.g., laptop, webcam, etc.) you may be eligible for the college's technology lending program, which is a first come first served program. Click on this link for more information <https://www.nashua.cc.edu/technology>

Laptops that meet NCC technology specifications are available for purchase at the NCC bookstore. Financial aid may be used for purchases made at the bookstore. Contact the bookstore for more information <https://www.bkstr.com/nashua.cc/store/home>

Supplemental Materials:

- USB flash drive is essential for saving and submitting student work.
- Loaned by EET Department - Most lab materials are provided by NCC; however, tool & proto-board quality is not guaranteed.

- Students are encouraged to acquire some lab materials for their exclusive use during lab. These items will be discussed in lab and are available from a variety of sources. These materials are:
 1. small/medium gauge wire strippers.
 2. Diagonal cutters.
 3. Small needle nose pliers,
 4. Prototyping board (breadboard).
 5. Solid wire, 24 gauge preferred (colors; black and red for power, other colors for everything else.)
- Components – In the EET lab, there is an abundance of some components which student may use for their project. Examples of excess material include wire, resistors, inductors, some other hardware, etc. Please check with the professor when components are needed.

Course Expectations:

Canvas

All materials presented in class along with lab assignments can be found on Canvas. All assignments must be uploaded to canvas to be graded. Do not email your submissions or provide printed copies.

Homework / Lab Assignments:

Assigned homework will be due at the beginning of the next class (as stated on Canvas). No late submissions will be accepted except for extraordinary circumstances.

Notes Missed:

See a classmate so that you can copy their notes.

Tests:

A test must be made up ASAP and you must have a valid reason for missing it. It is the student's responsibility to make an appointment IN ADVANCE for a make-up. Only one test can be made up during the semester.

Zoom Policy:

We need to be able to see and hear you during Zoom classes. Therefore, when participating in a zoom class/lab, please leave your video turned on.

Student Responsibilities:

The student should:

- Invest in the development of their employability skills
- Assess on a weekly basis the development of workplace behaviors (a checklist will be provided by the instructor)
- Practice workplace behaviors
- Be punctual and attend classes regularly
- Understand the principles of teamwork
- Plan in relation to preparation and completion of deliverables
- Acquire, organize, evaluate, interpret, and communicate information along with using computers to process information
- Use critical thinking principles in their decision making, problem solving, designs and troubleshooting methods
- Develop personal qualities including responsibility, self-management, and integrity
- Develop an understanding of the need for both technology skills and employability skills (competencies and foundation skills)

Students are expected to do project work during and outside the hours of regularly scheduled classes.

Grading:

The course is set up using a Project Management format. Deliverables are gated as follows:

- Project Complexity
- Project Selected and Preliminary Design defined
- Procure Parts & Begin Assembly
- Refine the Design and Begin Testing
- Finalize (Refine) the Design
- Demonstrate the design
- Dry run PowerPoint Presentation
- Formal Presentation before faculty, IAB members and other students
- Technical Write-up

They will tentatively count toward the final grade as follows:

Schedule	30%
Testing	30%
Communications	30%
Professionalism	10%

Grades will be assigned according to the following department scale:

Grading System:

A	93 - 100	B	83-86.9	C	73-76.9	D	63 -66.9
A-	90 - 92.9	B-	80 - 82.9	C-	70 - 72.9	D-	60 - 62.9
B+	87 -89.9	C+	77 -79.9	D+	67 -69.9	F	0 - 59.9

Diversity, Equity, and Inclusion Statement:

We are all responsible for creating a diverse, equitable, inclusive, and just environment. Thus, we must treat individuals with respect by valuing all types of diversity. This is fundamental in creating a welcoming and inclusive learning environment. Diversity may include multiple ways of identifying ourselves, including, but not limited to race, color, national origin, language, sex, disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. These diverse identities, among many others not mentioned, influence the perspectives our students, faculty, and staff bring to the NCC community. Through use of various approaches that enhance intellectually rich, respectful, safe, and inclusive learning environments, this dynamic process will demonstrate our sustained commitment at NCC. It is our core belief that diversity, equity, and inclusion promote excellence, collaboration, and innovation while also seeking justice.

Available Support Services

NCC Library: Get help with research for your papers and assignments from the NCC librarian and staff. Email ncclibrary@ccsnh.edu

Tutoring and Writing Center: The Tutoring and Writing Center, located in the library, offers free academic support services to all NCC students. Meet in-person or via Zoom with experts who can tutor you in math or accounting or help you with writing for any course. Tutoring is drop-in or by appointment. View the current tutoring schedule at <https://library.nashua.cc.edu/home/tutoring>

Online chat tutoring is also available 24/7 with Smarthinking. Find a link on the left navigation menu inside Canvas courses.

