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COURSE OUTLINE**

**VEHICLE OPERATION**

Course Title

**AM - 101**

Dept. & Course No.

**I COURSE DESCRIPTION**

This course covers the knowledge, skills and attitude needed to operate light duty vehicles classified under Palau Public safety restriction code A to C and comply with local traffic rules and regulation. It also includes vehicle minor repairs and servicing on under chassis components, power train lubrication, engine lubrication and engine cooling system.

**II SEMESTER CREDITS: 2**

**III CONTACT HOURS PER WEEK:**

<u>1</u>	<u>3</u>	<u>4</u>
Lecture	Laboratory	Total

**IV PREREQUISITE: None**

**V STUDENTS LEARNING OUTCOME**

Upon completion of this course the student will be able, with 65% level of accuracy, to:

- 1.) Name Under hood Components and explain their functions and specifications.

**VI. COURSE CONTENT**

**A. Under-hood components**

1. Engine oil level and quality
2. Engine coolant level and quality
3. Air filter and their condition
4. Types of drive belts and their specification
5. Automotive Battery and their specification
6. Water pipe and hoses
7. Radiator cap and tank
8. Vacuum hoses
9. Automatic transmission oil level
10. Types and class of brake fluids
11. Types of coolant
12. Types of windshield washer
13. Types and classification of Automatic transmission fluid
14. Types and classification of engine lubricants
15. Types and classification of automotive gear oils
16. Types and classification of automotive grease
17. Battery fluid

## 18. Power steering fluid

- 2.) Inspect Under hood Components in a correct procedure.
  - B. Under hood specifications
    1. Vehicle preventive maintenance schedule
    2. Brake fluid quality
    3. Engine oil viscosity index and quality
    4. Transmission oil viscosity index and quality
    5. Power steering fluid quality
    6. Spark plug and high tension wires performance
    7. Fuel lines and filter condition
    8. Battery voltage and performance
    9. Drive belt tension
    10. Fuses condition
    11. Head light connection
    12. Engine air duct and air filter condition
    13. Vacuum line condition
    14. Radiator, fins, hoses, and cap
    15. Engine coolant ratio
    16. Radiator fan and motor condition
  - C. Main vehicle components
    1. Brake system
    2. Suspension system
    3. Steering system
    4. Lighting system
    5. Power train units
    6. Engine mechanical system
    7. Wheel alignment
  - D. Main components specification
    1. Brake efficiency
    2. Suspension parts and components performance
    3. Steering parts and components performance
    4. Light bulbs and fuses specification
    5. Transmission stall performance
    6. Drive shaft conditions and performance
    7. Engine compression pressure
    8. Engine performance (idling, acceleration, and power)
    9. Tire condition (tire wear type and condition)
- 3.) Name vehicle main components and explain their functions and specification's.
- 4.) Inspect vehicle main components in correct procedure.

5.) Name vehicle cleaning material and explain their uses and specifications.

6.) Clean vehicle unit in a correct procedure.

7.) Explain traffic signs, rules and road markers used in Republic of Palau and in some foreign countries.

8.) Show road courtesy

9.) Obey and observe traffic rules and regulation as per PNC code specification.

10.) Explain the procedures in warming-up the engine.

E. Vehicle cleaning materials

- a. Tire cleaner
- b. Plastic cleaner
- c. Wax
- d. Engine cleaner/degreaser
- e. Upholstery and carpet cleaner
- f. Windshield cleaner
- g. Head light cleaner

F. Vehicle unit cleaning materials specification

- a. Cleaning carpet
- b. Cleaning tire and rims
- c. Waxing body panel
- d. Cleaning engine and compartment
- e. Cleaning upholstery
- f. Cleaning windshield
- g. Cleaning dash board and plastic materials

G. International traffic rules and signs

1. Traffic signs and road markers
2. Traffic rules and regulations

H. Road courtesy

1. Space
2. Respect
3. Patience
4. Foresight
5. Respectful
6. Good etiquette
7. Mutual respect

I. Traffic rules and regulation as per PNC code specification.

1. Obey traffic signs and road markers
2. Obey traffic rules and regulations
3. Demonstrate road courtesy

J. Procedures in warming-up the engine.

1. Positioning the shift lever to N or P ranges
2. Positioning the shift lever to neutral position
3. Checking engine coolant quantity and quality
4. Checking hoses for cracks and leakage
5. Checking engine oil quality and quantity
6. Checking engine oil for leakage
7. Checking cranking performance



8. Checking engine performance (idling with and without air-con, acceleration, power, and sounds)
  9. Checking engine temperature
  10. Checking radiator fan and condenser fan
- 11.) Explain switch controls, panel gauges functions, and signs used in a vehicle.
- 12.) Demonstrate defensive driving and dealing with maneuvering problems.
- K. Switch controls, panel gauges functions, and signs used in a vehicle.
    1. Battery charging
    2. Hand brake / brake signs
    3. Check engine light
    4. Signal and hazard light
    5. Head light (high and low beam)
    6. Temperature gauge
  - L. Defensive driving and dealing with maneuvering problems.
    1. Three seconds rule
    2. Physics on curved lines
    3. Inertia and momentum when braking
    4. Clear distance ahead
    5. special road and weather conditions
    6. Speed control

