

# GANPAT UNIVERSITY

## FACULTY OF ENGINEERING & TECHNOLOGY

### TEACHING AND EXAMINATION SCHEME

Programme	Bachelor of Technology	Branch/Spec.	Marine Engineering																
Semester	III																		
Effective from Academic Year		2017-18	Effective for the batch Admitted in											July-2016					
Subject Code	Subject Name	Teaching scheme												Examination scheme (Marks)					
		Credit						Hours (per week)						Theory			Practical		
		Lecture(DT)			Practical(Lab.)			Lecture(DT)			Practical(Lab.)			CE	SEE	Total	CE	SE E	Total
		L	TU	Total	P	TW	Total	L	TU	Total	P	T W	Total						
2MR301	Workshop Technology & Practice - II	2	0	2	2	0	2	2	0	2	4	0	4	40	60	100	25	25	50
2MR302	Seamanship & Survival at Sea	3	0	3	1	0	1	3	0	3	2	0	2	40	60	100	25	25	50
2MR303	Ship Structure & Construction	3	0	3	0	0	0	3	0	3	0	0	0	40	60	100	0	0	0
2MR304	Applied Thermodynamics	3	0	3	0	0	0	3	0	3	0	0	0	40	60	100	0	0	0
2MR305	Electrical Machines	2	0	2	1	0	1	2	0	2	2	0	2	40	60	100	25	25	50
2MR306	Strength of Material	3	0	3	1	0	1	3	0	3	2	0	2	40	60	100	25	25	50
2MR307	Marine Internal Combustion Engine - I	3	0	3	0	0	0	3	0	3	0	0	0	40	60	100	0	0	0
2MR308	General Performance	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	50	50	100
	Audit Course	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0
<b>Total</b>		<b>19</b>	<b>0</b>	<b>19</b>	<b>5</b>	<b>1</b>	<b>6</b>	<b>21</b>	<b>0</b>	<b>21</b>	<b>10</b>	<b>0</b>	<b>10</b>	<b>280</b>	<b>420</b>	<b>700</b>	<b>150</b>	<b>150</b>	<b>300</b>

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology			Branch/Spec.		Marine Engineering		
Semester		III			Version		2.0.0.1		
Effective from Academic Year			2016-17		Effective for the batch Admitted in			July 2015	
Subject code		2MR301	Subject Name		Workshop Technology & Practice - II				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	2	0	2	0	4	Theory	40	60	100
Hours	2	0	4	0	6	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 8.2, 8.3, 8.4, 8.5 &amp; 8.7</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
1.	<b>Common workshop Tools:</b> <ul style="list-style-type: none"> <li>Description and use of different types of Callipers, Straight edges, Try squares, Vices, Hammers, Chisels, Scrapers, Files, Drills, Reamers, Tapes, V-Blocks, Face plate, Marking blocks, Carpentry tools, pattern maker's tools, Smithy tools and Moulding tools.</li> <li>Application of Above Tools</li> </ul>								4
2.	<b>Metal cutting Machines:</b> <ul style="list-style-type: none"> <li>Specification, operation and inspection of important types of metal cutting machines including Centre lathes, Capstan and turret lathes, Automatic lathes, drilling and boring machines. Shaping slotting and planing machines, Milling and broaching machines.</li> </ul>								4
3.	<b>Machine Process &amp; Machine Tools:</b> <ul style="list-style-type: none"> <li>The geometry of cutting processes, Chip formation, Cutting Forces, Stresses and power; Friction of chip on tool. Generation and dissipation of heat in cutting.</li> <li>Standard nomenclature for Cutting tools. Cutting speeds and feeds estimation of machining Time.</li> <li>The fundamental Cutting process, geometrical control of the cutting edge Turning, Screw cutting and taper turning Processes on Centre lathe.</li> </ul>								6
4.	<b>Abrasive process:</b> <ul style="list-style-type: none"> <li>Grinding, honing and lapping by hand and machines.</li> <li>Shears and punches.</li> <li>Wood working machines.</li> <li>Principles of jigs and fixtures</li> </ul>								4
5.	<b>Measuring Instruments &amp; Inspection:</b> <ul style="list-style-type: none"> <li>Description and use of steel rule, Vernier calliper, Micro-meter, Dial gauge, Depth gauge, thread gauge, Feeler gauge, Wire gauge, patternmaker's scale, Taper gauge, snap gauge, and</li> <li>Plug gauge. Optical methods of measurement and Principles of interchange ability,</li> </ul>								6

