Wharton County Junior College

Administrative - Master Syllabus
COVER SHEET

***Purpose**: It is the intention of this Administrative-Master Syllabus to provide a general description of the course, outline the required elements of the course and to lay the foundation for course assessment for the improvement of student learning, as specified by the faculty of Wharton County Junior College, regardless of who teaches the course, the timeframe by which it is instructed, or the instructional method by which the course is delivered. It is not intended to restrict the manner by which an individual faculty member teaches the course but to be an administrative tool to aid in the improvement of instruction.*

Course Title –Final Project
Course Prefix and Number – ELMT 2330
Department –Electronics Technology **Division** – Bus. and Technology
Course Type: (check one)

- ☐ Academic General Education Course (from ACGM – but not in WCJC Core)
- ☐ Academic WCJC Core Course
- ☒ WECM course (This course is a Special Topics or Unique Needs Course: Y☐ or N☒)

Semester Credit Hours # : Lecture hours# : Lab/other hours # **3:2:2**

Equated Pay hours for course – 2 + (2 × ½) = **3**

List Lab/ Other Hours
Lab Hours 2
Clinical Hours
Practicum Hours
Other (list)

Course Catalog Description -Principles of electrical/electronic design encompassing schematics wiring diagrams, materials lists, operating characteristics, completion schedules, and cost estimates. The student will be required to plan and develop a project consisting of research, design, layout, construction and operation of an electrical-mechanical project. A formal written report and a demonstration and presentation of process and results is required. This course is intended to provide a Capstone experience for graduating Electronics Technology students.

Prerequisites/Corequisites - Electronics Technology major expecting graduation in the current semester.

Approvals – the contents of this document have been reviewed and are found to be accurate.

Prepared by: David Kercon	Signature	Date 9-24-07
Department Head: David Kercon	Signature	Date 9-24-07
Division Chair	Signature: Stephanie Dees	Date 11/8/07
Vice President: Dr. Ty Pate	Signature: Ty Pate	Date 11/12/07

I. Topical Outline – Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, clinical or other non lecture instruction):

The following performance will be expected of any student completing this course with a passing grade. There is no absolute time limit on the performance of these objectives, unless noted, but the grade received by the student will depend, in part, on the relative speed and precision of the student's performance in these tasks. Where subjective evaluations are indicated, the instructor will make these judgments based on his or her knowledge of the skills required to place a graduate with the expectation of successful on-job performance.
The student will be expected to perform the following tasks in written examination or laboratory demonstration:

Week 1 : Introductions and Project consideration

Week 2 : Begin 1st (mini) project

Week 3 : Complete project 1 with all documentation.

Week 4 : Discuss and finalize major project.

Week 5 : Preliminary design

Week 6 : Obtain parts/assemble prototype

Week 7 : Prototype testing

Week 8 : Design refinement

Week 9-13: Build hardware and test assembly

Week 14-15: Final functionality tests and documentation collection

Week 16 : Project and all documentation Due.

II. Course Learning Outcomes

Course Outcome/Objective	Assessment Method
1. Critical thinking and life long learning. 2. Verbal and Written communication 3. Teamwork 4. Project management 5. Responsibility and ethical work habits 6. Technical knowledge and skills *See attached Rubric and Learning outcomes	Rubric : See attachment

III. Required Text(s), Optional Text(s) and/or Materials to be Supplied by Student.
Departmental handouts, Internet, library, and data book references.

IV. Suggested Course Maximum - 30 lecture, 15 laboratory

V. List any specific spatial or physical requirements beyond a typical classroom required to teach the course.
Lecture facilities for 30 students. Laboratory facilities for 18 students must include 9 bench positions each with a digital meter, logic probe, 50 MHz oscilloscope and probes, breadboarding facility with power supply and signal generator, a comprehensive stock of electronic components, soldering irons, cutting, and drilling equipment..

VI. Course Requirements/Grading System – Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course

This course is intended to provide a capstone experience to electronics majors expecting to graduate in the current year. Individual grades are determined by the quality of final project, individual contributions to the project, and journal submissions.

