Ohio Articulation Number (OAN)
Course Submission Form
2005-2006

College/University       Lorain County Community College

Course(s) Submitted (Title & Course #)       Digital Electronics ELCT 121 E
Ohio Articulation Number       OET 002
for       July 15, 2006
Date       Course       1
of a       1
Course OAN mapping.

Name and title of individual submitting on behalf of the college/university
Name       Rosemary Schestag       Title       Project Manager

Address       1005 N. Abbe Road, Elyria, Oh 44035
E-mail       rschetag@lorainccc.edu
Phone       440 366 7412
Fax       440 366 4150

Credit Hours       4
Lecture Hours       3
Laboratory Hours       3 (if applicable)
Pre-Requisites(s)       Electric Circuits I and concurrent Technical Mathematics I
Course work (if applicable)
Placement Score (if applicable)
(Name of test)N/A
(Domain)- (Score)-

Catalog/Course Description (Includes Course Title and Course #)

ELCT 121 Digital Electronics:
The course serves as an introduction to basic digital electronic concepts. Topics included are number systems, logic gates, Boolean algebra, combinational logic, flip flops, counters, registers, memories, and an introduction to microprocessors. A laboratory is required. (A special fee will be assessed.) Prerequisite: ELCT 111 and concurrent MTHM 121
Course Objectives and/or Plan of Work

This course is the first course in a four-course sequence in electronics that were designed to provide adequate knowledge and practical application skills in electronics needed for technician jobs in the industry. In this course, the lab exercises are designed to provide a thorough basic understanding of electronics. Students are allowed to work as a team of two but submit individual lab reports for evaluation of outcomes. Technical communication skills are evaluated through lab reports.

Description of Assessment and/or Evaluation of Student Learning

<table>
<thead>
<tr>
<th>Cognitive-Knowledge:</th>
<th>Assessment Method(s):</th>
</tr>
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</table>
| **1. Perform** mathematical operations involving binary numbers and Boolean algebra. | • Tests and quizzes  
• Formative and summative assessments of homework and laboratory exercises  
• Classroom assessment techniques (i.e. the minute paper)  
• Standard final exam |
| **2. Interpret** schematic diagrams and symbols for digital integrated circuits. | • Tests and quizzes  
• Formative and summative assessments of homework and laboratory exercises |
| **3. Analyze** circuits containing digital integrated circuits and determine proper operations | • Tests and quizzes  
• Formative and summative assessments of homework and laboratory exercises  
• Standard final exam |

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<th>Psychomotor-Skills:</th>
<th></th>
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<td><strong>4. Construct</strong> electronic circuits from schematics using digital integrated circuits.</td>
<td>* Formative and summative assessments of laboratory exercises</td>
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</table>
| **5. Construct** a truth table and a timing diagram for combinational logic circuits, counters and registers. | • Tests and quizzes  
• Formative and summative assessments of homework and laboratory exercises  
• Standard final exam |
<p>| <strong>6. Perform</strong> troubleshooting of digital integrated electronic circuits using digital instrumentation | • Evaluation of laboratory exercises |</p>
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<th>General Education Outcomes</th>
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<td>6. Develop precision, clarity, and fluency in writing</td>
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</tr>
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<td>8. Apply mathematical concepts to solve quantitative problems</td>
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<td>Evaluation of homework and laboratory exercises</td>
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<td>9. Develop critical thinking and reasoning skills in problem solving.</td>
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<tr>
<td>Evaluation of homework and laboratory exercises</td>
<td></td>
</tr>
</tbody>
</table>

Master Syllabi and Working Syllabi (if both are used)

ELCT 121  DIGITAL ELECTRONICS

INSTRUCTOR:  Kelly Zelesnik, Ext. 7028; e-mail kzelesni@lorainccc.edu
OFFICE HOURS:

EVALUATION

The grade for the course will be determined by the following:

1. HOMEWORK (40%). The odd-numbered problems in the text have the answers in the appendix. Students should do as many of these as needed to acquire facility with each type of problem covered in class. Selected problems (even or odd numbers) will be assigned as homework. Students are encouraged to work together on homework problems, but each student must work the problems themselves and turn in an individual assignment. All work must be shown for credit. Late homework assignments will be reduced 20% per week. All assignments must be turned in prior to the final full week of classes.

