

# Faculty of Engineering, the Built Environment & IT

*Technology for tomorrow*

**Study Guide 2019 Semester 1**

Department of Marine Engineering

North Campus

## **MEK 2**

**EMAR 201**

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**PREREQUISITE SUBJECTS/MODULES**

Marine Engineering Knowledge 1

#### A OBJECTIVES

The objective of the course is to develop an understanding of the fundamental underpinning principals of general marine engineering and safety.

To meet the minimum requirements for knowledge, understanding and proficiency

for Marine Engineering Officers according to the SAMSA code.

The intended applications of the skills acquired are for:

* preparation for further/advanced study.
* practical applications.

**B ESSENTIAL CONTENT**

The following are essential aspects of this course:

* Steam plant and auxiliary systems
* Ship handling
* Power transmission systems
* Instrumentation and Controls
* Refrigeration

These aspects will be evaluated against the objectives/outcomes provided in the table detailing the syllabus in section C.

**C SYLLABUS**

The following syllabus describes the scope of the work to be covered in this course.

| Content | **Related Topics Considered** | **Learning outcomes.****After completing this unit, learners will be able to:** | **Reference/s** | **Assessment** | **Expected duration** |
| --- | --- | --- | --- | --- | --- |
| **STEAM**  **A** | * Marine Boilers * Marine Boilers operation * Boiler water treatment * Boiler failures * Feed Systems * Marine steam turbine | * Describe the production and uses of Boilers * Have and understanding of commonly used design materials and operation of Boilers * Have and understanding of commonly failure. * Have and understanding corrosion prevention and safety procedure | F2 | 1st test  Content A | 8 weeks |
| **Ship handling**  **B** | * Steering gear regulations * Steering gear checks * Dry docking * Variable delivery pumps * Telemotor control * Hunting gears * Bow thrusters * Stabilisers * Bridge control systems | * Understand steering gear regulation. * Describe the operation of a steering gear. * Understand dry dock checks. * Describe the operation of variable delivery pumps * Describe bow thrusters, stabilisers. * Describe bridge control systems | F1:  Chapter 3 | Integrated and assessed in later sections. | 4 weeks |
| **Power transmission**  **C** | * Construction and operation * Alignment * Shaft bearings * Water lubricated stern tubes * Oil lubricated stern tubes * Shaft seal * Fixed pitch propeller * Variable pitch propeller * Azimuth propulsion * Shaft couplings * Gearing * Clutches * Maintenance | * Describe construction and operation * Describe different bearings * Sketch transmission line. * Describe different stern tube application. * Describe the auxiliary ship systems. * Describe different pitch assembly * Identify proper couplings, gear, clutches. * Identify problem and possible solution | F1:  Chapters 4 | 2nd Test  Content B-C | 4 weeks |
| **Instrument & Control**  **D** | * Values measurements * Instruments errors * Bridge control of main engines, steering, CPP (pitch propeller) * Electrical supply Control * UMS operation * Monitoring systems * Vibration monitoring * Thermal monitoring * Oil mist detector * Instrument selection * Mandatory instrument * Closed loop Theory * Proportional controls * Combination control systems * Piston cooling and lubrication oil control * Fluid temperature control * Automatic boiler control * Soot blower control * Feed water control * Conductor and semiconductor * Dynamic positioning * Plc | * Describe instruments * Solve instruments faults * Calibrate instruments * Be aware of instrument regulation survey * Sketch a base bridge control system. * Describe ship UMS operation * Be able to select proper instrument * Be familiar with the oil mist detector | F1:  Chapter 5 | Integrated and assessed in later sections. | 4 weeks |
| **Refrigeration**  **E** | * Refrigeration theory intro * Environmental consideration * Refrigeration systems components * Vapour compression cycle * Air conditioner * Containers systems * Safety and survey | * Describe the components of a refrigeration system. * Sketch a base refrigeration system. * Sketch Vapour cycle * Describe Air condition system * Be aware of regulation and survey | F1:  Chapter 5 | Final test A-B-C-D-E | 4 weeks |

**D EVALUATION**

**1. FORMATIVE ASSESSMENT**

The tutorial assessments are designed to assess comprehension, application and analysis. Students write the tutorials or part thereof individually. They are then placed in ad hoc teams of up to four students to discuss their answers and to produce a combined answer sheet. The combined answer sheet will be assessed by the lecturer or assistant for feedback purposes.