Rubric: Grade total 100%

80% - Project
Group/Teamwork
Documentation
Presentations
Communication

20% - Individual
Journal Entries
Work Ethic
Attendance
Personal contributions

VII. Curriculum Checklist

☐ - **Academic General Education Course** (from ACGM – but not in WCJC Core)
No additional documentation needed

☐ - **Academic WCJC Core Course**
Attach the Core Curriculum Checklist, including the following:
- Basic Intellectual Competencies
- Perspectives
- Exemplary Educational Objectives

☒ - **WECM Courses**
Attach the following:
- Program SCANS Matrix
- Course SCANS Competencies Checklist

ELMT 2330/Electronics Technology Assessment

Objective: Design, develop and test a capstone electromechanical project.

Students will demonstrate a minimum of 70% proficiency in selecting, designing, building and demonstrating the capstone project.

Objective	0	1	2	3
1. Critical thinking and lifelong learning				
2. Verbal and Written Communication				
3. Teamwork				
4. Project Management				
5. Responsibility and Ethical work habits				
6. Technical Knowledge and skills *****See for more detail				
a. Electronic Fabrication - CETT 1321				
b. DC Circuits – CETT 1403				
c. AC Circuits – CETT 1405				
d. Digital Fundamentals – CETT 1425				
e. Solid State Devices – CETT 1429				
f. Communication Circuits – CETT 2439				
g. Linear Integrated Circuits – CETT 1457				
h. Industrial Electronics – ELMT 2433				
i. Digital Systems – CETT 1449				
j. Microprocessors - CETT 1445				
k. Technical Programming – CETT 1331				
l. Final Project – ELMT 2330				
m. Programmable Logic Controllers – ELMT 1301				
n. Telecommunications – EECT 1303				

Key:
O – Did not do
1 – Attempted objective but did not complete
2 – Objective attempted but results incorrect
3 – Objective completed and requirements met

*** See attached Program Learning Outcomes for more detail on individual categories**.

Program Learning Outcomes:

1. Critical Thinking and Life-Long Learning:

a. Evaluate and assess alternatives where appropriate.
b. Locate appropriate references to assist in acquiring new skills.
c. Understand the rapid pace of advances in the information technology industry.
d. Perform basic math operations and practical math problems.

2. Verbal and Written Communication:

a. Create appropriate documentation with appropriate detail and clarity.
b. Communicate verbally to both technical and non-technical audiences.
c. Accurately interpret verbal and written messages.

3. Teamwork:

a. Recognize the importance of cooperation.
b. Manage a team project.
c. Respect others' work habits, skills, opinions, and cultural differences.

4. Project Management:

a. Assess needs and gather information.
b. Research alternative solutions within a budget.
c. Implement the solution.
d. Test and evaluate for quality assurance.

5. Responsibility and Ethical Work Habits:

a. Recognize the legal implications of actions.
b. Manage time efficiently.
c. Employ secure information management practices.
d. Demonstrate professionalism.
e. Recognize the importance of attendance and timeliness.

6. Technical knowledge and Skills:

a. Apply modern electronic circuit fabrication techniques ensuring quality standards.

a. Develop documentation including step-by-step procedures, schematic/wiring diagrams, and theory of circuit description.

a. Identify the tools required to produce a printed circuit board and a good solder connection.

a. Apply safety techniques while working on and troubleshooting various circuits.

b. Analyze DC circuits from the simple to the complex.

b. Construct and make measurements of DC circuits from the simple to the complex.

b. Repeat by memory the resistor color code; and identify components by their electronic symbols.

b. Interpret characteristics of voltage, current, resistance, and power in DC circuits.

b. Measure voltage, current, and resistance in DC circuits using appropriate measuring devices.

b. Analyze DC circuits using appropriate mathematical formulas such as Ohm's Law, Kirchhoff's Law, and the power formula.

b. Troubleshoot various DC circuits using schematics diagrams

c. Analyze AC circuits from simple to complex.

c. Construct and make measurements for AC circuits from simple to complex.

c. Describe in technical terms an AC signal on an oscilloscope.
c. Describe the difference between an AC and DC signal.

d. Explain the operation of digital logic gates.
d. Use Boolean algebra and Karnaugh mapping to express logic operations and minimize logic circuits in design.
d. Construct, analyze, and troubleshoot combinational logic circuits.
d. Create a truth table for standard digital logic gates.
d. Add, subtract, multiply, and divide using the binary numbering system.