	limit system. Use of limit gauge	
6.	<b>Fitting and Overhauling:</b> <ul style="list-style-type: none"> <li>• Types of packing, joining materials and their uses.</li> <li>• Design considerations and construction of various types of valves and cocks.</li> <li>• Reducing valves for steam and air.</li> <li>• Bedding of bearings, marking of engine parts for fitting, machining operations fitting of keys, cotters.</li> <li>• Pipe work</li> <li>• Properties and parameters considered in the fabrication and repair of systems and components</li> </ul>	6
7.	<b>Safety Measures:</b> <ul style="list-style-type: none"> <li>• Source of danger and methods of protection.</li> <li>• Types of guards and safety devices</li> <li>• Factory Act regulations.</li> </ul>	4
8.	<b>Welding:</b> <ul style="list-style-type: none"> <li>• Basic of Welding and Related equipments</li> <li>• Basics of Gas Cutting and Related equipments</li> <li>• Brazing operation</li> </ul>	2
	<b>TOTAL</b>	<b>36</b>

Practical content

**Workshop:**

Study of Workshop layout;

Prepare a job piece which consists of following operations:

- Straight Turning.
- Taper turning
- Knurling operation
- Thread cutting by Lathe Machine.
- Grooving Operation
- Drilling Operation
- Inside Boring
- A Step pulley.
- Rectangular Block making by Shaping Machine.
- Shaft key Way making by Milling Machine.

**Training Manual Assignments:**

**Assignment No: 01**

Workshop Practice & Fitting - Hand Tools

**Assignment No: 02**

Advance Workshop Practice

Text Books

1	Workshop Technology I & II – HazaraChoudhury
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Reference Books

1	Workshop Technology - Kurmi.
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2	Workshop Technology - W.A.J. Chapman (Vol I & II)								
3	H.M.T production Technology - TATA McGraw Hill, New Delhi								
<b>GANPAT UNIVERSITY</b>									
<b>FACULTY OF ENGINEERING &amp; TECHNOLOGY</b>									
Programme		Bachelor of Technology				Branch/Spec.		Marine Engineering	
Semester		III				Version		2.0.0.1	
Effective from Academic Year				2016-17		Effective for the batch Admitted in			July 2015
Subject code		2MR302		Subject Name		Seamanship & Survival at Sea			
Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	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 4.1.10, 9.10 &amp; 13.1.1</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
1.	<b>Seamen &amp; their duties:</b> <ul style="list-style-type: none"> <li>Ship's departments</li> <li>General Ship Knowledge and familiarization with Nautical ( Ship ) Terminology</li> </ul>								3
2.	<b>Safety and Cargo Work:</b> <ul style="list-style-type: none"> <li>Precautions in bad weather, lashing of cargo, Slings hooks used in cargo work, standard safety precaution on cargo work.</li> <li>Permit to Work System</li> <li>Emergency signals and Alarms.( Abandon Ship, Fire, Man overboard )</li> </ul>								5
3.	<b>Navigational Lights and Signals:</b> <ul style="list-style-type: none"> <li>Port and starboard, forward and aft mast lights, Colors and location. Lookout, Flags, Flag etiquettes and Dressing the vessel.</li> </ul>								2
4.	<b>Anchor and Cable Work:</b> <ul style="list-style-type: none"> <li>Anchor, Shackle, Cable arrangement, Chain locker.</li> <li>Associated fittings, anchoring, weigh up procedure and safety precautions.</li> <li>Moorings and its types, windlass and mooring winches.</li> </ul>								4
5.	<b>Navigation:</b> <ul style="list-style-type: none"> <li>General knowledge of principal stars, Sextants, navigation compasses, echo sounder, log and uses, barometer and weather classification, GMT and zonal time, wireless navigational instruments, radar satellite navigation, EPIRB and SART</li> </ul>								14
6.	<b>Rope Work:</b> <ul style="list-style-type: none"> <li>Types of knots, Practice of knot formation.</li> <li>Ropes: materials of ropes. Strength, care &amp; maintenance.</li> <li>Use of mooring lines, heaving line, rat guards, canvas and uses.</li> <li>Pilot ladder</li> </ul>								2

