LONG BEACH CITY COLLEGE

ELECTRICAL TECHNOLOGY

Curriculum Guide for Academic Year 2011-2012

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Students planning to **transfer** to a four-year college or university should refer to the ASSIST web site at www.assist.org and **consult a counselor** before beginning a program of study. To meet with a counselor call 562-938-4561 for the LAC, or (562) 938-3920 for PCC. Students may also wish to visit the Transfer Center on either campus.

Program Admission Requirements

While there are no requirements for admission, the department recommends the following:

1. Completion of the Math, English and Reading Assessment testing prior to enrollment. To schedule an assessment test call 562-938-4049

2. For students enrolled in the night program, the successful completion of ELECT 202 Electrical Mathematics prior to enrollment in ELECT 204 is recommended. If that is not possible, then the student *must* be concurrently enrolled in ELECT 202, ELECT 204 and ELECT 210A for the first semester in the Electrical Program. Students have the option to obtain credit by exam for ELECT 202 Electrical Mathematics. Students may also apply college Algebra and Trigonometry classes for credit in ELECT 202 and/or ELECT 225.

3. To accommodate changes in employment, students will be allowed to switch from day or evening programs with instructor and Department Head approvals. Students are encouraged to confer with the instructor of this major field of concentration during the first week of the semester to insure they are enrolled in the proper courses to meet their educational objectives

4. This program recommends a minimum qualification from the assessment testing for ENGL 801A and READ 881.

5. Electrical Code Classes are not to be taken prior to completion of ELECT 204 or ELECT 200A.

6. A valid CPR card or concurrent registration in a CPR class is suggested while enrolled in Electricity courses.

See next page for Associate Degree Requirements

Program of study leading to:
Associate in Science (A.S.) Degree

DAY PROGRAM

The following sequence of classes is the order recommended for day students. The length of time to complete the program will depend upon how many classes the student takes each semester. Electives may be taken anywhere in the sequence as long as the prerequisites for the course have been met.

				UNITS	In Progress	Completed Grade
REQUIRED COURSES (listed below in recommended sequence)						
	ELECT 253	OSHA Standards for Construction Safety		2		
	ELECT 200A	First Semester Industrial Electricity		8		
†*	ELECT 225	Algebra and Trigonometry for Electricians		4		
†	ELECT 200B	Second Semester Industrial Electricity		8		
†	ELECT 200C	Third Semester Industrial Electricity		8		
†	ELECT 435A	Electrical Motor control 1		2		
†	ELECT 200D	Fourth Semester Industrial Electricity		8		
			Subtotal Units	**40**		

				UNITS		
IN ADDITION, complete FIVE (5) UNITS from the following courses:						
	CISCO 250	Network Cabling Installation		3		
	CISCO 251	Introduction to Networking		3		
	ELECT 41	Technical Applications of Minicomputers		2		
†	ELECT 224	Electrical Motors and Transformers		3		
†	ELECT 226	Solid State Fundamentals for Electricians		3		
†	ELECT 227	D.C. and A.C. Variable Speed Drives		3		
†	ELECT 229	Industrial Drive Systems		3		
	ELECT 230A	Robotics Technology-Design		3		
	ELECT 230B	Robotics Technology-Integration		3		
	ELECT 230C	Robotics Technology-Applications		3		
†	ELECT 242	Electrical Code – Grounding		1.5		
	ELECT 261	Introduction to Renewable Energy		3		
†	ELECT 262	Solar 1 – Grid-Tied Solar Photovaltics		3		
†	ELECT 263	Solar 2 – Advanced Solar Photovaltics		3		
	ELECT 271	Electrical Cost Estimating		3		
	ELECT 275	Electrical Pipe Bending (A)		0.5		
†	ELECT 276	Electrical Pipe Bending (B)		0.5		
†	ELECT 277	Blueprint Reading for Electricians		3		
	ELECT 280	Traffic Signal Systems 1		3		
†	ELECT 284	Traffic Signal Controllers & Digital Systems		3		
†	ELECT 435B	Electrical Motor Control 2		2		
			Subtotal Units	**5**		
			TOTAL UNITS	**45**		

For both the Day and Night programs, the following is **REQUIRED for the NATURAL SCIENCES** requirement:
Complete any one course (3 units minimum) appearing on the current CSU-GE Breadth List (Plan B) in areas B1, B2, or B3.

Associate Degree requirements continue on the following page:

Associate Degree requirements continued from the previous page:

NIGHT PROGRAM

The following sequence of classes is the order recommended for night students. The length of time to complete the program will depend upon how many classes the student takes each semester. Electives may be taken anywhere in the sequence as long as the prerequisites for the course have been met.

