

College of Micronesia – FSM
P.O. Box 159
Kolonia, Pohnpei

Course Modification Request

VBM 102 Building Maintenance II
 Course Number and Title

Technology and Trade
 Department

Same as above
 Recommended Course Title and Number

Same as above
 Department

New Course Description:
 Same as approved

New Course Objectives:

This course introduces the students to the fundamentals of electrical theories and residential wiring. It will also enable students to follow safety rules and regulations including the proper handling of tools, materials and equipment. Students will splice/joint electrical conductors, use electrical measuring instrument, perform wiring installation and will also learn to troubleshoot and repair electrical circuit.

Revision/s Requested:

Request 1 is to revise the course content of VBM 102 into more simplified and skill oriented topics.

Justification:

The purpose of modifying VBM 102 is to make the course more skill oriented. Students will benefit more from a skill oriented course than from the more theoretical present structure which emphasizes topics that are not relevant for the building maintenance.

Request 2 is to change the textbook to Modern Residential Wiring, Based on 1999 NEC, Holzman, Harvey N., The Goodheart-Willcox Company, Inc., Tinley Park Illinois.

Justification:

Since the requested textbook covers most of the topics in the revise course content, we therefore recommend it for students' use.

 /s/
 Gardner Edgar

 12/8/05
 Date

 Chairperson, Curriculum Committee

 Date

 President, COM –FSM

 Date

Course Outline Cover Page

Building Maintenance II

Course Title

VBM 102

Department and Number

Course Description: This course is designed to provide the students with the basic skills necessary to properly install individual electrical circuits in a building and will also cover the use of essential hand and power tools. It is also designed to provide the students with the basic knowledge required for properly using a meter for testing faulty devices and troubleshooting electrical circuit.

Prepared by: Cirilo Recana

State: Pohnpei Campus

| | Hours per Week | No. Of Weeks | Total Hours | Semester Credits |
|-------------------------|----------------|--------------|-------------|------------------|
| Lecture | 3/6 | 16/8 | 48 | 3 |
| Laboratory | 3/6 | 16/8 | 48 | 1 |
| Total Semester Credits: | | | | 4 |

Purpose of Course

| | |
|----------------------|----|
| Degree Requirement | |
| Degree Elective | |
| Advanced Certificate | |
| Certificate | XX |
| Apprentice | XX |
| Remedial | |
| Other (Workshop) | |

Prerequisite Course(s): VSP 153a Industrial Safety

Signature, Chairman, Curriculum Committee

Date Approved by Committee

Signature, President, COM-FSM

Date Approved by the President

General Objectives: This course introduces the students to the fundamentals of electrical theories and residential wiring. It will also enable students to follow safety rules and regulations including the proper handling of tools, materials and equipment. Students will splice/joint

electrical conductors, use electrical measuring instrument, perform wiring installation and will also learn to troubleshoot and repair electrical circuit.

Learning Outcomes: Upon successful completion of this course students will be able to:

1. Apply safety rules and regulations in electrical works as per OSHA.
2. Identify basic hand tools and power tools and its uses.
3. Perform wire splices and joints commonly used in the electrical installation.
4. Describe the basic concept of voltage, current, resistance, and its relationship to electrical circuit.
5. Calculate electrical circuit quantities using fundamental laws.
6. Perform electrical testing and measuring using analog and digital multimeter in troubleshooting electrical circuit.
7. Identify wiring materials needed for electrical installations as per NEC requirements.
8. Install common residential wiring layouts.
9. Troubleshoot and repair electrical circuits for residential wiring.

Course Content: This course contains:

1. Safety
 - a. Electrical accidents
 - b. Electrical fire
 - c. Safety colors
2. Hand tools and Power tools
 - a. Tool identification
 - b. Tool usage
 - c. Tool maintenance
3. Wire splices and joints
 - a. Conductors and insulators
 - b. Types of splices and joints
 - c. Uses of splices and joints
4. Concepts of voltage, current and resistance
 - a. Electron theory
 - b. Voltage and Current
 - c. Methods of producing electricity
 - d. Alternating and Direct current
 - e. Passive and Active devices
 - f. Basic component of electric circuit
5. Electrical circuit quantities using the fundamental laws.
 - a. Ohm's Law applied in series, parallel, and Series-parallel circuit
 - b. Ohm's law and Power Law in series, parallel, and Series-parallel circuit
 - c. Voltage drop and voltage divider circuit
 - d. Current divider circuit
6. Electrical testing and measuring using analog and digital multimeter in trouble shooting electrical circuit.

- a. Types of electrical testing and measuring instruments
- b. Types of multimeter
- c. Parts and function of multimeter
- d. Analog scale reading
- e. Circuit testing
7. Electrical wiring materials
 - a. Boxes and fittings
 - b. Types of switches
 - c. Fuse & Circuit breakers and Ratings
 - d. NEC provisions on wiring materials
 - e. Wiring methods
8. Wiring Layouts for residential wiring
 - a. Types of wiring circuits
 - b. Single-pole switch and light fixture
 - c. Single-pole switch with duplex receptacle
 - d. Ganged single-pole switch controlling separate lighting fixture
 - e. Three-way switches and lighting fixture between switches
 - f. Four-way, three-way switches and lighting fixture
9. Troubleshooting electrical circuit for residential wiring
 - a. ground fault
 - b. open circuit
 - c. short circuit

Learning Outcomes: On completion of this course the learner will be able to:

Learning Outcome 1: Apply safety rules and regulations in the electrical works.