7.	<b>Abandoning ship:</b> <ul style="list-style-type: none"> <li>• Life Raft and Life Boat</li> <li>• Manning of life boat and life rafts, muster list, Radio and alarm signals, distress signals (SOS)</li> <li>• Pyrotechniques.</li> </ul>	8
8.	<b>Survival at sea:</b> <ul style="list-style-type: none"> <li>• Survival difficulties and factors, equipment available, duties of crew members, initial action on boarding.</li> <li>• Maintaining the craft.</li> <li>• Donning of Life jackets, Life boat drills.</li> <li>• Lowering and hoisting of Life boats.</li> </ul>	6
9.	<b>Life Saving Appliances:</b> <ul style="list-style-type: none"> <li>• Classification of ship for Life Saving Appliances.</li> <li>• LSA requirements for cargo ships.</li> <li>• Safety, care and maintenance of life saving appliances.</li> <li>• LSA Regulation, LSA – Code</li> </ul>	8
10.	<b>Method of helicopter rescue and evacuation</b>	2
	<b>TOTAL</b>	<b>54</b>
<b>Practical content</b>		
<ul style="list-style-type: none"> <li>• Rope Work.</li> <li>• Use of Life buoys.</li> <li>• Donning of Life jackets.</li> <li>• Life boat drills. Lowering and hoisting of Life boats (model).</li> <li>• Study of working of life boat and provisions for life boat.</li> <li>• Construction and operational details of life raft giving importance to manual and hydrostatic Release device.</li> </ul>		
<b>Text Books</b>		
1	Seamanship by J. Dinger	
<b>Reference Books</b>		
1	Survival in Lifeboat:	-Capt. Puri,
2	SOLAS	-IMO
3	MARPOL	-IMO
4	International Light and Shape and Sound Signal by	-W.Moore
5	Electronic navigation aids by	-G.Sonnenberg
6	Search and Rescue Manual	-IMO Publication
7	Mariners Handbook	-HMSO

