

COURSE SYLLABUS

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| Course Title: | Digital Circuits and Logic | | Date submitted: | 02/10/2020 (AAC: 20-11) | | | |
| Department: | STEAM | | | | | | |
| Curriculum: | Computer Information Systems | | | | | | |
| Course Descriptors: Make certain that the course descriptors are consistent with college and Board of Trustees policies, and the current course numbering system. | Course Code: (eg. ACC 101) | CST*145 | Prerequisites: | | | | |
| | Course Type: | X | C- or better in Intermediate Algebra (MAT*137) or higher, AND Introduction to Computers (CSC*101) or permission of Program Coordinator | | | | |
| | A: Clinical B: Lab D: Distance Learning I: Individual/Independent L: Lecture N: Internship M: Seminar P: Practicum U: Studio X: Combined Lecture/Lab Y: Combined Lecture/ Clinical/Lab Z: Combined Lecture/Studio | | Elective Type: | Corequisites: | | | |
| | | | G | None | | | |
| | AH: Art History E: English FA: Fine Arts FL: Foreign Language G: General HI: History HU: Humanities LAS: Liberal Arts & Sciences M: Math S: Science SS: Social Science | | Credit Hours: | | | None | |
| | | | 4 | | | | |
| | Developmental: (yes/no) | | no | | | | |
| | Lecture: | | 3 | | | | |
| | Clinical: | | 0 | | | | |
| | Contact Hours: | | | | | | |
| Lab: | | 2 | | | | | |
| Studio: | | 0 | | | | | |
| Other: | | 0 | | | | | |
| TOTAL: | | 5 | Other Requirements: | | | | |
| Class Maximum: | | 24 | None | | | | |
| Semesters Offered: | | F | | | | | |
| Catalog Course Description: | A study of the elements of digital logic design, digital circuits, and the fundamentals of a modern digital system. Topics include binary number systems and data representation, Boolean algebra, analysis and design of combinational and sequential logic circuits, basic computer components, processor instruction set and assembly language. Logic design exercises and simulations are used to provide practical experience. | | | | | | |
| Topical Outline: List course content in outline format. | <ol style="list-style-type: none"> Digital Systems and Number System Boolean algebra and Logic Gates Gate-level minimization & combinational logic Synchronous sequential logic Registers & counters Memory & programmable logic RAM, DRAM, ROM, EPROM and EEPROM Assemble, link and run an Assembler program | | | | | | |

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| | <p>8. Lab projects:</p> <ul style="list-style-type: none"> A. Microcomputer Components B. Familiarization with equipment and safety C. Combinational Logic D. Decoder and Multiplexer E. Half Adder and Full Adder F. Flip Flops G. Shift Register H. Binary Counter I. Arithmetic Logic Unit J. Control unit |
| <p>Outcomes: Describe measurable skills or knowledge that students should be able to demonstrate as evidence that they have mastered the course content.</p> | <p>Upon successful completion of this course, the student will be able to do the following:</p> <ol style="list-style-type: none"> 1. Learn number systems 2. Learn Boolean logic, theorems, logic gates and Karnough Maps 3. Design combinational logic such as Multiplexer, Decoder, Adder and Subtractor 4. Analyze combinational circuits 5. Analyze and design sequential circuits 6. Describe the function of microcomputer's components 7. Learn characteristics of RAM, DRAM, ROM, EPROM and EEPROM 8. Perform experiments using breadboard and / or emulators such as Logic Works or Logisim or Micromedia Logic. NOTE: Micromedia Logic is an open source product. It allows users to begin with simple gates and work their way up to larger components, such as memory and ALU, which are included as devices in the software. 9. Learn processor instructions including data transfer, arithmetic instructions, loops and conditional jumps 10. Assemble, link and run an assembler program 11. Learn different addressing modes <hr/> <p>PROGRAM: <i>(Numbering reflects Program Outcomes as they appear in the college catalog)</i> None</p> <hr/> <p>GENERAL EDUCATION: <i>(Numbering reflects General Education Outcomes as they appear in the college catalog)</i></p> <ol style="list-style-type: none"> 1. Critical Analysis/ Logical Thinking - Students will be able to organize, interpret, and evaluate evidence and ideas within and across disciplines; draw reasoned inferences and defensible conclusions; and solve problems and make decisions based on analytical processes. <p>Demonstrates: Identifies the issue(s); formulates an argument; explains and analyzes relationships clearly; draws reasonable inferences and conclusions that are logical and defensible; provides support by evaluating credible sources of evidence necessary to justify conclusions.</p> <p>Does Not Demonstrate: Identifies few or no issues; formulates an argument without significant focus; provides an unclear explanation of analysis and relationships; drawing few reasonable inferences and conclusions that are illogical and indefensible; provides little to no support using credible sources of evidence necessary to justify conclusions.</p> 2. Quantitative Reasoning - Students will learn to recognize, understand, and use the quantitative elements they encounter in various aspects of their lives. Students will develop a habit of mind that uses quantitative skills to solve problems and make informed decisions. <p>Demonstrates: Interprets numerical information and applies sufficient laws of logic and mathematics to solve problems using numbers, symbols, graphs and/or descriptions.</p> <p>Does Not Demonstrate: Misinterprets numerical information or insufficiently applies laws of logic and mathematics to solve problems using numbers, symbols, graphs and/or descriptions.</p> |

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| | <p>9. Scientific Knowledge - Students will gain a broad base of scientific knowledge and methodologies in the natural sciences. This will enable them to develop scientific literacy, the knowledge and understanding of scientific concepts and processes essential for personal decision making and understanding scientific issues.</p> <p>Demonstrates: Consistently recalls and correctly applies discipline-specific terms, relevant theories, laws, and concepts to analyze and explain scientific information.</p> <p>Does Not Demonstrate: Inconsistently recalls or incorrectly applies discipline-specific terms, relevant theories, laws, and concepts to analyze or explain scientific information.</p> <p>10. Scientific Reasoning - Students will become familiar with science as a method of inquiry. Students will develop a habit of mind that uses quantitative skills to solve problems and make informed decisions.</p> <p>Demonstrates: Identifies and successfully executes components of the scientific method (hypothesis, procedure, observations, data analysis, and conclusions) to investigate real-world phenomena.</p> <p>Does Not Demonstrate: Misidentifies or poorly executes components of the scientific method (hypothesis, procedure, observations, data analysis, or conclusions) to investigate real-world phenomena.</p> |
| <p>Evaluation: List how the above outcomes will be assessed.</p> | <p>Assessment will be based on the following criteria:</p> <ol style="list-style-type: none"> 1. Written examinations to demonstrate of terminology, concepts and skill 2. Lab Projects 3. Quizzes |
| <p>Instructional Resources: List library (e.g. books, journals, on-line resources), technological (e.g. Smartboard, software), and other resources (e.g. equipment, supplies, facilities) required and desired to teach this course.</p> | <p>Required:</p> <ul style="list-style-type: none"> • Computer lab • Computers with updated version of Logisim, Logisim-Evolution, as a digital circuit design simulation program |
| <p>Textbook(s)</p> | <p>Current textbook will be selected at the start of semester</p> |