

## Course Outline Cover Page

Business Machine Servicing  
Course Title

VEE225  
Department and Number

**Course Description:**

This course covers the principles of operation and servicing of business machines. It includes the manufacturers' procedures in servicing, systematic procedures in diagnosing faults, repairing of business machines, reassembling and testing repaired business machines according to industry standards.

**Prepared by:** Dr. Nelchor T. Permitez

**State:** Pohnpei Campus

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

**Purpose of Course:**

|                      |               |
|----------------------|---------------|
| Degree Requirement   | _____ X _____ |
| Degree Elective      | _____         |
| Advanced Certificate | _____         |
| Certificate          | _____         |
| Remedial             | _____         |
| Other (Workshop)     | _____         |

**Prerequisite Course(s):** VEE135

\_\_\_\_\_  
**Signature, Chairman, Curriculum Committee**

\_\_\_\_\_  
**Date Approved by Committee**

\_\_\_\_\_  
**Signature, President, COM-FSM**

\_\_\_\_\_  
**Date Approved by the President**

## I. Course Learning Outcomes

A. General Objective: This course is designed to introduce students to the principles of operation and servicing of business machines using manufacturers' service manuals. Students will be exposed to actual mechanical assembly and disassembly, perform actual maintenance procedures and troubleshoot business machine circuitry.

B. Specific Objectives: Upon successful completion of this course students will be able to service and repair:

1. Fax Machines
2. Computer Printers (Laser & Desk Jet)
3. Cash Registers
4. Photocopiers
5. Microwave Ovens

**Note:** Refer to the Required Course Materials section for the specific brand & model types of the above equipment.

## II. Outline of Course Content

### 1. *Fax Machines*

1. Principles of operation
2. Parts and functions
3. Use of service manual and parts reference book
4. Maintenance procedures
5. Service and repair procedures
6. Fax machine faults
7. Symptoms, analysis and diagnosis
8. Assemble and disassemble

### 2. *Computer Printers*

1. Principles of operation
2. Parts and functions
3. Use of service manuals and parts reference book
4. Maintenance procedures
5. Service and repair procedures
6. Computer printers faults
7. Symptoms, analysis and diagnosis
8. Assemble and disassemble

### 3. *Cash Registers*

1. Principles of operation
2. Parts and functions
3. Use of service manual and parts reference book
4. Maintenance procedures
5. Service and repair procedures
6. Cash Register machine faults
7. Symptoms, analysis and diagnosis
8. Assemble and disassemble

### 4. *Photocopier*

1. Principles of operation
2. Parts and functions
3. Use of service manual and parts reference book
4. Maintenance procedures
5. Service and repair procedures
6. Photocopier machine faults
7. Symptoms, analysis and diagnosis
8. Assemble and disassemble

### 5. *Microwave Ovens*

1. Principles of operation
2. Parts and functions
3. Use of service manual and parts reference book
4. Maintenance procedures
5. Service and repair procedure
6. Microwave oven faults
7. Symptoms analysis and diagnosis
8. Assemble and disassemble

***STUDENTS WILL BE MADE AWARE OF  
OCCUPATIONAL HEALTH AND SAFETY ISSUES IN ALL  
SITUATIONS AND BE EXPECTED TO DEMONSTRATE  
SAFE WORKING PRACTICES AT ALL TIMES***

### III. Textbook

- ❖ Multifunction Peripherals for PCs: Technology and Troubleshooting and Repair by Marvin Hobbs, ISBN 0750671254, January 2000.
- ❖ Troubleshooting and repairing Microwave Ovens by Homer L. Davidson, ISBN 0070157677, Nov 1996.
- ❖ Professional photocopier Troubleshooting and Repair by Eric Kuaimoku, ISBN 0830643087, August 1993.

### IV. Required Course Materials

#### Instructor:

- a. CAI Classroom with whiteboard or chalkboard
- b. Laboratory equipment with tools of the trade
  - b.1 Tools
    - Screw driver set (positive and negative)
    - Pliers (Long nose, Side cutters and Linesman)
    - De-soldering pump
    - Flexible Claw
    - DMM (Digital Multi-meter)
    - Analog Multi-meter
  - b.2 Equipment
    - PANASONIC Fax Machine Model : KX-F1000
    - HP Laser Jet Model: 2200DP
    - HP Desk Jet Model: 710C
    - SHARP Cash Register Model: ER-A410
    - CANON Copier Model: PC795
    - WHIRLPOOL Model: XT-20ES

[**Note:** If these specific brands & models are not available, current or similar existing models can be utilized.]