# GANPAT UNIVERSITY

## FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology			Branch/Spec.	Marine Engineering				
Semester	III			Version	2.0.0.1				
Effective from Academic Year			2016-17	Effective for the batch Admitted in			July 2015		
Subject code	2MR303		Subject Name	Ship Structure & Construction					
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	0	0	3	Theory	40	60	100
Hours	3	0	0	0	3	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 11.2.1 &amp; 11.3</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
1.	<b>Ship terms:</b> <ul style="list-style-type: none"> <li>• Various terms used in ship construction e.g. lbp, loa, molded and extreme depth, beam and draught, camber, sheer, flare, rake, tumblehome, parallel body etc., displacement &amp; deadweight.</li> <li>• Overview of gt and nt.</li> <li>• Basic general layout of principal ship types such as bulk carrier, oil tanker, container ships, multipurpose / general cargo ship.</li> </ul>								2
2.	<b>Stresses in Ship's Structure:</b> <ul style="list-style-type: none"> <li>• Hull girder, Static, dynamic and local stresses. Hogging, Sagging, Racking, Pounding, Panting, Dry-docking, local loads etc. and Strength members to counteract the same.</li> </ul>								3
3.	<b>Materials for ship construction:</b> <ul style="list-style-type: none"> <li>• Materials used in ship construction, grades of steel, plates and sections like Angles, Bulb Plates, I beam T sections etc. used in ship construction.</li> </ul>								4
4.	<b>Framing systems and Double Bottom:</b> <ul style="list-style-type: none"> <li>• Transverse and Longitudinal framing, Tank side bracket, Beam Knee, Web frame, stringer, Double bottom construction, types of floors, duct keel.</li> </ul>								5
5.	<b>Shell &amp; Decks:</b> <ul style="list-style-type: none"> <li>• Plating systems for shell. Deck plating &amp; deck girders. Openings in decks like hatches.</li> <li>• Hatch comings and closing arrangements of cargo hatches. Water tightness the hatches.</li> </ul>								6
6.	<b>Bulk heads &amp; Deep Tanks:</b> <ul style="list-style-type: none"> <li>• Functions and construction of transverse and longitudinal bulkheads. Corrugated bulkheads.</li> <li>• Openings through W/T bulkheads; Deep tanks for liquids.</li> </ul>								5

7.	<b>Fore End Arrangements:</b> <ul style="list-style-type: none"> <li>Stem construction, Arrangements to resist panting and pounding. Construction within forepeak tank. Bulbous bow. Hawsepipes, Spurling pipes and Chain locker etc.</li> </ul>	3
8.	<b>Aft end construction and arrangements:</b> <ul style="list-style-type: none"> <li>Additional strengthening in machinery space, Aft peak tank, shaft tunnel, Types of Sterns, Stern frame, Stern Tube, types of rudder, rudder supporting arrangements-pintles, gudgeon, construction of rudder, rudder carrier bearing etc.</li> </ul>	6
9.	<b>Ship Types:</b> <ul style="list-style-type: none"> <li>Different ship types and their constructional details and requirements. Sections of general cargo ships, bulk carriers, tankers, container ships, RoRo ships etc.</li> </ul>	2
10.	<b>Overview &amp; General Knowledge:</b> <ul style="list-style-type: none"> <li>Shipyards Practice: Ship design process, Layout of shipyards, Fabrication of components. Basic concepts of Launching of ships and sea trials.. General knowledge of CAD, CAM applications.</li> </ul>	2
11.	<b>Piping and venting Systems:</b> <ul style="list-style-type: none"> <li>Venting arrangements (natural and mechanical) for tanks, holds and oil fuel tanks. Sounding pipes, bilge piping, bilge wells and strum box, ballast piping etc.</li> </ul>	2
12.	<b>Offshore Technology:</b> <ul style="list-style-type: none"> <li>Basic concepts of Drilling Ships, Rigs, Platforms and Supply/Support Vessels etc.</li> </ul>	2
13.	<b>Loadings and Tonnage:</b> <ul style="list-style-type: none"> <li>Definition of freeboard and various assigning conditions, List of closing appliance, Load Line surveys, Tonnage regulations, Calculation as per latest convention , details of LL markings, Plimsol line</li> </ul>	4
14.	<b>Ship Surveys:</b> <ul style="list-style-type: none"> <li>Survey rules, Functioning of ship classification Societies, Surveys during construction, Periodical surveys as per statutory regulations, harmonization of survey, retention/suspension of class of a ship, constructional features and rule guidelines for a merchant vessel as per SOLAS, Marpol regulations, IBC and IGC codes : Just an overview</li> </ul>	4
15.	<b>Statutory Certificates and their validity :</b> <ul style="list-style-type: none"> <li>Ships registration formalities, Intact Stability Criteria under damaged conditions (constructional point of view in compliance with statutory regulations), Enhanced Survey requirements, HSSC, CAS.</li> </ul>	4
	<b>TOTAL</b>	<b>54</b>