Formative assessment is open-book. The learner may use his/her own reference books and other resources.

**2. SUMMATIVE ASSESSMENT**

2.1. LABORATORY / PRACTICAL ASSIGNMENTS

The purpose of this assessment is to reconcile practice with theory. The attainment of the specific outcomes will be assessed by observation of the practical demonstrations performed in the laboratory and the analysis undertaken followed by a report (which will serve as the only record). This assessment is open-book, therefore a learner may use his/her own reference books and other resources. The work is conducted in groups with the team leader being rotated for each lab session.

Note: It is the learner’s responsibility to ensure that he/she reaches a high level of competency before being assessed. The learner should therefore consult the laboratory technician/assistant for additional access to the laboratory if required.

* 1. THEORETICAL ASSESSMENTS

The purpose of this assessment is to ascertain whether or not the specific outcomes have been achieved by an individual. Students write a minimum of three theoretical assessments individually. The attainment of the specific outcomes will be assessed by the application of the assessment criteria supplied with each unit of learning and detailed for each assessment task. This assessment is closed-book and therefore the application of the various engineering concepts are written from memory.

2.3 CONTINUOUOS EXAMINATION TESTS

This IS done in the form of 3 test, the purpose of this assessment is to ascertain whether or not the key theoretical and practical concepts pertaining to the specific outcomes have been synthesized and integrated for this module by the individual. Learners do the final assessment individually at the end of the module. This assessment is a written test and therefore the theoretical and practical application of the engineering concepts are tested.

Evaluation shall be based on:

* Year mark = 7 x Exams x 0.7
* Assignment x 0.3
* Exam mark = 1st Test 0.3

2nd Test 0.3

Final Test 0.4

* Final mark = (Ym x0.7) +(Em x 0.3)
* Final Mark = 3 x Class Test (50% of Final Mark)
* = 3 x Assignment (50% of Final Mark)
* = 50% sub-minimum for final mark
* The student must acquire a sub-minimum of 50% in both Assignment work and class tests to pass the Module.
* **~~The student will not be allowed final test entry if he/she has failed to achieve a sub-minimum of 10% 1~~~~st~~ ~~and 2~~~~nd~~ ~~test together (this applies to achieve a minimum of 50% passing final test with full marks).~~**
* To pass the subject the student must achieve a sub-minimum of 50% for the ~~exams~~ class tests and 50% Assignment work.
* The subject is **closed** book during evaluation (including exam tests). A formula sheet will be made available. Student can expect to be pressured on time.

**E PRACTICAL WORK**

An assignment, as determined by the lecturer, will be done by the student. This shall include:

Self-study (research)

**F REFERENCES (Prescribed)**

F1 Marine Engineering Theory – Volume 1: General 1st edition Derek G. Lambert

F2 Marine Engineering Theory – Volume 4: Steam 1st edition Derek G. Lambert

F3 Lecturer notes

**G OTHER REFERENCES**

**H ICT COMPONENT (software)**

H1 MSWord, Excel and Internet surveys.

H2 Autodesk Inventor

**I SCHEDULE OF WORK**

TESTS

Test 1: Date: (to be confirmed) \_\_\_\_\_

Test 2: Date: (to be confirmed) \_\_\_\_\_

Test 3: Date: (Lecturers discretion) \_\_\_\_\_\_

Notes:

1. The order in which the syllabus is covered may change and is at the discretion of the lecturer.