



PROGRAM ARTICULATION AGREEMENT

College Program: Electronics Engineering Technician
Career Pathway: Maintenance, Installation and Repair
Career Cluster: Manufacturing

CIP: 15.0303

The purpose of this agreement is to grant college credit to high school students who have achieved the level of knowledge and skill required for the college-equivalent entry-level course(s) identified in this agreement. Upon successful completion of the identified course competencies with a grade of 'B' (3.0) or higher and the high school teacher's endorsement that the competency requirements have been met, articulated credit will be granted.

The following Spokane Community College course(s) have been approved for Tech Prep articulation with Colville School District high school course(s) as listed below:

High School / Course Title	College / Course Title	Credits
Colville HS	SCC	
Electronics 1, 2, 3 and 4	ELECT 110 Computer Fundamentals for Electronics	2
	ELECT 111 Fundamentals of DC/AC Circuits	7
<i>(each component graded separately)</i>	ELECT 112 DC/AC Circuit Lab	5
	ELECT 113 DC/AC Circuit Math	5

**see attached list(s) of competencies for articulated courses*

Student Articulation Procedure:

1. Be enrolled in the required high school class.
2. Register for Tech Prep/Dual Credit articulated course during the same academic year the high school class is completed. If a series of courses are involved in the articulation, students register for credit during the same academic year the last course in the series is completed. **Students cannot earn "retroactive credit" for courses taken in previous years.**
3. Earn a grade of 'B' (3.0) or better in all courses required under the articulation agreement.
4. Complete all required skills as identified on the competency profile.
5. If an exam or review of completed work is required under the terms of this agreement, students must receive a passing score (determined by college or industry certification) to earn college credit (*see competency list for requirements*).

High School Instructors:

1. Ensure all students receive a copy of the course syllabus outlining information about Tech Prep, the college course competencies and the process required to earn college credit.
2. Hold students accountable for the same competency standard and course expectations as required by the college-equivalent course (*see competency list attached*).
3. If required for articulation, ensure students are prepared to take industry certification exams, complete a professional portfolio documenting their work, or take a final exam to measure their level of skill and competence in the coursework.
4. Submit final grades for all students registered to earn Tech Prep college credit no later than June of the current academic year.
5. Attend scheduled meetings, workshops or in-service activities that enhance the high school/college partnership & support implementation of the Tech Prep articulated program.

Articulation Review and Renewal:

The designated program facilitators, college administrators and/or instructors and high school faculty will meet regularly to revise or discuss the articulation agreement. Agreements must be reviewed/updated and re-signed by college faculty/deans and CTE directors/HS teachers on a schedule, not to exceed a three (3)

year rotation, or as deemed necessary due to changes in HS/college course content or structure. Individual teacher verification forms must be signed and submitted annually. Minor revisions can be made via phone calls, correspondence or e-mail.

**PROGRAM ARTICULATION AGREEMENT
Electronics Engineering Technician**

**PARTICIPATING INSTITUTIONS
2008 - 2009 School Year**


Colville School District and Spokane Community College

We the undersigned representatives of the Northeast Washington Technical Education Consortium (NEWTEC), agree to all provisions of the articulation program/course agreement, have reviewed the course competencies, and understand the process to which students may be granted college credit through the Tech Prep program. We commit staff time and resources to ensure successful program implementation.



