COMPLETE CURRICULUM AND SYLLABI
FOR AN ASSOCIATE DEGREE IN ELECTRICAL CONTRACTING TECHNOLOGY

For

The Electrical Contracting Foundation:
“A National Model for an Associate Degree in Electrical Contracting Technology”

From

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ELECTRICAL CONTRACTING TECHNOLOGY
ASSOCIATE DEGREE CURRICULUM

First semester: English Composition I \(^{GE}\)
College Algebra \(^{MS}\)
Introduction to Accounting \(^{BM}\)
Computer Applications and Computations \(^{MS}\)
Introduction to Electrical Circuits

Second semester: English Composition II \(^{GE}\)
Trigonometry \(^{MS}\)
Electrical Power Controls and Equipment
Electrical Drawings and Specifications
Accounting for Electrical Contractors

Third semester: The National Electrical Code
Estimating for Electrical Contractors
Organizational Behavior and Management \(^{BM}\)
Principles of Economics \(^{OR}\)
Industrial Co-op I

Fourth semester: Speech Communications \(^{GE}\)
Electrical Construction Bid Process
Project Management and Labor Relations
Electrical Capstone Experience
Industrial Co-op II

All courses are 3 semester credit hours

This associate degree was designed to be accredited by the American Council for Construction Education (ACCE). The ACCE requires the following: 9 semester hours of general education (GE); 9 semester hours of mathematics and science (MS); 6 semester hours of business and management (BM); 3 semester hours other requirements (OR), such as free electives; 33 semester hours of construction design principles and practice. Accreditation of the degree will permit a student to use any of the above courses, as transfer credits for similar courses in a BS program. Transfer credit into the AS degree from an apprentice program, would most easily be facilitated by permitting a student with similar coursework, to test-out of a course based on the outcome of an assessment procedure, such as an examination.
COURSE SYLABUS

COURSE TITLE: ENGLISH COMPOSITION I

FORMAT: 2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE: None.

COURSE DESCRIPTION: Students will learn to write well organized, thoroughly developed documents that achieve a desired objective, and meet a reader’s needs. Students will maintain a journal, a portfolio of short writing assignments, and will write a number of extensive essays.

COURSE ACTIVITIES AND OBJECTIVES: Keep a journal that responds to the assigned readings, and explores topics for writing.

Practice prewriting techniques to find and explore writing topics.

Practice situational analysis (audience and purpose) as a means of focusing a topic.

Participate in small group work to explore issues raised in readings and to respond to rough drafts.

Participate in large group discussions on reading and writing strategies.

Practice revision strategies to improve writing.

Acquire a more efficient, mature vocabulary.

Use the dictionary proficiently.

Meet college-level standards of correctness in spelling, punctuation, and usage.

Use computers for word processing.

GRADING:

Journal: 10%
Portfolio of written work: 40%
Essays (4 @ 10% each): 40%
Final Exam: 10%
COURSE SYLABUS

COURSE TITLE: COLLEGE ALGEBRA

FORMAT:  2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE:  None.

COURSE DESCRIPTION:  This course deals with common topics in college algebra, such as functions, polynomials, logarithms, and sets of linear equations.

COURSE TOPICS:  Functions (2 hours)
  - Definition of a function
  - Independent and dependent variable
  - Domain and range of a function
  - Function notation

  Graphs of Functions (2 hours)
  - The graph of a function
  - Interval notation
  - Finding the domain and range of a function from the graph

  The Algebra of Functions (2.5 hours)
  - Combinations of functions
  - Addition, subtraction, multiplication, and division.

