

ANNOTATION

Ship Diesel Engines 150 h, mandatory	ESTC credits: 10
Department: Ship Power Systems	Lectures: Assoc. Prof . Ph.D. Ivan Ivanov Exercises: Assoc. Prof . Ph.D. Ivan Ivanov Assist. Prof . Ph.D. Dragiya Yanulov
Learning objectives: Students SHOULD KNOW: <ul style="list-style-type: none">- the basic theoretical principles of operation of turbocharged marine diesel engines;- components of turbocharged marine diesel engines and the basics of their operation;- curve types and procedures for optimal operational modes selection;- approaches for improving engine efficiency and performance;- approaches and means for environmental pollution prevention;- design features, operating conditions, materials, manufacturing technology, maintenance and service of fixed and running parts of marine diesel engines;- principles ensuring the dynamic balance of the engine;- simplified calculations for analysis of technical conditions, load estimation and engine performance prognosis in the period before maintenance;- gas exchange system components, their design and principles of operation, service and maintenance;- diesel engine service systems, their design and principles of operation, service and maintenance;- design of the most common engine control systems, their principle of operation, service and maintenance;- design features of the basic marine diesel engines types. Students SHOULD BE ABLE TO: <ul style="list-style-type: none">- operate marine diesel engines, their service systems and equipment in laboratory conditions;- carry out equipment adjustments;- define the load diagram and performance curves of marine diesel engine;- prepare and present reports which include measurement data, calculation data and explanatory notes;- conduct software aided control and monitoring of marine engines;- navigate through the extraordinary diversity of marine diesel engine constructions and modifications;- prepare for operation, start and service diesel engines in laboratory conditions while they are running;- carry out calibration and adjustment of diesel engines components and systems.	

Assessment system:

The trainees' progress in the acquisition of the material is controlled at the end of each topic. The theoretical knowledge of the trainees is assessed with questionnaires and tests. Their practical knowledge is assessed by the instructor with reports and oral assignments.

An examination at the end of the 6th and the 7th semester.

SCOPE: This syllabus covers the requirements of the 1995 STCW convention Chapter III, Section A-III/1 Code Competence, Reference 1.6, 1.7, 2.1, 4.1 Operational level competences, Section A-III/2 code competence Reference 1.3, 1.4, 1.5, 3.2 Management level competence and the recommendations in the IMO/ILO Document for Guidance 1999 as prescribed in IMO Model course 7.02, Function 1 Competence 1.1.3.2, 1.1.4.5, 1.2.2.11 to 14, 1.3.1 and Model Course 7.04 Function 1 Competence 1.6.1.24 to 1.6.1.43, 1.7.1.

Contents:

No.	Subject area (modules)	Lectures	Exercises
1.	Basic terms. Operational principles, characteristics and parameters of internal combustion engines.	4	2
2.	Precise method of Grinevetsky	4	2
3.	Working cycle characteristics	4	3
4.	Fuel injection in diesel engines. Fuel/air mixing and combustion.	14	5
5.	Scavenging of two-stroke marine diesel engines	4	2
6.	Supercharging of marine diesel engines. Characteristics of marine diesel engines.	16	6
7.	Improving marine diesel engines performance. Ecological problems related to marine diesel engines operation.	6	-
8.	Course assignment	-	3
9.	Internal combustion engines classification. Basic definitions. Fixed parts of marine diesel engines.	8	4
10.	Running parts of marine diesel engines	6	2
11.	Dynamics and balance of internal combustion engines	6	
12.	Gas exchange control devices	4	2
13.	Air charging and exhaust gas system	8	3
14.	Fuel oil system	6	2
15.	Lubricating oil system	2	2
16.	Cooling and starting air systems. Reversal and control.	8	4
17.	Basic design features of marine diesel engines	4	4
	Total	107	43