

## FACULTY OF ENGINEERING & TECHNOLOGY

Programme		Bachelor of Technology			Branch/Spec.	Marine Engineering			
Semester		VI			Version	2.1.1.1			
Effective from Academic Year			2017-18		Effective for the batch Admitted in			July 2015	
Subject code		2MR601	Subject Name		Refrigeration & Air Conditioning				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	0	1	0	3	Theory	40	60	100
Hours	2	0	2	0	4	Practical	25	25	50
Pre-requisites:									
Learning Outcome:									
After successful completion of the course, student will be able to									
<ul style="list-style-type: none"> <li>• Comply with the TAR Book Competency number 4.3.4, 4.5 &amp; 9.6</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
<b>1.</b>	<b>Introduction to Refrigeration and Air Conditioning:</b> <ul style="list-style-type: none"> <li>• Brief history of refrigeration, methods of Refrigeration, conventional and non-conventional, and units of Refrigeration, Coefficient of Performance, and Refrigeration efficiency.</li> </ul>								<b>4</b>
<b>2.</b>	<b>Theory of Refrigeration:</b> <ul style="list-style-type: none"> <li>• Carnot cycle with P-V and T-S diagram, Bell Coleman and Reversed Bray ton cycle with P-V and T-S diagram.</li> </ul>								<b>3</b>
<b>3.</b>	<b>Mechanical Refrigeration</b> <ul style="list-style-type: none"> <li>• Carnot vapour compression cycle, Simple vapour compression cycle, vapour absorption Refrigeration.</li> <li>• Comparison between Vapour Absorption Refrigeration and Vapour Compression Refrigeration with different components like evaporator, condenser, expansion valve and compressor.</li> <li>• Understanding the system on Test Rig</li> </ul>								<b>8</b>
<b>4.</b>	<b>Refrigerants:</b> <ul style="list-style-type: none"> <li>• Desirable properties of refrigerants, Primary and secondary of refrigerants, various refrigerants and their properties, alternatives to chloroform carbons.</li> </ul>								<b>5</b>
<b>5.</b>	<b>Air Conditioning: Introduction:</b> <ul style="list-style-type: none"> <li>• Specific humidity, Relative humidity, Dew point, Unsaturated and Saturated air.</li> <li>• Psychrometric, Psychrometric charts, various processes, comfort and industrial A/c, Effective temperature and comfort, chart, unitary and central A/c system.</li> <li>• Understanding system on Test Rig</li> </ul>								<b>5</b>
<b>6.</b>	<b>Design and constructional:</b> <ul style="list-style-type: none"> <li>• Details of various equipment for air conditioning used in marine practice and their justification. Control of temperature and humidity. Description of various types of Compressors used in marine industry.</li> <li>• Loading/Unloading System, Oil Separator, Receivers, Charging Process, Expansion valves, Back Pressure Valves, Evaporators, Construction of fridge room and drain.</li> <li>• Requirement of defrosting and it's system, Various methods of detecting leaks.</li> </ul>								<b>11</b>
								<b>TOTAL</b>	<b>36</b>
Practical content									

- To understand different components of VCR system and to determine it's COP
- To understand construction and working of reciprocating, rotary and centrifugal compressor used for R&AC.
- To understand various tools used for refrigeration tubing and to perform various operations like flaring, swaging, bending, brazing etc.
- To perform different psychometric processes and analyse the same using psychometric chart.
- To understand construction and working of window air-conditioner/ split air-conditioner and to determine its capacity.
- Study of domestic refrigerator and to determine % running time at different thermostat settings.
- To study the Tool kit used for the maintenance of the Refrigeration system.
- To study different types of expansion valves used for refrigeration systems

**Training Manual Assignments:**

**Assignment No: 68**

Refrigeration-provision refrigerating plant

**Text Books**

1	General Engineering Knowledge - H. D. McGoeorge
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**Reference Books**

1	Refrigeration at Sea - J. R. Stot
2	Marine Air-conditioning - S. D. Srivasatav
3	Advanced Marine Engineering - J. K. Dhar