  Inverse Functions (3 hours)
  - Definition of an inverse function
  - Recipe for finding an inverse function

  Exam 1: (1 hour)

  Quadratic Functions (3 hours)
  - Definition of a quadratic function
  - Quadratic formula
  - $x$ and $y$-intercepts of a quadratic function
  - Maximum, minimum of quadratic functions

  Polynomial Functions of Higher Degree (2 hours)
  - Finding zeros by factoring

  Exponential Functions (3 hours)
  - Using the calculator to evaluate exponential functions.
  - Graphing exponential functions
  - Compound interest (periodic and continuous)
Logarithms and Logarithmic Functions (4 hours)
Definition and Properties of a logarithm
Evaluating logarithms, including common logs and natural
logs, with and without a calculator

Solving Exponential and Logarithmic Equations (4 hours)
Inverse properties of exponentials and logarithms
Exponential equations and logarithmic equations

Exam 2: (1 hour)

Matrix Operations (4 hours)
Equality of Matrices
Addition of Matrices
Matrix Multiplication
Properties of Matrix operations
Solving a matrix equation

Inverse Matrices (3 hours)
Definition of an inverse matrix
Finding the inverse of a matrix
Simultaneous equations and matrices
Solving a set of equations using an inverse matrix

Determinants (2 hours)
Finding the determinant of a matrix

Exam 3: (1 hour)

GRADING: Homework assignments: 10%
Exams, (3 @ 20% each): 60%
Final Exam: 30%
COURSE SYLABUS

COURSE TITLE: INTRODUCTION TO ACCOUNTING

FORMAT: 2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

COREQUISITE: College Algebra, and Computer Applications and Computations, or consent of instructor.

COURSE DESCRIPTION: This course provides an introduction to the field of accounting. Students will learn to prepare and analyze a set of financial statements, using computer software, where appropriate.

COURSE TOPICS:

Overview (3.5 hours)
- Financial Accounting
- Financial Statements
- Basic Accounting Principles and Underlying Concepts

Financial Statements (11 hours)
- Balance Sheet
- Transaction Analysis
- Assets
- Liabilities
- Income Statement
- Cash Flows
- Transaction Analysis

Exam 1: (1 hour)

The Worksheet and Adjustments (6 hours)
- Preparation of the Worksheet
- Adjusting Entries

Categories in Detail (7 hours)
- Cash
- Receivables and Payables
- Inventories
- Plant and Equipment

Exam 2: (1 hour)

Financial Statement Analysis (7 hours)
- Comparative Financial Statements
- Comparison with Standards

Exam 3: (1 hour)
GRADING:

Homework assignments: 10%
Exams, (3 @ 20% each): 60%
Final Exam: 30%
COURSE SYLABUS

COURSE TITLE: COMPUTER APPLICATIONS AND COMPUTATIONS

FORMAT: 3 semester credit hours; 1.25 hours of lecture per week, for 15 weeks, for a total of 18.75 hours, and 2 hours of lab per week, for a total of 30 hours.

PREREQUISITE: None

COURSE DESCRIPTION: This course provides an introduction to computer hardware, software, and problem solving. Students gain hands-on experience with word processing, spreadsheets, and presentation graphics.

COURSE TOPICS:

- Computer Concepts (1.5 hours)
  - Data Storage and File Structures
  - Floppy Disks, CDs and The Hard Disk
  - Processing and Memory

- Operating Systems (2 Hours)
  - DOS
  - Microsoft Windows

- Word Processing (2 Hours)
  - Microsoft Word

- Midterm (1.25 Hours)

- Spreadsheets (6 Hours)
  - Microsoft Excel
  - Spreadsheet Calculations
  - Graphs and Charts
  - Integration into a Complete Report

- Multimedia and Presentation (2 Hours)
  - Microsoft PowerPoint

- Networks (4 Hours)
  - Databases
  - Communications Software
  - LANs and Intranets
  - The World Wide Web

GRADING:

- Laboratory assignments: 30%
- Midterm: 30%
- Final Exam: 40%
COURSE SYLABUS

COURSE TITLE: INTRODUCTION TO ELECTRICAL CIRCUITS

FORMAT: 2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

COREQUISITE: College Algebra, or consent of instructor.

COURSE DESCRIPTION: This course provides an introduction to electrical circuits. Topics include: dc and ac circuits, resistance, impedance, and three phase circuits.

