



COURSE OUTLINE

Outline Status: Outline Update (ECD 9778); 2009-2010

Section I: BASIC COURSE INFORMATION

1. **COLLEGE: L.A. SOUTHWEST COLLEGE**
2. **SUBJECT: ELECTRONICS**
3. **COURSE NUMBER: 002**
4. **COURSE TITLE: INTRODUCTION TO ELECTRONICS**
5. **UNITS: 3**
6. **CATALOG COURSE DESCRIPTION:**

An introductory electronics course for majors and non-majors, with emphasis on hands-on activities. In addition to exploring career opportunities in the world's largest industry, electronics, students will learn to solder, read schematic drawings, identify electronic components, gates, symbols, electrical laws, numbering systems, and construct numerous electronic circuits and projects.

7. CLASS SCHEDULE COURSE DESCRIPTION:

An introductory, hands-on, activity-oriented electronics class for majors and non-majors. Students will be introduced to electronic components, symbols, and electrical laws.

8. **INITIAL COLLEGE APPROVAL DATE: 1974**
9. **COURSE OUTLINE UPDATE APPROVAL DATE: 11/17/09**

Course change description; Course Change Request, hours in Protocol

10. CLASS HOURS:

	Standard Hrs Per Week (based On 18 weeks)	Total Hs per Term (hrs per week x 18)	Units
Lecture:	3	54	3
Lab/Activity (w / homework):	0	0	0
Lab/Activity (w /o homework):	0	0	0
Totals:	Lecture: 3	Lecture: 54	Lecture: 3
	Lab: 0	Lab: 0	Lab: 0
	Total: 3	Total: 54	Total: 3
Totals In Protocol:	Lecture: 0	Lecture: 0	
	Lab: 3	Lab: 54	
	Total: 3	Total: 54	Total: 3

11. PREREQUISITES, COREQUISITES, ADVISORIES ON RECOMMENDED PREPARATION, and LIMITATION ON ENROLLMENT:

Note: The LACCD's *Policy on Prerequisites, Corequisites and Advisories* requires that the curriculum committee take a separate action verifying that a course's prerequisite, corequisite or advisory is an 'appropriate and rational measure of a student's readiness to enter the course or program' and that the prerequisite, corequisite or advisory meets the level of scrutiny delineated in the policy.

PREREQUISITES: No

	Subject	Number	Course Title	Units	Validation Approval Date

COREQUISITES: No

	Subject	Number	Course Title	Units	Validation Approval Date

ADVISORIES: No

	Subject	Number	Course Title	Units	Validation Approval Date

12. OTHER LIMITATIONS ON ENROLLMENT: (See Title 5, Section 58106 and Board Rule 8603 for policy on allowable limitations. Other appropriate statutory or regulatory requirements may also apply):

None

Section II: COURSE CONTENT AND OBJECTIVES

1. COURSE CONTENT AND OBJECTIVES:

COURSE CONTENT AND SCOPE - Lecture: Outline the topics included in the lecture portion of the course (<i>Outline reflects course description, all topics covered in class</i>).	Hours per topic	COURSE OBJECTIVES - Lecture: Upon successful completion of this course, the student will be able to.. (<i>Use action verbs - see Bloom's Taxonomy for 'action verbs requiring cognitive outcomes.'</i>)
INTRODUCTION a. Course supplies and materials. b. Overview of the electronics field. c. Explore career opportunities in the field of electronics. d. Discuss the impact of electronics on various industries. e. Overview of careers in electronics. f. Overview of the role of the electronics technician.	3	A. Interpret simple schematic drawings. B. Identify common electronic components. C. Calculate the solution to Ohms Law, series circuit, parallel circuit, and complex circuit problems.
ELECTRONICS PRINCIPLES a. Resistor Color Code. b. Resistor measurement with a Digital MultiMeter (DMM). c. Measuring voltage with a DMM. d. Measuring current with a DMM.	3	D. Construct and solder basic electronic circuits from schematic drawings. E. Assemble circuits on a printed circuit board. F. Operate various electronic test instruments, such as the DMM, Function Generator, Oscilloscope, and Power Supply.
ELECTRONIC PROJECT BUILDING a. How to read a simple schematic. b. Construct a simple circuit from a schematic drawing. c. 555 timer theory. d. Variable resistance theory.	5	G. Distinguish different types of symbols and gates.
LIGHT EMITTING DIODES a. Basic LED theory of operation. b. Seven-segment displays. c. Matrix LEDs. d. Alphanumeric LEDs.	3	H. Convert to various numbering systems, binary, octal, and hexadecimal. I. Experiment and test a given electronic project to be assembled.
NUMBERING SYSTEMS a. Binary number system. b. Binary addition. c. Octal numbering system. d. Hexadecimal numbering system.	3	J. Identify and discuss various career opportunities in the world's largest industry - field of electronics.
SYMBOLS AND GATES a. Cover all type of electronic symbols b. Cover all type of gates that are used in building electronic circuits c. Discuss electronic equations	5	
SOLDERING a. Use of solder. b. Practice soldering experience. c. Soldering tie-points. d. Soldering on PC boards.	10	
OHMS LAW a. "Big three" in electronics. b. Relationship between current, voltage, and	6	

