

COURSE PACKAGE

Part A: Course Specifications

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|----------------------------------|---|--|---|------------------------------------|--|---|----------------|---------|
| Course Code | : | ICT | | | | | | |
| Course Descriptive Title | : | Maritime Information, Communications, and Technology with Networking | | | | | | |
| Prerequisite | : | None | | | Corequisite | : | None | |
| Year Level | : | First Year | | | Semester Offered | : | First Semester | |
| Course Credits | : | 2 units | Theoretical Contact Hours Per Week | : | 1 hour | Demonstration/ Practical Work Contact Hours Per Week | : | 2 hours |
| Course Description | : | This course provides the introductory knowledge in the use of internal communications systems on board. This includes the knowledge in the operation of portable VHF-UHF radio, telephone system, public address, intercom, fire detection and alarm system. The practical use of the internal communication devices will be covered in the course of Engine Watchkeeping. This course also provides knowledge and skills in data communications computer networks on board. | | | | | | |
| STCW Reference | : | STCW Table | Function | Competence | Knowledge, Proficiency | Understanding | and | |
| | | III/1 | Marine Engineering at the operational level | Use internal communication systems | Operation of all internal communication systems on board | | | |
| Course Outcomes | : | PO-A.1-.2 PO-B.3 PO-E.2-.3 PO-E.7 PO-E.8 | <i>At the end of the course, the student must be able to:</i> CO1. Identify the internal communication devices used on board ship in terms of application CO2. Explain the use of different internal communication devices to send or receive a message. CO3. Explain the main features of data processing and communications CO4. Explain the different computer networks found on board in terms of their set-up, purposes and capabilities CO5. Build a small-scale wired local area network for three (3) computers with a common shared folder | | | | | |
| Course Intake Limitations | : | The number of students that can be accommodated shall not exceed 40 per for lecture and 20 for laboratory. | | | | | | |
| Faculty Requirement | : | Instructor: | | | | | | |

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| | <p>The faculty that will be assigned to handle the course must possess the following qualifications:</p> <ul style="list-style-type: none"> • graduate of Bachelor of Science in Marine Transportation or graduate of Bachelor of Science in Marine Engineering; • Officer-in-charge of a Navigational Watch on seagoing ships of 500 GRT or more or with at least 12 months of seagoing experience as Officer-in-charge of an Engineering Watch on seagoing ships powered by propulsion machinery of 750 kW propulsion power or more • completed Training Course for Instructors (IMO Model Course 6.09); • completed Training Course on Assessment, Examination and Certification of Seafarers (IMO Model Course 3.12); • Attended training for computer hardware, software and networks; <p>OR</p> <ul style="list-style-type: none"> • Holder of Certificate of Competency (COC) for Electro-technical Officer (ETO); • completed Training Course for Instructors (IMO Model Course 6.09); • completed Training Course on Assessment, Examination and Certification of Seafarers (IMO Model Course 3.12); • Attended training for computer hardware, software and networks; <p>OR</p> <ul style="list-style-type: none"> • Graduate of any ITE (Information Technology Education) related program or BS Computer Engineering with Master's degree in ITE Related Units or in the same discipline; • with at least one (1) year industrial and/or teaching experience; • completed Training Course for Instructors (IMO Model Course 6.09); • completed Training Course on Assessment, Examination and Certification of Seafarers (IMO Model Course 3.12); • Attended in-house or external course in the use of internal communications system; <p>Assessor The assessor assigned shall have the same qualifications above.</p> <p><i>Note:</i></p> <ul style="list-style-type: none"> • <i>The instructor shall conduct the <u>formative assessment</u>.</i> • <i><u>Summative assessment</u> shall be conducted by an Assessor not teaching the students (assessee).</i> |
| <p>Teaching Facilities and Equipment</p> | <p>CLASSROOM</p> <p>The standard classroom size shall be a minimum of 48 square meters, no side shall be less than 6 meters for a class of 40 students. Classroom must be illuminated at 50.76 Lux and well-ventilated. It should contain the following:</p> <ul style="list-style-type: none"> • Tables and chairs or armed chairs • Whiteboards or chalkboards • Multimedia equipment <p><i>Note: The MHEIs can use additional teaching facilities and equipment as deemed necessary to meet the learning outcomes of this course.</i></p> |