#### Practical content

#### Text Books

- |   |   |
|---|---|
| 1 | Ship Construction -REEDS Vol -5                                       |
| 2 | D. J. Eyres "Ship Construction" Butter worth - Heinemann,Oxford, 1994 |

#### Reference Books

- |   |  |                            |
|---|--|----------------------------|
| 1 | Ship Construction                            | -REEDS Vol -5              |
| 2 | Ship Construction                            | -Munro & Smith             |
| 3 | D. J. Eyres "Ship Construction" Butter worth | - Heinemann, Oxford, 1994. |
| 4 | Merchant Ship Construction                   | -H.J. Pursey               |
| 5 | Merchant Ship Construction                   | -D.A. Taylor               |
| 5 | Principles of Naval Architecture             | -SNAME Publication         |

# GANPAT UNIVERSITY

## FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology			Branch/Spec.	Marine Engineering				
Semester	III			Version	2.1.1.1				
Effective from Academic Year			2017-18	Effective for the batch Admitted in			July 2016		
Subject code	2MR304		Subject Name	Applied Thermodynamics					
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	0	0	3	Theory	40	60	100
Hours	3	0	0	0	3	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 4.5</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
<b>1.</b>	<b>Basic Concepts:</b> <ul style="list-style-type: none"> <li>• Microscopic &amp; macroscopic point of view, Thermodynamic system and control volume, Thermodynamic properties, processes and cycles, Thermodynamic equilibrium, Quasi-static process, pure substance, vapourliquid- solid phase in a pure substance, p-v-t surface, critical and triple point of pure substance.</li> <li>• First law of Thermodynamics: First law for a closed system undergoing a cycle and change of state, Energy-A property of the system, Perpetual motion machine of the first kind.</li> </ul>								<b>4</b>
<b>2.</b>	<b>The second Law of Thermodynamics:</b> <ul style="list-style-type: none"> <li>• Different statements of the second Law of Thermodynamics. Carnot cycle, Thermodynamics Reversibility.</li> <li>• Carnot's Principle, Carnot's cycle for a gas, Deductions from Carnot's cycle. Thermodynamics Temperature scale.</li> <li>• Steam and Gas Processes on T-S and H-S charts, Entropy and Irreversibility Applied problems.</li> </ul>								<b>8</b>
<b>3.</b>	<b>Steam cycle:</b> <ul style="list-style-type: none"> <li>• Carnot cycle for steam and Ideal Efficiency. Rankin cycle with dry saturated steam and superheated steam.</li> <li>• Teed Pump work. Rankin Efficiency, cycle Efficiency, Isentropic Efficiency, work Ratio, Reheating and Regenerative Feed Heating and their effect on Thermal Efficiency. Applied Problems.</li> </ul>								<b>11</b>
<b>4.</b>	<b>Steam Engines:</b> <ul style="list-style-type: none"> <li>• Modified Rankin cycle for steam Engines, Hypothetical Indicator Diagram, Mean Effective pressure and work transfer. Diagram Factor, Indicated power, Specific steam Indicated Thermal Efficiency. Efficiency Ratio, Engine Efficiency,</li> <li>• Energy Compound steam Engines, Missing quantity prob. Applied lems.</li> </ul>								<b>10</b>
<b>5.</b>	<b>Reciprocating Compressors:</b> <ul style="list-style-type: none"> <li>• Ideal cycle for compressors, work Transfer in single stage compressor, Mass and volume flow. Free Air Delivery, Effect of clearance and volumetric</li> <li>• Efficiency in Single stage compressors, Multi-stage compression neglecting</li> </ul>								<b>12</b>



