

# Commercial Electrical Design Certificate

This three semester certificate provides the student the basic skills needed for employment as an electrical design technician for commercial electrical projects. The electrical design process for commercial construction includes design for three-phase electrical services, feeders, branch circuits, appliances, lighting, communication/data, fire safety, motors and control circuits.

## Suggested/Sample Course Sequence

The sequence taken by the student may vary depending on prerequisites, course availability, and personal/ professional responsibilities.

(Major Code 5060; State CIP Code 46.0302)

- Gainful Employment Data (<http://www.jccc.edu/electrical-tech/ge-commercial-design/gedt.html>) (link opens in a new window)
- Electrical Technology (<http://www.jccc.edu/electrical-tech>)

### First Semester

DRAF 120	Introduction to Drafting	2
DRAF 130	Introduction to CAD Concepts - AutoCAD*	3
MATH 130	Technical Mathematics I*	3
ELTE 123	Electromechanical Systems	4
Total Hours		12

DRAF 120 and DRAF 130 are 8-week courses and are offered consecutively in the same semester, same time and days.

### Second Semester

ELTE 200	Commercial Wiring Methods*	4
ENGL 121	Composition I*	3
DRAF 230	Intermediate CAD: AutoCAD*	3
ELTE 122	National Electrical Code I	4
Total Hours		14

### Third Semester

ENGL 123	Technical Writing I*	3
DRAF 250	Electrical Drafting*	3
ELTE 202	Electrical Estimating*	3
Total Hours		9

**Total Program Hours: 35**

## Courses

### ELTE 122 National Electrical Code I (4 Hours)

This is an introductory course on the use and interpretation of the current National Electrical Code. Students should develop a working knowledge of the code that will permit them to apply it to everyday applications. Upon successful completion of this course, the student should be able to use the code to design service entrances, feeders and branch circuits and discern between wiring methods used in different occupancies. 4 hrs. lecture /wk.

### ELTE 123 Electromechanical Systems (4 Hours)

Upon successful completion of this course, the student should be able to identify electrical components and their relationships to the various repair and troubleshooting techniques. The materials in this course will prove useful to service technicians whose background in electricity is limited. The course includes material from basic electrical theory to troubleshooting complex electrical circuits. This course will provide practice in the application of electrical theory as well as in the interconnection of components of heating and cooling systems. The student will be required to provide ANSI Z87 safety glasses and may be expected to provide other basic hand tools and/or equipment. This is a beginning course in electrical theory that is required for HVAC, electrical and power plant technology but is appropriate for all interested students. Common components found in the HVAC industry are used to develop these skills. 3 hrs. lecture, 3 hrs. lab/wk.

**ELTE 125 Residential Wiring Methods\* (4 Hours)****Prerequisites or corequisites:** HVAC 123 or ELTE 123

This is an introductory course on residential wiring methods that includes practical application and hands-on experience in implementing the code requirements. Upon successful completion of this course, the student should acquire the necessary skills to wire a residence to meet the minimum requirements as set forth in the current National Electrical Code for residential occupancies. The student will be required to provide ANSI Z87 safety glasses and may be expected to provide other basic hand tools and/or equipment. 3 hrs. lecture, 3 hrs. lab/wk.

**ELTE 200 Commercial Wiring Methods\* (4 Hours)****Prerequisites or corequisites:** HVAC 123 or ELTE 123

This course covers commercial wiring methods. Upon successful completion of this course, the student should be able to read commercial blueprints and apply the current National Electrical Code to commercial wiring systems. The student will gain working knowledge and hands-on experience with commercial wiring techniques. The student will be required to provide ANSI Z87 safety glasses and may be expected to provide other basic hand tools and/or equipment. 3 hrs. lecture, 3 hrs. lab/wk.

**ELTE 202 Electrical Estimating\* (3 Hours)****Prerequisites:** ELTE 122 and ELTE 125 or ELTE 200 or department approval

Upon successful completion of this course, the student should be able to manually and electronically (using industry standard computer software) develop an electrical estimate for a residential and commercial design. Emphasis will be placed on compiling a take-off list of materials from blueprints, completing a bill of material and completing the final bid process. This includes a bid accuracy analysis to determine the job's selling price. The student will be able to determine material cost, labor cost, the proper application of direct cost, overhead and profit. Also, to conclude the estimate, the student will be able to write bid proposals and change orders. 2 hrs. lecture, 2 hrs lab/wk.

**ELTE 205 Industrial Electrical Wiring\* (4 Hours)****Prerequisites:** ELTE 122 or ELTE 125 or ELTE 200

This advanced course covers industrial wiring methods. Upon successful completion of this course, the student should be able to read industrial blueprints and apply the current National Electrical Code to industrial wiring systems. The student will gain working knowledge and hands-on experience with industrial wiring techniques. The student will be required to provide ANSI Z87 safety glasses and may be expected to provide other basic hand tools and/or equipment. 3 hrs. lecture, 3 hrs. lab/wk.

**ELTE 210 Code Certification Review\* (3 Hours)****Prerequisites:** ELTE 122

Upon successful completion of this course, the student should be able to use the current National Electrical Code to do calculations involving loads, lighting and circuit sizing. The course will cover typical load calculations used in both residential and commercial settings. The student should also be able to interpret and apply the National Electrical Code rules to special wiring systems including Hazardous Locations, Elevators, Remote-control circuits and Fire Alarm systems. 3 hrs. lecture/wk.

**ELTE 215 Generators, Transformers and Motors\* (4 Hours)****Prerequisites:** ELTE 123 and one of the following: ELTE 122 or ELTE 125 or ELTE 200 or equivalent experience and department approval

This is an advanced course on the use of generators, transformers and motors. Upon successful completion of this course, the student should be able to interpret and apply the rules of the current National Electrical Code to wiring systems composed of these electrical components. Also, the student will gain a working knowledge of the theory of these single-phase and 3-phase electrical components and their practical applications in everyday use in the electrical industry. 4 hrs. lecture/wk.

**ELTE 271 Electrical Internship I\* (3 Hours)****Prerequisites:** department approval

Upon successful completion of this course, the student should be able to apply classroom knowledge to an actual work situation. The internship will provide advanced students with on-the-job experience under the supervision of professionals in the industry. The work will be developed cooperatively with area employers, college staff and each student to provide a variety of actual job experiences directly related to the student's career goals. 1 hr. lecture, minimum 15 hrs. on-the-job training/wk.

**ELTE 291 Independent Study\* (1-7 Hour)****Prerequisites:** 2.0 GPA minimum and department approval

Independent study is a directed, structured learning experience offered as an extension of the regular curriculum. It is intended to allow individual students to broaden their comprehension of the principles of and competencies associated with the discipline or program. Its purpose is to supplement existing courses with individualized, in-depth learning experiences. Such learning experiences may be undertaken independent of the traditional classroom setting, but will be appropriately directed and supervised by regular instructional staff. Total contact hours vary based on the learning experience.