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| | <p>COMPUTER LABORATORY (Shall be provided by the MHEI)</p> <ul style="list-style-type: none"> • Computer hardware and software – including system software and application software • Computer networking peripherals such as router, switch and ethernet cable • Computer workstations (connected by LAN and internet) with OS, Microsoft Office, and Cisco Packet Tracer installed <p><i>Note: Computer laboratory can be used as for lecture activities.</i></p> |
| <p>Teaching Aids</p> | <p> TA1 Data Communications and computer networks TA2 Computer component or devices and software TA3 Radio TA4 Telephone TA5 Public address and intercom TA6 Fire Detection and Alarm System </p> <p><i>Note: The MHEIs can use alternate and/or additional teaching aids as deemed necessary to meet the learning outcomes of this course.</i></p> |
| <p>References/ Bibliographies</p> | <p>References:</p> <p>R1 International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended</p> <p>R2 IMO MSC-FAL.1/Circ.3 – Guidelines on maritime cyber risk management</p> <p>R3 IMO Resolution MSC.64(67) – Adoption of new and amended performance standards, Annex I – Recommendation on performance standards for Integrated Bridge Systems (IBS)</p> <p>R4 IMO MSC/Circ.891 – Guidelines for the on-board use and application of computers</p> <p>R5 IACS Rec. No. 156 – Network Architecture</p> <p>R6 NIST Special Publication 800-82 (Revision 2) – Guide to Industrial Control Systems (ICS) Security</p> <p>R7 BIMCO, CLIA, ICS, Intercargo, InterManager, INTERTANKO, IUMI, OCIMF and World Shipping Council (2020). <i>The Guidelines on Cyber Security Onboard Ships</i> (Ver. 3). Retrieved from https://www.ics-shipping.org/wp-content/uploads/2020/08/guidelines-on-cyber-security-onboard-ships-min.pdf.</p> <p>R8 Williams, B., & Sawyer, S. (2015). <i>Using Information Technology</i> (11th ed.). New York City: McGraw Hill.</p> <p>R9 Liptak, B. G., & Eren, H. (Eds.). (2012). <i>Instrument Engineer's Handbook: Process Software and Digital Networks</i> (Fourth ed., Vol. III). Boca Raton, Florida: CRC Press.</p> <p>R10 Chou, L. D., & Juang, J. Y. (1996). <i>Network-Integrated Ship Automatic System and Internetworking to the Internet</i>. <i>Journal of Marine Science and Technology</i>, 4(1), 35-41.</p> |

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| | <p>R11 Markus Fruth & Frank Teuteberg Shaofeng Liu (Reviewing Editor) (2017) <i>Digitization in maritime logistics—What is there and what is missing?</i>, Cogent Business & Management, 4:1, DOI: https://doi.org/10.1080/23311975.2017.1411066</p> <p>R12 Junkeon Ahn, Tae-Hwan Joung, Seong-Gil Kang & Jongkap Lee (2019) Changes in container shipping industry: Autonomous ship, environmental regulation, and reshoring, <i>Journal of International Maritime Safety, Environmental Affairs, and Shipping</i>, 3:3-4, 21-27, DOI: https://doi.org/10.1080/25725084.2019.1678564</p> <p>R13 Gitiessse Marine Electronics – IMCOS (Integrated Multimedia Communication System) – Technical Manual, www.gitiessse.com</p> <p>R14 MOTOROLA SOLUTIONS, UHF AND VHF TWO WAY RADIOS – Technical Manual, www.motorolasolutions.com</p> <p>R15 NEXEDGE DIGITAL RADIOS PORTABLE – Operation and specifications, www.kenwood.com</p> <p>R16 Fire Detection and Alarm System Manual - https://www.ifsta.org/sites/default/files/Chapter14_FICE8.pdf</p> |
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Note: The MHEIs can use alternate and/or additional references/bibliographies as deemed necessary to meet the learning outcomes of this course.

Part B: Course Outline and Timetable

Note:

Considering that practical work activities could not be performed per weekly basis because of the required underpinning knowledge, the MHEI can deliver the same on the specified weeks provided below:

| Term | Week | Topic | Time Allotment (in hours) | |
|--|--------|--|---------------------------|----------------------------------|
| | | | Theoretical | Demonstration/ Practical Work |
| Note: MHEIs shall determine the number of periods for terms the semester is divided based on their school calendar activities | 1 - 3 | 1. Basic Internal Communication Devices and Systems 1.1 Telephone 1.2 Public address system 1.3 Portable Radios 1.4 Fire Detection and Alarm Systems | 3 | - |
| | 4 - 5 | 2. Introduction to Computer Systems 2.1 Main components of computer system – Hardware 2.2 Types of computers 2.3 CPU and GPU 2.4 Operating and application systems | 2 | - |
| | 6 - 8 | 3. Computer Hardware and Storage Devices 3.1 Input devices 3.2 Output devices 3.3 Input/output devices issues 3.4 Cache memory 3.5 Primary/main storage 3.6 Secondary/backing storage | 3 | - |
| | 9 - 10 | 4. Basic Computer Hardware and Software Servicing with Troubleshooting 4.1 Disassembly/assembly 4.2 Application installation and configuration 4.3 Basic computer troubleshooting | 2 | - |

