

**Nashville State Community College  
Science, Technology, Engineering, and Math  
Electrical Engineering Technology**

**Master Course Syllabus**

**EETC 1331 Digital Fundamentals**

*(This master course syllabus template is a general guide for providing an overview of each course offered at Nashville State. Each instructor will further clarify specific criteria for grading, classroom procedures, attendance, exams and dates, etc. on his/her individual course syllabus. Prompts for individual adaptations are italicized and in parentheses; faculty should remove or replace these prompts when creating master syllabi and their own individual syllabi if they have not been removed previously.)*

**Course Information:**

**Course Title:** EETC 1331 Digital Fundamentals

**Credits:** 3

**Class Hours:** 3

**Course Description:**

*An introductory course in digital logic systems. Studies 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. Lab exercises are included to demonstrate course topics.*

**Instructor Information:**

**Name:**

**Email:**

**Office Phone:**

**Office Location:**

**Office Hours:**

**Required Textbook(s) & Other Materials:**

**Textbook(s):** Volume IV Digital is available free on-line at: [Lessons in Electric Circuits](#)

**ISBN:**

**Reference Materials:** Optional, Digital Fundamentals, Floyd, 11ed, 2015, Pearson, ISBN 9780133514896

**Supplies:**

Once enrolled, all students should verify that they have the correct textbook and materials information by consulting the D2L/NS Online shell for the course. If you are registered with the Access Center and

require an alternate format for the textbook and other course materials, please contact the Access Center at 615-353-3721, 615-353-3741, or [accesscenter@nsc.edu](mailto:accesscenter@nsc.edu).

### **Course Outcomes:**

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

- *Demonstrate an understanding of the binary numbering system.*
- *Demonstrate the use of logic devices.*
- *Demonstrate the use of Boolean logic.*

### **Course Competencies:**

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

- 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
- 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 tristate 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.

The following are general education competencies intended to support the course outcomes:

### Topics to Be Covered:

*(List topics in relevant order)*

### Course Assessments:

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

Knowledge assessments will be given on the lecture and reading material. A written technical report is required on a course related topic. The report is presented in class using Power Point. The presentation is evaluated on a 100 point rubric that is standard for the Electrical Engineering Technology program. Mastery of the material is also evaluated by the successful completion of hands-on labs.

### Grading Policy:

Area	Percent
Report	10
Labs	40

Area	Percent
Quizzes	20
Final	30
Total	100

### **Late Work Policy & Make-up Procedures for Missed Assignments and Work:**

All work must be completed and turned in by the due date. No work will be accepted after the last class meeting.

### **Attendance Policy**

Students are expected to attend all scheduled classes and laboratories. 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.

In online courses, attendance is signaled by logging on to the D2L/NS Online shell, participating as prompted (e.g., responding to an instructor's email, posting to a discussion board) and/or completing and submitting assignments. Campus closures do not affect attendance and assignment completion in online courses.

*(Each instructor will provide policy, especially how attendance influences student assessment and grading.)*

### **Grading Scale:**

Letter Grade	Percentage Range
A	90 – 100
B	80 – 89
C	70 – 79
D	60 – 69
F	Less than 60

#### **FA**

According to NSCC policy, if a student fails a course, but has not officially withdrawn from the course, and her/his last date of attendance is before the last date to withdraw (*use date appropriate to your section*), the student will receive a grade of FA (i.e., "Failure for Attendance Reasons").

#### **FN**

An FN is awarded to students who never attended class.

### **Technology Statement**

Nashville State's classes are considered to be web-enhanced. Faculty have an expectation that students will use a computer and the Internet to complete assignments, engage in online discussions, and access various course materials through D2L/NS Online course shells. Computers are available for student use at each campus during campus open hours.

## **D2L/NS Online and myNSCC**

It is students' responsibility to check D2L/NS Online course shells for all enrolled courses and myNSCC, including student email, on a regular basis. These are the official communication channels between the college and students, who are responsible for the information communicated through those channels. D2L/NS Online contains specific course information and myNSCC contains information important for other purposes.

## **ADA Compliance Statement**

Nashville State complies with the Americans with Disabilities Act (ADA). If you require accommodations for any courses in which you are enrolled, contact the Access Center at 615.353.3741 or 615.353.3721, or e-mail [accesscenter@nsc.edu](mailto:accesscenter@nsc.edu). If you are registered with the Access Center and require an alternate format for the textbook and other course materials, please contact the Access Center.

## **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 measures. Please review the [Nashville State Student Code of Conduct policy](#). Please be aware that children are not allowed in class or to be left unattended on campus.

## **Academic Misconduct**

Any form of academic dishonesty, cheating, plagiarizing, or other academic misconduct is prohibited. Students are responsible for understanding and abiding by the [Academic Misconduct Policy](#) in the Nashville State Student Code of Conduct. In addition to other possible disciplinary measures that may be applied 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.

## **Academic Early Alert System**

Nashville State Community College uses an Early Alert System to let students know of a faculty member's concern in one or more of these academic areas: lack of attendance, lack of classroom participation, late or missing assignments, and/or poor performance on assignments/tests. \*Please note that Early Alerts do not affect a student's academic standing. If you receive an Early Alert email, please see your instructor and your academic advisor as soon as possible.

## **RAVE Emergency Alert System**

Emergency events can happen at any time and Nashville State Community College wants to be able to notify students if and when they occur. For this reason, all students have been enrolled in the free RAVE alert system. If you have not already done so, please log in at <https://www.getrave.com/login/nsc> to confirm and update your contact information and notification preferences. It is critical that your information be correct so that you will receive any emergency notifications. Your RAVE Username is your NSCC email address. If you've never received an email from RAVE with your password, or if you need to reset your password, select "Forgot your password?" and a new password will be emailed to you. Should the RAVE system indicate "user not found", select Register and create your own RAVE account.

### **Inclement Weather & Campus Closings**

Nashville State will use the RAVE alert system to send a text message to students, staff, and faculty about adjusted hours of operation and/or closings at individual campuses. All students should check the Nashville State web site home page at [www.nsc.edu](http://www.nsc.edu) for announcements on campus closures, which may vary from campus to campus. Campus closures will also be announced on local television stations. Students should use their own best judgment in determining whether to report to campus during inclement weather when classes are not cancelled.

Even when campuses are closed, students are still responsible for completing all assigned work. When classes are cancelled, faculty will post online assignments and any additional instructions in the D2L/NS Online course shell. Check D2L/NS Online for a message from your instructor regarding your online assignment requirements. Faculty have discretion over adjusting deadlines or due date for assignments, but students are responsible for completing all assigned work by the due date established by the instructor.

### **Class Cancellation Policy**

If the class is cancelled, the instructor will notify all students by posting in the D2L/NS Online course, e-mailing through D2L/NS Online, and/or by posting a sign on the classroom door. In the event of class cancellation, students must access D2L/NS Online to complete classwork and the assignment that will be posted in the course D2L site.