

## **M.S. Notice 6 of 2000**

### **Subject : Examination & Certification System for Marine Engineers**

Introduction (1) The amended International Convention on Training Certification and Watchkeeping for Seafarers 1978 as amended on the 7th day of July 1995 entered into force on 1st February 1997. This Convention requires establishment of training and certification procedures in conformity with the requirements of the convention with effect from 1st August 1998 for new entrants. The Convention also requires the standards of competence which is required of candidates for certificates issued under STCW 78 be compared with Part A of the STCW Code and updating training or assessment be undertaken, where necessary, to meet the STCW 95 requirements. Transitional arrangements allow all existing certificates to remain valid until 1st February 2002 after which such certificates will not be valid for sea service.

(2) In India, the new examination rules, called Merchant Shipping (Standards of Training Certification and Watchkeeping for Seafarers) Rules 1998 (here-forth referred to as the 'new' rules for Marine Engineer Officers) came into force from 1st August 1998 and superseded the Merchant Shipping (Examination of Engineers Officers in the Merchant Navy) Rules 1989 as amended in 1994, (here-forth referred to as the 'old' rules). The objective of these new rules is to give full and complete effect to the provisions of STCW 95. All candidates starting training after 1st August 1998 must meet the requirements of these rules. Certificates issued prior to the date of commencement of these rules are required to be withdrawn and upgraded certificates be issued on fulfilling the prescribed conditions. To implement these requirements, the META manual volumes I and II have been published. These volumes carry the details of the preparatory and Upgradation courses necessary for the assessment towards conversion from the 'old' to the 'new' system. The M.S. Notice No.11/98 was issued and circulated whereby procedure for assessment facilitating conversion from the 'old' Certificate to the 'new' certificate was explained. M.S. Notice No. 11/98 also covers those candidates who hold the certificates issued under the old rules, and during the transition period till 1st February 2002, are still appearing for higher examinations or are in the process of being eligible for the examinations under the old rules.

(3) Considering the fact that not much progress has been made towards this conversion during the last 18 months and the fact that it may be difficult for all the candidates to upgrade their certificates to 'new' in a short period, to enable them sail in the same capacity as before, the provisions of M. S. Notice No. 11/98

has been reviewed and interim arrangements have been devised as detailed below:

#### INTERIM ARRANGEMENTS

(1) After 30th September 2000, Class IV Certificate of Competency examination (orals) under the 'old' system shall be discontinued.

(2) The 'new' MEO Class IV examination has commenced from January 2000. The preparatory course is of 3 months duration.

(3) After 31st December 2000, Class II Certificate of Competency examination under the 'old' system shall be discontinued. Any candidate who is successful in part of the written examination held till December 2000 for the Class II examination under the 'old' system shall have the subjects in which he has passed be credited to him for appearing in the 'new' MEO Class IV examination. Institutes conducting 'old' Class II preparatory courses are required to take steps to convert into 'new' Class IV preparatory course.

(4) The 'new' MEO Class II examination shall commence from January 2001. The preparatory course is of 4 months duration. Training Institutes must take measures to ensure that this course is commenced as early as possible, preferably by 1st September 2000.

(5) After 31st December 2001, the examination for Class I Certificate of Competency under the 'old' system shall be discontinued. Any candidate who is successful in part of the written examination held till December 2001 for the Class I examination under the 'old' system, shall have the subjects in which he has passed be credited to him for appearing in the 'new' MEO Class II examination. Institutes conducting 'old' Class I preparatory courses are required to take steps to convert into 'new' Class II preparatory course.

(6) Every candidate who has either passed in an examination under the 'new' system or has upgraded his certificate issued under the 'old' system into one under the 'new' system at levels of Class IV and Class II shall be issued with an EXN-45 booklet which the candidate keeps in his custody at all times. Such an 'EXN-45' has to be produced by the candidate every-time he appears for the next higher-grade examination.