| Term | Week | Topic | Time Allotment (in hours) | |
|-----------------------------------|---------|--|---------------------------|----------------------------------|
| | | | Theoretical | Demonstration/ Practical Work |
| | 11 - 14 | 4. Data Communication and Computer Networks 4.1 Types of computer networks based on geographical span 4.2 Computer network devices – network linking devices and communication media 4.3 Types of network topologies 4.4 Communication technologies 4.5 Protocol and OSI model 4.6 Shipboard computer network and internet access 4.7 Network standardisation process and security | 7 | - |
| | 15 - 17 | 5. Practical Work 5.1 Basic Troubleshooting 5.2 Basic Assembly and Disassembly 5.3 Computer Networking | - | 34 |
| Sub-Total (Contact Hours) | | | 17 | 34 |
| Total Contact Hours | | | 51 | |
| Examination and Assessment | | | | |

Note:

1. The MHEIs are to develop their respective timetable according to their resources but meets with the minimum time allocation for the contact hours. OR
2. The MHEIs shall determine the time allotment for the conduct of summative assessments.



Part C: Course Syllabus

| CO | Topics Learning Outcomes | References/ Bibliographies | Teaching Aids |
|-------------------|--|-------------------------------|--------------------|
| CO1 CO2 | <p>1. Internal Communication Devices</p> <p>1.1. Identify different types of internal communication devices usually found onboard a vessel such as automatic telephone system, sound powered telephone, public address system, talk back system, UHF-VHF portable radios, and megaphone.</p> <p>1.2. Explain basic construction and operation of different types of internal communication devices usually found onboard a vessel (automatic telephone, sound powered telephone, public address system, intercom, talk back system, UHF-VHF portable radios, fire detection and alarm system)</p> <p>1.3. Explain the procedure in operating internal communication devices in transmitting or receiving messages</p> | R14, R15, R16 | TA3, TA4, TA5, TA6 |
| CO3 CO4 CO5 | <p>2. Introduction to Computer Systems</p> <p>2.1 Explain the computer system in relation to its main components</p> <p>2.2 Explain the different types of computers and their use</p> <p>2.3 Identify the different central processing unit and graphics processing unit with regards to their advantages, disadvantages, uses and functions</p> <p>2.4 Identify the operating and application systems with regards to their processes and functions</p> | R8 | TA2 |
| | <p>3. Computer Hardware and Storage Devices</p> <p>3.1 Identify the different input and output devices, their functions and purposes</p> <p>3.2 Compare and contrast main memory and backing storage with regards to their usage, benefits and performance</p> <p>3.3 Perform system maintenance for computer data storage</p> <p>3.4 Trouble shoot common input/output devices issues: port connection issues; driver related issues</p> <p>3.5 Implement effective computer files and folder management</p> | R8 | TA2 |
| | <p>4. Basic Computer Hardware and Software Servicing with Troubleshooting</p> <p>4.1. Install and configure applications by different methods including using data storage devise (e.g., CD-ROM, DVD-ROM, Flash Drive), internet, app store (e.g., Microsoft Store, Mac App Store) and web-based apps</p> <p>4.2. Perform basic disassembly/assembly and troubleshooting of a computer</p> | R9, | TA2 |

| CO | Topics Learning Outcomes | References/ Bibliographies | Teaching Aids |
|----|---|--|---------------|
| | <p>5. Data Communication and Computer Networks</p> <p>5.1. Identify the different computer networks with regards to their characteristics and purpose including: PAN; LAN; WLAN; WAN; Internet; and Intranet</p> <p>5.2. Identify the common computer network devices and their functions</p> <p>5.3. Explain the different network protocols and topologies with regards to their use, advantages and disadvantages</p> <p>5.4. Explain the transfer of data such as text, images and videos over a network using different communication technologies</p> <p>5.5. Explain the typical network connection set-up onboard</p> <p>5.6. Explain the set-up of a shipboard computer network involving access to the internet are interconnected through a network</p> <p>5.7. Explain how the Bridge navigational equipment and various engine room equipment</p> <p>5.8. Set-up a small-scale wired local area network with minimum of 3 computers and create a common network shared folder</p> | R2, R3, R4, R5, R6, R7, R11, R13, R14, | TA1 |

Note: The MHEIs are to develop Part D: Detailed Teaching Syllabus and Instructional Materials (IMs), and Part E: Course Assessment and Assessment Tools (ATs) which satisfactorily meets with the requirements of the course as prescribed in the course outcomes and learning outcomes.