

**Nashville State Community College**  
**Computer and Engineering Technologies Division**  
**Electrical Engineering Technology**

**Master Course Syllabus**

**EETH 1400 Digital Electronics**

**2 Credits**

**2 Class Hours**

Study concepts of Boolean Logic and their applications to designing and analyzing digital integrated circuits. Topics include binary and other number base systems and codes, logic circuits, A/D and D/A converters, counters, shift registers, adders, multiplexers, encoders and various memory devices and their operation.

**Instructor Information:**

Name:

Email:

Office Phone:

Office Location:

Office Hours:

**Textbook and Other Materials:**

Textbook: [Lessons in Electric Circuits](#)

Reference Materials: Optional; Digital Fundamentals, Floyd, Pearson/PH, ISBN #'s  
0132359235, 9780132359238

Supplies: Safety Glasses

**Course Outcomes:**

Upon successful completion of this course, students should be able to:

- Apply arithmetic and logic operations on decimal, octal, hexadecimal and binary numbers
- Identify logic device symbols and perform Boolean operations both with the symbols and the Boolean expressions
- Analyze and appraise the operation of counter circuits using timing diagrams
- Analyze and appraise the operation of multiplexers, demultiplexers, encoders and decoders using timing diagrams

## Course Competencies:

The following are detailed course competencies intended to support the course outcomes.

- distinguish between analog and digital signals.
- convert between decimal and binary numbers.
- convert from either the octal or hexadecimal number system to either the decimal or binary number systems.
- express decimal numbers using the BCD code.
- cite the major differences between the Gray code and the binary code.
- explain the need for alphanumeric codes, especially the ASCII code.
- describe the parity method for error detection.
- draw the logic symbol, truth table, and Boolean expression for the AND, NAND, OR, NOR, XOR, XNOR, and NOT gates.
- draw timing diagrams for the various logic circuit gates.
- simplify complex logic circuits by applying the various Boolean algebra laws and rules.
- properly apply DeMorgan's Theorem.
- use either of the universal gates (NAND or NOR) to implement a logic circuit.
- describe the concept of active-high and active-low logic symbols.
- modify a logic function into a standard sum-of-products format.
- use the Karnaugh map as a tool to simplify and design logic circuits of three and four variables.
- explain the operation of inhibit circuits.
- describe the inherent operative differences between TTL and CMOS.
- analyze the operation of latches and use them to de-bounce a mechanical switch.
- describe the difference between synchronous and asynchronous systems.
- distinguish between SR, JK, and D flip-flops and employ them in their various applications.
- draw the output timing waveforms of several types of flip-flops in response to a set of input signals.
- perform binary and hexadecimal arithmetic.
- manipulate signed binary numbers using 2's complement system.
- use full adders in the design of parallel binary adders.
- construct counters of particular MOD numbers.
- analyze and evaluate various types of pre-settable counters.
- compare ring and Johnson counters.
- recognize and evaluate the operation of various registers.
- compare characteristics of TTL and CMOS devices.
- determine the fan-out for a particular logic device.
- use logic devices with open-collector and/or tri-state outputs.
- implement the various considerations required when interfacing digital devices from different logic families.
- analyze and use both decoders and encoders.
- analyze the operation of multiplexers and demultiplexers.
- compare two binary numbers using a magnitude comparator circuit.
- explain the theory of operation and circuit limitations of several types of digital-to-analog converters.
- explain the theory of operation and circuit limitations of several types of analog-to-digital converters.
- correctly use the terminology associated with memory systems.
- outline the steps that occur when the CPU reads from or writes to memory.

- distinguish between the various types of RAMs and ROMs.
- write a technical reports on laboratory assignments using correct technical terms and English grammar.
- relate the course content to practical applications.
- enhance reading, writing and oral communications skills through an interactive learning approach.

### **Course Assessments:**

The following performance assessments will be used to demonstrate students' understanding, knowledge and skills:

Several exams and a final exam will be administered consisting of both quantitative questions based on assigned homework and conceptual essay type questions where the student will explain in his own words an understanding of the material. These essays are graded for both technical accuracy and clarity. A written technical report is required on a topic requiring more depth of knowledge than can be found in the text and requires extensive research using the Internet. This information must additionally be presented to the class in a PowerPoint format to demonstrate the student understands the material. This presentation is evaluated on a 100 point sheet that is standard for the Electrical Engineering Technology program.

### **Grading Policy**

Tests (100 pts each)

Technical Report (100 pts each)

Class Presentation (optional 100 pts each)

Final Exam (200 pts)

### **Grading Scale:**

A (90-100%), B (80-89%), C (70-79%), D (60-69%), F (less than 60%)

### **Topics to Be Covered:**

### **Attendance Policy**

A student is expected to attend all scheduled classes and laboratories. Each instructor will formulate an attendance policy and provide it on the course syllabus. Absences are counted from the first scheduled meeting of the class, and it is the responsibility of each student to know the attendance policy of each instructor in whose class he/she is enrolled. If a student is absent from a class, he/she should give an advanced explanation to the instructor. Absences in a course may affect a student's final grade. The student is responsible for all assigned work in the course regardless of excused or unexcused absences. Tardiness may also affect a student's final grade.

