

# Faculty of Engineering, the Built Environment & IT

*Technology for tomorrow*

**Study Guide 2020 Semester 2**

Department of Marine Engineering

North Campus

## **MEK 3**

**EMAR 302**

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**PREREQUISITE SUBJECTS/MODULES**

Marine Engineering Knowledge 2

#### 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:

* Motor
* Pollution
* Energy Efficiency
* Ship Maintenance
* Ship Management & ERM

 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** |
| --- | --- | --- | --- | --- | --- |
| **Motor****A** | * Internal combustion
* Diesel engine
* 2 stroke and 4 stroke engine
* Start up and shut down engines
* Operating limits
* Functions and mechanism of automatic control for main engines
* Recognition of irregularity in performance of machinery
* Construction details of engine components: cooling systems, starting air, turbo blowers.
 |  * Plan an instrumentation performance monitoring system, by applying instrumentation selection and performance analysis
* Apply internal combustion technology optimised for the marine environment, including the use of alternative fuels.
* Optimise fuel plant application by the use of inspections, surveys and failure analysis.
* Evaluate and plan bunker for the trip.
 | F2 | 1st testContent A | 10 weeks |
| **Pollution****B** | * Pollution
* MARPOOL annex 1-6
* Oil record book
* Exhaust gas cleaning system
* Ballast water treatment
 | * Plan ship safety requirements and safety equipment
* Demonstrate e proper knowledge to compile the ORB
* Describe new ballast procedure
 | F1:Chapter 10 | Integrated and assessed in later sections. | 3 weeks |
| **Energy Efficiency and Energy Management****C** | * Energy Management and the International Response in Shipping
* Energy Efficiency and Ship Design
* Energy Efficient Ship Operations
* Energy Management On-board Ship
* Alternative Fuels and Marine Renewable Energy
 | * Research own project for renewable energy to apply on ships
* Describe energy international issue
* Identify new ship design
* Describe energy management operation
* Identify Alternative fuel and renewable Energy
 |  | 2nd TestContent B-C | 4 weeks |
| **Ship Maintenance****D** | * Government surveys
* Classification society surveys
* Private surveys
* Check list and work permit filling
* Inspection technique
* Condition monitoring
* Engineering responsibility
* Breakdown repairs
* Wear and tear
* Engine routine tasks, inspection and overhauling (Derek motor book)
* Incident reports
* Survey reports
* Staff performance report
 | * 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 11 | Integrated and assessed in later sections. | 3 weeks |
| **Ship Management** **&** **ERM****E** | * Staff duties
* Personal development
* Reporting and recording
* Dry docking
* Inter departmental communication
* Engine resource Management 1 and 2
 | * Describe staff duties
* Propose personal development plan
* Demonstrate proper reporting & recording procedure
* Demonstrate an appropriate communication skills
* Demonstrate deep knowledge of ERM procedure
 | F1: Chapter 12 | 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 3 : Motor 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.