

MODULE OUTLINE

AME 205 ELECTRICAL AND ELECTRONIC DIAGNOSTICS

1. CBT Learning Facilitator (Lecturer/Instructor)

Name : Mr Okore-Hanson

Contact Detail : email okorehanson@yahoo.com

Tel: +233-246-127472

2. MODULE INFORMATION

**Group: HND AUTOMOTIVE ENGINEERING YEAR TWO SEMESTER ONE
STUDENTS**

Period: 6 Hours

3. MODULE DESCRIPTION

The module AME 205 Electrical and Electronic Diagnostics is meant to provide students with:

- Electrical and Electronic diagnostic competences (practical skill and insight)
- Ability to issue repair advice
- Ability to provide technical support as a supervisor

4. LEARNING OUTCOMES

A student completing this module successfully is competent to:

- Read and interpret advanced Electrical and Electronic diagrams
- Measure and interpret signal in advanced network
- Issue diagnosis report on Electrical and Electronic systems
- Issue repair advice
- Approach and solve a problem in a logical manner
- Apply theoretical knowledge to isolate less probable causes and zero-in on the actual fault

5. TOPICS TO BE COVERED

- i. Diagnostic Techniques
- ii. Tools and Equipment
- iii. Oscilloscope Diagnostics
- iv. On-board Diagnostics
- v. Sensors and Actuators
- vi. Engine Systems

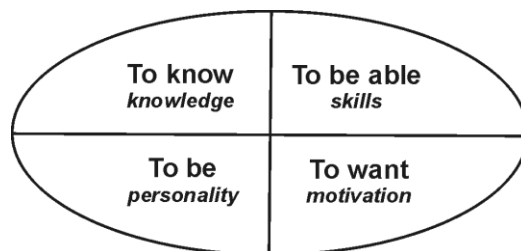
6. INSTRUCTIONAL APPROACH

The HND Automotive Engineering Programme is a Competence Based Training (CBT) programme.

The aim of CBT is to equip you:

- with competences that you need and are relevant to your future profession;
- With knowledge and skills to perform to professional and occupational standards.

Competences go beyond knowledge and skills. A competence consists of four integrated components:



The HND Automotive Engineering Programme is build up from practical challenges. A practical challenge is a task taken from the actual day-to-day practice of an HND Automotive Engineer. Becoming competent or developing competences is a matter of learning to understand how to properly carry out a practical challenge – this means acquiring necessary and applicable knowledge and putting it to practice.

Each practical challenge is composed of three steps that helps you to structure your learning process:

1. Orientation
2. Preparation
3. Execution

The **Orientation** step is purely meant to help you learn to understand what the practical challenge entails and to gain the necessary and applicable knowledge through a variety of learning activities. The result of the orientation step is that you have a mental movie about what the task entails, what procedures should be used, how to use those tools, how the system is composed, what could be possible problems, and what science or theory is relevant.

The **Preparation** and the execution steps are about doing the practical challenge, practicing with the practical challenge. These two steps are in fact the normal day-to-day practice of a real HND Automotive Engineer.

The preparation entails collecting the right tools and equipment for the practical challenge and taking the appropriate safety measures. The result of the preparation is that you are ready to start with execution of the actual task.

The **Execution** step starts when you carry out the actual service, repair, diagnostic, fabrication, supervision or management task.

You will work in sub-groups to complete each practical challenge in this module. The average time for each practical challenge in this module is 7 hours.

7. MODULE DELIVERY SCHEDULE

First Two Weeks

Diagnostic Techniques

- Introduction
- Diagnostic process
- Diagnostics on Paper
- Mechanical Diagnostics Techniques
- Electrical Diagnostics Techniques
- Fault Codes
- Systems

- On-and –off board diagnostics
- Data Sources

Third Week

Tools and Equipment

- Basic equipment
- Oscilloscopes
- Scanners/Fault code readers
- Engine analysers

Fourth and Fifth Weeks

Oscilloscope Diagnostics

- Introduction
- Sensors
- Actuators
- Ignition systems
- Other Components
- Summary

Sixth and Seventh Weeks

On-board Diagnostics

- On-board diagnostics- a first perspective
- What is on-board diagnostics?
- Petrol/Gasoline on-board diagnostic monitors
- On-board diagnostics-a second perspective
- Summary

Ninth to Thirteenth Week

Sensors and Actuators

- Introduction
- Sensors
- Actuators

Engine Systems

- Introduction

- Engine operation
- Diagnostics – engines
- Fuel system
- Diagnostics – fuel system
- Introduction to engine management
- Ignition
- Diagnostics – ignition systems
- Emissions
- Diagnostics – emission
- Fuel injection
- Diagnostics – fuel injection systems
- Diesel injection
- Diagnostics – diesel injection systems
- Engine management
- Diagnostics – combined injection and fuel control systems
- Engine management and faultfinding information
- Air supply and exhaust systems
- Diagnostics – exhaust and air supply
- Cooling
- Diagnostics – cooling
- Lubrication
- Diagnostics - lubrication
- Batteries
- Diagnosing battery faults
- Starting
- Diagnosing starting system faults
- Charging
- Diagnosing charging system faults

8. ASSESSMENT OF THE MODULE

Your performance in the module AME 205 Electrical and Electronic System Diagnosis is assessed in the following ways:

FORMATIVE ASSESMENT METHODS

During the learning process formative assessment – measuring progress of students' competence development – is taking place in two ways:

1. Continuous formative assessment carried out by the facilitator through observing and questioning the students during the orientation, preparation and execution of the practical challenge. If the continuous formative assessment shows that a student lacks certain competences the learning process is adapted to the needs of the student and the student is enabled to redo steps in orientation, preparation or execution of the practical challenge.
2. Self assessment of the students by reflection on learning

Formative assessment instruments

- Self-reflection format for the students to help them reflect on their learning process. The format allows student to reflect on their activities during the orientation, preparation and execution stage of the practical challenge and to indicate which activities went well and which activities they aim to improve during the next practical challenge and how.
- Attachment record sheet
- Attachment report format

SUMMATIVE ASSESMENT METHODS

During the learning process continuous summative assessment of the execution of the practical challenges will take place to determine if students have successfully carried out a practical challenge. The continuous summative assessment of the practical challenges focuses on two elements:

1. Products that students are required to produce as part of the orientation, preparation, execution (eg. orientation report, ordering form, checklist, etc.) of the practical challenge are assessed and marked.
2. When students have completed the execution of a practical challenge, a mark is given for the product and process.

At the end of the semester final summative assessment of the modules will take place to determine if students have successfully developed the competences related to the

module. The final summative assessment of the modules will be carried out in two ways:

1. A practical test at the end of the semester combining a number of practical challenges from the modules covered during the semester.
2. Written tests, for each of the modules covered during the semester

We assess your practical challenges during the module according to the following criteria:

- Process
- Product
- Application of theoretical knowledge
- Tool Usage
- Safety
- Proper Conduct
- Confidence

REFERENCE MATERIAL

The following are the information sources you can use for reference in AME 205. They can be found in the school of Engineering library/Department of Automotive Engineering.

- CD At Ghana 3rd Edition
- Advanced Automotive Fault Diagnosis (By Tom Denton)
- Reference manual Opel Omega B
- Reference manual Ford focus
- Automotive Technician Training (by Tom Denton)
- Automotive Electrical and Electronic systems (By Tom Denton)

10. MODULE POLICIES

Access to the practical examination depends on whether or not you have satisfactorily executed all practical challenges of all modules of the previous semester.

Others include; attendance, lateness, class participation, missed assignments, tests, late submission of assignments, academic dishonesty.