- b.3 Protective gears
  - Face mask
  - Workshop apron
- c. Text, Teacher's Resource Guide and workbook
- d. Overhead projector and transparencies

#### Student:

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

- d. Scientific calculator
- e. Toolkit

V. Reference Materials

- ❖ Service manuals of Sharp Cash Register
- ❖ Service manuals of Panasonic Photocopier
- ❖ Service Manual of Panasonic Fax Machine
- ❖ Service Manual of Panasonic Microwave Oven
- ❖ Fax machine maintenance and repair video
- ❖ NTE Electronic Inc., Semiconductors: Technical Guide & Cross Reference, 12<sup>th</sup> Edition, 2005 ([www.nteinc.com](http://www.nteinc.com))
- ❖ Texas Instruments, TTL Logic Data Book, 1999
- ❖ [www.dogpile.com](http://www.dogpile.com)

VI. Instructional Cost

Refer to attached list of materials and equipment.

VII. Methods of Instruction

1. Computer Aided Instruction
2. Practical/Experimentation
3. Lecture/Demonstration
4. Troubleshooting of Business Machines

VIII. Evaluation

Final Grade for this course will be based on meeting the course requirements at the following percentage rates as established by the College:

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

Credit-by-examination is not available for this course.

IX. Attendance Policy

The COM-FSM attendance policy will apply.

X. Academic Honesty

The COM-FSM academic honesty policy will apply.

XI. Assessment Criteria

Learning Outcome 1: Service and Repair Fax Machine

- Assessment Criteria:
- a. Explain the principles and operations of a fax machine.
  - b. Identify the parts and functions using service manual.
  - c. Perform maintenance procedures by following service manual.
  - d. Set-up the machine for service and repair using service manual.
  - e. Identify common faults/ trouble based on service manual.
  - f. Use reference materials to identify and find parts replacements/substitutions.
  - g. Apply symptoms analysis and diagnosis using service manual.
  - h. Assemble and disassemble using service manual.

Assessment Methods: Multiple Choice Questions  
Short answer Questions  
Observation  
Performance test

Learning Outcome 2: Service and Repair Computer Printers

- Assessment Criteria:
- a. Explain the principles and operations of the Laser and DeskJet printers.
  - b. Identify the parts and functions using service manuals.
  - c. Perform maintenance procedures by following service manuals.
  - d. Set-up the machines for service and repair using service manuals.
  - e. Identify common faults/ trouble based on service manuals.
  - f. Use reference materials to identify and find parts replacements/substitutions.
  - f. Apply symptoms analysis and diagnosis using service manuals
  - g. Assemble and disassemble using service manuals

Assessment Methods: Multiple Choice Questions  
Short answer Questions  
Observation  
Performance test

Learning Outcome 3: Service and Repair Cash Register

- Assessment Criteria:
- a. Explain the principles and operations of a cash register machine.

- b. Identify the parts and functions using service manual.
- c. Perform maintenance procedures by following service manual.
- d. Set-up the machine for service and repair using service manual.
- e. Identify common faults/ trouble based on service manual.
- f. Use reference materials to identify and find parts replacements/substitutions.
- g. Apply symptoms analysis and diagnosis using service manual.
- h. Assemble and disassemble using service manual

Assessment Methods: Multiple Choice Questions  
 Short answer Questions  
 Observation  
 Performance test

Learning Outcome 4: Service and Repair Photocopier Machine

- Assessment Criteria:
- a. Explain the principles and operations a photocopier machine.
  - b. Identify the parts and functions using service manual.
  - c. Perform maintenance procedures by following service manual.
  - d. Set-up the machine for service and repair using service manual.
  - e. Identify common faults/ trouble based on service manual.
  - f. Use reference materials to identify and find parts replacements/substitutions.
  - g. Apply symptoms analysis and diagnosis using service manual.
  - h. Assemble and disassemble using service manual

Assessment Methods: Multiple Choice Questions  
 Short answer Questions  
 Observation  
 Performance test

Learning Outcome 5: Service and Repair Microwave Oven

- Assessment Criteria:
- a. Explain the principles and operations of a microwave oven.
  - b. Identify the parts and functions using service manual.
  - c. Perform maintenance procedures by following service manual.
  - d. Set-up the machine for service and repair using service manual.
  - e. Identify common faults/ trouble based on service manual.
  - f. Use reference materials to identify and find parts replacements/substitutions.
  - g. Apply symptoms analysis and diagnosis using service manual.
  - h. Assemble and disassemble using service manual.

Assessment Methods: Multiple Choice Questions  
Short answer Questions  
Observation  
Performance test