## VII MATERIALS AND EQUIPMENT

<b>Materials</b>	<b>Equipments</b>
Engine oil (gas)	Crocodile jack 3 ton
Engine oil (diesel)	Vehicle sedan type
Engine coolant	Vehicle pick-up 4x4
Brake fluid	Jack stand
Transmission gear oil	Rubber stopper
Power steering fluid	Car lifter
Windshield washer fluid	
Automatic transmission fluid	
Differential gear oil	
Automotive grease	
Sandpaper # 120	
Sand paper # 1000	
Gasoline fuel	
Diesel fuel	
Cleaning carpet	
Cleaning tire and rims	
Waxing body panel	
Cleaning engine and compartment	
Cleaning upholstery	
Cleaning windshield	
Cleaning dash board and plastic materials	

VIII TEXT AND REFERENCES

A **Required Text:**

James E. Duffy, **Modern Automotive Technology**, Tinley Park Illinois,  
GOODHEART-WILLCOX COMPANY, INC. 2004  
ISBN-10: 1-59070-186-0  
ISBN-13: 978-1-59070-186-7

PNC (Palau National Code) booklet title 42

IX METHOD OF INSTRUCTION

- A. Lecture
- B. Visual Aid
- C. Demonstration
- D. Discussion

X METHOD OF EVALUATION:

- 1.) The components with corresponding weight in percent included in the computation of the final grade are:

Course work (quizzes / class works / homework / projects) .....	30%
Skill Tests .....	40%
Exam (Midterm and final exam) .....	30%
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	100%

- 2.) The transmutation of the total percent to a letter grade is as of follows:

90 – 100 .....	A
80 – 89 .....	B
70 – 79 .....	C
65 – 69 .....	D
0 – 64 .....	F



**Form NC-2  
TASK LISTING SHEET**

**AM-101 VEHICLE OPERATION**

Course No. & Title

Credits:    1            1            48  
                  Lec.        Lab        Total lab hours

Laboratory objectives	Time allotment
<p><b>1.) Inspect Under hood Components in a correct procedure.</b></p> <ul style="list-style-type: none"> <li>a. Inspect engine lubrication system, cooling system for quality and quantity, and check air induction system for restriction.</li> <li>b. Check ignition system, starting system, charging system for functionality.</li> <li>c. Inspect windshield washers, brake components, and power steering components for functionality.</li> <li>d. Check drive belts tension and condition.</li> </ul>	10 hours
<p><b>2.) Inspect vehicle main components in correct procedure.</b></p> <ul style="list-style-type: none"> <li>a. Inspect brake system, suspension system, and steering system for good working condition.</li> <li>b. Inspect Lighting system, Power train units, and Engine mechanical system for functionality.</li> <li>c. Check engine compression pressure, engine power, acceleration, and idling performance.</li> <li>d. Check tire wear pattern and condition.</li> </ul>	15 hours
<p><b>3.) Clean vehicle unit in a correct procedure.</b></p> <ul style="list-style-type: none"> <li>a. Clean engine compartment, windshield, passenger's compartment, upholstery and outside body panel in a correct procedure.</li> <li>b. Clean outside body panel, rims, tires, aluminums, plastics, and bull bars in a correct procedure.</li> </ul>	6 hours
<p><b>4.) Show road courtesy</b></p> <ul style="list-style-type: none"> <li>a. Demonstrate respect, patience, and good etiquette to all road users when driving motor vehicle.</li> <li>b. Show space, mutual respect to all road users when driving motor vehicle.</li> </ul>	4 hour
<p><b>5.) Obey and observe traffic rules and regulation as per PNC code specification.</b></p> <ul style="list-style-type: none"> <li>a. Obey and observe traffic rules and regulation as per PNC code specification.</li> <li>b. Obey and observe traffic signs and road markers.</li> <li>c. Obey and observe traffic rules and regulations.</li> </ul>	6 hours

<p><b>6.) Demonstrate defensive driving and dealing with maneuvering problems.</b></p> <ul style="list-style-type: none"><li>a. Establish the Three seconds rule when using the drive way.</li><li>b. Apply Physics when driving on curved lines, and applying brakes.</li><li>c. Clear distance ahead</li><li>d. Demonstrate skills in controlling engine speed and vehicle speed.</li><li>e. Demonstrate defensive driving and maneuvering skills on special road with change weather conditions.</li></ul>	<p>7 hours</p>
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**PALAU COMMUNITY COLLEGE**  
**AM-101 VEHICLE OPERATION**  
**COURSE LEARNING OUTCOMES**

During the course experience, the course learning outcomes (CLO's) will be assessed through the use of signature assignments. A rating scale will be used to determine the students' proficiency level of each CLO using specifically aligned assignments. The numerical ratings of 3, 2, and 1 are not intended to represent the traditional school grading system of A, B, C, D, and F. The descriptions associated with each of the numbers focus on the level of student performance of each of the course learning outcomes listed below:

Rating Scale:

- 3 Highly Competent ..... 85% to 100%
- 2 Competent ..... 70% to 84%
- 1 Beginner ..... Below 70%

**Course learning Outcome #1: Inspect Under hood Components**

**Paper based assessment:** Name under hood components and explain their functions, explain the operating principle of lubrication system, cooling system, air induction system, windshield washer, and explain battery.