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FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Bachelor of Technology				Branch/Spec.	Marine Engineering			
Semester	VI				Version	2.0.0.0			
Effective from Academic Year			2016-17		Effective for the batch Admitted in			July 2014	
Subject code	2MR602		Subject Name		Marine Systems and Simulation				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	0	0	2	0	2	Theory	0	0	0
Hours	0	0	4	0	4	Practical	50	50	100
Pre-requisites:									
Learning Outcome:									
After successful completion of the course, student will be able to Engine Simulator Lab Exercise: Description of basic engine functions and their simulation introduced in Engine Room Simulator.									
Theory syllabus									
Unit	Content								Hrs
	Simulation Training of the following Marine Systems: <ul style="list-style-type: none"> <li>• Engine Room Familiarization</li> <li>• Operation of Valves</li> <li>• Operation of main and emergency air compressors</li> <li>• Operation of electricity generation plant including emergency generator</li> <li>• Operation of various pumps</li> <li>• Operation of steam generating plants (Auxiliary Boiler, Exhaust Gas Boiler )</li> <li>• Operation of OWS and Incinerator</li> <li>• Operation of Oil Purifiers</li> <li>• Operation of Fresh Water Hydrophore Systems</li> <li>• Operation of Steering Gear</li> <li>• Operation of Shaft Generator</li> <li>• Operation of Fire Fighting Equipment</li> <li>• Operation of Domestic Refrigeration Systems</li> <li>• Operation of Fresh Water Generator</li> </ul> Following Tasks to be performed. <ul style="list-style-type: none"> <li>• Starting of Emergency Generator during Dead Ship Condition</li> <li>• Line up and Starting of Fresh Water Generator</li> <li>• Line up and Starting of OWS</li> <li>• Starting and warming up of Boiler</li> <li>• Line up for receiving bunkers</li> </ul>								
Practical content									
Text Books									
Reference Books									

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## FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	Marine Engineering		
Semester	VI	Version	2.0.0.0		
Effective from Academic Year		2016-17	Effective for the batch Admitted in		
			July 2014		
Subject code	2MR603	Subject Name	Marine Internal Combustion Engine - II		
Teaching scheme			Examination scheme (Marks)		
(Per week)	Lecture(DT)		CE	SEE	Total
	L	TU			
	Practical(Lab.)				
	P	TW			
Credit	3	0	0	0	3
Hours	3	0	0	0	3
			Theory	40	60
			Practical	0	0
					100
					0

Pre-requisites:

Learning Outcome:

After successful completion of the course, student will be able to

- Comply with the TAR Book Competency number 4.3.1, 5.4, 9.2 & 9.4

Theory syllabus

Unit	Content	Hrs
<b>1.</b>	<b>Fuel pumps and metering devices:</b> <ul style="list-style-type: none"> <li>• Jerk and Common rail systems; Fuel injection systems helical groove and spill valve type Fuel Pumps. System for burning heavy oil in slow and medium speed marine engine, V.I.T. &amp; Electronic injection system.</li> <li>• Effect of viscosity on liquid combustion.</li> <li>• Measuring equipment and its working principle.</li> <li>• Necessity of variable fuel injection system.</li> <li>• Procedure of application on a modern slow speed long stroke engine. Necessity for adoption of fuel quality setting system.</li> <li>• Incorporation of FQSL along with the V.I.T. system of the engine.</li> </ul>	<b>10</b>
<b>2.</b>	<b>Manoeuvring Systems:</b> <ul style="list-style-type: none"> <li>• Overview of Starting and reversing systems of different Marine Diesel engine with safety provisions.( On Simulator )</li> </ul>	<b>4</b>
<b>3.</b>	<b>Indicator diagrams and Power Calculation:</b> <ul style="list-style-type: none"> <li>• Construction details of indicator instrument. Study of different types of indicator cards, Significance of diagram Power Calculations, fault detection, simple drew cards and out of Phase diagrams.</li> <li>• Power balancing, Performance Characteristic Curves, Test bad and Sea trials of diesel engines.</li> </ul>	<b>8</b>
<b>4.</b>	Lubrication arrangement in diesel engine including Coolers & Filters, Cylinder-lubrication, Linear wear and preventive measures, Combinations of lubricating oil its effect and preventive measures. <ul style="list-style-type: none"> <li>• Improvements in Lubricating oils though use of additives. Types of additive</li> <li>• Monitoring engines though lubricating oil analysis reports.</li> </ul>	<b>10</b>
<b>5.</b>	<b>Automation in modern diesel plants:</b> <ul style="list-style-type: none"> <li>• Remote operation, Alarm and fail safe system.</li> <li>• Changeover of remote/automatic to local control of main and auxiliary system</li> <li>• Governors and their basic functions Constant speed and Over speed governors. Constructional details and hunting of governor.</li> </ul> Electronic Governor	<b>6</b>