COURSE TOPICS:

Units and Problem Solving (2 hours)
- Unit systems
- Scientific notation
- Significant figures and rounding off numbers
- Conversion factors

Fundamental Quantities (4 hours)
- Current
- Voltage
- Resistance and resistivity
- Temperature effects on resistance
- American wire gauge
- Power
- Energy (kWh)

Analysis of a Basic dc Circuit (4 hours)
- Circuit diagrams and symbols
- Voltage sources
- Ohm’s law
- Current, polarity and voltage drops
- Power in the electric circuit
- Measuring voltage, current, resistance, and power

Exam 1: (1 hour)

Series Circuits (3 hours)
- Equivalent resistance
- Kirchhoff’s voltage law
- The voltage divider rule
- Analysis of series circuits
Parallel Circuits (3 hours)
  Equivalent resistance
  Kirchhoff’s current law
  The current divider rule
  Analysis of parallel circuits

Series-Parallel Circuits (4 hours)
  Equivalent resistance
  Analysis of series-parallel circuits

Exam 2: (1 hour)

Fundamentals of ac Quantities (3 hours)
  Voltage (peak and effective values)
  Current (peak and effective values)
  Frequency and period
  Phase relation and phase angle
  Inductance, capacitance, and Impedance

Analysis of ac Circuits (4.5 hours)
  Impedance calculations
  Impedance diagrams
  Analysis of series circuits
  Analysis of parallel circuits
  Analysis of series-parallel circuits

Three Phase Systems (5 hours)
  Three-phase source
  Wye and delta source connections
  Phase sequence
  The four-wire, three phase load
  Three-wire, three-phase balanced loads
  Unbalanced three-phase delta and wye loads
  Three-phase loads and line impedance
  Power measurement in three-phase circuits

Information Systems (2 hours)
  Introduction to information technology
  Fiber optic systems

Exam 3: (1 hour)

GRADING:
  Homework assignments: 10%
  Exams, (3 @ 20% each): 60%
  Final Exam: 30%
COURSE SYLABUS

COURSE TITLE: ENGLISH COMPOSITION II

FORMAT: 2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE: English Composition I, or consent of instructor.

COURSE DESCRIPTION: This course will focus on the writing process as well as the written product. The course builds upon the basic attitudes and abilities developed in Comp. I, by requiring students to work with significantly longer and more sophisticated kinds of writing, research, reading, speaking, and listening. Critical thinking and research are primary learning objectives in this course.

COURSE ACTIVITIES AND OBJECTIVES: Further enhance the writing processes developed in English Composition I.

Develop analytical and critical thinking skills.

Write for different audiences, including opponents of your position, and learn how to reach those opponents in a rational manner.

Learn more about research, including the library and the World Wide Web.

Understand the purpose and function of documentation in research papers.

Polish skills to be able to write essays characterized by unity, organization, and support; appropriate word choice; and standard usage spelling, and mechanics.

Collaborate with classmates to create essays and to improve you writing.

Learn to appreciate unfamiliar perspectives.

GRADING: Journal of written work: 30%
Essays (5 @ 12% each): 60%
Final Exam: 10%
COURSE TITLE: TRIGONOMETRY

FORMAT: 2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE: College Algebra, or consent of instructor.

COURSE DESCRIPTION: This course provides an introduction to the area of trigonometry, including trigonometric functions, and analytic trigonometry.

