

TEXAS COLLEGE

DIVISION OF NATURAL AND COMPUTATIONAL SCIENCES

Department of Computer Science

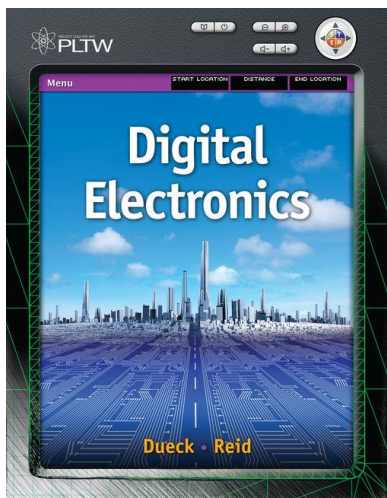
Course Syllabus COSC 3371 Digital Systems



College is a Historically Black College founded in 1894, by the Colored Methodist Episcopal Church, now the Christian Methodist Episcopal Church (CME). Our mission continues to embody the principles of the Christian Methodist Episcopal Church. The College shall prepare students with competencies in critical and creative thinking related to the knowledge, skills, and abilities as defined in areas of study. Additionally, the College shall provide an environment to inspire intellectual, spiritual, ethical, moral, and social development, which empowers graduates to engage in life-long learning, leadership, and service.

Textbooks and or Electronic Site Required

Textbook: Ken Reid and Robert Dueck, *Digital Electronics*, 1st Edition, Course Technology, Cengage Learning, 2017, ISBN-13 9781418041021



[Discovering Computers: Digital Technology, Data, and Devices](#)

17th Edition | Copyright 2023 | by Jennifer T. Campbell, Mark Ciampa, Steven M. Freund, Mark Fry...



STEM Teaching and Learning Methodology and Philosophy:

The teaching and learning philosophy in this course is to expose students to a variety of concepts, ideas, and problem-solving strategies, which are developed and extended through assigned exercises, class discussion, peer instruction method, interactive exploration, and extended lab work. The course is intended to prepare students to work independently on advanced projects. Much of the learning is expected to take place through class exercises, students creating and delivering lessons which act as steppingstones to concept development and subsequent growth in computer science.

Required Readings/Resources

Each student will be required to supply themselves with the following supplies throughout the course.

- Jump/Flash drive
- Notebook/Folder/Pens/Pencils

Access to a computer and internet outside of the classroom can become helpful.

COURSE DESCRIPTION

This class introduces students to the basic concepts of digital systems, including analysis and design. Both combinational and sequential logic will be covered. Students will become familiar with the properties of the various types of logic gates and test the operation of basic digital gates: AND, OR, NOT, NAND, NOR. The students will demonstrate some fundamental laws of

Boolean algebra by building simple circuits. Flip-flops, latches, half and full adders will be discussed. Students will build a 7-segment LED; a virtual lab will be used. Prerequisites: COSC 1336, MATH 2330 Discrete and Combinatorial Mathematics

TEXAS COLLEGE OUTCOMES

1. Critical Thinking Skills
2. Communication Skills
3. Empirical and Quantitative Skills
4. Teamwork
5. Social Responsibility
6. Personal Responsibility

Furthermore, COSC 3310 Internet Programming ensures the following institutional objectives:

1. Enhance communicative skills (oral and written)
2. Enhance critical thinking and technology skills
3. Enhance leadership abilities and spiritual awareness
4. Create opportunities for professional and post-graduate pathways

All learning objectives reflect the Texas College Core Values:

Academic Excellence: Developing a culture of curiosity and creativity that will challenge the frontiers of teaching/learning; stimulate research; raise the level of analytical reasoning and inquiry; and enable students to acquire leadership, human relations, communication, and technology skills.

Integrity: Instilling the pursuit of character, honesty, and sincerity of purpose as the moral rubrics upon which the behaviors of our graduates and College family are anchored.

Perseverance: Implanting diligence, enterprise, and pride in the application of skills, knowledge and abilities developed during the course of study at Texas College.

Social Responsibility: Promoting in the College community a conscious awareness that we are all stewards of the resources entrusted to our care.

Tolerance: Emphasizing openness to divergent points of view, applying an eclectic approach to rational and analytical thinking.

Community Service: Encouraging self-extension in service to others as the heart and soul of our educational enterprise.