	<ul style="list-style-type: none"> <li>• Computerized monitoring and diagnostic applications in propulsion engines.</li> <li>• Concept of intelligent engine</li> <li>• Concept of U.M.S.</li> </ul>	
<b>6.</b>	<b>Maintenance of diesel engines:</b> <ul style="list-style-type: none"> <li>• Inspection and replacement of various Component members such as Piston, Piston ring, X-head &amp; other bearings, Cylinder Head (air start valve, relief valve, exhaust valve, fuel injector) Liner, Bearings, Driving Chain and gears and preparation of decarbonizing report of main and auxiliary engine.</li> <li>• Overhauling of turbocharger</li> <li>• Crankshaft deflection and alignment. Crankshaft Slip</li> <li>• Crankcase inspection and its procedure</li> <li>• Engine holding down arrangements.</li> <li>• Tightening of Tie bolts.</li> <li>• Action to be taken in case of stoppage of main engine, blackout, failure of other auxiliary equipment necessary for main propulsion</li> </ul>	<b>10</b>
<b>7.</b>	<b>Modern trends in development:</b> <ul style="list-style-type: none"> <li>• Current Engine (Sulzer RTA B&amp;W LMC &amp; SMC).</li> <li>• Intelligent Engine (Camless concept).</li> <li>• Improvement in design for increased TBO. NOx – Control of marine Diesel Engines.</li> <li>• All latest Technology incorporated in as modern propulsion machinery ships.</li> </ul>	<b>6</b>
	<b>TOTAL</b>	<b>54</b>
<b>Practical content</b>		
<b>Text Books</b>		
1	Lamb's Marine Diesel Engine."	
2	Marine Diesel Engine", DevenArhana	
<b>Reference Books</b>		
1	Wood yard, Goug, "Pounder's Marine Diesel Engines". 8th Edition, Butter Worth Heinemann Publishing, London, 2001.	
2	"Slow speed Diesel Engine", Institute of Marine Engineer.	
3	D K Sanyal, "Principal & Practice of Marine Diesel Engines", 2nd Edition, Bhandarkar Publication, Mumbai, 1998	

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology				Branch/Spec.		Marine Engineering	
Semester		VI				Version		2.0.0.0	
Effective from Academic Year				2016-17		Effective for the batch Admitted in			July 2014
Subject code		2MR604		Subject Name		Marine Auxiliary Machines - II			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	4	0	0	0	4	Theory	40	60	100
Hours	4	0	0	0	4	Practical	0	0	0
Pre-requisites:									
Learning Outcome:									
After successful completion of the course, student will be able to									
<ul style="list-style-type: none"> <li>Comply with the TAR Book Competency number 4.3.4, 5.3, 6.3.2, 9.6, 10.1.2 &amp; 10.1.3</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
1.	<b>Pollution Prevention:</b> <ul style="list-style-type: none"> <li>Oily bilge Separators their construction and operation. Use of coalescers, prevention of oil pollution and various International requirements, oil content monitoring equipments and its function</li> <li>S T P</li> <li>Incinerator</li> </ul>								10
2.	<b>Steering gears:</b> <ul style="list-style-type: none"> <li>Operation and Constructional details of various types of steering machinery. Telemeter systems, transmitters and receivers.</li> <li>Variable Delivery Pumps used in steering gears, axial and radial displacement types. Hunting action of Steering gear.</li> <li>Emergency Steering arrangement.</li> <li>Safematic Steering Gear with redundancy concept as per SOLAS. Care and Maintenance of Steering Gear Plants.</li> </ul>								12
3.	<b>Shafting:</b> <ul style="list-style-type: none"> <li>Methods of shaft alignment, constructional details and working of Thrust blocks. Intermediate Shaft bearing and Stern tube bearing.</li> <li>Oil water lubricated Stem Tubes. Sealing Glands. Stresses in Tail End, Intermediate and Thrust Shafts.</li> </ul>								8
4.	<b>Dry Docking:</b> <ul style="list-style-type: none"> <li>Methods of dry docking of ships. Inspection and routine overhauling of underwater fittings and hull.</li> <li>Measurement of clearances and drops. Removal and fitting of propellers (with and without Key).</li> </ul>								7
5.	<b>Noise and Vibrations:</b> <ul style="list-style-type: none"> <li>Elements of aerodynamics and hydrodynamics sound, Noise Sources on Ships and noise suppression techniques, Noise level measurement. Various modes of vibration in a ship (i.e. free, forced, transverse, axial, torsional - Their sources and effects).</li> </ul>								10