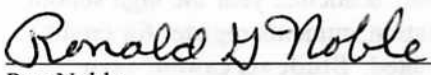
Kevin Knight,
Colville HS CTE Director

1-5-09
Date



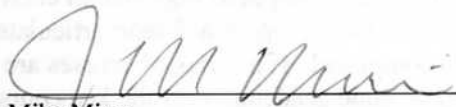
Jim Scheidegger,
SCC Faculty

15 DEC 2008
Date



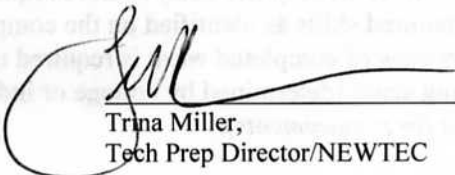
Ron Noble,
Colville HS Teacher

1-5-09
Date



Mike Mires,
SCC Program Dean

Date



Trina Miller,
Tech Prep Director/NEWTEC

12/15/08
Date

Original 04/18/2002

Renewed 12/09/2008: Renewal rotation, updated format. -gmf

Course Objectives/Course Outline

Spokane Community College

Course Title: FUNDAMENTALS OF DC/AC CIRCUITS

Prefix and Course Number: ELECT 111

Course Description: ELECT 111 — Fundamentals of DC/AC Circuits (7 cr)

Students are introduced to DC/AC circuits including resistors and resistive circuits, series and parallel circuits, meter movements, ammeters, voltmeters, VOMs, DMMs and Wheatstone Bridges.

Learning/Performance Expectations (e.g., outcomes, performance objectives, competencies, etc.)

AT THE COMPLETION OF THIS COURSE, A STUDENT SHOULD:

- Identify the basic electronic components and symbols
- Identify the fundamental principles of electron theory
- Identify the functions of conductors, insulators, and resistors
- Demonstrate the color code and wire sizes
- Demonstrate DC circuit theory
- Use DC meters to measure voltage, current and resistance
- Analyze wave forms
- Demonstrate phase relationships in AC circuits

COURSE OUTLINE:

Introduction

- A. Familiarization of College Facilities
- B. Class Organization
- C. Grading
- D. Department Policies
- E. Attendance
- F. Safety
- G. Work Place Ethics

II. Survey of Electronics

- A. Passive Electrical Components
- B. Symbols
- C. Schematic Diagrams
- D. Terminology

III. Fundamentals

- A. Electron Theory
- B. Conductors
- C. Insulators
- D. Resistors
- E. Sources (i.e., Photovoltaic)
- F. Color Code
- G. Wire Sizes

- IV. Ohm's Law
 - A. Voltage
 - B. Current
 - C. Resistance
 - D. Power
 - E. Sources
 - 1. Internal Resistance
 - 2. Constant Voltage
 - 3. Constant Current

- V. Series Circuits
 - A. DC Circuit Analysis
 - 1. Kirchhoff's Voltage Law
 - 2. Aiding and Opposing Sources
 - 3. Power
 - 4. Troubleshooting
 - B. DC Circuit Measurement
 - 1. Meter Operation
 - 2. Voltage Measurements and Errors
 - 3. Current Measurements and Errors
 - 4. Resistance Measurements and Errors

- VI. Parallel and Series Parallel Circuits
 - A. DC Circuit Analysis
 - 1. Voltage
 - 2. Kirchhoff's Current Law
 - 3. Total Resistance
 - 4. Series Equivalents
 - 5. Power
 - 6. Troubleshooting
 - 7. Redrawing Circuits
 - B. DC Circuit Measurements
 - 1. Voltage
 - 2. Current
 - 3. Resistance

- VII. Meter Circuits
 - A. Types
 - 1. Voltage
 - 2. Current
 - 3. Resistance

- VIII. AC Circuits
 - A. General Information
 - 1. Safety
 - 2. Equipment
 - B. Sine Waves
 - 1. Generation Of Sine Waves
 - 2. Methods Of Measurement
 - a. Instantaneous
 - b. Peak To Peak
 - c. Peak
 - d. RMS
 - 3. Units of Angular Measurement
 - B. Frequency and Phase
 - 1. Frequency Spectrum
 - 2. Wavelength
 - 3. Phase Relationships
 - a. Definition
 - b. Time Relation
 - c. Angular Relation
 - d. Capacitor Circuits
 - A. Series Coupling
 - B. Parallel Bypass
- IX. Inductor Circuits
 - A. Series
 - B. Parallel
 - C. Mutually Linked
- XI. Transformers
 - A. Voltage
 - B. Current
 - C. Power
 - D. Efficiency

Course Objectives/Course Outline

Spokane Community College

Course Title: DC/AC Circuit Lab

Prefix and Course Number: ELECT 112

Course Description: ELECT 112 — DC/AC Circuit Lab (5 cr)

This course presents DC/AC circuit lab applications including resistors and resistive circuits, series and parallel circuits, meter movements, ammeters, voltmeters, VOMs, DMMs and Wheatstone Bridges. Prerequisite: Concurrent enrollment in ELECT 111 or department chair approval.

