

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

## Course Outline Cover Page

**Brakes, Steering, Suspension, and Wheel Alignment**

Course Title

**VTM 104**

Department and Number

**Course Description:** This course covers operation and repair of drum/disc type brake systems. Topics include brake theory, concepts related to design, diagnosis and repair of power assist systems, manual and anti-lock brake systems. It also deals with the theory and operation of automotive suspension and steering systems including wheel problem diagnosis, component repair, and alignment procedures. The subjects contained in this course were carefully selected to establish a firm understanding of the relationship of these systems for the student to obtain an understanding of how each system affects the operation of the other when making diagnosis of faults that may occur.

**Prepared by:** Pablo H. Lamsis, Jr.

**State:** Pohnpei Campus

	<b>Hours per Week</b>	<b>No. Of Weeks</b>	<b>Total Hours</b>	<b>Semester Credits</b>
Lecture	3	16	48	3
Laboratory	3	16	48	1
Total Semester Credits:				4

**Purpose of Course**

Degree Requirement \_\_\_\_\_

Degree Elective \_\_\_\_\_

Advanced Certificate \_\_\_\_\_

Certificate \_\_\_\_\_

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Remedial \_\_\_\_\_

Other (Workshop) \_\_\_\_\_

**Prerequisite Course(s):** VTM 101, VTM 102 & VTM 103

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

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

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

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

**I. LEARNING OUTCOMES:**

**A. General Learning Outcomes:** Upon successful completion of this course, students will competently be able to:

1. Explain the theory of brakes operation and hydraulic principles.
2. Perform brake system diagnosis, brake bleeding, vacuum booster testing, anti-lock brake service, and road test procedures.
3. Define steering column and linkage fundamentals, manual and power steering theory, theory of suspension system, and wheel alignment fundamentals.

**B. Specific Learning Outcomes:** On completion of this course, students will be able to:

**Learning Outcome 1: Explain the theory of brakes operation and hydraulic principles.**

- Assessment Criteria:
- a. Explain hydraulic brakes principles of operation.
  - b. Explain how power brakes work in conjunction with disc and drum brakes.

Assessment Method: Multiple choice questions  
Short answer questions  
Practical exercises/tests

**Learning Outcome 2: Perform brake system diagnosis, brake bleeding, vacuum Booster testing, anti-lock brake service and road test procedures.**

- Assessment Criteria:
- a. Demonstrate how to diagnose brake problem, how to bleed the brakes equipped with brake vacuum booster.
  - b. Describe basic steps in performing maintenance of anti-lock brakes system.
  - c. Describe procedures how to perform a road brake test.

Assessment Method: Multiple choice questions  
Short answer questions  
Practical exercises/tests

**Learning Outcome 3: Define steering column and linkage fundamentals, manual and power steering theory, theory of suspension system and wheel alignment fundamentals.**

- Assessment Criteria:
- a. Explain how a manual steering system functions.
  - c. Explain how power steering works.

- d. Describe using a block diagram how the steering components are connected.
- e. Define suspension theory.
- f. Give examples of diagnosis relating to suspension faults.
- g. Explain the principles of wheel alignment.
- h. Define procedures in performing 4 wheel alignment.

Assessment Method      Multiple choice questions  
Short answer questions  
Practical exercises/tests

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

## II. COURSE CONTENTS:

1. Brake operation principles
  - Brake theory and hydraulic principles
  - Disc and drum brakes operation
  - Power brakes theory
2. Brakes system diagnosis and repair
  - Brake system problem diagnosis
  - Bleeding procedures
  - Vacuum booster testing
  - Anti-lock brake service
  - Road test procedure
3. Fundamentals of steering; manual and power steering
  - Conventional steering linkage mechanism
  - Rack and pinion steering
4. Theory of suspension system
  - Independent and non-independent suspension
  - Conventional shock absorbers and MacPherson struts
  - i. Suspension system diagnosis and repair
    - Diagnosis relating to suspension systems
    - R&R ball joints and springs

- Wheel alignment fundamentals
- Principles of wheel alignment
- Four wheel alignment

**III. TEXTBOOK:**

*Modern Automotive Technology, Duffy, 2003*

**IV. REQUIRED COURSE MATERIALS:****1. Instructor:**

- a. Classroom with whiteboard
- b. Laboratory equipment with tools of the trade
- c. Text, Teacher's Resource Guide, workbook
- d. Computer, Overhead projector, transparencies

**2. Student:**

- a. Text(s), handouts provided when deemed necessary by the Instructor
- b. Ring binder
- c. College ruled note sheet, pencil or pen
- d. Tool Kit

**V. REFERENCE MATERIALS:**

*Modern Automotive Technology, James Duffy*

*How Stuff Works, [www.howstuffworks.com](http://www.howstuffworks.com)*

*Manufacturer's Service Manuals*

*Selected Films and Charts from Various Sources*

**VI. METHODS OF INSTRUCTION:**

Computer Aided Instruction  
Practical/Experimentation  
Lecture/Demonstration

**VII. EVALUATION:**

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

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

**VIII. ATTENDANCE POLICY:**

The COM-FSM attendance policy will apply.

**IX. ACADEMIC HONESTY POLICY:**

The COM-FSM attendance policy will apply.