(7) MEO Class I or Chief Engineer Officers possessing Certificate of Competency issued under the 'old' Rules or earlier are eligible to obtain Certificate of Competency issued under the 'new' Rules after successful completion of an approved Upgradation course, which includes assessment by the institute. This course has been running since January 1999.

## Upgradation of engineers certificate

All 'new' certificates shall be valid for a maximum period of 5 years from the date of completion of Upgradation Course or date of passing the examination.

For Upgradation of the Certificates, in addition to the training courses prescribed below, every candidate shall:

(i) Meet the standards of medical fitness as prescribed in the Merchant Shipping (Medical Examination) Rules and the STCW Code,

(ii) Establish continued professional competence by: .

1 approved seagoing service, performing functions appropriate to the certificate held, for a period of at least one year in total during the preceding five years; OR

2 having performed functions considered to be equivalent to the seagoing service required in paragraph (ii).1 (e.g. officers working in marine related jobs, such as : maritime surveyors, lecturers, superintendents, etc.); OR .

3 having completed approved seagoing service, performing functions appropriate to the certificate held, for a period of not less than three months in a supernumerary capacity, OR in a lower officer rank than that for which the certificate held is valid immediately prior to taking up the rank for which it is valid.

### Class I

MEO Class I or Chief Engineer Officers possessing Certificate of Competency issued under the 'old' Rules or earlier are eligible to obtain Certificate of Competency of the same grade issued under the 'new' Rules on successful completion of the Upgradation course as detailed in **APPENDIX M-I/10.12** of META Manual Volume II as revised and appended herewith.

### Class II

MEO Class II or Second Engineer Officers possessing Certificate of Competency issued under the 'old' Rules or earlier are eligible to obtain Certificate of Competency of the same grade issued under the 'new' Rules after passing the examination to obtain such 'new' certificate. An examination result (EXN 45) shall be issued indicating the status in the subjects. This EXN 45 will be required to be produced to examination centre before appearing in examination leading to issuance of 'new' M.E.O. Class I

Certificate of Competency.

MEO Class II possessing Certificate of Competency issued under the 'old' Rules or earlier are also eligible to obtain Certificate of Competency of the same grade issued under the 'new' Rules, provided the candidates possess the following certificates:

1) Proficiency in Survival Craft

2) Advance Fire Fighting

3) First Aid at Sea, and

i) Should have done 5 days of "Engine Room Simulator" training, and

ii) Documentary evidence of having attended the course for MEO Class I of three months duration at an approved institute as per the 'old' rules, and

iii) Successful completion of an Upgradation Course as detailed in **Appendix M-I/10.11** of META Manual Volume II as revised and appended herewith.

OR

Documentary evidence of having attended the course for 'new' MEO Class II of four months duration at an approved institute as per the 'new' rules, in lieu of ii) and iii) above. An examination result (EXN 45) shall be issued indicating the status in the subjects. This EXN 45 will be required to be produced to examination centre before appearing in examinations leading to issuance of M.E.O. Class I Certificate of Competency. It is mandatory to pass in all the subjects of the 'new' MEO Class II Examination, if the candidate aspires to obtain a 'new' MEO Class I Certificate of Competency.

Class IV

MEO Class IV possessing Certificate of Competency issued under the 'old' Rules are eligible to obtain Certificate of Competency of the same grade issued under the 'new' Rules after passing the examination to obtain such 'new' certificate. An examination result (EXN 45) shall be issued indicating the status in the subjects. This EXN 45 will be required to be produced to examination centre before appearing in examination leading to issuance of 'new' M.E.O. Class II Certificate of Competency.

MEO Class IV possessing Certificate of Competency issued under the 'old' Rules are also eligible to obtain Certificate of Competency of the same grade issued under the 'new' Rules, provided the

candidates possess the following certificates:

1) Proficiency in Survival Craft

2) Advance Fire Fighting

3) First Aid at Sea, and

i) Should have done 3 days of "Engine Room Simulator" training, and

ii) Documentary evidence of having attended the course for MEO Class II of three months duration at an approved institute as per the 'old' rules, and

iii) Successful completion of an Upgradation Course as detailed in **Appendix M-I/10.10** of META Manual Volume II as revised and appended herewith.