Disability & Accessibility (Reasonable Accommodation Plan): Students who think they may have or have a documented disability (*physical, learning, or mental health*) and/or had an IEP or 504 Plan in high school who may need classroom accommodations must meet with the Disability Services Coordinator to set up an NCC Reasonable Accommodation Plan (RAP). For more information view the Disability & Accessibility page: <https://www.nashua.cc.edu/student-services/disability-accessibility-information> and/or contact Jodi Quinn, Disability Services Coordinator (office located in the library), at jquinn@ccnsh.edu or (603) 578-8996.

In order to receive reasonable accommodations, it is the student's responsibility to email the current semester's RAP to each instructor and as needed meet with instructors to discuss the Plan. Each term the student wants to utilize accommodations, the RAP must be renewed and the student provides the current term Plan to instructors even if provided a Plan to an instructor for a previous term course.

Audio Record Classroom Lecture: Please note that as a student in this class, you may have a classmate who by permission can audio record class lectures for his/her learning purposes. **Only students with prior written permission** from the instructor or the Disabilities Services Coordinator may audio record class lectures - *for educational purposes only*. Students who audio record class lectures are prohibited from selling, transcribing, or distributing the recordings in *any manner* and are asked to delete the recordings when it is no longer essential for their learning purposes.

Instructors may record their own class lectures, activities, and discussions using electronic video, still photo, or audio recording for educational purposes, including academic research, professional development, and recording of course content for access through online learning and other formats. Every student present will be informed by the instructor of any recording at the beginning of class.

CARE Team

If you need information or a referral to local resources in the areas of Mental Health or basic support services (such as food, clothing, shelter, substance abuse or others including domestic and sexual violence), you can email the NCC CARE team (NCCCares@ccnsh.edu) and we will assist you in connecting to community resources.

Department Policies

Professionalism includes the following:

Students are expected to adhere to the "NCC Student Code of Conduct" as described in the "NCC Student Handbook"

<https://www.nashua.cc.edu/images/PDF/handbook/2021-2022-NCC-Student-Handbook.pdf>

Students are also expected to contribute to a cooperative and productive learning environment. To meet this objective, students are expected to show up for class on time, be attentive, not disrupt the instructor or other students, work quietly and use time in the lab time to complete assigned work, stay in lab until assigned work is complete, demonstrate respect for other people, demonstrate initiative and self-motivation, and take responsibility for academic success.

Attendance:

Attendance is vital to the student's success in this course. You are expected to attend all classes and laboratory sessions, and to be on time. It is extremely difficult to make up for lost hours of instruction time. You are responsible for all material and information given in class whether present or not.

Notes Missed:

See a classmate so that you can copy their notes.

Lab / Homework Assignments:

Assigned homework will be due as specified in the write-up of the assignment. Your homework will be checked for effort and completeness.

All work during the scheduled lab time must be submitted before the student leaves the lab, even if only partially completed. The student will automatically receive a "0" for that lab if they don't. This applies even if additional files or updates to the lab are to be uploaded later. For those labs where students work with a partner (specifically in engineering courses), the final lab write up describing the results needs to be individually written and submitted.

Exams:

The exams and final project presentations (if applicable) must be given on the date announced by the instructor. Only in an extreme case will a make-up be permitted. The student also must provide documentation for the absence, and it is the student's responsibility to notify the instructor of the absence prior to the exam. In addition, the instructor may choose to move the seating assignments for exams / quizzes.

Cell Phones/ Laptops:

DO NOT TEXT OR TALK ON THE PHONE DURING CLASS. It is rude and will not be tolerated. If something important should arise and you need to use your cell phone for personal matters you are expected to excuse yourself from the room before completing the call or text.

Please let the instructor know before class starts that you may be expecting an important call, etc. If you need to leave your cell phone on, please use the vibrate mode. Penalties will be applied as designated by the instructor if you are caught using it or if your phone rings. Laptop computers are also not to be used during class without first getting instructor permission.