COURSE TOPICS:

Trigonometry (12 hours)
- Radian and Degree Measure
- The Trigonometric Functions
- Right Triangle Trigonometry
- Trigonometric Functions of Any Angle
- Graphs of Sine and Cosine Functions
- Graphs of Other Trigonometric Functions
- Inverse Trigonometric Functions
- Applications and Models

Exam 1: (1 hour)

Analytic Trigonometry (12 hours)
- Using Fundamental Identities
- Verifying Trigonometric Identities
- Solving Trigonometric Equations
- Sum and Difference Formulas
- Multiple-Angle and Product-Sum Formulas

Exam 2: (1 hour)

Additional Topics in Trigonometry (6 hours)
- Law of Sines
- Law of Cosines
- Vectors (Phasors) in the Plane

Exam 3: (1 hour)

Topics in Analytic Geometry (4.5 hours)
- Polar Coordinates
- Graphs of Polar Equations

Exam 3: (1 hour)

GRADING:
- Homework assignments: 10%
- Exams, (3 @ 20% each): 60%
- Final Exam: 30%
COURSE SYLABUS

COURSE TITLE: ELECTRICAL POWER CONTROLS AND EQUIPMENT

FORMAT: 3 semester credit hours; 2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE: Introduction to Electrical Circuits, corequisite: Trigonometry, or consent of instructor.

COURSE DESCRIPTION: This course provides an introduction to power equipment and control devices, such as induction motors, transformers, motor control devices, and programmable logic controllers.

COURSE TOPICS:

The Power Triangle (2.5 hours)
- Reactive power and apparent power
- The power triangle
- Power factor correction

Electrical Power-Control Devices (4 hours)
- Enclosures
- Contactors
- Fuses, circuit breakers, and overload relays
- Connectors and other hardware
- Effects of power surges and transients
- Electrical grounding systems and protection
- Standby power units

Transformers (5 hours)
- Transformer construction and terminology
- Ideal transformer, turns-ratio, and polarity
- Equivalent circuit of a practical transformer
- Transformers and the per-unit system
- Current transformers
- Three-phase transformers and connection schemes
- Three-phase to 2 phase transformation

Exam 1: (1 hour)
Induction Motors (11 hours)
- Principle of the induction motor
- Single phase induction motor
- Three-phase induction motor
- Standardization and classification of induction motors
- Typical motor nameplate
- Typical motor circuits
- Motor circuit conductor sizing
- Motor overload and short circuit protection
- Motors controllers and control circuits

Exam 2: (1 hour)

Programmable Controllers (PLCs) (12 hours)
- General characteristics and system layout
- Operational procedures
- Control of coils and contacts
- Addresses and registers
- Timers and counters
- Others discrete functions

Exam 3: (1 hour)

GRADING:
- Homework assignments: 10%
- Exams, (3 @ 20% each): 60%
- Final Exam: 30%
COURSE SYLABUS

COURSE TITLE: ELECTRICAL DRAWINGS AND SPECIFICATIONS

FORMAT: 3 semester credit hours; 1.25 hours of lecture per week, for 15 weeks, for a total of 18.75 hours, and 2 hours of lab per week, for a total of 30 hours.

PREREQUISITES: Introduction to Electrical Circuits.

COURSE DESCRIPTION: This course emphasizes the practical interpretation of electrical drawings and specifications as applied to electrical systems in buildings.

COURSE TOPICS: Reading Drawings (4 hours)
- Visualization and interpretation
- Electrical drawing layout
- Title blocks
- Scales
- Lines and symbols
- Schedules and notes

Types of Electrical Drawings (9 hours)
- One-line diagrams
- Equipment diagrams
- Grounding plan
- Conduit plan
- Lighting plan
- Physical arrangement drawings

Care and Control of Project Drawings (1.5 hours)
- Revised drawings

Introduction to CAD Systems (3 hours)

Midterm exam (1.25 hours)

GRADING:
- Laboratory assignments: 30%
- Midterm: 30%
- Final Exam: 40%
COURSE SYLABUS

COURSE TITLE: ACCOUNTING FOR ELECTRICAL CONTRACTORS

FORMAT: 2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE: Introduction to Accounting, or consent of instructor.

COURSE DESCRIPTION: This course will examine accounting topics and methods pertinent to the electrical contractor. The course will include fixed and variable costs, revenue forecasting, and budget development with ramifications on pricing.

