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Government of Pakistan
Ministry of Ports & Shipping
(Ports & Shipping Wing)
****

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CIRCULAR NO. 03 /2016

Ministry of Ports & Shipping has developed the Course with Syllabus for issuance of Certificate of Competency to eligible Electro-technical Officers (ETO) after an oral examination under regulation III/6 of the STCW-Convention, 1978. This certificate will entitle the successful candidate to perform the most senior electro-technical role in electrical, electronic and control engineering functions and duties at an operational level on a ship of any propulsion power in any operating area.

2. All the Existing Electrical Engineers desirous to appear in the Certificate of Competency Oral Examination are hereby informed to first go through the standard of Examination set in the attached **Appendix-I**, before applying for issuance of Notice of Eligibility (NOE) which will be issued once you have met the requirements as specified under:

1) The appropriate fee;

2) A medical fitness certificate from the Administration approved medical center or doctor;

   a) For any Certificate of Competency, candidate must meet the medical fitness and eyesight standards as required by the Merchant Shipping (Maritime Labour Convention) (Medical Certification) Regulations 2010 (S.I. 2010/737).

   b) The seafarer medical examination includes a sight test for both colour vision and visual acuity. Failure to meet the statutory requirements will mean that an unrestricted medical certificate cannot be issued.

   c) The medical fitness certificate must specify the date of examination, the period of validity and any restriction applied.

3) An eye test from MMD office;

4) 2 passport-size photographs;

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5) Proof of the required seagoing service applicable, as per Appendix-II t of Competency being applied for;

i) At least 6 months of the qualifying seagoing service must have b within the 5 years immediately preceding the issue of Certificate o

ii) Seagoing service may be performed in vessels of any flag. Seagoing be performed in merchant ships proceeding to sea.

iii) If the ship candidate serving on is in lay-up, at maintenance bert anchorage or dry dock he may count up to 25% of this service qualifying service.

iv) Candidate will be required to submit documentary evidence of seagoi for Certificate of Competency applied for. Proof of seagoing service documented by seamen service discharge book entries. Each entry supported by testimonials from the Master or Chief Engineer. The test must cover conduct and ability of the candidate.

6) Ancillary Technical and Safety Courses:

i. Personal Survival Techniques (STCW Code – Table A-VI/1-1);
ii. Fire Prevention and Fire Fighting (STCW Code – Table A-VI/1-2);
iii. Elementary First Aid (STCW Code – Table A-VI/1-3);
iv. Personal Safety and Social Responsibilities (STCW Code - Table AVI/1-4);
v. Proficiency in Survival Craft and Rescue Boats other than Fast Rescue B (STCW Code – Table A-V1/2);
vi. Advanced Fire Fighting (STCW Code - A-VI/3)
vii. High Voltage (management) (STCW Code - A-III/2)

7) ETO Oral Examination Syllabus has been provided at **Appendix-III**, to this Circular. The principal objective of the oral examination is to ensure that a candidate will be able to undertake the duties and responsibilities of an ETO (O) on board a seagoing ship. In the examination every candidate must prove the ability to undertake the tasks, duties and responsibilities listed in the column 1 of table A-III/6 of STCW Code.

3. After obtaining NOE for ETO oral Exams, candidates should confirm their date of Oral Examination and any other information from the Office of Chief Examiner of Marine Engineers at Ist

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Floor, KDLB Building, West Wharf Road, Karachi. Oral examination would be arranged on monthly/quarterly basis in view of number of candidates desiring to appear.

4 Application Forms for the Examination, complete in all respect, should be submitted through Mercantile Marine Department, Karachi at least two weeks before the examination.

(**WAMIQ ABRAR SIDDIQUI**)
Chief Engineer & Ship Surveyor/
Chief Examiner of Engineers

DISTRIBUTION:

1. The Director General (P&S).
2. The Chief Nautical Surveyor, P&S Wing, Karachi.
3. The Principal Officer, MMD, Karachi.
4. Engineer & Ship Surveyor (Exams), P& S Wing, Karachi.
5. Notice Board.

Appendix-I

Standard of ETO Examination

The ETO certificate is issued under regulation III/6 of the International Convention on the Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW). With this certificate, you can perform electrical, electronic and control engineering functions and duties at an operational level on a ship of any propulsion power in any operating area. This is the most senior electro-technical role.