2. LABORATORY (25%). The laboratory section of the course consists of experiments that have been selected by the instructor to reinforce the course material. Students may work in groups of no more than two, or alone, if there is enough equipment. A student must be in attendance and participate to receive credit for a laboratory exercise. Students are encouraged to work together on labs, but each student must complete the report themselves and turn in an individual assignment. All work must be shown for credit. Reports are due one week after the laboratory work is completed. Late reports will be reduced by 20% per week. Late reports must be turned in before the last full week of classes. Missed lab assignments may be made up; however, the work must be completed and the report turned in before the last full week of classes. Make-up labs must contain the signature of an electronics instructor or student assistant, so as to verify that the student actually performed the exercise.

3. QUIZZES (25%) & FINAL EXAM (10%). The exact times of quizzes will be announced in class, and students are required to be present. If a student misses a
quiz due to unavoidable circumstances, arrangements should be made with the instructor to take a make-up. Make-up quizzes must be completed prior to the final full week of classes. The final exam will be comprehensive. If circumstances prevent a student from attending the final as scheduled, alternative arrangements must be made with the instructor.

**GRADE SCALE:**  
A (90% to 100%),  
B (80% to 90%),  
C (70% to 80%),  
D (60% to 70%),  
F (below 60%).

**INDIVIDUAL ASSISTANCE**  
The instructor will be available for individual assistance during office hours, laboratory sessions, or by appointment. Tutoring is available free of charge in the Learning Resources Center (located in the library). Please contact the Learning Resource Center if you would like assistance. Your instructor may be contacted by leaving a message with the Department of Engineering Technology, Ext. 4005.

**STUDENTS WITH SPECIAL NEEDS**  
The Office for Special Needs Services (OSNS) exists to serve the needs of students with disabilities - physical, learning and/or emotional. If you are a person with a disability who needs accommodations or assistance, contact the OSNS in Room 115 in the Learning Resource Center (ext. 4058).

**READING DAYS**  
Reading days are scheduled during the semester to provide students time to work on papers and other assignments, prepare for finals, meet with their instructors, etc. On those days the instructor will be in his office or lab during normal class times and during office hours.

**ACADEMIC DISHONESTY**  
The Code of Student Conduct defines Academic dishonesty and any form of cheating as follows: Academic dishonesty and any form of cheating, which includes but is not limited to:

- Copying from another student’s materials;
- Using unauthorized materials during a test, quiz, exam, or project;
- Collaborating with any person during a test, quiz, exam, project, or assignment without instructor’s permission;
- Knowingly obtaining, copying, using, buying, selling, transporting, or soliciting in whole or in part the contents of any test, quiz, exam, project or assignment without specific authorization of the appropriate official;
- Bribery or the attempt to bribe any person to obtain any test, any grade(s), any grade change(s), or any related information;
- Soliciting or receiving (buying, selling) unauthorized information about any test, quiz, exam, project or assignment;
- Substituting for another student or permitting any person to substitute for a test, quiz, exam, participate in assignment, project, or other course/College activity;
- Plagiarism of any kind: to steal or pass off as one’s own ideas, words, writings, sources of another without giving direct and complete credit; to commit literary theft; to present as new and original ideas, phrases, photos, sentences or products of any length derived from an existing source without citing the quotation as such and listing the complete source;
- Recording any lectures on audio or video tape without instructor’s permission;
- Failure to comply with posted college laboratory and facility policies as well as posted programmatic policies;

Any student identified practicing Academic dishonesty shall be assigned a grade of F for the course without opportunity to withdraw and charges of misconduct shall be filed with the office of director of enrollment services according to disciplinary procedures.

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**Lorain County Community College**  
**ELCT 121 Section ____  Fall 2006**  
**Instructor: Kelly Zelesnik**

I _________________________ (print name) represent that all homework, labs, quizzes, tests and any other assigned work that I turn in for the above noted course is my own original work and not the intellectual property of any other person or entity. I have read and understand the course syllabus as provided.

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**Signature_______________________________   Date___________________________**

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**Tentative Course Outline (16 Week Session)**