COURSE TOPICS:

Fixed and Overhead Costs (2 hours)
- Office/Building
- Equipment
- Personnel

Variable Costs (3 hours)
- Material
- Labor

Controllable versus Uncontrollable Costs (2.5 hours)
- Insurance
- Workmen's Compensation
- Taxes

Revenue Forecasting (2 hours)

Exam 1: (1 hour)

Budget Development (3 hours)

Profit Forecasting (3 hours)

Depreciation, Tax Credits (2 hours)

Capital Renewal, Replacement (4 hours)
- Estimating Methods
- Life Cycle Costing
- Replacement Index Method

Exam 2: (1 hour)

Project Cost Estimation (4 hours)
Prorating Overhead (2 hours)

Cost Control (4 hours)
  Monitoring Systems
  Code Charging
  Sampling Techniques
  Cost Variance Analysis
  Cash Flow Management by Project
  Overall Business

Asset and Debt Management (1.5 hours)

Exam 3: (1 hour)

Post Evaluation Review (1.5 hours)

**GRADING:**

Homework Assignments: 10%
Exams, (3 @ 20% each): 60%
Final Exam: 30%
COURSE TITLE: THE NATIONAL ELECTRICAL CODE

FORMAT: 2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE: Electrical Power Controls and Equipment, or consent of instructor.

COURSE DESCRIPTION: This course provides an introduction to the national electrical code, including its organization and layout. An emphasis is placed on how to use the codebook as a reference.

COURSE TOPICS:

Ampacities and Derating (4 hours)
- Ampacity tables
- Wiring insulation
- Derating factors and examples
- Ampacity and overcurrent protection

Residential Wiring (3 hours)
- Receptacle requirements
- Circuit interrupters
- Lights
- Switches and fixtures
- Appliances

Residential Service Calculations (4 hours)
- Calculation methods
- Appliance circuits
- Air conditioners
- Electric ranges
- Sample calculations

Exam 1: (1 hour)

Commercial and Industrial Service Calculations (6 hours)
- Calculating lighting loads
- Calculating non-lighting loads
- Demand factors
- Branch circuit and feeder sizing
- Sample commercial calculations

Overcurrent Protection (5 hours)
- Introduction to overcurrent protection
- Standard fuse and circuit breaker sizes
- Ground fault protection
- Overcurrent protection for transformers
Exam 2: (1 hour)

Grounding Issues (5 hours)
  Electrical system grounding
  Current flow in a grounded system
  Ground rods
  Sizing of service grounding conductors
  Sizing of equipment grounding conductors
  Receptacle grounding
  Grounding of transformer secondaries

Raceways, boxes and cabinets (5 hours)
  Wire and conduit dimension tables
  Conduit fill
  Outlet box wire fill
  Cabinet and panel wiring spaces

Exam 3: (1 hour)

Special situations (2.5 hours)
  Emergency systems
  Public locations
  Hazardous locations

GRADING:
  Homework assignments: 10%
  Exams, (3 @ 20% each): 60%
  Final Exam: 30%
COURSE SYLABUS

COURSE TITLE: ESTIMATING FOR ELECTRICAL CONTRACTORS

FORMAT:  2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE:  Accounting for Electrical Contractors, and Computer Applications and Computations, or consent of instructor.

COURSE DESCRIPTION:  At the conclusion of this course students will have a thorough understanding of the estimating process, as pertaining to electrical contractors.  Students will develop detailed estimates, using computer software, when appropriate.

COURSE TOPICS:  Estimating Fundamentals (5 hours)
  Preliminary Estimates
  Detailed Estimates
  Conceptual Estimating
  Risks in Estimating
  Cost to Develop an Estimate
  Sources of Errors in Estimating

  Organization and Structure (6 hours)
  Scope of Work
  Forms Used
  Addendum
  Finalizing
  Delivery
  Bid Openings

  Exam 1: (1 hour)

  Computers and Estimating Programs (6 hours)
  Estimating Software
  Impact and Risks
  Spreadsheets