OR

Documentary evidence of having attended the course for 'new' MEO Class IV of three months duration at an approved institute as per the 'new' rules, in lieu of ii) and iii) above. An examination result (EXN 45) shall be issued indicating the status in the subjects. This EXN 45 will be required to be produced to examination centre before appearing in examinations leading to issuance of M.E.O. Class II Certificate of Competency. It is mandatory to pass in all the subjects of the 'new' MEO Class IV Examination, if the candidate aspires to obtain a 'new' MEO Class II Certificate of Competency.

Upgradation Course

The Upgradation courses as detailed in **Appendix M-I/10.11** of META Manual Volume II, as revised and appended herewith and M-I/10.12 of META Manual Volume II, as revised and appended herewith are qualitatively and quantitatively the same. The contents of the first four days must include the contents of **Appendix M-I/10.10** of META Manual Volume II, as revised and appended herewith.

Institutes conducting or about to conduct these courses may make note of these and may amend the course contents suitably.

Candidates holding MEO Class II or Second Engineer Officer certificate and eligible to attend the Upgradation Course as detailed in **Appendix M- I/10.11** are also eligible to attend the Chief Engineer's Upgradation course.

Similarly, candidates holding MEO Class IV certificate and eligible to attend the Upgradation Course as

detailed in **Appendix M- I/10.10** are also eligible to attend the first four days of Chief Engineer's Upgradation course.

**Sd/-**

**(P.Misra.)**

**Dy. Chief Surveyor with the Govt. of India.**

**Encl:**

**APPENDIX M-I/10.10**-revised Refresher and Updating Training (Upgradation course) for certificate of Competency as MEO Class IV issued under the M.S. (Examination of Engineer Officers in the Merchant Navy) Rules, 1989.

**APPENDIX M-I/10.11**-revised Refresher and Updating Training (Upgradation course) for certificate of Competency as MEO Class II issued under the M.S. (Examination of Engineer Officers in the Merchant Navy) Rules, 1989.

**APPENDIX M-I/10.12**-revised Refresher and Updating Training (Upgradation course) for certificate of Competency as MEO Class I issued under the M.S. (Examination of Engineer Officers in the Merchant Navy) Rules, 1989 or earlier.

**APPENDIX M-I/10.10-revised**

**Refresher and Updating Training (Upgradation Course) for Certificate of Competency as MEO Class-IV issued under the M.S. (Examination of Engineer Officers in the Merchant Navy) Rules, 1989.**

- (a) Production of documentary evidence of having attended the course for MEO Class II of three months duration at an approved institute as per the M.S. (Examination of Engineer Officers in the Merchant Navy) Rules, 1989.
- (b) Should have done the following courses: -
  - (i) Proficiency in Survival Craft
  - (ii) Advance Fire Fighting
  - (iii) First Aid at sea
- (c) Should have done 3 days of 'Engine Room Simulator' training
- (d) Refresher and Updating Training course consisting of the following items in the Chief Engineer's Upgradation Course

**Duration: FIRST 4 DAYS of the 10 day Chief Engineer's Upgradation Course**

<b>Sr. No.</b>	<b>Name of topic</b>	<b>Faculty</b>	<b>Duration</b>
1.	<b>Inaugural Lecture</b>  Details of STCW Convention. How and why this course was formulated	Course Co-ordinator	1 hour
2.	<b>SOLAS Regulations</b>  IMO recommendation concerning ship stability in normal and damaged condition and associated stress analysis. Stability and stress conditions are maintained within safety limits at all times.  Amendments under SOLAS, Ro-Ro Stability, Formal safety assessment	Experts in the field	4 hours
3.	<b>Load Line Assignment</b>  Ship construction - Modernisation of ship design and ship stability, Load line, conditions of assignment.	Experts in the field	2 hours
4.	<b>MARPOL regulations</b>  1) Recent amendments to the Annexes  2) Overview of Annex VI  3) Harmful effects of TBT in anti-fouling paints  4) Management of harmful effects of ballast water discharges	Experts in the field	2 hours
5.	<b>ISM Code, Quality Management Systems</b>  Requirement and documentation certificates and other documents required to be carried on board ships by international conventions, how they may be obtained and the period of their legal validity.	Experts in the field	2 hours
6.	<b>Ship inspections including port state</b>	Experts in the field	2 hours