- Assessment Criteria:
- a. Demonstrate knowledge of the nature and effects of electric shock.
 - b. Prevent and provide treatment for electric shock.
 - c. Specify how to work on an energize circuit.
 - d. Identify fire hazards in the work area.
 - e. Recognize safety colors
 - f. Apply hand and power tool precautions.

Assessment Methods:

- Oral questioning
- Multiple choice questions
- Short answer test

Learning Outcome 2: Identify basic hand tools and power tools and its uses.

- Assessment Criteria:
- a. Classify basic hand and power tools.
 - b. Describe the types of task performed with each tool and its proper use.
 - c. Develop proper habit of care and maintenance of hand and power tools.

Assessment Methods:

- Short answer test
- Active participation in group activity

Learning Outcome 3: Perform wire splices and joints commonly used in the electrical installation.

Assessment Criteria:

- a. Identify wire splices and joints commonly used in electrical installation.
- b. Describe how wire splices and joints are done and their purpose.
- c. Perform wire splices and joints such as:
 1. pigtail splice
 2. tap joint
 3. western union splice
 4. fixture joint
- d. Apply safe practices when working with electrical devices.

Assessment Methods: Short answer test
Practical exercises

Learning Outcome 4: Describe the basic concept of voltage, current, resistance and its relationship to electrical circuit.

Assessment Criteria:

- a. Discuss electron theory
- b. Describe six methods of producing electricity
- c. Differentiate alternating and direct current
- d. Describe the make-up of an electrical circuit
- e. Differentiate series and parallel circuit
- f. Explain electromagnetic induction
- g. Discuss operation of transformer and electric motors

Assessment Methods: Multiple choice questions
Short answer test

Learning Outcome 5: Calculate electrical circuit quantities using fundamental laws.

Assessment Criteria:

- a. Explain the fundamentals of Ohm's and Power's laws
- b. Apply the fundamental laws to resistance, voltage and current
- c. Perform practical experiments.

Assessment Methods: Multiple choice questions
Computer manage activities

All works must ensure that safe practices are applied.

Learning Outcome 6. Perform electrical testing and measurement using analog and digital multi-meter in trouble shooting electrical circuits.

Assessment Criteria:

- a. Discuss the design of various electrical measuring instruments.
- b. Identify types of multimeter
- c. Describe the functional section and purpose of multimeter.
- d. Read analog multimeter scale
- e. Perform experiment in the use of multimeter

Assessment Methods:

Written test
Computer manage test
Computer aided activities

All works must ensure that safe practices are applied.

Learning Outcome 7:

Identify materials needed for electrical wiring installation.

Assessment Criteria:

- a. Identify boxes, fittings and other accessories.
- b. Identify switches and schematic symbols.
- c. Describe function of each type of switches.
- d. Differentiate fuse and circuit breakers.
- e. Enumerate provisions on the use of switches, breakers, boxes and fittings.
- f. Identify wiring methods used in electrical installation.

Assessment Methods:

Short answer test
Identification test
Practical exercises

All works must ensure that safe practices are applied.

Learning Outcome 8:

Install common residential wiring layout.

Assessment Criteria:

- a. Read and interpret electrical wiring circuit.
- b. Perform wiring installation of lighting fixtures using single-pole, three-way switch operation.
- d. Perform wiring installation of lighting fixtures and duplex receptacles controlled by switches.
- e. Practice safety work habits in working with electrical task.

Assessment Methods:

- a. Written and oral test
- b. Practical/Hands-on exercises
- c. Active participation in group activity.

All works must ensure that safe practices are applied.

Learning Outcome 9:

Troubleshoot and repair electrical circuit for residential wiring.

Assessment Criteria:

- a. Perform testing for ground fault

- b. Perform testing for open circuit
- c. Perform testing for short circuit

Assessment Criteria:

- a. Oral and written test
- b. Practical/Hands-on exercises

All works must ensure that safe practices are applied.

Required Course Materials:

1. Instructor:

- a. Classroom/Workshop with whiteboard or chalkboard
- b. Laboratory equipment with tools of the trade
- c. Text, Teacher's Resource Guide, CAI Pro
- d. Overhead projector, transparencies

2. Student:

- a. Text(s), handouts provided by instructor
- b. Ring binder
- c. College ruled note sheet, pencil or pen
- d. Scientific calculator

Textbook: Modern Residential Wiring, Based on 1999 NEC, Harvey N. Holzman

Method of Instruction:

- 1. Computer Aided Instruction
- 2. Practical/Hands-on Activities
- 3. Experimentation

Evaluation: Evaluation will be based on quizzes, exams, and hands-on activities. The final grade for this course will be based on meeting the course requirements at the following percentage rates:

| | |
|------------|-------------------|
| 90% - 100% | A – Superior |
| 80% - 89% | B – Above Average |
| 70% - 79% | C – Average |
| 60% - 69% | D – Below Average |
| 0 % - 59% | F – Failure |

Attendance: The COM-FSM attendance policy will apply.

Academic Honesty: The COM-FSM Academic Honesty policy will apply.