  Materials Estimate (7 hours)
  Lighting Fixtures
  Light Switches, Wall Receptacles, and Special Outlets
  Conduit, Boxes, and Covers
  Wiring
  Heating, Air Conditioning, and Controls
  Other, or Special Equipment
Exam 2: (1 hour)

Developing Other Costs (7 hours)
  Labor
  Suppliers
  Overhead
  Contingencies
  Profit

The Finished Product (3.5 hours)
  Errors in Estimating
  The Complete Package – Checking Your Work

Exam 3: (1 hour)

GRADING:  Homework Assignments: 25%
           Exams, (3 @ 15% each): 45%
           Final Exam: 30%
COURSE SYLABUS

COURSE TITLE: ORGANIZATIONAL BEHAVIOR AND MANAGEMENT

FORMAT:  2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE:  English Composition I, or consent of instructor.

COURSE DESCRIPTION:  This course will examine the principles of management and human behavior in organizations at the individual and group level, including the effect of organization structure on behavior. Specific attention will be given to using organizational behavior concepts for developing and improving interpersonal skills and organizational productivity.

COURSE TOPICS:  Managerial Functions (1.5 hours)
  - Planning
  - Organizing
  - Leading
  - Controlling

Types Of Managers (2.5 hours)
  - Levels Of Management
  - Areas of Managers
  - Recent Changes In Managerial Hierarchies

The Task Environment (2.5 hours)
  - Suppliers
  - Distributors
  - Customers

The General Environment (5 hours)
  - Ethical Concerns
  - Economic Forces
  - Technological Forces
  - Sociocultural Forces
  - Demographic Forces
  - Political And Legal Forces
  - Global Forces

Exam 1: (1 hour)

The Nature of Managerial Decision Making (3 hours)
  - Programmed and Nonprogrammed Decision Making
  - The Classical Model
Steps in the Decision-Making Process (4 hours)
   Recognize the Need for A Decision
   Generate Alternatives
   Evaluate Alternatives
   Learning From Feedback

Organizational Structure (4 hours)
   The Organizational Environment
   Strategy
   Technology
   Human Resources

Exam 2: (1 hour)

Motivation (4 hours)
   Pay and Motivation
   Benefits
   Union Structures

Groups, Teams, And Organizational Effectiveness (4 hours)
   Partnering

Communication (4 hours)
   The Importance of Good Communications
   Negotiating Skills
   The Communication Process
   The Role of Perception in Communication
   The Dangers of Ineffective Communication

Exam 3: (1 hour)

GRADING:  Homework Assignments: 10%
          Exams, (3 @ 20% each): 60%
          Final Exam: 30%
COURSE SYLABUS

COURSE TITLE: PRINCIPLES OF ECONOMICS

FORMAT: 2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE: English Composition I, or consent of instructor.

COURSE DESCRIPTION: This course focuses on the theory and application of the principles of macroeconomics. Among the issues discussed in this course are supply and demand, the business cycle, and monetary issues.

COURSE TOPICS:
- Basics of Economics (2 hours)
  - Economics Defined
  - Types Of Economics
  - How Economics Works
  - Differences Between Micro and Macro Economics

  Production Possibilities (3.5 hours)
  - Introduction to Production Possibilities Curves
  - Opportunity Cost
  - Unemployment and Growth
  - Trade Issues

  Supply and Demand (6 hours)
  - Goals
  - Demand
  - Supply
  - Equilibrium
  - Price Restrictions
  - Labor Market

  Exam 1: (1 hour)

  Measuring Output and Inflation (7 hours)
  - Economic Growth
  - Introduction to the Business Cycle
  - Inflation
  - Measuring Output
  - Measuring GDP
Expenditure Model (3 hours)
  Historical Background
  Keynesian Model

Exam 2: (1 hour)

Money and Policy (9 hours)
  Purpose Of Money
  Measures Of Money
  The Banking System
  Federal Reserve Board Structure and Operation
  Monetary Policy and Interest Rates
  Taxes
  Fiscal Policy
  Government Behavior
  The Public Debt