Final examination

You must pass a final exam to show you have met the standards of competency specified in section A-III/6 of the STCW Code. The final exam is currently an oral examination. If a candidate fails an oral examination re-sits may be taken at the following intervals:

Second attempt	-	at 2 weeks after the initial examination;
Third attempt	-	at least 4 weeks after the second attempt;
Subsequent attempts	-	at least 3 months after the previous attempt.

Time periods between examinations can be reduced at the discretion of the examiner. Where a candidate exhibits a lack of basic competency across the syllabus ormakes fundamental errors in areas of safety, the examiner may impose a seagoing service penalty which the candidate must complete before re-sitting the examination.

Fraudulent Certificates and Seagoing Service

The Administration checks that all of the information you submit in support of your application is accurate and true. We:

1) Check and verify ancillary and safety course certificates;
2) Verify sea service testimonials and discharge book entries;
3) Only accept original course completion certificates.

If you submit fraudulent seagoing service records or certificates we will not allow you to proceed with your application. We reserve the right not to let you apply again until after a period specified by the Chief Examiner.

Appendix-II

Proving sea service

You are responsible for making sure your sea service is documented and verified by your ship's master or company. To support your sea service, you must provide the following documents for each vessel you have served on:

1) certificate of sea service
2) discharge certificate or discharge book (ensuring that sign on / signed off entries match the service certificate dates).

If it is not included in one of the documents above, you must also provide a reference (on company letterhead), from the ship's master or your employer. The reference(s) must state the start and end dates of your service and duties while in service. Any references must cover your experience, conduct, sobriety and ability. The documents you provide must contain all of the following details for each vessel you have served on:

1) your employer's name and contact details
2) the name, tonnage and type of vessel (for example, cargo vessel, tanker, bulk carrier)
3) the type of cargo carried and area of operation
4) the engine type, make, model and output power
5) the dates you were employed and the sea time completed between those dates
6) your duties, including the actual time you spent on engine room in capacity of Electrical Engineer Officer.
7) At least 6 months sea service experience as an Electrical Engineer for the electrician (rating) after qualifying for the Electrical Engineer.

Any statutory declarations you have made are *not* acceptable as proof of your sea service.

Training

The sea service, training and experience required for this certificate must involve functions and duties associated with electrical, electronic and control engineering at an operational level, on a ship of 750kW propulsion power or more in any operating area.

As part of your training, you are required to gain electro-technical (electronic and electrical) workshop skills relevant to the duties of an electro-technical officer. This training may be carried out ashore with an approved training provider.

The competencies you will need to gain and demonstrate are set out in Table A-III/6 of the STCW Code.

You must attend and pass an ETO training course from the institutes approved by the Administration, and meets the required competencies specified in section A-III/6 of the STCW Code. You should check that the course provides the required training in electro-technical workshop skills.

Syllabus for Electro-technical Officer (ETO) certificate of competency for the existing Electrical Engineer.

The principal objective of the oral examination is to ensure that a candidate will be able to undertake the duties and responsibilities of an ETO (O) on board a seagoing ship. In the examination every candidate must prove the ability to undertake the tasks, duties and responsibilities listed in the column 1 of table A-III/6 of STCW Code.

The syllabus indicated below is in compliance with the STCW requirements and is divided into topics. Each topic contains a group of tasks, duties and responsibilities for the operation, maintenance and repair of the electrical system and equipments considered necessary for the safe and efficient running of the ship, safety of life at sea or protection of the marine environment.

ETO Operational level STCW Convention regulation III/6

All candidates MUST have the knowledge of the oral examination syllabus before taking oral examination with the Chief Examiner.

Topic- 1

Monitor the operation of the Electrical, Electronic and Control Systems

a. Basic understanding of the operation of mechanical engineering systems of thefollowing:

- *i.* Prime movers including emergency generators;
- *ii.* Main Propulsion Machinery;
- *iii.* Auxiliary Equipment;
- *iv.* Steering system;
- *v.* Cargo handling systems /machinery;
- *vi.* Deck machinery;
- *vii.* Hotel systems.

b. Knowledge of:

- *i.* Electrical machines theory (construction, working principle and protectiondevices for Generator, Motor (including types and various starting methods) andTransformer);
- *ii.* Fundamentals of electronics and power electronics;
- *iii.* Electrical power distribution boards and electrical equipment;
- *iv.* Fundamentals of automation, automatic control systems;
- *v.* Instrumentation , alarm and monitoring systems;
- *vi.* Electrical drives (including control unit and power modulator - converters (ac to dc, ac regulators, choppers or dc-dc converters, inverters, cycloconverters),variable impedance and switching circuits);
- *vii.* Technology of Electrical materials;
- *viii.* Electro-hydraulic and electro-pneumatic control systems;
- *ix.* Appreciation of the hazards and precautions required for the operation of powersystems above 1000 volts.