	<b>control</b>  Ship survey and inspection on behalf of various bodies like maritime Administration, Health Administration.		
7.	<b>Advancements in the Proficiency in Survival Craft including Rescue Boat</b>  Construction, outfit, characteristics and launching devices for rescue boats including fast rescue boats. Rough weather practices for rescue boats. Enclosed lifeboats and video film on same. Video films on free fall lifeboats.	Experts from approved institution	3 hours
8.	<b>Human Resource Management and Personal Safety and Social Responsibility (PSSR)</b>  Understand orders and be understood in relation to shipboard duties. Method of improving communication skills. Interpersonal relations and contribution to effective human relation on board the ship. Social responsibilities; employment conditions; individual rights and obligations; dangers of drug and alcohol abuse.	Experts in HRD management	4 hours
9.	<b>Advancements in "Advanced Fire Fighting Course"</b>  1) SOLAS amendments in structural fire protections  2) Smoke extractor  3) Dry distillation, chemical reactions, boiler uptake fires  4) Fire involving dangerous goods  5) Assessments of cause of incidents involving fire  6) Advancement in fire fighting detection and extinguishing systems.	Lecturers from Approved Institutions	3 hours



10.	<b>Advancements in "Medical First Aid"</b>	Lecturers from Approved Institution	3 hours
	1) Toxicological hazards on board, including use of the medical first aid guide for use in accidents involving dangerous goods		
	2) Medical care of rescued persons		
	3) Radio medical advice		
	4) Pharmacology		
	5) Sterilisation		
<b>TOTAL</b>			<b>26 Hours</b>

**OR**

- (a) Produce proof of having attended MEO Class IV Course of three months duration as under M.S. (STCW) Rules, 1998.
- (b) Should have already done the following courses: -
  - (i) Proficiency in Survival Craft
  - (ii) Advance Fire Fighting
  - (iii) First Aid at sea
- (c) Should have done 3 days of Engine Room Simulator training.

**APPENDIX M-I/10.11-revised**

**Refresher and Updating Training (Upgradation Course) for Certificate of Competency as MEO Class-II or Second Engineer Officer issued under the M.S. (Examination of Engineer Officers in the Merchant Navy) Rules, 1989 or earlier.**

- (d) Production of documentary evidence of having attended the course for MEO Class I of three months duration at an approved institute as per the M.S. (Examination of Engineer Officers in the Merchant Navy) Rules, 1989.
- (e) Should have done the following courses: -
  - (i) Proficiency in Survival Craft

(ii) Advance Fire Fighting

(iii) First Aid at sea

(f) Should have done 5 days of 'Engine Room Simulator' training

(g) Refresher and Updating Training course consisting of the following:

**Duration: 10 days**

Sr. No.	Name of topic	Faculty	Duration
11.	<b>Inaugural Lecture</b>  Details of STCW Convention. How and why this course was formulated	Course Co-ordinator	1 hour
12.	<b>SOLAS Regulations</b>  IMO recommendation concerning ship stability in normal and damaged condition and associated stress analysis. Stability and stress conditions are maintained within safety limits at all times.  Amendments under SOLAS, Ro-Ro Stability, Formal safety assessment	Experts in the field	4 hours
13.	<b>Load Line Assignment</b>  Ship construction - Modernisation of ship design and ship stability, Load line, conditions of assignment.	Experts in the field	2 hours
14.	<b>MARPOL regulations</b>  5) Recent amendments to the Annexes  6) Overview of Annex VI  7) Harmful effects of TBT in anti-fouling paints  8) Management of harmful effects of ballast water discharges	Experts in the field	2 hours
15.	<b>ISM Code, Quality Management Systems</b>  Requirement and documentation certificates	Experts in the field	2 hours