Business Expectations (4 hours)
  Rational Expectations
  Investment
  Real Business Cycles

Exam 3: (1 hour)

GRADING:  
  Homework Assignments: 10%
  Exams, (3 @ 20% each): 60%
  Final Exam: 30%
# COURSE SYLABUS

<table>
<thead>
<tr>
<th>COURSE TITLE:</th>
<th>INDUSTRIAL CO-OP I &amp; II</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORMAT:</td>
<td>Each course requires 200 contact hours of job site experience.</td>
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<tr>
<td>PREREQUISITE:</td>
<td>Consent of program coordinator.</td>
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<tr>
<td>COURSE DESCRIPTION:</td>
<td>A student will work for an electrical contractor (sponsor), as a paid employee. These courses are designed to provide students with practical job site experience, so as to permit them to contribute effectively for their subsequent employers, immediately upon graduation. Both of these courses may be undertaken with a single employer.</td>
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<tr>
<td>COURSE STRUCTURE:</td>
<td>Each co-op student’s job site experience will be facilitated by means of a cooperative agreement between a local electrical contractor and the educational institution. This partnership will allow students to utilize and refine skills learned in the educational process. All work is to be performed in accordance with industry standards, and will be jointly supervised by the employer and a faculty member from the degree program.</td>
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It is generally expected that the co-op training will involve office-type activities, and that students will typically work in a construction management application. Upon graduation, many students will be employed in the specialized area of electrical construction management. The nature of this degree curriculum provides students with a good in-depth understanding of the electrical contracting industry. In some instances it may be desirable that students obtain some skills in the electrical technology area, which may be facilitated by having the student become an assistant to the foreman, for some portion of the co-op training.

At the discretion of the program coordinator, a student’s prior work experience may be used to satisfy some, or all, of these co-op requirements.

<table>
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<tr>
<th>GRADING:</th>
<th>A student’s grade will be determined by:</th>
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<tbody>
<tr>
<td>1.</td>
<td>A written evaluation by their industrial supervisor.</td>
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<tr>
<td>2.</td>
<td>A report written by the student detailing their activities, and experience gained.</td>
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<tr>
<td>3.</td>
<td>Assessment by the faculty supervisor.</td>
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</tbody>
</table>
COURSE SYLABUS

COURSE TITLE: SPEECH COMMUNICATIONS

FORMAT:  2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE:  None.

COURSE DESCRIPTION: This course helps the student develop appropriate and effective methods for delivering an oral presentation. The course also develops the skills needed to permit an individual to effectively participate in one-to-one communication experiences.

COURSE TOPICS: Understanding the Nature of Communication (1.5 hours)
Emotion and Confidence
Making Contact with Your Audience (2 hours)
Communication Apprehension
Audience Attention
Organizing and Outlining the Speech (4 hours)
Selecting a Topic
Supporting Material
Planning the Topic
Introducing and Conducting the Speech
Effective Use of Language (4 hours)
Focusing Your Mind
Achieving the Desired Impact
Developing Effectiveness in Oral Style
Midterm Exam: (1 hour)
Delivering the Speech (7 hours)
Place and Audience
Use of Voice
Audio-Visual Aids (4 hours)
Types of Aids
Rules for Preparation and Presentation
Communicating on the Interpersonal Level (7 hours)
Active Listening
Conflict Resolution
Information Gathering
Group Communications (7 hours)
  Preparing for Discussion
  Group Interaction
  Discussion Leadership

GRADING:
  Homework Assignments: 10%
  Class presentations/exercises: 30%
  Midterm: 30%
  Final Exam: 30%
COURSE SYLABUS

COURSE TITLE: ELECTRICAL CONSTRUCTION BID PROCESS

FORMAT: 2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE: Estimating for Electrical Contractors, or consent of instructor.

COURSE DESCRIPTION: At the conclusion of this course students will have a thorough understanding of the bid process, as pertaining to electrical contractors. Students will prepare all documents required for a successful bid submission.