<p>students will be able to construct basic electronic circuits for a specific outcome.</p>	<p>drawing as homework or in class projects to be constructed as electronic circuits.</p> <p>1.b. Verify that the electronic circuits are properly constructed.</p> <p>1.c. Test the electronic circuits and check the desired outcomes.</p> <p>PASS: outcome observed NEEDS TO IMPROVE: outcome not observed</p> <p>Desired Outcome: 80% or more passing</p> <p>Embedded assessment in final exam.</p> <p>Desired Outcome: 70% of class should attain 75% or above.</p>		<p>Out of 30 students, 90% passed the SLO</p>	
<p>2. Given various types of gates and symbols, students will be able to distinguish the meaning and the purpose of each symbol and gate.</p> <p>SLO REVIEWED 11/14/09 GY</p>			<p>Fall 2010</p>	

2. REQUIRED TEXTS:

Provide a representative list of textbooks and other required reading; include author, title and date of publication:

Electricity, 10th Edition; Howard H. Gerrish, Dugger and Delucca; 2009

3. READING ASSIGNMENTS:

Provide a representative list of textbooks and other required reading; include author, title and date of publication:

Read the textbook to prepare for the class and complete all assigned work. Outside reading is always encouraged to broaden the knowledge in subject area. Students will read articles on electronics in popular electronics magazines and journals.

4. WRITING ASSIGNMENTS:

Writing assignments, as required by Title 5, in this course may include, but are not limited to the following:

Tests that include short, one- or two-paragraph, essay question answers.

5. REPRESENTATIVE OUTSIDE ASSIGNMENTS (HOMEWORK):

Out of class assignments (Homework) may include, but are not limited to the following:

Students will investigate and report on career choices in electronics, research data sheets on solid-state components, and read articles on electronics in popular electronics magazines and journals.

6. REPRESENTATIVE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING:

Provide examples of assignments, as required by Title 5, that demonstrate critical thinking.

Example, students are given a schematic drawing and required to interpret the component symbols and connecting conductors, and analyze the overall drawing in order to construct an electronic circuit.

7. METHODS OF EVALUATION:

Title 5, section 55002 requires grades to be 'based on demonstrated proficiency in subject matter and the ability to demonstrate that proficiency, at least in part, by means of essays, or, in courses where the curriculum committee deems them to be appropriate, by problem solving exercises or skills demonstrations by students.' Methods of evaluation may include, but are not limited to the following (please note that evaluation should measure the outcomes detailed 'Course Objectives' at the beginning of Section II):

Students are given tests that demonstrate the ability to interpret schematic drawings and understand the theory of circuit operation. In addition, they are evaluated on their success in building working electronic circuits and projects.

8. METHODS OF INSTRUCTION:

Please Check All That Apply

- Lecture**
- Discussion**
- Laboratory**
- Activity**
- Field Experience**
- Independent Study**
- Other (Please Explain)**

9. SUPPLIES:

List the supplies the student must provide.

Notebook, pens, ruler, paper, etc. Basic hand tools, such as a soldering iron, needle nose pliers, side cutters, and set of screwdrivers.

10. COMPUTER COMPETENCY:

If applicable, explain how computer competency is included in the course.

N/A

11. INFORMATION COMPETENCY:

If applicable, explain how information competency is included in the course.

N/A

12. DIVERSITY:

If applicable, explain how diversity (e.g., cultural, gender, etc.) is included in the course.