STUDENT LEARNING OBJECTIVES & OUTCOMES

Program Outcomes:

Graduates of the Computer Science Program will have an ability to:

- 1) *Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.*
- 2) *Design, implement, and evaluate a computing -based solution to meet a given set of computing requirements in the context of the program’s discipline.*
- 3) *Communicate effectively in a variety of professional contexts.*
- 4) *Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.*
- 5) *Function effectively as a member or leader of a team engaged in activities appropriate to the program’s discipline.*
- 6) *Apply computer science theory and software development fundamentals to produce computing-based solutions.*

When you have completed your study in this course, you should be proficient in meeting the following objectives.

STUDENT LEARNING OBJECTIVES AND OUTCOMES

Course Objective: The student will be able to:	ACM	Assessment
Be able to differentiate between analog and digital systems	1, 2, 3	Programs, and test
Demonstrate the conversion of one number system to another.	1, 2, 6	Test
Identify the basic behavior and properties of basic logic gates.	1, 2, 3	Programs and test
Apply Boolean algebra and other techniques to express and simplify logic expressions.	1 3, 4, 5	Programs and tests

Analyze and design combinational and sequential digital systems	1, 2	Test
Design ,build, and verify simple circuits.	1,2, 3, 4, 6	Programs

*** The Association of Computing Machinery (ACM): Guidelines and Competencies**

SOFTWARE AND SUPPLIES

Software and Programs:

- 1. Access to websites as referenced in class. Students attempting to gain access through cell phones, Mac books, or outdated equipment may experience difficulties with certain websites or videos. It is the student's responsibility to locate viable equipment.*
- 2. Access to JICS online classroom. It is the student's responsibility to become familiar with the online classroom and related components.*
- 3. Most documents in this course will be Word, or PDF format. Word is available through the webmail portal.*
- 4. Students should be prepared to back up files on their own Flash Drive. Work should be saved more than once, as it is not the instructor's responsibility if technology issues suddenly occur and information is lost.*
- 5. Youtube will be an integral part of our ability to record and evaluate performances. Please make sure that you have access to Youtube on a regular basis.*

COURSE POLICIES AND PROCEDURES

SUBMISSION OF ASSIGNMENTS

*All assignments must be submitted on time in JICS, primarily through Upload and the Forums. Please do not submit work through emails. Each day that an assignment is late, points will be deducted from the final grade of that assignment. In the event **extenuating circumstances** prevent you from turning in an assignment please contact the instructor **before** the due date. Late work will be accepted without penalties only if emergencies are documented or technology outages prevail. Students are required to have access to internet that is JICS compatible.*

ATTENDANCE POLICY

*Attendance in remote synchronous learning sessions (Zoom) or face to face in the studio is required for this course. Online participation is also a requirement for a passing grade in this course. **Students are expected to participate in class discussion.** Respond to the weekly discussion question by each Wednesday and reply to at least one classmate by Sunday of each week. To receive credit for substantive participation, each posting should exceed 80 words in thoughtful, complete sentences. You will not receive credit for participation if you submit bullet points, texting language, slang, profanity, or **plagiarized commentaries.** Please be advised that poor online participation can result in failing the course. Students should check emails and classroom announcements (JICS) on a daily basis to remain well-informed.*

The student is responsible for attending all lectures, seminars, Performance Labs, Student Recitals and Juries for each registered class—beginning with the first day of class scheduled—in order to verify registration with instructors and to complete all work assigned for the course. If a student does not attend class during the first week (first five instructional days) of the semester, or does not attend five consecutive class sessions, and does not give prior notification to the instructor of reasons for absence, and intent to attend the class, the student may be recommended to the Vice-President for Academic Affairs to be administratively withdrawn from the course. The instructor should read the rules governing class attendance and absences to each of the assigned classes at the beginning of each semester.

These attendance regulations will be strictly enforced.

The student will be held accountable for adhering to the College Attendance Policy. Instructors are not obligated to allow students to submit late assignments because of their absence, unless the absences have been officially approved. An officially approved absence, however, gives the individual who missed the class an opportunity to turn in the assignment late but in no way excuses the student from the work required. Official excuses are granted by the vice president for student affairs for authorized College activities, verified personal illness, or illness or death in the student's immediate family. Students should understand that absences may jeopardize their grades. A student will be permitted one unexcused absence per credit hour of the course in which he/she is enrolled. Any student whose unexcused absences exceed the number permitted may, at the discretion of the instructor, be assigned a grade of "F" or be dismissed from the class.

Absences will count from the first official date of classes and not from the first day the student attends. It is the responsibility of the instructor to keep an accurate attendance record of all students enrolled. Students receiving veterans' benefits are required to attend classes according to the regulations of the Veterans Administration in addition to those regulations set by the College for all students.

