SYLLABUS

DATE OF LAST REVIEW: 09/2019

CIP CODE: 15.1201

SEMESTER: Departmental Syllabus

COURSE TITLE: Digital Electronics I

COURSE NUMBER: ENGR-0211

CREDIT HOURS: 4

INSTRUCTOR: Departmental Syllabus

OFFICE LOCATION: Departmental Syllabus

OFFICE HOURS: Departmental Syllabus

TELEPHONE: 913-334-1100

EMAIL: *KCKCC issued email accounts are the official means for electronically communicating with our students.*

PREREQUISITE(S):   Completion of ENGR-0108, Electronic Circuit Fundamentals.

REQUIRED TEXT AND MATERIALS: Please check with the KCKCC bookstore, http://www.kckccbookstore.com/, for the required texts for your particular class.

COURSE DESCRIPTION: Detailed study of sequential logic circuits, counters, shift registers and clocks. Explain decoders, encoders, multiplexers, demultiplexers. Study of code converters, memories and logic arrays. Explanation of digital test equipment and frequency counters.

Upon completion of this course, the students will have a thorough understanding of computers and their operation. Students will be able to understand logic circuit, fault-finding and repair. Students will also have a firm understanding of memories used in digital computer systems and their capacities. Students, upon completion of this course, will be able to design and make any kind of digital displays, counters and registers. This course will lead to a good understanding of microprocessors.

METHOD OF INSTRUCTION: A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, and panels,

conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE:
  I.   Unit 1. Sequential Logic Circuits, Counters, Shift Registers and Clocks
      A. Counters
      B. Binary Counters
      C. Special Counters
      D. Shift Registers
      E. Shift Register Applications
      F. MOS Shift Registers
      G. Clocks and One Shots
  II. Unit 2. Combinational Logic Circuits
      A. Decoders
      B. Encoders
      C. Multiplexers
      D. Demultiplexers
      E. Exclusive OR
      F. Code Converters
      G. Read Only Memories
      H. Programmable Logic Arrays
  III. Unit 3. Digital Design
      A. Introduction
      B. Design Criteria
      C. Combinational Logic Circuit Design
      D. Sequential Logic Circuits Design
  IV. Unit 4. Digital Applications
      A. Digital Test Equipment
      B. Frequency Counter
      C. Digital Computers

Laboratory Experiments:
  1.   Code Converters
  2.   Latches
  3.   Edge-Triggered Flip-Flops
  4.   Pulse-Triggered Flip-Flops
  5.   One-Shots
  6.   Asynchronous Counters
  7.   Synchronous Counters
  8.   Counter Applications
  9.   Universal Shift Register
  10. Register Files with Open-Collector Outputs
  11. Random Access memories (RAMs) with 3-State I/O
  12. Digital-to-Analog (D/A) Conversion
  13. Analog-to-Digital (A/D) Conversion
  14. CMOS Analog Multiplexer/Demultiplexer

15. Applications of the Schmitt Trigger
16. Arithmetic Logic Unit (ALU)

EXPECTED LEARNER OUTCOMES:

A. Upon completion of the course the student will be able to describe the operation of common digital circuits.
B. Upon completion of the course the student will be able to explain the applications of digital techniques in electronics
C. Upon completion of the course the student will be able to demonstrate the use of digital electronics.
D. Upon completion of the course the student will be able to describe most common integrated circuits used in digital equipment

COURSE COMPETENCIES:

Upon completion of the course the student will be able to describe the operation of common digital circuits.
1. The student will be able to explain the operation of code converters.
2. The student will be able to demonstrate the operation of latches.
3. The student will be able to explain the operation of latches.
4. The student will be able to explain the operation of edge-triggered flip-flops.
5. The student will construct the operation of pulse triggered flip-flops.
6. The student will be able to demonstrate the operation of pulse triggered flip-flops.
7. The student will be able to explain the operation of pulse triggered flip-flops.
8. The student will construct the operation of one-shots.
9. The student will demonstrate the operation of one-shots.
   Upon completion of the course the student will be able to explain the applications of digital techniques in electronics
10. The student will explain the operation of one-shots.
11. The student will construct the operation of asynchronous counters.
12. The student will demonstrate the operation of asynchronous counters.
13. The student will explain the operation of asynchronous counters.
14. The student will construct the operation of synchronous counters.
15. The student will demonstrate the operation of synchronous counters.
16. The student will explain the operation of synchronous counters.
17. The student will demonstrate the operation of counter applications.
18. The student will explain the operation of counter applications.
19. The student will explain the operation of universal shift registers.
   Upon completion of the course the student will be able to demonstrate the use of digital electronics.
20. The student will explain the operation of register files with open-collector outputs.
21. The student will demonstrate the operation of random access memories (RAM) with three state I/O.
22. The student will explain the operation of random access memories (RAM) with three state I/O.

23. The student will construct the operation of analog-to-digital (A/D) converters.
24. The student will demonstrate the operation of analog-to-digital (A/D) converters.
25. The student will explain the operation of analog-to-digital (A/D) converters.
26. The student will construct the operation of digital-to-analog (D/A) converters.
27. The student will demonstrate the operation of digital-to-analog (D/A) converters.
28. The student will explain the operation of digital-to-analog (D/A) converters.
    Upon completion of the course the student will be able to describe most common integrated circuits used in digital equipment.
29. The student will construct the operation of CMOS analog multiplexer/demultiplexer.
30. The student will demonstrate the operation of CMOS analog multiplexer/demultiplexer.
31. The student will explain the operation of CMOS analog multiplexer/demultiplexer.
32. The student will construct the operation of applications of the Schmitt Trigger.
33. The student will demonstrate the operation of applications of the Schmitt Trigger.
34. The student will explain the operation of applications of the Schmitt Trigger.
35. The student will construct the operation of arithmetic logic units (ALU).
36. The student will demonstrate the operation of arithmetic logic units (ALU).
37. The student will explain the operation of arithmetic logic units (ALU).

ASSESSMENT OF LEARNER OUTCOMES:
Assessment methods may include, but are not limited to, the following: Homework, Assignments, Quizzes, Class Participation, Chapter Tests, and Final Exam. The grading scale and the process for calculating the course grades are to be determined by the individual instructors. This information will be included in each instructor's syllabus.

SPECIAL NOTES:
This syllabus is subject to change at the discretion of the instructor. Material included is intended to provide an outline of the course and rules that the instructor will adhere to in evaluating the student's progress. However, this syllabus is not intended to be a legal contract. Questions regarding the syllabus are welcome any time.

Kansas City Kansas Community College is committed to an appreciation of diversity with respect for the differences among the diverse groups comprising our students, faculty, and staff that is free of bigotry and discrimination. Kansas City Kansas Community College is committed to providing a multicultural education and environment that reflects and respects diversity and that seeks to increase understanding.

Kansas City Kansas Community College offers equal educational opportunity to all students as well as serving as an equal opportunity employer for all personnel. Various laws, including Title IX of the Educational Amendments of 1972, require the college's policy on non-discrimination be administered without regard to race, color, age, sex, religion, national origin, physical handicap, or veteran status and that such policy be made known.

Kansas City Kansas Community College complies with the Americans with Disabilities Act. If you need accommodations due to a documented disability, please contact the disabilities services office at (913) 288-7664.

All enrolled students at Kansas City Kansas Community College are subject to follow all rules, conditions, policies and procedures as described in both the Student Code of Conduct as well as the Student Handbook. All Students are expected to review both of these documents and to understand their responsibilities with regard to academic conduct and policies. The Student Code of Conduct and the Student Handbook can be found on the KCKCC website.