e. Analyze the characteristics and operations of solid state device circuits.
e. Construct and make measurements of solid state device circuits.
e. Describe the atomic interaction found at the depletion region of a diode and the DC biasing of a BJT transistor.
e. Analyze coupling and bypass capacitors.
e. Analyze small signal operations, voltage amplifiers, power amplifiers, emitter followers, communication circuits, frequency effects, and FET biasing.

f. Describe the operation of communication receivers and transmitters.
f. Be familiar with measuring and troubleshooting communication systems.
f. Describe the operation of the major components of microwave, satellite, optical, and wire/cable communication systems.
f. Describe the operation of antennas.
f. Describe the use of microwave receivers and transmitters.

g. Identify and analyze linear integrated circuits including operational amplifiers.
g. Measure and troubleshoot circuits containing linear integrated circuits.
g. Describe the pin out of any given operational amplifier by referring to the spec sheet.

h. Describe how electronic input and output circuits are used to control automated manufacturing and/or process systems.
h. Identify basic elements used for input, output, timing, and control.
h. Define how programmable electronic systems use input data to alter output responses.

i. Analyze and troubleshoot digital systems.
i. Describe the difference between a digital system and analog system.
i. Evaluate the operation of a digital system using various test instruments.

j. Define terms used to describe microprocessor/microcomputer systems.
j. Program and operate applications for microprocessor/microcomputer systems.
j. Write a program using assembly level language.
j. Describe the purpose of microprocessor internal registers.

k. Demonstrate a knowledge of structured programming methods through the development and execution of high level language programs which solve technical problems

l. Build a project using the principles of the electrical/electronic design process.
l. Write an operations procedure of an electrical/electronic project.
l. Demonstrate the operation or function of an electrical/electronic project.
l. Prepare an electrical/mechanical project proposal.
l. Submit a detailed project plan with proper schematics.
l. Identify and locate equipment and supplies needed for a project.
l. Develop an estimated time schedule for each phase of a project.
l. Prepare weekly project reports and prepare a final written report and documentation.

m. Explain terminology; select hardware components, and predict PLC operation based on ladder logic diagrams
m. Program a PLC to perform various control functions.

n. Identify telecommunications system components.
n. Define and explain and use common telecommunication terms.
n. Describe the organizational evolution of the telecommunications industry.
n. Identify, define and describe the rules and regulations governing the telecommunications industry.
n. Identify and describe industry standards and protocols of the telecommunications industry.

Program: Electronics Technology	**Credential:** AAS Degree

LIST OF ALL COURSES REQUIRED AND IDENTIFIED COMPETENCIES

Competencies								**Course Number**	**Course Title**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**		
X			X	X	X	X	X	CETT 1321	Electronic Fabrication
X	X	X	X	X	X	X	X	CETT 1403	D. C. Circuits
X	X	X	X	X	X	X	X	CETT 1425	Digital Fundamentals
X	X	X	X	X	X	X	X	CETT 1405	A. C. Circuits
X	X	X	X	X	X	X	X	CETT 1449	Digital Systems
X	X	X	X	X	X	X	X	CETT 1331	Technical Programming
X		X	X	X	X	X	X	CETT 1341	Solid State Circuits
X	X	X	X	X	X	X	X	CETT 1445	Microprocessors
X	X	X	X	X	X	X	X	CETT 1457	Linear Integrated Circuits
X	X	X	X	X	X	X	X	EECT 2439	Communication Circuits
X	X	X	X	X	X	X	X	ELMT 1301	Programmable Logic Controllers
X	X	X	X	X	X	X	X	ELMT 2330	Final Project
X		X	X	X	X	X	X	ELMT 2433	Industrial Electronics
X	X	X	X	X	X	X	X	EECT 1303	Introduction to Telecommunications
X	X		X	X	X			ENGL 1301	English
X		X	X	X	X			MATH 1314	College Algebra
X	X		X	X	X			ENGL 2311	Technical Report Writing
X		X	X	X	X			Math 1316	Trigonometry
X			x	x	x			Elective	Social Behavioral Science
X			X	X	X			Elective	Humanities/Fine Arts

COMPETENCY REFERENCES

8 B BASIC USE OF COMPUTERS

7 B WORKPLACE COMPETENCIES

6 B PERSONAL QUALITIES

5 B THINKING SKILLS

4 B SPEAKING AND LISTENING

3 B ARITHMETIC OR MATHEMATICS

2 B WRITING

1 B READING