Failure to attend class will result in a final course grade of "FA" or "FN" (see explanation below) depending on the individual instructor's course policy.

FA= failure, attendance-related (unofficial withdrawal) Last recorded date of attendance required.

FN= failure, never attended class (unofficial withdrawal)

## **Student Communication Channels**

It is the student's responsibility to check D2L and MyNSCC email on a regular basis. These are the official communication channels between the college and students. Students are responsible for the information communicated through those channels. D2L contains specific course information and MyNSCC contains information important for other purposes.

## **Early Warning System**

Nashville State Community College has implemented an Early Warning System to notify students via e-mail about academic problems such as poor classroom attendance, poor performance on assignments/tests, poor communication skills, late/missing assignments, and/or lack of classroom participation. Please note that Early Warning Alerts do not affect a student's academic standing.

## **ADA Compliance Statement**

Nashville State complies with the Americans with Disabilities Act. Please contact the Access Services Coordinators at 615-353-3721 or 615-353-3741 if you would like to arrange ADA accommodations.

## **Classroom Misconduct**

Nashville State Community College has a zero tolerance policy for disruptive conduct in the classroom. Students whose behavior disrupts the classroom will be subject to disciplinary sanctions. Please consult your Student Handbook for more specific details.

The instructor has primary responsibility for control over classroom behavior and maintenance of academic integrity. He/she can order temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or in conduct which violates the general rules and regulations of the College.

Disruptive behavior in the classroom may be defined as, but is not limited to, behavior that obstructs or disrupts the learning environment (e.g., offensive language, harassment of students and professors, repeated outbursts from a student which disrupt the flow of instruction or prevent concentration on the subject taught, failure to cooperate in maintaining classroom decorum, etc.), the continued use of any electronic or other noise or light emitting device which disturbs others (e.g., disturbing noises from beepers, cell phones, palm pilots, lap-top computers, games, etc.).

Please be aware that children are not allowed in class or unattended on campus.

## **Academic Dishonesty (Honor Code)**

Any form of academic dishonesty, cheating, plagiarizing, or other academic misconduct is prohibited. "Plagiarism may result from: (1) failing to cite quotations and borrowed ideas, (2) failing to enclose borrowed language in quotation marks, and (3) failing to put summaries and paraphrases in your own words (A Writer's Reference 331). Academic dishonesty may be defined as, but is not limited to, intentionally trying to deceive by claiming credit for the work of another person, using information from a web page or source without citing the reference, fraudulently using someone else's work on an exam, paper, or assignment, recycling your own

work from another course, purchasing papers or materials from another source and presenting them as your own, attempting to obtain exams/materials/assignments in advance of the date of administration by the instructor, impersonating someone else in a testing situation, providing confidential test information to someone else, submitting the same assignment in two different classes without requesting both instructor's permission, allowing someone else to copy or use your work, using someone else's work to complete your own, altering documents, transcripts or grades, and forging a faculty/staff member's signature.

In addition to other possible disciplinary sanctions that may be imposed through regular college procedures as a result of academic dishonesty the instructor has the authority to assign an "F" or a "Zero" for the exercise, paper, or examination or to assign an "F" for the course. Students may appeal through the appropriate college grade appeal procedures.

### **Inclement Weather Policy**

In the event of an inclement weather event, check the Nashville State web site home page at [www.nsc.edu](http://www.nsc.edu) for announcements on campus closures. Campus closures will also be announced on local television stations (channels 2, 4, 5, and 17).

When classes are cancelled, an online assignment will be posted in NS Online. Check your NS Online email for a message from your instructor regarding your online assignment requirements. Even though classes may be cancelled, some areas, i.e. Testing Center, may be open. However, you should check before commuting to campus.

The Vice President for Academic Affairs and the Director of Security are responsible for cancellation decisions during an inclement weather event for the Nashville State main campus and the Southeast campus. Cookeville, Waverly, and Dickson Campus Directors will make class cancellation decisions based on conditions in their respective areas. Decisions about class cancellations are based on actual conditions, not forecasts. The perspective used for making decisions is that of the college as an employer, not as a K-12 institution. Students should use their own best judgment in determining whether to report to campus during inclement weather when classes are not cancelled.

**NOTE:** This syllabus is meant simply as a guide and overview of the course. Some items are subject to change or may be revised at the instructor's discretion. Each instructor will further clarify their criteria for grading, classroom procedures, attendance, exams and dates, etc. on his/her course syllabus.