Students are responsible for following the policies, schedule, and procedures outlined in this syllabus. The syllabus is subject to change in the event of circumstances beyond the instructor's control.

ACADEMIC INTEGRITY

Texas College believes that strength of character is as important as academic achievement; therefore, the College expects everyone in the academic community to maintain personal integrity in academic matters and not to contribute or condone the dishonesty of others. Scholastic dishonesty (which includes any form of plagiarism, cheating, falsification of records, and collusion with others to defraud) is improper and will not be tolerated. Texas College reserves the right to apply disciplinary actions to a student who has committed scholastic dishonesty.

Plagiarism Policy:

All students must uphold the ethical standards of the education and abide by Texas College's policy on plagiarism. In this regard, any evidence of plagiarism submitted in course assignments will be dealt with according to this policy. This action may mean a failing grade for the course. For further information regarding plagiarism, see the *Texas College Handbook* (pp. XX-XX, items bb, 3b).

INSTRUCTIONAL METHOD

Texas College observes **remote synchronous instruction** defined as a two-way, real-time/live, virtual instruction between instructors and students when students are not on campus and observing COVID-19 distance requirements.

In this method, the required amount of instructional time related to courses will be scheduled each day, and communication is generated when attendance is recorded daily at a locally selected time utilizing Bio Signature Software. Synchronous instruction is provided through a computer or other electronic device or over the phone. The instructional method will address the course and degree program requirements. If a student who is originally scheduled to receive instruction through the on-campus or synchronous instructional method is not present at the designated official attendance time, the student will not be considered present for the day by engaging through the remote synchronous method.

In the remote synchronous instructional method, student engagement is measured daily, and attendance is assigned based on the student's completion of that day's course engagement measure. Students who do not complete the daily measure of engagement will be counted absent for that day, and that absence cannot be changed to remote synchronous present if the student completes the engagement measure on a later date.

Attendance is measured as synchronous interaction for scheduled courses. Attendance depends on the **active participation of students**. Students are expected to attend online sessions just as they would in a face-to-face classroom, by avoiding non-course related activities. We encourage appropriate lighting which promotes better engagement when the video feature of Zoom is in use.

Program in Which the Course is Required:

Bachelor of Science in Computer Science

COURSE METHODS, PROCEDURES, CONTENT, and REQUIREMENTS

IMPORTANT: The instructor provides the environment to facilitate learning; the student must engage his/her mind and actions. The instructor cannot guarantee that students will learn unless they do their part as active participants of their own education. Therefore, (1) Students may vary in their competency levels on these learning outcomes, and (2) they can expect to achieve these learning outcomes *only if* they honor all course policies, attend classes regularly, complete all assigned work in good faith and on time, and meet all other course expectations.

Instructional Strategies:

Each lesson consists of study of assigned literature. This includes rehearsing pitches and rhythms, practicing language fluency, discussion of performance practices for the style period in question, and evaluation of performances by the student and by others. Assignments for the following week are made and reviewed by student and teacher. The student is responsible for preparing those assignments and learning and memorizing the repertoire. The lesson is not designed for “learning” the music, but instead for fine tuning vocal technique and a meaningful performance. Students will gain performing experience through performances on Performance Labs and Student Recitals where they will evaluate their performance.

Student Activities:

Students will complete an Art Song/Aria Analysis Worksheet for each piece studied. From that worksheet, they will write Program Notes like those they will use for their final recitals.

Students will complete Fluency Assignments for each of the four languages. This includes reading the song text as if it is prose or dialogue. Listening to recordings of native speakers is recommended for the language to be as authentic as possible.

Performance Analysis studies will help the student identify challenges and problems in their own vocal technique as well as that of others. Recording their own performances and listening to performances on Youtube is the basis for this activity. This activity prepares students to become instructors in their applied area.

Performance Lab, Student Recitals, and Juries are assessments of the student’s ability to demonstrate the creativity associated with the applied area, Voice. Students are required to attend all of the above and offer feedback to their classmates as well as evaluating their own performance.

Other activities may be added as deemed necessary by the instructor.

Method of Instruction and Expectations:

The method of teaching in applied lessons is much more relaxed and informal than in a lecture-based class. There are, however, high expectations from the student. The student is responsible for progress in the class. It is important that the student rehearse, practice, study the music and

complete all of the learning activities as they are assigned to make adequate progress. The student MUST perform as assigned on Performance Lab, Student Recitals, and most of all, the Final Jury.

