

**STATE UNIVERSITY OF NEW YORK %
COLLEGE OF TECHNOLOGY %
CANTON, NEW YORK %**



**MASTER SYLLABUS
ELEC 161 – ELECTRONIC FABRICATIONS**

Prepared By: David W Hartle
Updated By: Stephen Frempong

**CANINO SCHOOL OF ENGINEERING TECHNOLOGY !
ELECTRICAL ENGINEERING TECHNOLOGY & ENGINEERING SCIENCE !
DEPARTMENT !
FALL 2018 !**

A. % **TITLE:** ELECTRONIC FABRICATIONS

B. % **COURSE NUMBER:** ELEC 161

C. % **CREDIT HOURS:** (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

Credit Hours: 2 !

Lecture Hours: 1 per week %

Lab Hours: 2 per week %

Other: per week

Course Length: 15 Weeks

D. % **WRITING INTENSIVE COURSE:** No

E. **GER CATEGORY:** NONE

F. % **SEMESTER(S) OFFERED:** Fall

G. **COURSE DESCRIPTION:** Stresses practical fabrication techniques used in electronic and communication industries. Procedures focus on the basics of hand soldering, wiring, installing, testing and troubleshooting methods used in assembly and repair of electronic equipment. Topics include terminating voice, video, and data cables and also design and fabrication of a single sided printed circuit board.

H. % **PRE-REQUISITES/CO-REQUISITES:** “none”

I. % **STUDENT LEARNING OUTCOMES:**

Institutional Student Learning Outcome (ISLO’s)

(1) Communication Skills (2) Critical Thinking (3) Foundational Skills

(4) Social Responsibility (5) Industry, Professional, Discipline-Specific Knowledge and Skills.

Accreditation Board for Engineering and Technology ABET- Student Outcomes (a-k)

Course Objectives	ABET-Student Outcomes (a-k)	ISLO’s
a. Define how to properly prepare to solder electronic circuits, practice how to properly care for soldering equipment, and Solder	(a) An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined	(5) Industry, Professional, Discipline-Specific Knowledge and Skills.

printed circuit boards and electronic components.	engineering technology activities.	
b. Perform techniques and processes employed in developing printed circuits boards, Fabricate a printed circuit board, Fabricate voice, video, and data cable terminations.	(c) An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.	(2) Critical Thinking (5) Industry, Professional, Discipline-Specific Knowledge and Skills.

J. APPLIED LEARNING COMPONENT: CLASSROOM/LAB

K. % TEXTBOOK:

1. Quality Hand Soldering and Circuit Board Repair, 6th Edition (H. Smith). Delmar.
2. Data, Voice, and Video Cabling 3rd Edition (Hayes and Rosenberg). Delmar.

L. % REFERENCES: Information sheets and specification sheets distributed in class.

M. % EQUIPMENT: Hand tools -- Diagonal pliers, knife, needle nose pliers.

N. % GRADING METHOD: A-F

O. % SUGGESTED EVALUATION CRITERIA/METHODS: Fabrication projects, Quizzes, Hourly Exams, Graded Laboratory Projects, and Practical Laboratory Experience.

P. % DETAILED OUTLINE - LECTURE

I ! Hand soldering techniques, stripping and tinning stranded wires, through hole component soldering and desoldering.

- A. Soldering Information and Techniques
- B. Preparing and soldering wires
- C. Printed circuit boards, through hole and surface mount components
- D. Desoldering THM and SMT, evaluations.

- II Telephone Wiring, Network Cabling, Video Cabling, Testing wiring and terminations.
 - A. Introduction to Data, Voice and Video Cabling
 - B. Video System Installations
 - C. Telephone Wiring and Network Cabling
 - D. Testing Data, Voice and Video wiring
- III Circuit board prototyping and construction.
 - A. Printed Circuit Boards
 - coatings
 - Layers
 - Resists
 - B. Developers, Etchants, Resists
 - Positive resists
 - Negative resists
 - Direct etch
 - C. Drafting Aids
 - MultiSim
 - Ultiboard
 - D. Chemical Safety and Environmental concern

Q. DETAILED OUTLINE - LABORATORY

WEEK #:	TOPIC:
1	Introduction Solder -- Kinds of Solder -- Flux, Kinds, Purpose/Of -- Fusion Diagram
2	Soldering !-- Soldering Iron -- Techniques -- Tools and Soldering -- Aids
3 - 4	Printed Circuit Board -- Kinds, Purpose

-5-

- Development Techniques
- Photographic Process
- Etching

5-6 Desoldering !

- Through hole !
- Surface mount !
- Single sided and double sided PC boards !

7 ! Technical Writing/Research Paper for an Electronic Fabrication Project !

9 - 10 Telecommunications Voice and Data Systems Survey and Field Trip to an Operations Switch room

11 - 15 Fabrication and Testing of an Electronic Design Project