<table>
<thead>
<tr>
<th>WEEK</th>
<th>CHAPTER</th>
<th>Homework</th>
<th>Labs</th>
</tr>
</thead>
</table>
| 1    | 1       | CH1: 6, 9, 10, 14  
       | 2       | CH2: 6, 8      |       |
| 2    | 2       | CH2: 12, 16, 20, 23,  
       |         | 26, 30       | 2  
       | 3       | CH3: 2, 3, 6, 9, 12,  
       |         | 14, 16      | 3  
| 4    | 3       | CH3: 20, 22  
       |         | CH4: 4, 6, 8, 9, 10,  
       |         | 14, 16      | 4  
| 5    | 4       | CH4: 18, 22, 24, 26,  
       |         | 30, 38, 42   | 5  
| 6    | 5       | CH5: 2, 4, 6, 10, 18,  
       |         | 20, 22, 26   | 6  
| 7    | 6       | CH6: 2, 4, 11, 13, 14,  
       |         | 20, 21, 26, 30| 7  
| 8    | 7       | CH7: 1, 4, 6, 8, 10,  
       |         | 12, 20, 22, 25| 8  
| 9    | 8       | CH8: 2, 8, 9, 13, 20,  
       |         | 16 & 17     | 9  
| 10   | 9       | CH8: 26, 30  
       |         | CH9: 2, 3, 6, 8 | 10 |
| 11   | 9       | CH9: 12, 14, 21, 23,  
<pre><code>   |         | 25          | 11 |
</code></pre>
<table>
<thead>
<tr>
<th>12</th>
<th>10 Memory &amp; Storage</th>
<th>12 CH10: 4, 8, 14, 17, 18</th>
<th>20 &amp; 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>12 Introduction to Computers</td>
<td>13 CH10: 20, 24, 26&lt;br&gt;CH12: 2, 4, 6, 8, 10</td>
<td>23&lt;br&gt;24</td>
</tr>
<tr>
<td>14</td>
<td>12 Introduction to Computers</td>
<td>14 CH12: 12, 14, 18, 22, 24, 26, 34, 36</td>
<td>26&lt;br&gt;Open Lab</td>
</tr>
<tr>
<td>15</td>
<td>13 Introduction to Digital&lt;br&gt;Signal Processing</td>
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<tr>
<td>16</td>
<td>Final Examination</td>
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</tbody>
</table>

**List of Lab exercises:**

1- Familiarization with laboratory equipment
2- Logic probe and logic pulser
3- Logic inverter
4- AND/NAND logic gates
5- OR/NOR logic gates
6- CMOS logic gates
8- Logic gate application
9- Universal property of NAND/NOR gates
10- Exclusive OR gates
12- Comparators
13- Parallel binary adder/subtractor
14- Parity generator/checker
15- Data selectors/multiplexers
16- Encoders
17- Decoders/Demultiplexers
18- Code converters
19- Latches
20- Edge-Triggered flip-flop
22- One-shots
23- Asynchronous counters
24- Synchronous counters
26- Universal shift registers
29- Digital-to-Analog conversion
30- Analog-to-digital conversion
Additional Documentation

<table>
<thead>
<tr>
<th>OAN</th>
<th>LCCC</th>
<th>BGSU</th>
<th>KSU</th>
<th>U, Akron</th>
<th>U. Toledo</th>
</tr>
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<tbody>
<tr>
<td>OET 002</td>
<td>ELCT 121</td>
<td>ECT 358</td>
<td>EERT 22004</td>
<td>2860:136 &amp; 2860:237</td>
<td>EET 2210</td>
</tr>
</tbody>
</table>

This information is from the Equivalency Guide in CAS. It shows how our indicated courses are accepted by BGSU, KSU, U of Akron, and U of Toledo. Blue font indicates that the school submitted that course as indicated OAN.

**COURSE DESCRIPTION WITH STUDENT OUTCOMES**

**LORAIN COUNTY COMMUNITY COLLEGE**

**DIVISION:** Engineering Technologies  
**COURSE TITLE:** Digital Electronics  
**COURSE NUMBER:** ELCT 121 E

<table>
<thead>
<tr>
<th>Contact Hours/Week</th>
<th>Weight</th>
<th>ILU's</th>
</tr>
</thead>
<tbody>
<tr>
<td>LECTURE/RECITATION</td>
<td>3.0 x</td>
<td>(1.0) = 3</td>
</tr>
<tr>
<td>LAB</td>
<td>3.0 x</td>
<td>(0.85) = 2.55</td>
</tr>
<tr>
<td>CLINICAL</td>
<td>0 x</td>
<td>(1.0) =</td>
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</tbody>
</table>

* Please refer to the “Quality Point Checklist for New and Revised Courses” and/or Pages 500.01 through 500.05 of the Ohio Board of Regents Operating Manual for Two-Year Campus Programs for Instructional Arrangements that are not identified as Lecture/Recitation, Lab or Clinical. ([http://www.regents.state.oh.us/progs/2yrmanual.pdf](http://www.regents.state.oh.us/progs/2yrmanual.pdf))