**Authentic Assessment:** Change engine oil and filter, check cooling system, check engine drive belts tension, check automotive battery cranking and charging voltage, and/or check brake fluid, windshield washer fluid, automatic transmission fluid level and quality.

Numerical Value	
<b>Highly Competent</b> 3 (10 points)	Student demonstrates the knowledge and skills in inspecting Under-hood Components with 85% to 100% performance accuracy.
<b>Competent</b> 2 (7 points)	Student demonstrates the knowledge and skills in inspecting Under-hood Components with 70% to 84% performance accuracy.
<b>Beginner</b> 1 (3 points)	Student demonstrates the knowledge and skills in inspecting Under-hood Components with below 70% performance accuracy.

**Course learning Outcome #2: Inspect vehicle main components**

**Paper based assessment:** Name vehicle main components and explain their functions, explain the operating principle of brake system, suspension system, steering system, lighting system, and analyze the cause and effect involving vehicle main components failure, and interpret vehicle preventive maintenance schedules.

**Authentic Assessment:** Check suspension components, check steering components, check brake components, check drive train components, and/or check lighting components, panel board gauges, warning lights, instruments panel and control switches.



Numerical Value	
<b>Highly Competent</b> 3 (10 points)	Student demonstrates the knowledge and skills in inspecting vehicle main components with 85% to 100% performance accuracy.
<b>Competent</b> 2 (7 points)	Student demonstrates the knowledge and skills in inspecting vehicle main components with 70% to 84% performance accuracy.
<b>Beginner</b> 1 (3 points)	Student demonstrates the knowledge and skills in inspecting vehicle main components with below 70% performance accuracy.

### Course learning Outcome #3: Clean Vehicle Unit

**Paper based assessment:** Name automotive cleaning materials and explain their uses, and explain Car washing and shampooing procedures.

**Authentic Assessment:** Use cleaning materials correctly, wash vehicle body panel, clean engine compartment, interior panel and/or perform dry clean on carpet and seats.

Numerical Value	
<b>Highly Competent</b> 3 (10 points)	Student demonstrates the knowledge and skills in cleaning Vehicle Unit with 85% to 100% performance accuracy.
<b>Competent</b> 2 (7 points)	Student demonstrates the knowledge and skills in cleaning Vehicle Unit with 70% to 84% performance accuracy.
<b>Beginner</b> 1 (3 points)	Student demonstrates the knowledge and skills in cleaning Vehicle Unit with below 70% performance accuracy.

### Course learning Outcome #4: Obey and Observe Traffic Rules and Regulation

**Paper based assessment:** Explain the significance of traffic sign, road markers and symbols on motorway, and/or explain road courtesy, Palau Public Safety, and International Traffic Rules and Regulation.

**Authentic Assessment:** Obey traffic sign and road markers, show road courtesy, and obey traffic rules and regulation.

Numerical Value	
<b>Highly Competent</b> 3 (10 points)	Student demonstrates the knowledge and skill in obeying and observing Traffic Rules and Regulation with 85% to 100% performance accuracy.
<b>Competent</b> 2 (7 points)	Student demonstrates the knowledge and skills in obeying and observing Traffic Rules and Regulation with 70% to 84% performance accuracy.
<b>Beginner</b> 1 (3 points)	Student demonstrates the knowledge and skills in obeying and observing Traffic Rules and Regulation with below 70% performance accuracy.

**Course learning Outcome #5: Drive Light Duty Vehicle**

**Paper based assessment:** Explain pre-starting and warming-up the engine procedures, explain panel board gauges signs and symbols and/or assess pre-driving checks and adjustments, and explain driving procedures, defensive driving, and coping with car problems.

**Authentic Assessment:** Conduct pre-heating and warm-up engine, drive light duty vehicle equip with manual transmission, drive light duty vehicle equip with automatic transmission, and show defensive driving skills.

<b>Numerical Value</b>	
<b>Highly Competent 3 (10 points)</b>	Student demonstrates the knowledge and skills in driving Light Duty Vehicle with 85% to 100% performance accuracy.
<b>Competent 2 (7 points)</b>	Student demonstrates the knowledge and skills in driving Light Duty Vehicle with 70% to 84% performance accuracy.
<b>Beginner 1 (3 points)</b>	Student demonstrates the knowledge and skills in driving Light Duty Vehicle with below 70% performance accuracy.