College Policies

Non-Discrimination Policy: The NCC Equity Committee is designated to coordinate compliance with the Non-Discrimination Policy and handles all concerns of discrimination that occur on campus that are not covered under Title IX. View more information here [Non-Discrimination Policy and Grievance Procedure](#)

Title IX Policy: Classroom instructors at Nashua Community College are encouraged to create and maintain a safe learning environment in which students feel able to share opinions and related life experiences in classroom discussions, in written work, and in meetings with professors. To the greatest extent possible, this information will be kept private. However, staff and faculty have a legal obligation to report information concerning sexual misconduct, violence and exploitation of individuals per federal statute and in compliance with established policies and procedures at Nashua Community College. If you have been subjected to sexual misconduct, violence or exploitation, we encourage you to contact your Title IX Coordinator, Vice President Lizbeth Gonzalez, for support and assistance. She can be reached at Nashua Community College, 505 Amherst Street, Nashua, NH, 603-578-8928 or lgonzalez@ccsnh.edu. View more information here [Title IX Policy and Grievance Procedure](#)

Attendance: Regular attendance and active participation are essential for academic success. Every student should carefully review the department and college attendance requirements posted in the Department and College Policies Sections of this syllabus.

If a student must be absent from class, the student should contact his/her professor and follow the professor's make up policy listed in the syllabus under Course Expectations. In an online or hybrid class, measures of attendance and active participation include contributing to discussion board, submitting an assignment, taking a test or quiz on Canvas, etc. Logging into Canvas does not count as class attendance or participation. (For a complete definition of active participation, see regular and substantive interaction statement in student handbook.)

Rarely, a student may experience a serious situation that prevents that student from attending class for an extended period. This could be for reasons such as illness/hospitalization, loss of child care, or lack of transportation. In these situations, the student should notify his/her professor as soon as possible and contact the advising center for assistance NCCAcademicAdvisingCenter@ccsnh.edu.

AF Policy: In all cases, faculty will issue an AF grade if a student has 1) missed more than two consecutive weeks of class and 2) failed to communicate with the instructor by responding to EAB attendance alerts and other outreach.

Students should also refer to department attendance policy under the Department Policies section of the syllabus.

In addition, an instructor or administrator may issue an AF grade if a student's behavior violates the Student Code of Conduct and disrupts classroom instruction.


Please be advised that if the behavior of any student (or students) disrupts the learning of his/her classmates, the following steps will be taken by the instructor: 1) verbal warning; 2) meeting with instructor and department chair; 3) filing of written complaint and referral to Vice President of Academic Affairs for possible removal from the course with AF grade.

An AF grade may also be issued if a student registered in a clinic, practicum, internship, or lab is deemed unsafe or performing in an unsatisfactory manner as determined by an evaluation by a faculty member/agency supervisor in accordance with department criteria and procedure.

An "AF" grade is calculated in the GPA as an "F". Students should refer to the student handbook for additional information about the AF policy.

Canvas: Canvas is the online learning management system used by instructors and learners at Nashua Community College. Instructors will post syllabi, course related documents and grades in Canvas. Students may be required to submit assignments and/or take assessments through Canvas and/or participate in discussion boards. **If class is ever cancelled because of instructor illness or inclement weather, students will need to check Canvas for the ir assignment.**

24/7 Canvas Support: To access support through email, phone or chat

click on the  icon. Students can also find guides, videos, and a Canvas community by clicking on the *CCSNH Resource* icon on the toolbar at the left of the Canvas screen then choosing Canvas Resources.

If you have forgotten your Easy Login Password information, please visit the following link: <https://password.ccsnh.edu/accounts/Reset>

EAB Alerts Faculty can issue "Alerts" for students at any time. The administration at NCC encourages professors to issue alerts for any student who may be having difficulty in the course. When a faculty member raises an alert, both the student and student's advisor receive an automated email based on the alert raised. Faculty can issue an alert through EAB Navigate on the college website or directly using the following link: <https://nashuacc.campus.eab.com>

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In addition:

- Students should check their College email account regularly to ensure they are staying current with all official communications. Official communication includes, but is not limited to, policy announcements, registration and billing information, schedule changes, emergency notifications and other critical and time sensitive information.
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2. A student submitting as his or her own creation the artwork (including but not limited to a painting, drawing, photograph, object, digital representation) of another person.

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5. The paraphrasing of another person's unique work with no acknowledgment of the original source.
6. Copying another student's work on a quiz or test.

Some instructors may consider self-plagiarism to be a form of plagiarism. Self-plagiarism includes **submitting the same paper** in response to **two different** assignments. Please consult with your instructor and carefully review instructor expectations posted on your syllabus if you have any questions.

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Course Calendar
Course + Semester/ Term

Posted on the Canvas Calendar.

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