Note: Designated time will be given to each student to discuss student progress. Make an appointment with your instructor.

Method of Student Evaluation:

Students will be evaluated informally during the lesson time with instant feedback regarding the various elements of the piece. The student will be evaluated formally after each performance and for each assignment submitted. Summative assessment will take place at the Final Jury where the student will be evaluated by a panel of the music faculty using a standardized rubric.

GRADING RUBRIC

90-100	A	Transformative (and submitted on time)
80-89	B	Proficient
70-79	C	Developing
60-69	D	Beginning
Below 60	F	Not Submitted

Grade Distribution:

The weights of the grades are as follows:

- Programming 30 %
- Assignments 20%
- Quizzes 20 %
- Midterm Exam 15 %
- Final Exam/Project 15 %

REMEDIATION PLAN

Students who have difficulty with the course will have the opportunity to:

- Meet with the professor for one-on-one support through fact-to-face meetings, telephone sessions, or web conferencing.

- Revise unsatisfactory work until it is satisfactory within a 7- day time limit.

DISABILITIES AND SPECIAL NEEDS

Texas College provides equal opportunity to qualified disabled persons in accordance with the requirements of the American with Disabilities Act (ADA). This Act ensures that individuals with current disabling conditions are provided reasonable accommodations to enable them to enjoy the programs, activities, services, and employment opportunities offered by the College. Texas College adheres to this provision once a student/employee self identifies. Students may contact the Office of Academic Affairs for information/assistance at:

adasupport@texascollege.edu .

NOTICE OF NON-DISCRIMINATION

Texas College does not discriminate in any employment practice, education program, or educational activity on the basis of race, color, religion, national origin, sex, age, disability, sexual orientation, or veteran status. The Vice President for Academic Affairs has been designated to handle student inquiries regarding non-discrimination policies. Contact information is: Texas College, Attn: Vice President for Academic Affairs, Office of Academic Affairs/Martin Hall 1st floor, 2404 North Grand Avenue, Tyler, Texas 75702.

Diversity Statement:

Texas College is committed to creating a community that affirms and welcomes persons from diverse backgrounds and experiences and supports the realization of their human potential. We recognize that there are differences among groups of people and individuals based on ethnicity, race, socioeconomic status, gender, exceptionalities, language, religion, sexual orientation, and geographical area. All persons are encouraged to respect the individual differences of others.

Caveat:

In the event of extenuating circumstances, the schedule and requirements for this course may be modified.

COVID-19 REQUIREMENTS

COVID -19 Vaccination Policy:

Texas College, as a private, faith-based institution, strongly suggests that, effective for the Fall, 2021 term, all students, faculty and staff provide evidence that they have been fully vaccinated. Individuals who have religious beliefs, medical reasons, and/or philosophies (or are generally indifferent to taking the vaccination) will be required to provide and/or sign a statement to that effect, which they believe prohibits them from being fully vaccinated. This information is available at <https://www.texascollege.edu/covid-19> information/ as well as <https://www.texascollege.edu/fall-2021>

TECHNOLOGICAL STATEMENT

This course is infused with technology in order to:

- Participate in Courses Synchronously
- To provide access for course information
- Use the Internet and electronic databases to conduct searches for research projects
- Create multimedia presentations to present class projects to teachers and peers
- PowerPoint Presentations

WRITING ACROSS THE CURRICULUM

Strong communication skills are critical for professionals. In an effort to maintain a commitment to developing effective writing skills for all students, all writing assignments will be evaluated for overall communicative competence. The following will be considered when grading written assignments:

- Word-processed (12 font), double-spaced, one inch left, right, top and bottom margins
- Content
- Clarity and Organization
- Source(s)
- Depth of thought/Originality
- Technology and Delivery
- Grammar and mechanics

WEEKLY COURSE SCHEDULE

Week	Topics
1-2	Basic Principles of Digital Systems and Number systems
3	Boolean algebra
4	Binary arithmetic Boolean Algebra and Combinational Logic
5	Logic Functions and Gates Boolean Identities and DeMorgan's Theorems
6	Combinational logic and building blocks
7	Combinational Logic Functions
8	Digital Arithmetic and Arithmetic Circuits

9	Digital System Application
10	Introduction to Sequential Logic
11	Counters and Shift Registers
12	Study of encoder and decoder circuits Logic Gate Circuitry
13-14	Memory Devices, Systems and Microprocessors Putting it all together – <i>Constructing a 2-bit RAM</i>