	REQUIRED COURSES (listed below in recommended sequence)		**UNITS**	**In Progress**	**Completed Grade**
	ELECT 202	Electrical Mathematics	3		
	ELECT 253	OSHA Standards for Construction Safety	2		
	ELECT 204	First Semester Fundamentals of D.C.	3		
	ELECT 210A	Laboratory Practices 1	1		
		(204 & 210A must be taken concurrently)			
†	ELECT 225	Algebra & Trigonometry for Technicians	4		
†	ELECT 209	Second Semester Fundamentals of Motors/Generators	3		
†	ELECT 210B	Laboratory Practices 2	1		
		(209 & 210B must be taken concurrently)			
†	ELECT 240	Electrical Code - Residential	3		
†	ELECT 212	Third Semester Fundamentals of AC Electricity	3		
†	ELECT 210C	Laboratory Practices 3	1		
		(212 & 201C must be taken concurrently)			
†	ELECT 435A	Electric Motor Control 1	2		
†	ELECT 214	Fourth Semester AC Principles and Pract	3		
†	ELECT 210D	Laboratory Practices 4	1		
		(214 & 210D must be taken concurrently)			
†	ELECT 245	Electrical Code – Commercial	3		
†	ELECT 250	Electrical Code – Industrial	3		
†	ELECT 242	Electrical Code – Grounding	1.5		
		Subtotal Units	**37.5**		

	IN ADDITION, complete SEVEN & ONE HALF (7.5) UNITS from the following		**UNITS**		
	CISCO 250	Network Cabling Installation	3		
	CISCO 251	Introduction to Networking	3		
	ELECT 41	Technical Applications of Minicomputers	2		
†	ELECT 224	Electrical Motors and Transformers	3		
†	ELECT 226	Solid State Fundamentals for Electricians	3		
†	ELECT 227	D.C. and A.C. Variable Speed Drives	3		
†	ELECT 229	Industrial Drive Systems	3		
	ELECT 230A	Robotics Technology-Design	3		
	ELECT 230B	Robotics Technology-Integration	3		
	ELECT 230C	Robotics Technology-Applications	3		
	ELECT 261	Introduction to Renewable Energy	3		
†	ELECT 262	Solar 1 – Grid-Tied Solar Photovoltaics	3		
†	ELECT 263	Solar – Advanced Solar Photovoltaics	3		
†	ELECT 271	Electrical Cost Estimating	3		
	ELECT 275	Electrical Pipe Bending (A)	0.5		
†	ELECT 276	Electrical Pipe Bending (B)	0.5		
†	ELECT 277	Blueprint Reading for Electricians	3		
	ELECT 280	Traffic Signal Systems 1	3		
†	ELECT 284	Traffic Signal Controllers & Digital Systems	3		
†	ELECT 435B	Electrical Motor Control 2	2		
		Subtotal Units	**7.5**		
		TOTAL UNITS	**45**		

For both the Day and Night programs, the following is **REQUIRED for the NATURAL SCIENCES** requirement:
Complete any one course (3 units minimum) appearing on the current CSU-GE Breadth List (Plan B) in areas B1, B2, or B3.

Associate Degree requirements continued from the previous page:

Math courses listed under the General Education Pattern for CSU Transfers (Plan B) will be accepted as a substitute for the field of concentration courses in the event the college cancels, or does not offer classes required by the field of concentration. To qualify for this option the student must have been continuously enrolled as defined by college policy, as shown in the catalog.

For graduation with an **Associate in Science (A.S.) Degree with a major in Electrical Technology:**

1. **Units**: Complete a minimum of 60 units, distributed as follows:

Electrical Technology Major:	45 units
General Education/A.S.	19 units
Electives/Other courses:	0 units
TOTAL:	64 units

2. **Scholarship:** Maintain an **overall grade point average (GPA) of 2.0** ("C" average) based on all accredited college work applied to the degree, no matter where completed. For this **field of concentration, complete each course above** with a **grade of "C" or better**, or "P" if course is graded on a P/NP basis.
3. **Residence for the Degree:** Complete at least 30 units of the required 60 in residence at LBCC, or complete in residence at LBCC at least 20 units within the last 30 units of work applied to the degree.
4. **Residence for the Field of Concentration**: Complete fifty percent (50%) or more of the unit requirements for this field of concentration in residence; this means at **least 23 units** of the required 45 must be **completed at Long Beach City College**. Credit earned by exam, where applicable, may be included.
5. **General Education and Proficiency Requirements:** Complete the required A.A./A.S. General Education and Proficiency requirements*, otherwise known as "Plan A". For Plan A requirements, refer to the general catalog or view it online at http://osca.lbcc.edu .
6. Complete and submit the degree application form to the Admissions and Records office during your final semester of course work. These forms are available in the Admissions and Records office, or online at http://admissions.lbcc.edu/ . Refer to the Schedule of Classes (http://schedule.lbcc.edu) and click the "Important Dates" link to view the actual deadline for each semester.

*The requirements for general education/proficiency and the field of concentration (major) need to be from the same catalog year. This catalog year may be any year between the year of initial enrollment to the present, provided continuous enrollment is maintained throughout. See the catalog for definition of "continuous enrollment".