	<ul style="list-style-type: none"> <li>• Resonance and critical speed Structure borne, and air borne vibration, Anti vibration mountings of machineries.</li> <li>• De-tuners, Dampers with reference to torsional vibrations dampers, use of torsi graphs.</li> <li>• Various stresses acting on marine diesel engine</li> </ul>	
<b>6.</b>	<b>Shipboard application of hydraulic system:</b> <ul style="list-style-type: none"> <li>• Hydraulic Servo mechanisms. Servo valves, valve-operated servo mechanisms and Pump controlled servo mechanisms. Hydraulic press, Jack, Accumulator, Hydraulic crane</li> <li>• Hydraulic pumps &amp; Motors:-Types of Hydrostatic drives. Types of Hydraulic Transmission Systems Multi motor open-circuit Systems and closed -circuit systems. Applications of Hydraulic Transmission.</li> <li>• Advantages and disadvantages of Hydrostatic transmission &amp; fluid circuit.</li> <li>• Pumps: Design considerations, characteristics and calculations on Gear, Screw, Vane pumps of fixed and variable displacement types, Axial piston pumps of fixed and variable Displacement types-Swash plate and Bent Axis Design; Radial piston pump.</li> <li>• Motors: Fixed or Variable displacement type, axial piston unit of Swash plate and bent axis design, fixed displacement axial piston unit of wobble plate design vane type.</li> </ul>	<b>16</b>
<b>7.</b>	<b>Other Ship board equipments:</b> <ul style="list-style-type: none"> <li>• Engine room crane, chain blocks, tackles, Anchor chain, its testing and survey requirements.</li> <li>• Different types of ship stabilizer. Bow Thrusters, Hull protection arrangements.</li> </ul>	<b>7</b>
	<b>TOTAL</b>	<b>72</b>
Practical content		
Text Books		
1	Marine Auxiliary machinery	- H.D. McGeorge
Reference Books		
1	Marine Engineering Practice	- VikramGokhale& N. Nanda
2	Basic Marine Engineering	- J. K. Dhar