Topic – 2

Monitor the operation of automatic control systems of propulsion and auxiliary machinery

Knowledge, understanding and proficiency in the preparation of control systems of propulsion and auxiliary machinery, for operation and maintaining safe operating condition – alarms, autochange over (to stand by unit), shut down, lock out, slow down, safety interlocks.

Topic – 3

Operate Generators and distribution systems

Knowledge, understanding and proficiency in coupling, load sharing, changing over generators, coupling and breaking connection between switchboards and distribution panels – ability to establish rules and procedures for safe operation in accordance with the operating manuals (maker) – ability to explain electrical distribution system with drawing/instructions – knowledge of earthing systems and earth fault finding procedures.

Topic – 4

Operate and Maintain Power Systems in excess of 1,000 Volts

Have Knowledge, understanding and proficiency in:

a. Safety precautions and procedures;
b. Electrical propulsion of the ships;
c. Electrical motors and control system;
d. Safe operation and maintenance of high-voltage systems and the danger resulting from
e. operational voltage of more than 1,000 volts;
f. Legislation pertaining to high voltage (HV) systems;
g. HV switchboards;
h. Protection for HV feeder, motors and transformers;
i. Permit to work and sanction to test;
j. Compiling and implementing switching plan to isolate a HV distribution fault;
k. Earthing procedures;
l. Checking Circuit Breaker for correct operation;
m. Pressure tests of Circuit Breaker;
n. Polarisation Index test for HV transformers;
o. Trending HV IR tests.

Topic – 5

Operate Computers and Computer Networks on Ships

Have understanding of:

a. Main features of data processing;
b. Construction and use of computer networks on ships;
c. Bridge based, engine room based and commercial computer use;
d. Ability to check and handle the computer networks and computers correctly.

Topic – 6

Use of Internal Communication System

Have knowledge, understanding and proficiency regarding the operation of all internal communication systems on board.

Topic – 7
Maintenance and Repair of Electrical and Electronic Equipment

Have knowledge, understanding and proficiency in:

a. The interpretation of electrical and electronic diagrams;
b. Safety requirements for working on shipboard electrical systems, including safe isolation of electrical equipment before personnel are permitted to work on such equipment;
c. Issuance and requirements for the permit to work document;
d. Maintenance and repair of electrical system equipment, switchboards, electric motors, generators and DC electrical systems and equipment;
e. Detection of electric mal function, location of faults and measures to prevent damage;
f. The precautions while carrying out insulation test on equipment incorporated with electronic circuit and devices;
g. Construction and operation of electrical testing and measuring equipment;
h. The performance test, maintenance, fault finding and repair of fire detection system and equipment;
i. Function and performance tests of the following;
j. Monitoring system;
k. Automatic control system;
l. Protective devices.

Topic – 8
Maintenance and Repair of automation and control systems of main propulsion and auxiliary machinery

Have knowledge, understanding and proficiency in:

a. Safe isolation of equipment and associated system before personnel are permitted to work on the plant or equipment;
b. Safety and emergency procedures;
c. Testing, maintenance, fault finding and repair;
d. Interpreting technical drawing;
e. The use of measuring and calibrating instruments;
f. Making justifiable decision leads to the restoration of automation and control systems by the method most suitable and appropriate to the prevailing circumstances and conditions.

Topic - 9
Maintenance and Repair of Bridge Navigation Equipment and Ship Communication Systems

Have knowledge, understanding and proficiency in:

a. The principles and maintenance procedures of Navigation equipment, internal and external communication systems;
b. Detecting machinery malfunction, location of faults and action to prevent damage;
c. Safe isolation procedures;
d. Interpretation of ships technical drawing;
e. Safe maintenance and repair procedures;
f. Testing, maintenance, faultfinding and repair.

Topic – 10

Maintenance and repair of electrical, electronic and control systems of deck machinery and cargo-handling equipment

Have knowledge, understanding and proficiency in:

a. Safe isolation of equipment and associated system before personnel are permitted to work on the plant or equipment;
b. Safety and emergency procedures;
c. Testing, maintenance, faultfinding and repair;
d. Interpreting technical drawing;
e. The use of measuring and calibrating instruments;
f. Making justifiable decision leads to the restoration of deck machinery and cargo handling equipment by the method most suitable and appropriate to the prevailing circumstances and conditions.