**IS THERE A SEPARATELY SCHEDULED LAB:** Yes  
**IS THERE A SEPARATELY SCHEDULED CLINICAL:** No

**SPECIAL FACILITIES:** Electronic Laboratory with measuring instruments  
**START YEAR/SEMESTER:** on going

**PREREQUISITE:** ELCT 111  
(Please indicate course/s that must be taken before this course.)  
**COREQUISITE:** None  
(Please indicate course/s that must be taken with this course.)  
**CONCURRENT:** MTHM 121  
(Please indicate course/s that must be taken before or with this course.)
CATALOG DESCRIPTION:
The course serves as an introduction to basic digital electronic concepts. Topics included are number systems, logic gates, Boolean algebra, combinational logic, flip flops, counters, registers, memories, and an introduction to microprocessors. A laboratory is required. (A special fee will be assessed.) Prerequisite: ELCT 111 and concurrent MTHM 121

REQUIRED TEXTBOOK(S)/MATERIAL(S):

TOPICAL OUTLINE: (COMMON CORE TOPICS)
- Number systems, operations and codes
- Logic gates and truth tables
- Boolean algebra
- Combination logic circuits
- Adders, decoders, multiplexers
- Flip-flops, one shots, timers
- Counters, registers
- Memories
- Introduction to microprocessors

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<thead>
<tr>
<th>COURSE OUTCOMES &amp; ASSESSMENT:</th>
<th>(Tools, Methods, and Expected Results)</th>
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<tr>
<td><strong>Outcomes</strong></td>
<td><strong>Assessment Method(s)</strong></td>
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<tr>
<td><strong>Cognitive- Knowledge:</strong></td>
<td><em>Most courses will address all three domains. In the instance when only two domains are addressed, include a justification in the Division cover letter.</em></td>
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GENERAL EDUCATION REQUIREMENT: OUTCOMES AND ASSESSMENT (Tools, Methods, and Expected Results)
1. Develop the professional competencies to function effectively within their chosen academic disciplines and careers.
2. Develop technological literacy and demonstrate knowledge of the applications of technology in everyday life.
3. Understand and apply methods of scientific inquiry.
4. Develop an appreciation for and an understanding of the arts and humanities.
5. Develop an understanding of the history of the diverse social, economic, and political models of society.
6. Develop precision, clarity, and fluency in writing.
7. Develop accuracy, conciseness, and coherence in spoken communication.
8. Apply mathematical concepts to solve quantitative problems.
10. Develop an awareness and understanding of gender, ethnic, minority, multicultural, and global issues.
11. Develop an appreciation for and an understanding of the benefits of a healthy, active and well-balanced lifestyle.

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**SUGGESTED INSTRUCTIONAL METHOD(S) AND TECHNIQUE(S):**
- Lecture: Explanation of concepts and applications
- Demonstration: Presentation of problem solving techniques
- Demonstration: Demonstrate the proper use of test equipment
- Laboratory Exercises: Conducting lab experiments and writing lab reports

**GRADING PROCEDURES:**
- Home work assignments = 40%
- Laboratory Exercises = 25%
- Quizzes / Exams = 25%
- Final Exam = 10%

**TRANSFER MODULE REQUIREMENT CHANGES:**
- **X** none
- ____ Add to English Composition area of Transfer Module
- ____ Add to Arts/Humanities area of Transfer Module
- ____ Add to Social and Behavioral Sciences area of Transfer Module
- ____ Add to Mathematics area of Transfer Module
- ____ Add to Natural and Physical Sciences area of Transfer Module

**MISCELLANEOUS**
- OET 002 Add Ohio Articulation Number (OAN) and Department Code
- ____ Add “G” for International Course (at least 30% of content is outside U.S.)
- ____ Course/Cluster Program Review Underway

**OTHER RESOURCES INCLUDING EQUIPMENT AND SOFTWARE**
- Digital electronic trainers Integrated circuits
- Oscilloscopes
- Logic probes
- Pulsers
- DC Power Supplies
- Signal Generators
- Frequency Counters
- Digital Multimeters
- Electronic Circuit Simulation Software installed in a Computer Lab

Date: July 15, 2006

<table>
<thead>
<tr>
<th>OBR Use</th>
<th>Action</th>
</tr>
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<tbody>
<tr>
<td>Approved</td>
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<tr>
<td>Additional Information Requested</td>
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<tr>
<td>Rejected</td>
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