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FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology				Branch/Spec.		Marine Engineering	
Semester		VI				Version		2.0.0.0	
Effective from Academic Year				2016-17		Effective for the batch Admitted in			July 2014
Subject code		2MR605		Subject Name		Naval Architecture - II			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	2	0	0	0	2	Theory	40	60	100
Hours	2	0	0	0	2	Practical	0	0	0
Pre-requisites:									
Learning Outcome:									
After successful completion of the course, student will be able to									
<ul style="list-style-type: none"> <li>Comply with the TAR Book Competency number 4.1.5 &amp; 11.1.4</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
1.	<b>Motion of Ship on waves:</b> <ul style="list-style-type: none"> <li>Theory of waves, Trochoidal waves, relationship between line of orbit centres and the undisturbed surface, Sinusoidal waves. Irregular wave pattern, Wave spectra, Wave amplitudes, Rolling in unresisting media, rolling in resisting media, practical aspects of rolling, Ant rolling devices, Forces caused by rolling and pitching, Heaving and Yawing.</li> </ul>								6
2.	<b>Strength of Ships:</b> <ul style="list-style-type: none"> <li>Curves of buoyancy and weight Curves of load, Shearing force and bending moments, Alternate methods, Standard Conditions, Balancing ship on wave.</li> <li>Approximation for max. shearing force and bending moment, method of estimating B.M. &amp; Deflection. Longitudinal Strength &amp; bending, Moment of Inertia of Section, Section Modulus &amp; strength calculation, Stresses on deck. Pressure on bulkhead.</li> </ul>								10
3.	<b>Propulsion &amp; Propellers:</b> <ul style="list-style-type: none"> <li>Geometry of screw Propeller &amp; terminology, wake, apparent and real slip, Thrust, relation between powers, relation between mean pressure and speed, measurement of pitch, Cavitations, QPC, efficiency of hull &amp; propeller.</li> <li>Laws of similarity, thrust co-efficient (KT), Torque co-efficient (KQ), Advance co-efficient (J) Propeller types, Fixed pitch, Variable Pitch, Ring propeller, Kort nozzles, Voith Schneider propeller, propeller theory.</li> </ul>								8
4.	<b>Blade element theory:</b> <ul style="list-style-type: none"> <li>Law of similitude and model tests with propellers, propulsion tests, ship model correlation ship trials.</li> </ul>								4
5.	<b>Rudder Theory:</b> <ul style="list-style-type: none"> <li>Action of the Rudder in turning a ship, Force on rudder, Torque on stock, calculation of force torque on non-rectangular rudder, angle of heel due to force torque on rudder, Angle of heel when turning.</li> <li>Types of Rudder, model experiments and turning trials, Area and shape of rudder, position of rudder, stern rudders Bow rudders.</li> </ul>								8
								<b>TOTAL</b>	<b>36</b>

Practical content	
Text Books	
1	Naval Architecture & ship construction - Vikran Gokhale & N Nanda
Reference Books	
1	Ship's Naval Architecture - Munro - Smith
2	Ship Construction - D. T. Taylor
3	Naval Architecture for Engineers - Reeds' Vol- 6
4	Naval Architecture for Marine Engineer - W. Muckle
5	Ship Construction - Capt. CorhelValantineD'Mello

# GANPAT UNIVERSITY

## FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology				Branch/Spec.	Marine Engineering			
Semester	VI				Version	2.0.0.0			
Effective from Academic Year			2016-17		Effective for the batch Admitted in			July 2014	
Subject code	2MR606		Subject Name		Marine Boilers				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	0	1	0	3	Theory	40	60	100
Hours	2	0	2	0	4	Practical	25	25	50
Pre-requisites:									
Learning Outcome:									
After successful completion of the course, student will be able to									
<ul style="list-style-type: none"> <li>• Comply with the TAR Book Competency number 4.1.4, 4.3.2 &amp; 9.6</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
<b>1.</b>	<b>General Considerations governing the design of Boilers:</b> <ul style="list-style-type: none"> <li>• Marine boiler design considerations, stresses in cylindrical vessels-circumferential and longitudinal stress, requirements of Furnace; Circulation and use of Unheated Down comers in highly rated boilers.</li> <li>• Destructive and Non destructive tests on plates, rivets, welded seams, classification societies requirements for boilers construction.; Types of marine boilers, comparison of smoke tube and water tube boilers</li> </ul>								<b>3</b>
<b>2.</b>	<b>Smoke and Water Tube Boilers:</b> <ul style="list-style-type: none"> <li>• Various types of smoke tube boilers in marine use, Principal dimension and staying of flat surface of multitubular cylindrical Boilers. Vertical Auxiliary Boilers.</li> <li>• General description with sketches of principal water tube types of boilers in marine use, Furnace, Superheated, Economizer, and Air preheated &amp; Steam preheated; Superheat temperature control, Attemperators and Desuperheaters.</li> <li>• Double evaporation boiler. Fuel systems including pumps, heaters, burner's etc. Types of burners.</li> <li>• Different Types of stays.</li> </ul>								<b>10</b>
<b>3.</b>	<b>Waste heat Boilers :</b> <ul style="list-style-type: none"> <li>• Waste heat recovery, Lamont exhaust gas boiler, Cochran exhaust gas and composite boiler etc.</li> <li>• Forced Water Circulation boilers and associated systems</li> </ul>								<b>4</b>
<b>4.</b>	<b>Boiler Mountings:</b> <ul style="list-style-type: none"> <li>• Classification requirements. Different mountings. Safety Valves – Improved High Lift, Full lift and full Bore type Gauge glass – Ordinary plate type and remote Indicator.</li> <li>• Automatic feed regulator, High &amp; Low water level alarms, Main Steam stop valves, Retractable type Soot blower etc.</li> </ul>								<b>4</b>
<b>5.</b>	<b>Operation, Care &amp; Maintenance:</b> <ul style="list-style-type: none"> <li>• Pre-commissioning procedures, Hydraulic tests, steam raising and operating procedures, Action in the event of shortage of water. Blowing down of boiler, laying up a boiler.</li> <li>• General maintenance, inspection and survey of boilers. Plugging of tubes and their</li> </ul>								<b>5</b>