N/A

13. SCANS COMPETENCIES:

(required for all courses with vocational TOP Codes; recommended for all courses)

SCANS (Secretary's Commission on Necessary Skills) are skills the Department of Labor identified, in consultation with business and industry leaders, which reflect the skills necessary for success in the workplace. Check the appropriate boxes to indicate the areas where students will develop the following skills (please note that all SCANS competencies do not apply to all courses):

RESOURCES

- Managing Time:** Selecting relevant goal-related activities, ranking them in order of importance, allocating time to activities, and understanding, preparing and following schedules.
- Managing Money:** Using or preparing budgets, including making cost and revenue forecasts; keeping detailed records to track budget performance, and making appropriate adjustments.
- Managing Material and Facility Resources:** Acquiring, storing, allocating, and distributing materials, supplies, parts, equipment, space or final products in order to make the best use of them.

INTERPERSONAL

- Participating as Member of a Team:** Working cooperatively with others and contributing to group's efforts with ideas, suggestions and effort.
- Teaching Others New Skills:** Helping others learn needed knowledge and skills.

Exercising Leadership: Communicating thoughts, feelings, and ideas to justify a position, encouraging, persuading, convincing or otherwise motivating an individual or group, including responsibly challenging existing procedures, policies or authority.

Negotiating: Working toward agreement that may involve exchanging specific resources or resolving divergent interests.

Working with Cultural Diversity: Working well with men and women and with people from a variety of ethnic, social, or educational backgrounds.

INFORMATION

Acquiring and Evaluating Information: Identifying a need for data, obtaining the data from existing sources or creating them, and evaluating their relevance and accuracy.

Organizing and Maintaining Information: Organizing, processing and maintaining written or computerized records and other forms of information in a systematic fashion.

Interpreting and Communicating Information: Selecting and analyzing information and communicating the results of others, using oral, written, graphic, pictorial, or multimedia methods.

Using Computers to Process Information: Employing computers to acquire, organize, analyze and communicate information.

SYSTEMS

Understanding Systems: Knowing how social, organizational and technological systems work and operating effectively with them.

Monitoring and Correcting Performance: Distinguishing trends, predicting impacts of actions on system operations, diagnosing deviations in the functioning of a system/organization, and taking necessary steps to correct performance.

Improving or Designs Systems: Making suggestions to modify existing systems in order to improve the quality of products or services and developing new or alternative systems.

TECHNOLOGY

Selecting Technology: Judging which sets of procedures, tools or machines, including computers and their programs, will produce the desired results.

Applying Technology to Tasks: Understanding overall intent and proper procedures for setting up and operating machines, including computers and their reprogramming systems.

Maintaining and Troubleshooting Equipment: Preventing, identifying, or solving problems with equipment, including computers and other technologies.

Section III: RELATIONSHIP TO COLLEGE PROGRAMS

1. THIS COURSE WILL BE AN APPROVED REQUIREMENT FOR AN APPROVED ASSOCIATE DEGREE OR CERTIFICATE PROGRAM: Yes

a. If yes, the course will be a requirement portion of the 'approved program' listed on the State Chancellor's Inventory of Approved Programs (approved programs can be found on the State Chancellor's Office website at <https://misweb.cccco.edu/webproginv/prod/invmenu.htm>)

Electronics Technology AS - Program: 093400 State ID: 02868

2. GENERAL EDUCATION REQUIREMENTS FOR THE ASSOCIATE DEGREE STATUS:

a. Area Requested: None

Approval Date:

If applicable, provide an explanation of how the course meets the General Education parameters for one of the five general education areas - Natural Sciences, Social and Behavioral Sciences, Humanities, Language and Rationality, Health and Physical Education -- contained in Board Rule 6201.14 -General Education Requirements. http://marlin.laccd.edu/district/BoardRules_AdmRegs/boardrules.htm

b. Area Requested: None

Approval Date:

If applicable, provide an explanation of how the course meets the General Education parameters for one of the five general education areas - Natural Sciences, Social and Behavioral Sciences, Humanities, Language and Rationality, Health and Physical Education -- contained in Board Rule 6201.14 -General Education Requirements. http://marlin.laccd.edu/district/BoardRules_AdmRegs/boardrules.htm

Section IV: ARTICULATION INFORMATION

(Complete in consultation with College Articulation Officer)

1. TRANSFER STATUS:

a. Transferable to the University of California: No b. UC Approval Date:	c. Transferable to the California State University: Yes d. College Approval Date: before 1980
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2. GENERAL EDUCATION FOR TRANSFER:

<p><i>IGETC Certification</i></p> <p>a. Area Requested: b. Date Requested: c. IGETC Approval Date:</p> <p>If applicable, provide an explanation of how the course meets the appropriate General Education parameters, as defined in IGETC Certification Guidelines.</p> <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 10px;"></div>	<p><i>CSU Certification</i></p> <p>a. Area Requested: b. Date Requested: c. CSU Approval Date:</p> <p>If applicable, provide an explanation of how the course meets the appropriate General Education parameters, as defined in CSU Certification Guidelines.</p> <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 10px;"></div>
<p>a. 2nd Area Requested: b. Date Requested: c. IGETC Approval Date:</p> <p>If applicable, provide an explanation of how the course meets the appropriate General Education parameters, as defined in IGETC Certification Guidelines.</p> <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 10px;"></div>	<p>a. 2nd Area Requested: b. Date Requested: c. CSU Approval Date:</p> <p>If applicable, provide an explanation of how the course meets the appropriate General Education parameters, as defined in CSU Certification Guidelines.</p> <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 10px;"></div>

3. MAJOR REQUIREMENT FOR TRANSFER: N/A

Will this course be articulated to meet lower division major requirements?:

List college/university and the majors:

CAN NUMBER: **CAN SEQUENCE #: N/A**

CAN Approval -

Date requested: Date approved:

Section V: SUPPLEMENTAL COURSE INFORMATION

1. **DEPT/DIVISION NAME:** Business
2. **DEPT/DIVISION CODE:** 03
3. **SUBJECT CODE:** 346
4. **SUBJECT ABBREVIATION:** ELECTRN
5. **RECOMMENDED MINIMUM QUALIFICATION AREA:**
6. **ABBREVIATION FOR TRANSCRIPTS:** INTRO TO ELECTRONICS
7. **DEGREE CREDIT:**

Indicate whether the course meet the 'standards for approval' for degree credit course set forth in Title 5, section 55002(a)(2), which requires the course to have a degree of intensity, difficulty, and vocabulary that the curriculum committee has determined to be at the college level: **Degree Applicable**

8. **GRADING METHOD:** LETTER GRADE
9. **REPETITIONS:** # of times repeated for credit: **0**

If this course is repeatable, explain how repetition of this course meets Title 5, section 55041(c)(2)(B):

10. **PRIOR TO TRANSFERABLE LEVEL:**

This course attribute applies to **English, Writing, ESL, reading and mathematics** courses ONLY. If applicable, indicate how many levels below the transferable level this course should be placed: **Not applicable**

11. **CREDIT BASIC SKILLS:**

Title 5, section 55000(j) defines basic skills as 'courses in reading, writing, computation, and English as a Second Language, which are designated as non-degree credit courses pursuant to Title 5, section 55002(b).': **No**

12. **CROSS REFERENCE:**

Is this course listed as equivalent in content to existing College/District courses in another discipline?: **No**

If Yes, list courses (documentation of cross-discipline agreement must be provided):

13. **COURSE SPECIFICALLY DESIGNED FOR STUDENTS W/ DISABILITIES:**

Title 5, section 56029 allows a course to be repeatable when continuing success of the students with disabilities is dependent on additional repetitions of a specific class. Is this course designated as an 'approved special class' for students with disabilities?: **No**

If yes, provide an explanation of how this course meets the requirements of Title 5, section 56029:

14. COOPERATIVE EDUCATION STATUS:

Title 5, section 55252 allows for two types of Cooperative Education: 1) General Work Experience Education -- i.e., supervised employment, which is intended to assist students in acquiring desirable work habits, attitudes and career awareness, which need not be related to the students' educational goals; or 2) Occupational Work Experience Education - - i.e., supervised employment, extending classroom based occupational learning at an on-the-job learning station, which is related to the students' educational or occupational goal. Is this course part of the college's approved cooperative work experience education program?: **No**

15. COURSE CLASSIFICATION: Occupational

Note: A course's Classification, TOP Code and SAM code must be aligned: e.g., Courses with an 'Occupational' Course Classification must have an 'Occupational' TOP Code and a SAM Code of A, B, C, or D; courses that do not have an 'Occupational' Course Classification cannot have an Occupational TOP Code and must have an 'E' SAM Code. Courses coded as 'basic skills' in #11 should be coded 'Adult and Secondary Basic Skills.'