Topic – 11

Maintenance and repair of control and safety systems of hotel equipment

Have knowledge, understanding and proficiency in:

a. Detecting machinery malfunction, location of faults and action to prevent damage; safe isolation procedures of equipment and associated systems;
b. Interpretation of ships technical drawing;
c. Safe maintenance and repair procedures;
d. Testing, maintenance, fault finding and repair.

Topic – 12

General Electrical Safety

Have knowledge of:

a. The types of electrical and electronic equipment that can be fitted in hazardous areas; the precautions (in addition to proper isolation of electrical equipment and systems) forthe maintenance and repair of equipment and systems located in hazardous area;
b. The issuance of permit to work;
c. The precautions while working on live or dead electrical equipment/systems;
d. The appropriate PPE and tools used for the maintenance, testing and repair of electrical equipment and systems;
e. The Battery room safety, safe maintenance and working procedures on batteries, appropriate PPE and tools.

Topic – 13

Emergency Power Supply

Have knowledge of:

a. Emergency switchboard, emergency power supply to the essential equipment and lighting circuits and pertaining regulations, Emergency generator connection interlock (main and emergency switchboards) and various starting methods;
b. Testing and maintenance of the auto start system for the emergency generator in the event of main power failure;
c. Battery bank and UPS – maintenance and testing procedures.

Topic – 14

Controlling the operation of the ship and care for persons on board at the operational level.

a. **Ensure compliance with pollution prevention requirements.**

Knowledge of:

i. The precautions to be taken to prevent pollution of the marine environment;

ii. Anti-pollution procedures and all associated equipment;

iii. Importance of proactive measures to protect the marine environment.

b. **Prevent, control and fight fire on board.**

Knowledge of:

i. Organising fire drills;

ii. Classes and chemistry of fire;

iii. Fire-fighting systems;

iv. Actions to be taken in the event of fire, including fires involving oil systems.

c. **Operate life-saving appliances.**

Knowledge of:

i. Organising abandon ship drills;

ii. Operation of survival craft and rescue boats, their launching appliances and arrangements and their equipment, including radio life-saving appliances, satellite EPIRBs, SARTs, immersion suits and thermal protection aids.

d. **Apply medical first aid on board ship.**

Knowledge of:

i. Practical application of medical guides;

ii. Effective actions in the case of accidents or illnesses that are likely to occur on board ship.

e. **Application of leadership and team working skills**

Knowledge and ability to apply:

i. Task and workload management;

ii. Effective resource management;

iii. Decision-making techniques.

f. **Contribute to the safety of personnel and ship.**

Knowledge of:

i. Personal Survival Technique;

ii. Fire prevention and ability to fight and extinguish fires;

iii. Elementary first aid;

iv. Personal safety and social responsibilities.

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Notice of Eligibility (NOE) for Electro-technical Officer (ETO) certificate of competency for the existing Electrical Engineer's.

Notice of Eligibility (NOE) will be issued by the Office of the Chief Engineer and Ship Surveyor/Chief Examiner of Marine Engineers in the Ports & Shipping Wing, Karachi, to any prospective candidate, once he has met the requirements specified below. The NOE will allow to appear in an oral examination to be conducted by the Chief Examiner of Marine Engineers and any outstanding documents that you will need to submit prior to the issue of your Certificate of Competency.

Prior to the issue of NOE you must submit:

1) The appropriate fee;
2) A medical fitness certificate from the Administration approved medical center or doctor;
3) An eye test from MMD office;
4) 2 passport-size photographs;
5) Proof of the required seagoing service applicable to the Certificate of Competency being applied for;
6) Ancillary Technical and Safety Courses:

   i. Personal Survival Techniques (STCW Code – Table A-VI/1-1);
   ii. Fire Prevention and Fire Fighting (STCW Code – Table A-VI/1-2);
   iii. Elementary First Aid (STCW Code – Table A-VI/1-3);
   iv. Personal Safety and Social Responsibilities (STCW Code - Table AVI/1-4);
   v. Proficiency in Survival Craft and Rescue Boats other than Fast Rescue Boats (STCW Code – Table A-V1/2);
   vi. Advanced Fire Fighting (STCW Code - A-VI/3)
   vii. High Voltage (management) (STCW Code - A-III/2)

At least 6 months qualifying seagoing service must have been performed within the 5 years immediately preceding the issue of your NOE.