	<p>renewal.</p> <ul style="list-style-type: none"> <li>Alarms and Shutdown due to various failures (High Salinity, Low/High Level, Steam pressure high and Low; Super heater outlet temp; High/Low Viscosity or fuel oil temperature; Control System failure; Atomizing steam/air pressure low);</li> </ul>	
6.	<p><b>Refractory:</b></p> <ul style="list-style-type: none"> <li>Purposes of Refractory, types of refractory and reasons of failure.</li> </ul>	2
7.	<p><b>Oil Burning Process:</b></p> <ul style="list-style-type: none"> <li>Procedure of liquid fuel burning in open furnace.</li> <li>Various types of atomizer.</li> <li>Furnace arrangement for oil burning, corrugated furnace, boiler control system i.e. master control, fuel control, air control and viscosity control.</li> <li>BLOWBACK and its avoidance.</li> </ul>	3
8.	<p><b>Tests on Boiler:</b></p> <ul style="list-style-type: none"> <li>Destructive and non-destructive tests on plates, rivets, welded seams, classification society's requirement for boiler construction, hydraulic tests.</li> <li>Boiler Water Testing: Importance of Boiler water treatment, Effect of Quality of Boiler water on Boiler, Boiler water tests for hardness, Chloride Content, Alkalinity, Phosphate and pH.</li> </ul>	5
	<b>TOTAL</b>	<b>36</b>
<b>Practical content</b>		
<ul style="list-style-type: none"> <li>Boiler water testing</li> <li>Starting of Boiler from Cold Condition and Raising steam on Simulator</li> <li>Starting and understanding I.G System on Simulator</li> </ul> <p><b>Training Manual Assignments:</b></p> <p><b>Assignment No: 69</b> Auxiliary boiler &amp; mountings</p>		
<b>Text Books</b>		
1	Marine Boilers – G.T.H.Flanagan	
<b>Reference Books</b>		
1	Marine Steam Boilers – J.H.Milton	
2	Running & Maintenance of Marine Machineries – IME Publication	
3	Boiler Control System – David Lindsle	

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Semester	VI				Version	2.0.0.0			
Effective from Academic Year			2016-17		Effective for the batch Admitted in			July 2014	
Subject code	2MR607		Subject Name		Marine Engineering Drawing				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	2	0	1	0	3	Theory	40	60	100
Hours	2	0	2	0	4	Practical	25	25	50
Pre-requisites:									
Learning Outcome:									
After successful completion of the course, student will be able to									
<ul style="list-style-type: none"> <li>Comply with the TAR Book Competency number 9.6</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
	Assembly Drawings of marine components in Orthographic projection from Isometric views: <ol style="list-style-type: none"> <li>Cylinder Relief Valve</li> <li>Hydraulic Steering Gear</li> <li>Starting Air Pilot Valve</li> <li>Gear Pump</li> <li>Control Valve</li> <li>Fuel Valve</li> <li>Parallel Slide Stop Valve</li> <li>Feed Check Valve</li> <li>Starting Air Valve</li> </ol>								<b>72</b>
Practical content									
Text Books									
1	H. G. Beck, "Reed's, Engineering Drawing for Marine Engineers - Volume 11								
Reference Books									