16. TOP CODE - (6 digits XXXX.XX): 0934.00

Course content should match discipline description in Taxonomy of Programs found at <http://ecd.laccd.edu/TaxonomyOfPrograms.doccurriculum.htm>

17. SAM CODE (Student Accountability Model): D

18. FUNDING AGENCY CODE:

19. STATE COURSE ID:

Section VI: APPROVAL STATUS

1. APPROVAL STATUS:

		Approval Date Of	Board Date	Requested Effective Semester	Approved Effective Semester
a.	<input type="checkbox"/> New Course	College:	Board:	Effective Semester:	Effective Semester:
b.	<input type="checkbox"/> Addition of Existing District Course	College:	Board:	Effective Semester:	Effective Semester:
c.	<input checked="" type="checkbox"/> Course Change*	College: 11/17/09		Effective Semester: Fall 2009	Effective Semester:
d.	<input checked="" type="checkbox"/> Outline Update	College: 11/17/09			Effective Semester:
e.	<input type="checkbox"/> New Course	College:		Effective Semester:	Effective Semester:
f.	<input type="checkbox"/> New Course	College:	Board:	Effective Semester:	Effective Semester:

* Changes to a course require the completion of a 'Course Change Request' form and approval by the college's Curriculum Committee. In some cases districtwide approval is also required; see, Administrative Regulation E-65, section 3(c) for details.

Section VII: APPROVAL INFORMATION FOR NEW OR ADDED COURSES

(complete in consultation with Department Chair and the appropriate Academic Administrator)

1. **ORIGINATOR: EI-khoury, Naja**

2. **DEPARTMENT: 03**

3. **IF THIS IS A NEW COURSE, INDICATE HOW THE COLLEGE PLANS TO MEET THE EXPENSE OF THIS COURSE:**

By additional funds. Describe:

By deleting courses from the college catalog and course database. List specific courses to be deleted:

By deleting sections of existing course. List courses and number of sections to be deleted:

FIRST YEAR: SECOND YEAR: THIRD YEAR:

By rotating sections of existing courses. List courses and number of sections to be rotated, as well as the semesters in which they will be offered:

4. **IMPACT**

IMPACT -- Will this course directly impact other course offerings and/or associate degree or certificate programs on campus? No (If yes, briefly explain how)

5. **METHOD OF SUPPORT**

-- Indicate how the college plans to support the proposed course:

Additional staff -- List additional staff needed:

Classroom -- List classroom type needed:

Equipment -- List new equipment needed and indicate funding source for any new equipment:

Supplies- List supplies and indicate dollar value:

Library/Learning Resources- The course initiator shall consult with the College Librarian and review the college library, book, periodical, and electronic resource collections relevant to this course. List additional titles and resources to be considered for purchase as funding permits:

Teach Yourself Electricity and Electronics by Stan Gibilisco Getting Started in Electronics by Forrest Mims III Electronics for Dummies by Gordon McComb
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CERTIFICATION AND RECOMMENDATION

- This course meets Title 5 requirements for Associate Degree applicable college credit towards an Associate Degree.
- This course meets Title 5 requirements but does not satisfy the requirements for an Associate Degree applicable course.

We certify that the information and answers above properly represent this course.

Nouha Toure / N. El Khoury	11/17/2009
Originator	Date
Nouha Toure	11/17/2009
Department/Cluster Chairperson	Date
Linda Larson-Singer	11/17/2009
Articulation Officer	Date
Ramon Miramontes	11/17/2009
Librarian	Date
Elmer Bugg	11/17/2009
Dean (if applicable)	Date
Linda Larson-Singer	11/17/2009
Curriculum Committee Chairperson	Date
Allison Moore	11/24/2009
Academic Senate President	Date
Mary Callahan	12/08/2009
Vice President, Academic Affairs	Date

Section VIII: ADDENDA

(Uploaded Documents)

SLO Rubric	Grading Rubrics	<u>RubricsElectronics 2.docx</u>
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Electronics 2 – Rubrics – Grading the SLOs

➔ Grading

The final grade is to be awarded to each enrolled student in accordance with the 4.00 grading system shown below:

Term grades will be determined as follows:

<u>Grade Points</u>	<u>Grade</u>	<u>Percentage</u>	<u>Qualitative Description</u>
4.00	A	90-100%	Student performs consistently at the highest level
3.00	B	80-89%	Student performs consistently at a high level
2.00	C	70-79%	Student performs competently most of the time
1.00	D	60-69%	Student performs at a minimally competent level
0.00	F	Below 60%	Student does not perform at a minimal level