	and other documents required to be carried on board ships by international conventions, how they may be obtained and the period of their legal validity.		
16.	<b>Ship inspections including port state control</b>  Ship survey and inspection on behalf of various bodies like maritime Administration, Health Administration.	Experts in the field	2 hours
17.	<b>Advancements in the Proficiency in Survival Craft including Rescue Boat</b>  Construction, outfit, characteristics and launching devices for rescue boats including fast rescue boats. Rough weather practices for rescue boats. Enclosed lifeboats and video film on same. Video films on free fall lifeboats.	Experts from approved institution	3 hours
18.	<b>Human Resource Management and Personal Safety and Social Responsibility (PSSR)</b>  Understand orders and be understood in relation to shipboard duties. Method of improving communication skills. Interpersonal relations and contribution to effective human relation on board the ship. Social responsibilities; employment conditions; individual rights and obligations; dangers of drug and alcohol abuse.	Experts in HRD management	4 hours
19.	<b>Advancements in "Advanced Fire Fighting Course"</b>  7) SOLAS amendments in structural fire protections  8) Smoke extractor  9) Dry distillation, chemical reactions, boiler uptake fires  10) Fire involving dangerous goods  11) Assessments of cause of	Lecturers from Approved Institutions	3 hours

	incidents involving fire		
	12) Advancement in fire fighting detection and extinguishing systems.		
20.	<b>Advancements in "Medical First Aid"</b>  6) Toxicological hazards on board, including use of the medical first aid guide for use in accidents involving dangerous goods  7) Medical care of rescued persons  8) Radio medical advice  9) Pharmacology  10) Sterilisation	Lecturers from Approved Institution	3 hours
21.	<b>Improvements in Diesel engines, ship design and dealing with major breakdown.</b>  Latest development in the field of large marine diesel engines and also insights into main propulsion units of future. Salient features of maintenance involved	Senior consultants in the field	2 hours
22.	<b>Improvements in marine auxiliaries and dealing with major breakdown.</b>  Latest development in the field of marine auxiliaries including steam boilers and steering gear system.  Insight into the field of machinery of the future. Salient features of maintenance involved.  Planning and preparation of operation suited to the design parameter of power installation and the requirement of the voyages.  Surveillance of main propulsion plant and auxiliary system is sufficient to maintain safe operating conditions.	Experts in the field	2 hours
23.	<b>Latest development in regard automatic &amp; control - Computer and</b>	Experts in the field	2 hours

	<b>Computerisation on board a ship.</b>  Operation, testing and Maintenance of control system.		
24.	<b>Control equipment</b>  <i>Operate, test, detect faults, maintain and restore Electrical and Electronic Control equipment to operating condition.</i>	<i>Experts in the field</i>	<i>2 hours</i>
25.	<b>Ship Fuel Consumption - a topic of discussion.</b>	<i>Experts in the field</i>	<i>2 hours</i>
26.	<b>Simulation of combustion of a large marine diesel engine</b>	At least an approved PC based simulator	<i>4 hours</i>
27.	<b>Training for trainers and workshop</b>  Training of ship board trainers  A knowledge of personnel management, organisation and training on boards ships.	Experts in the field	6 hours
28.	<b>Dry-docking and lay-up repairs</b>  Preparation, surveys, work schedule, safety checklist and precautions.  Economy, commercial and technical aspects, undocking and sea trials after dry-docking.	Experts in the field	2 hours
29.	<b>Modern development in steam propulsion and auxiliary plant</b>	Experts in the field	2 hours
30.	<b>Case study of Marine Machinery failures</b>  Detection of machinery malfunction, location of faults and action to prevent damage.	Discussion among the participants	2 hours
31.	<b>Vibration related to main engines, auxiliary machinery and ship structure</b>  Includes diesel engines, pumps, compressors, steering gear and rudder. Alignment of couplings. Prevention by design and construction. Vibration analysis as guide for preventive maintenance.	Experts in the field	4 hours
32.	<b>Types of ships like Gas, Chemical, Oil, Bulk Carriers, Passenger Vessels, Ro-Ro and others. Specialised requirements of each.</b>	Experts from such ship owners	2 hours
33.	<b>Lubricating oil technology - Technical</b>	Expert in the field	2 hours