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology				Branch/Spec.		Marine Engineering	
Semester		VI				Version		2.1.0.0	
Effective from Academic Year			2017-18			Effective for the batch Admitted in			July 2015
Subject code		2MR608		Subject Name		Marine Workshop II			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	0	0	1	0	1	Theory	0	0	0
Hours	0	0	2	0	2	Practical	50	50	100
Pre-requisites:									
Learning Outcome:									
After successful completion of the course, student will be able to Comply with the DGS Training Manual Assignments Nos.: 11, 16, 19, 22, 61, 68, 69, 71									
Theory syllabus									
Unit	Content								Hrs
Practical content									
<b>Training Manual Assignments:</b>									
<b><u>Assignment No: 11</u></b>									
Fuel Pump (4 stroke)									
<b><u>Assignment No: 16</u></b>									
Crankshaft and bearings									
<b><u>Assignment No: 19</u></b>									
Lubricating oil cooler									
<b><u>Assignment No: 22</u></b>									
Crankcase Relief valve									
<b><u>Assignment No: 29</u></b>									
Piston Rod Stuffing Box									
<b><u>Assignment No: 35</u></b>									
Turbocharger System									
<b><u>Assignment No: 36</u></b>									
Exhaust Valve and Gear									
<b><u>Assignment No: 61</u></b>									
Propeller and rudder function									
<b><u>Assignment No: 71</u></b>									
Steering Gear									
Text Books									
1	DGS Training Manual								
Reference Books									
1	Various Manuals of Ship's Machineries								

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology				Branch/Spec.		Marine Engineering	
Semester		VI				Version		2.0.0.0	
Effective from Academic Year				2016-17		Effective for the batch Admitted in			July 2014
Subject code		2MR609		Subject Name		IMO & Conventions			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	2	0	0	0	2	Theory	40	60	100
Hours	2	0	0	0	2	Practical	0	0	0
Pre-requisites:									
Learning Outcome:									
Theory syllabus									
Unit	Content								Hrs
1.	<b>Introduction:</b> <ul style="list-style-type: none"> <li>National international bodies associate with shipping. Statutory Bodies, State Administration</li> </ul>								2
2.	<b>STCW:</b> <ul style="list-style-type: none"> <li>Standards of Training, Certification and watch-keeping for sea-farers – International Conference on 1978 and modifications under STCS 1995.</li> <li>Requirement of training &amp; Competency for operational and management level, Competency and training, Standard of training of crew, META manual of DGS, TAR Book for pre-sea and on-board training.</li> <li>Standard of training Institute, quality Management System for training institutes, inspection of training institutes, training of trainers.</li> </ul>								6
3.	<b>UNCLOS:</b> <ul style="list-style-type: none"> <li>United Nation’s Convention on the Law of the Sea, zones and limits, Freedom of navigation, Innocent passage, Flag State Control and Port State Control.</li> <li>WHO and International Health regulations</li> </ul>								4
4.	<b>IMO :</b> <ul style="list-style-type: none"> <li>IMO structure, organization, functions, activities, Conventions, Protocols, Codes, Recommendations, and Guidelines.</li> <li>Development and implementation of IMO Conventions</li> </ul>								4
5.	<b>Safety related Conventions:</b> <ul style="list-style-type: none"> <li>Overall Regulatory outline and latest amendments to SOLAS 74, ILLC 1966, and Tonnage 1969, STCW 1978 Conventions.</li> <li>Certificates carried on board as per all major conventions.</li> </ul>								4
6.	<b>Other Conventions and matters:</b> <ul style="list-style-type: none"> <li>LLMC, Civil Liability Convention 1992, FUND 1992. Supplementary Fund and Bunker Convention.</li> <li>International Convention on salvage. Colregs. Classification Societies. Statutory and classification Surveys and certificates.</li> <li>IACS and its functions</li> </ul>								4