Learning/Performance Expectations (e.g., outcomes, performance objectives, competencies, etc.)

AT THE COMPLETION OF THIS COURSE, A STUDENT SHOULD:

- Demonstrate basic safety procedures while operating electronic and mechanical devices
- Design circuits
- Construct circuits and measure results
- Employ Ohm's law in troubleshooting methods
- Apply Ohm's law and Kirchhoff's laws in calculations
- Demonstrate basic soldering skills
- Analyze phase measurements
- Demonstrate the use of oscilloscopes for frequency, voltage, phase and time measurements

Course Outline:

- I. Safety
- II. Basic Skills (Mechanical)
 - A. Hand Tools
 - B. Power Tools
 - C. Breadboard (Component Lay Out)
 - D. Soldering and De-soldering Techniques
 1. P.C. Board
 2. Bread Board
 3. Tinning
 4. Heat Sinks
- III. Basic Skills (Electronic)
 - A. Schematic (By Instructor)
 - B. Color Code And Ohmmeter
 - C. D.C. Sources
 - D. DMM
- IV. Ohm's Law
 - A. Series Circuits
 1. Resistance
 2. Voltage
 3. Current
 4. Kirchhoff's Voltage Law

- B. Parallel Circuits
 - 1. Resistance
 - 2. Voltage
 - 3. Current
 - 4. Kirchhoff's Current Law
- B. Series-Parallel Circuits
 - 1. Resistance
 - 2. Voltage
 - 3. Current
- V. Voltage Dividers
 - A. Unloaded Dividers
 - B. Loaded Dividers
 - C. Power Transfer
- VI. Troubleshooting
 - A. Static Measurements (Power Turned Off)
 - B. Dynamic Measurements (Power Turned On)
- VII. Equipment Familiarization
 - A. Oscilloscope
 - B. Signal Generator
 - C. Digital Multimeter (DMM)
- VIII. AC Components
 - A. Capacitors
 - B. Inductors
 - C. Transformers
- IX. Phase Measurements
 - A. Series AC Circuits
 - B. Parallel AC Circuits

Course Objectives/Course Outline

Spokane Community College

Course Title: DC/AC CIRCUIT MATH

Prefix and Course Number: ELECT 113

Course Description: ELECT 113 — DC/AC Circuit Math (5 cr)

Students review mathematics as it applies to DC/AC circuits and utilize the electronic calculator as a problem solving tool. The use of algebraic equations and trigonometric functions to solve circuit problems are emphasized.

Learning/Performance Expectations (e.g., outcomes, performance objectives, competencies, etc.)

AT THE COMPLETION OF THIS COURSE, A STUDENT SHOULD:

- Analyze DC circuits
- Understand number systems
- Have a thorough understanding of algebraic equations
- Use Ohm's Law in performing calculations involving dc circuits
- Express circuits as algebraic equations
- Relate sine, cosine, and tangent to angles of right triangles
- Understand the characteristics of phase relationships

COURSE OUTLINE:

I. Exponents

A. Significant Figures

1. Precision
2. Accuracy

B. Powers of Ten

1. Scientific Notation
2. Engineering Notation
3. Multiplication
4. Division
5. Addition and Subtraction
6. Approximations

II. Systems of Measurement

- A. English System
- B. S.I. Metric System

III. Algebraic Fractions

A. Simple Fractions

B. Compound Fractions

1. Addition and Subtraction
2. Multiplication and Division
3. Transposing

IV. Fractional Equations

- A. Numerical Considerations
- B. Literal Equations

V. Trigonometry