	<b>and commercial aspects</b>		
34.	<b>Participants Experience for benefit of others and discussion</b>	Course Co-ordinator	2 hours
35.	<b>Marine Insurance and P &amp; I clubs. Commercial knowledge and chartering.</b>	Experts from insurance companies	2 hours
36.	<b>Planned maintenance</b>  Correct planning and execution of maintenance activities in accordance with the,  1) Technical specification  2) Legislative specification  3) Safety specification  4) Procedural specification	Experts from shipping Companies	2 hours
<b>TOTAL</b>			<b>68 Hours</b>

**OR**

(b) Produce proof of having attended MEO Class II Course of four months duration as under M.S. (STCW) Rules, 1998.

(e) Should have already done the following courses: -

(iv) Proficiency in Survival Craft

(v) Advance Fire Fighting

(vi) First Aid at sea

(c) Should have done 5 days of 'Engine Room Simulator' training

#### **APPENDIX M-I/10.12-revised**

**Refresher and Updating Training (Upgradation Course) for Certificate of Competency as MEO Class-I or Chief Engineer Officer issued under the M.S. (Examination of Engineer Officers in the Merchant Navy) Rules, 1989 or earlier.**

(h) Should have done the following courses: -

- (i) Proficiency in Survival Craft
  - (ii) Advance Fire Fighting
  - (iii) First Aid at sea
- (i) Refresher and Updating Training course consisting of the following:

**Duration: 10 days**

Sr. No.	Name of topic	Faculty	Duration
37.	<b>Inaugural Lecture</b>  Details of STCW Convention. How and why this course was formulated	Course Co-ordinator	1 hour
38.	<b>SOLAS Regulations</b>  IMO recommendation concerning ship stability in normal and damaged condition and associated stress analysis. Stability and stress conditions are maintained within safety limits at all times.  Amendments under SOLAS, Ro-Ro Stability, Formal safety assessment	Experts in the field	4 hours
39.	<b>Load Line Assignment</b>  Ship construction - Modernisation of ship design and ship stability, Load line, conditions of assignment.	Experts in the field	2 hours
40.	<b>MARPOL regulations</b>  9) Recent amendments to the Annexes  10) Overview of Annex VI  11) Harmful effects of TBT in anti-fouling paints  12) Management of harmful effects of ballast water discharges	Experts in the field	2 hours
41.	<b>ISM Code, Quality Management Systems</b>  Requirement and documentation certificates	Experts in the field	2 hours

	and other documents required to be carried on board ships by international conventions, how they may be obtained and the period of their legal validity.		
42.	<b>Ship inspections including port state control</b>  Ship survey and inspection on behalf of various bodies like maritime Administration, Health Administration.	Experts in the field	2 hours
43.	<b>Advancements in the Proficiency in Survival Craft including Rescue Boat</b>  Construction, outfit, characteristics and launching devices for rescue boats including fast rescue boats. Rough weather practices for rescue boats. Enclosed lifeboats and video film on same. Video films on free fall lifeboats.	Experts from approved institution	3 hours
44.	<b>Human Resource Management and Personal Safety and Social Responsibility (PSSR)</b>  Understand orders and be understood in relation to shipboard duties. Method of improving communication skills. Interpersonal relations and contribution to effective human relation on board the ship. Social responsibilities; employment conditions; individual rights and obligations; dangers of drug and alcohol abuse.	Experts in HRD management	4 hours
45.	<b>Advancements in "Advanced Fire Fighting Course"</b>  13) SOLAS amendments in structural fire protections  14) Smoke extractor  15) Dry distillation, chemical reactions, boiler uptake fires  16) Fire involving dangerous goods  17) Assessments of cause of	Lecturers from Approved Institutions	3 hours