COURSE TOPICS:

Bidding Procedures (13 hours)
Prime versus Subcontract Bidding
Public vs. Private
Negotiated Bid/Pricing
Advertisements
Notices/Invitation to Bid
Instructions to Bidder
Qualifying Bidders
Bidding Period
Deciding to Bid
Risks in Estimating
Pre-Bid Meetings and Other Considerations

Midterm: (1.5 hours)

Bid Documents (10 hours)
The Bid Proposal
Bid Form
Bid Bond
Performance Bond

Contract Terms (13 hours)
Payment Terms
Request for Payment
Requests for Information
Change Orders
Indemnification
Insurance Requirements
Schedule
Safety
Clean Up
GRADING:

Homework Assignments: 25%
Midterm: 30%
Final Exam: 45%
COURSE SYLABUS

COURSE TITLE: PROJECT MANAGEMENT AND LABOR RELATIONS

FORMAT: 2.5 hours of lecture per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE: Organizational Behavior and Management, or consent of instructor.

COURSE DESCRIPTION: This course introduces the student to all aspects of practical job site management, including the roles and functions of various individuals, and groups. Pertinent labor issues are also examined.

COURSE TOPICS: The Scheduling Process (8 hours)
  Overall Impact of Scheduling on the Job
  Relations with General Contractors and Owners
  Scheduling Techniques
  Critical Events/Factors
  Scheduling Software

  Resource Control (8 hours)
    The Project Manager
    Project Management Software
    Project Management/Information flow via the Internet
    Other personnel and their Functions
    Material Control
    Equipment/Tool Control
    Labor Utilization
    Job Functions by Category

  Cost Control (6 hours)
    Estimated Cost
    Projected Cost
    Actual Cost
    Cost Control Options
    Claims Management

  Midterm: (1.5 hours)

  Quality Control (6 hours)
    QA/QC Programs
    TQM
    A Quality Control Plan
    Quality Control and the Contract Document
    Individuals’ Responsibilities
Safety (4 hours)
  Importance of a Good Safety Record
  OSHA and Compliance with All Safety Regulations
  Key Elements of a Job Site Safety Program
  A Drug Free Job Site

Labor Issues (4 hours)
  Historical Overview
  Jurisdictional Disputes/Protection
  Benefits of Union Membership to a Craftsman
  Assured Quality with Union-Backed Apprentice Programs

GRADING:
Homework Assignments: 25%
Midterm: 30%
Final Exam: 45%
COURSE SYLABUS

COURSE TITLE: ELECTRICAL CAPSTONE EXPERIENCE

FORMAT: 2.5 hours of classroom activities per week, for 15 weeks, for a total of 37.5 hrs.

PREREQUISITE: Student must be within 15 hours of graduation, or have consent of instructor.

COURSE DESCRIPTION: The capstone course integrates topics from all coursework comprising the degree. At the completion of the course a student will have a thorough understanding of all aspects of the electrical contracting industry.

COURSE STRUCTURE: The electrical capstone course is a synergistic, campus-based learning experience utilizing all aspects of the curriculum. Students will work on a number of projects, both individually and in a team-based environment. The emphasis will be on synthesis, analysis, process review, and problem solving, in as realistic conditions as possible. Special emphasis will be placed on the integration of fundamental skills, such as math, English, and speech, into the projects.

Projects will incorporate all of the necessary elements of a successful job, including: estimating, bidding, scheduling, project management, and safety. Scheduling issues will be a focus of the course, owing to their significant impact on the outcome of a job. As an example, a typical student project would begin with a notice to bid, with students then working through the complete process resulting from a successful bid. Another group of students would represent the electrical contractor. Actual industry bids and the resulting jobs will be used as case studies.

This course may be taught effectively, using a guest lecturer from the industry, or team-taught in this way with a faculty member.

GRADING: Written project outcome (4 @ 20% each): 80%
Oral presentations and negotiating: 20%