<b>7.</b>	<b>International Labour Organization and Conventions:</b> <ul style="list-style-type: none"> <li>• Role of International Labour Organization, its importance, Tripartite structure &amp; relevance to shipping, Merchant Shipping (minimum standards) Convention 1976 (No.147) &amp; its related Conventions. Maritime Labour Convention 2006.</li> <li>• Merchant Shipping Act: Salient features, Registration of ship, Role of Maritime Administration. Recruitment and Placement Rules.</li> </ul>	<b>4</b>
<b>8.</b>	<b>Management of Safety and Security:</b> <ul style="list-style-type: none"> <li>• International Safety Management Code, latest amendments, Development, certification, audits, and provisions.</li> <li>• Human error, Communication &amp; language. Impact and practice of Risk Assessment in safety management</li> </ul>	<b>4</b>
<b>9.</b>	<b>Overview of ISPS Code:</b> <ul style="list-style-type: none"> <li>• Security threats, SSO, PFSO, SSP, Security equipment, Contingency planning to deal with Piracy and such security threats. Best Management Practice</li> </ul>	<b>4</b>
	<b>TOTAL</b>	<b>36</b>
Practical content		
Text Books		
1	IMO Conventions - IMO Publication	
Reference Books		
1	STCW Convention	-IMO Publication
2	META Manual	-DGS, Govt of India
3	SOLAS, MARPOL 73/78	-IMO Publication
4	Classification Societies & IACS	

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology			Branch/Spec.		Marine Engineering		
Semester		VI			Version		2.0.0.0		
Effective from Academic Year				2016-17		Effective for the batch Admitted in			July 2014
Subject code		2HS601		Subject Name		Aptitude Skill Building - II			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	0	0	1	0	1	Theory	0	0	0
Hours	0	0	2	0	2	Practical	25	25	50
Pre-requisites:									
Learning Outcome:									
On successful completion of the course the students will be able to:									
<ul style="list-style-type: none"> <li>Understand and develop more skills that are required to solve fundamental practical problems related to maths.</li> <li>Acquire satisfactory competency in use of two basic skills (Quantitative Ability and Logical Reasoning)</li> <li>Solve campus placements aptitude papers covering Quantitative Ability and Logical Reasoning</li> </ul>									
Syllabus									
Unit	Content								Hrs
1	<b>Quantitative ability I:</b> Averages, weighted averages, median and mode, standard deviation, permutation and combination, probability								06
2	<b>Quantitative ability II:</b> Area and volume of polygon, cylinders and all other geometry, coordinate and mixed geometry								06
3	<b>Verbal Reasoning:</b> Vocabulary, sentence equivalence, Logic based Reading comprehensive, multiple blank text completion								06
4	<b>Logical Reasoning:</b> Analysing Arguments, Statement and Assumption, Course of Action, Statement and Conclusion, Theme Detection, Cause and Effect, Statement and Argument, Logical Deduction								05
5	<b>Date interpretation:</b> Pie Charts, Line Charts, Table Charts, Bar Charts								05
	Total								28
Practical content									
Text Books									
1	Aggrawal R.S., "Quantitative Aptitude for Competitive Examinations", S Chand, 20th edition (2013)								
2	Sharma Arun, "How to Prepare for Verbal Ability and Reading Comprehension for CAT", McGraw Hill Education (India) Private Limited; 2014 edition (2014)								
Reference Books									
1.	GuhaAbhijit, "Quantitative Aptitude for Competitive Examination", McGraw Hill Education India Private Limited, 5th edition (2014)								
2.	Aggrawal R.S., "A Modern Approach to Logical Reasoning", S Chand, 1st edition (2007)								
3.	Kumar Ajay, Kumar Anand, "General Aptitude Theory and Practice", Pathfinder Publication, 2016 edition (2016)								
4.	GKP, "GATE Engineering & Mathematics General Aptitude 2016", G.K. PUB, 12th edition (2015)								
5.	Lewis Norman, "Word Power Made Easy", Goyal, Reprint edition (2011)								

\*\*\*\*\* END of Semester VI\*\*\*\*\*