Unless otherwise noted, "double-counting" is not allowed. That is, one course may not be used to fulfill both a field of concentration requirement and to fulfill a general education requirement.

Program of study leading to:
Certificate of Achievement

REQUIRED COURSES—Complete the 45 units of required courses as listed in the Associate Degree requirements box on the preceding pages.

REQUIRED COURSES		In Progress	Completed
TOTAL UNITS	**45**		

For graduation with a **Electrical Technology Certificate of Achievement:**

1. Complete each of the **REQUIRED COURSES** listed above with a **minimum grade of** "**C**" or better, or P if the course is grade on a P/NP basis.
2. Complete fifty percent (50%) or more of the unit requirements for this field of concentration in residence; this means at **least 23 units** of the required 45 must be **completed at Long Beach City College**. Credit earned by exam, where applicable, may be included.
3. Complete and submit the certificate application form to the Admissions and Records office during your final semester of course work. These forms are available in the Admissions and Records office, or online at http://admissions.lbcc.edu/ . Refer to the Schedule of Classes (http://schedule.lbcc.edu) and click the "Important Dates" link to view the actual deadline for each semester

For both the **Associate in Arts** and the **Certificate of Achievement**, the following courses are recommended, **BUT ARE NOT REQUIRED** to earn either.

RECOMMENDED but not required courses:

LEARN 11	Learning & Academic Strategies	2		
ELECT 41	Technical Applications of Minicomputers	2		

Program of study leading to:

Certificates of Accomplishment

Certificate: Network Cabling Specialist 4089

REQUIRED COURSES		UNITS	In Progress	Completed Grade
CISCO 250	Network Cabling Installation	3		
	TOTAL UNITS	**3**		

Certificate: Network Installation 4090

REQUIRED COURSES		UNITS	In Progress	Completed Grade
CISCO 250	Network Cabling Installation	3		
CISCO 251	Introduction to Networking	3		
	TOTAL UNITS	**6**		

Certificate: Network Installation and Design 4091

REQUIRED COURSES		UNITS	In Progress	Completed Grade
CISCO 250	Network Cabling Installation	3		
CISCO 251	Introduction to Networking	3		
CISCO 252	Routing and Access Control	3		
CISCO 253	Cisco Networking III, LAN	3		
	TOTAL UNITS	**12**		

Certificate: Traffic Signals Systems 1 4029

REQUIRED COURSES		UNITS	In Progress	Completed Grade
ELECT 280	Traffic Signals Systems 1	3		
ELECT 284	Traffic Signal Controllers & Digital Systems	3		
	TOTAL UNITS	**6**		

Certificate: Solar Photovoltaics Installation and Design 4920

REQUIRED COURSES		UNITS	In Progress	Completed Grade
ELECT 261	Introduction to Renewable Energy	3		
ELECT 262	Solar 1 – Grid-Tied Solar Photovoltaics	3		
ELECT 263	Solar 2 – Advanced Solar Photovoltaics	3		
	TOTAL UNITS	**9**		

For graduation with a **Certificate of Accomplishment:**

1. Complete the above required units with a minimum grade point average of 2.0 ("C" average).
2. Fifty percent (50%) or more of the required units must be completed in residence at LBCC.
3. Complete and submit the certificate application form to the Admissions and Records office during your final semester of course work. These forms are available in the Admissions and Records office, or online at http://admissions.lbcc.edu/ .

Career Opportunities

Students prepare for entry-level employment in numerous electrical and electrically related trades. Upon completion of the Electrical Technology program, the student will be able to install, maintain, and repair electrical equipment and systems in a safe and workmanlike manner. The California Contractor's License requirements recognize the courses listed below as partial fulfillment of the experience requirements. This program also meets the standards set by the California Department of Apprenticeship Standards towards the current California Electrician Certification testing. Once a student has completed the program, that student will be allowed to register to take the Electrician's Certification Exam.

California Division of Apprenticeship Standards Approved School: #101

Program Mission and Outcomes

The mission of the Electrical Department is to educate its students in all areas of Industrial Electrical Technology in response to the needs of industry National Electrical Code standards.

Outcomes:

- Analyze different types of power distribution systems and apply these systems in a design environment.
- Design commercial building blueprint design project applying motor, transformer, power distribution, short-circuit calculations, and lighting systems meeting all the requirements of the National Electrical Code.

Legend

† This course has a prerequisite. Prerequisite courses must be complete with at least a "C" or "P" grade. Refer to the General Catalog (http://www.lbcc.edu/cat/index.html), the Schedule of Classes (http://schedule.lbcc.edu/), or the online Credit Course Outline (http://wdb-asir.lbcc.edu/coursecurriculum/coursedetails/) for specific prerequisite information.

* This course is an exception to the "double-counting" rule; it may be double-counted.