	incidents involving fire		
	18) Advancement in fire fighting detection and extinguishing systems.		
46.	<b>Advancements in "Medical First Aid"</b>  11) Toxicological hazards on board, including use of the medical first aid guide for use in accidents involving dangerous goods  12) Medical care of rescued persons  13) Radio medical advice  14) Pharmacology  15) Sterilisation	Lecturers from Approved Institution	3 hours
47.	<b>Improvements in Diesel engines, ship design and dealing with major breakdown.</b>  Latest development in the field of large marine diesel engines and also insights into main propulsion units of future. Salient features of maintenance involved	Senior consultants in the field	2 hours
48.	<b>Improvements in marine auxiliaries and dealing with major breakdown.</b>  Latest development in the field of marine auxiliaries including steam boilers and steering gear system.  Insight into the field of machinery of the future. Salient features of maintenance involved.  Planning and preparation of operation suited to the design parameter of power installation and the requirement of the voyages.  Surveillance of main propulsion plant and auxiliary system is sufficient to maintain safe operating conditions.	Experts in the field	2 hours
49.	<b>Latest development in regard automatic</b>	Experts in the field	2 hours

	<b>&amp; control - Computer and Computerisation on board a ship.</b>  Operation, testing and Maintenance of control system.		
50.	<b>Control equipment</b>  <i>Operate, test, detect faults, maintain and restore Electrical and Electronic Control equipment to operating condition.</i>	<i>Experts in the field</i>	<i>2 hours</i>
51.	<b>Ship Fuel Consumption - a topic of discussion.</b>	<i>Experts in the field</i>	<i>2 hours</i>
52.	<b>Simulation of combustion of a large marine diesel engine</b>	At least an approved PC based simulator	<i>4 hours</i>
53.	<b>Training for trainers and workshop</b>  Training of ship board trainers  A knowledge of personnel management, organisation and training on boards ships.	Experts in the field	6 hours
54.	<b>Dry-docking and lay-up repairs</b>  Preparation, surveys, work schedule, safety checklist and precautions.  Economy, commercial and technical aspects, undocking and sea trails after dry-docking.	Experts in the field	2 hours
55.	<b>Modern development in steam propulsion and auxiliary plant</b>	Experts in the field	2 hours
56.	<b>Case study of Marine Machinery failures</b>  Detection of machinery malfunction, location of faults and action to prevent damage.	Discussion among the participants	2 hours
57.	<b>Vibration related to main engines, auxiliary machinery and ship structure</b>  Includes diesel engines, pumps, compressors, steering gear and rudder. Alignment of couplings. Prevention by design and construction. Vibration analysis as guide for preventive maintenance.	Experts in the field	4 hours
58.	<b>Types of ships like Gas, Chemical, Oil, Bulk Carriers, Passenger Vessels, Ro-Ro</b>	Experts from such ship owners	2 hours

	<b>and others. Specialised requirements of each.</b>		
59.	<b>Lubricating oil technology - Technical and commercial aspects</b>	Expert in the field	2 hours
60.	<b>Participants Experience for benefit of others and discussion</b>	Course Co-ordinator	2 hours
61.	<b>Marine Insurance and P &amp; I clubs. Commercial knowledge and chartering.</b>	Experts from insurance companies	2 hours
62.	<b>Planned maintenance</b>  Correct planning and execution of maintenance activities in accordance with the,  5)            Technical specification  6)            Legislative specification  7)            Safety specification  8)            Procedural specification	Experts from shipping Companies	2 hours
<b>TOTAL</b>			<b>68 Hours</b>

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