



GUIDANCE NOTE
SAMSA Code: Engineer
Instrumentation and Control
Systems

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Compiled by

Senior Engineer Examiner

Approved by

Syllabus Committee:
13 May 2015

OPERATIONS – SEAFARER CERTIFICATION

GUIDANCE NOTE

SA MARITIME QUALIFICATIONS CODE

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COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	METHODS FOR DEMONSTRATING COMPETENCE	CRITERIA FOR EVALUATING COMPETENCE
MODULE 1			
1 Introduction.	1. Description of general instrumentation systems and Instrument specifications. Measurement definitions & error analysis.	Examination and assessment of evident obtained from theoretical instruction as associated laboratory or workshop practical training.	Demonstrate a clear theoretical and practical application of electricity
2 Sensors & Transducers	2. Passive devices: Resistive; potentiometers, strain gauges, resistance thermometers, thermistors, thick film devices. Inductive; self-inductance and mutual inductance, LVDT. Capacitive, variable area, displacement and push-pull devices. Hall effect transducers. 2.2 Active devices: to include, Electromagnetic sensors, Eddy current devices, Resolvers, Search coils. Thermoelectric and piezo-electric to include thermocouples, accelerometers; force and pressure measuring devices. Optical devices, to include optical fiber based sensors, laser based measurements and encoders.		
3 Automation and Controls	3 Concepts of automatic Control. 3.1 Working and maintenance of Temperature, Pressure, Flow, Level And other measuring equipment. 3.2 Operation and maintenance of various types of Transmitters, Controllers, Actuators, Valve Positioners and control valves with their characteristics. Boilers controllers-Boiler water level controller and Air Fuel combustion controller. 3.2 Operation and maintenance of the Automatic Controller along with calibration 3.3 The operation and maintenance aspects of Programmable Logic Controller 3.4 Manual and Automatic Control 3.5 Measuring Element, Measured Value, Desired value, Error as difference of measured value and desired value. 3.6 Open Loop Systems & Closed Loop Systems 3.7 Proportional Control, Integral Control, Derivative Control & P-I-D Control. 3.8 Instrumentation: Temperature measurement, Pressure measurement, Level measurement, Flow measurement and other measuring instruments. 3.9 Pneumatic Transmitter, Pneumatic Controller, Methods of determining the controller settings, Malfunction and Troubleshooting of controllers. 3.10 Factors influencing control action & Tuning of P-I-D controllers		

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4 Dynamic Positioning	4.1 Dynamic control systems. 4.2 DP Management 4.3 DP Requirement		