	clearance and with clearance. Condition for Minimum work Input and Perfect Interco ling. <ul style="list-style-type: none"> <li>• Tandem and In-line arrangement in compressors. Rotary positive Displacement Types of compressors. Compressed air Motors, Applied Problems.</li> </ul>	
<b>6.</b>	<b>Properties of Mixtures of Gases and Gas &amp;Vapours:</b> <ul style="list-style-type: none"> <li>• Dalton's Law of partial pressure, Amagat's Law of partial volume, volumetric and Gravimetric Analysis of Gas Mixtures,</li> <li>• Gibb's -Dalton Law, Mean value of a Gas constant. Equivalent Molecular weight, Density, specific volume,</li> <li>• Specific Heat and Molar Heat capacity of gas mixture. Advanced problem on Adiabatic Mixing.</li> </ul>	<b>9</b>
	<b>TOTAL</b>	<b>54</b>
Practical content		
Text Books		
1	Applied Thermodynamics for Engineering - R.Yadav	
Reference Books		
1	Technologists - T.D.Eastop& A- McConkey	
2	Applied Thermodynamics - J. B. O. Sneedcn& S. V. Karr.	
3	Basic Engineering Thermodynamics - Joel Rayners	
4	Heat Engines - P. L.Eallaney	
5	Thermodynamics - Applied to heat Engines - E. H. Lewitt	
6	Heat and Thermodynamics - Mark W. Zemansky& Richard H. Dittman	

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## FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	Marine Engineering						
Semester	III	Version	2.0.0.1						
Effective from Academic Year		2016-17	Effective for the batch Admitted in						
			July 2015						
Subject code	2MR305	Subject Name	Electrical Machines						
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

- Comply with the TAR Book Competency number 6.1.1 & 6.1.1.a

Theory syllabus

Unit	Content	Hrs
<b>1.</b>	<b>Direct current machines:</b> <ul style="list-style-type: none"> <li>• Principle of working, construction, winding, e.m.f. Equal ion. Armature reaction, Commutation, brush shin, compensating winding. Merits &amp; demerits of A.C. &amp; D.C.</li> </ul>	<b>4</b>
<b>2.</b>	<b>D.C. generator:</b> <ul style="list-style-type: none"> <li>• Their characteristics, methods of excitation, parallel operation, equalizer bus bar, performance equations.</li> </ul>	<b>6</b>
<b>3.</b>	<b>D.C. motor:</b> <ul style="list-style-type: none"> <li>• Their characteristics, starting and reversing, speed-torque equations, starters, speed control including electronic method of control, testing of d. c. machines for finding out losses and efficiency, braking of d.c. motor.</li> </ul>	<b>6</b>
<b>4.</b>	<b>Distribution System:</b> <ul style="list-style-type: none"> <li>• Two wire and three wire d. c. system, use of balancer, a.c. transmission single phase and three phase, three wire and four wire distribution, comparison of d.c. and a.c. transmission, effect of voltage drop, copper utilization under different systems, single and double fed distributors, fuses, d.c. air circuit breaker, a.c. air and oil circuit breakers. HV &amp; LV switchgears.</li> </ul>	<b>8</b>
<b>5.</b>	<b>Transformers:</b> <ul style="list-style-type: none"> <li>• Principle of action, e. m. f. equation, phasor diagrams for no load and load conditions, useful and leakage flux, leakage reactance, equivalent c ire nils, voltage regulation, losses and efficiency, open circuit and short circuit and short circuit tests, parallel operation, three phase transformer - core and shell type transformer, current and potential transformer, auto-transformer (single phase &amp; 3-phases). Specification of Transformer coolant.</li> </ul>	<b>12</b>
<b>TOTAL</b>		<b>36</b>

Practical content

- D.C. Machines:
- To study and run a rotary converter under different conditions to record the generated voltage on d.c. side against variation of load.

Text Books	
1	A Text Book of Electrical Technology Vol 1 - B L Thareja& A K Thareja
Reference Books	
1	Electrical Technology - Hughes Edward
2	Electric Machine - Ashfaq Husain

# GANPAT UNIVERSITY

## FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	Marine Engineering
Semester	III	Version	2.0.0.1
Effective from Academic Year	2016-17	Effective for the batch Admitted in	July 2015
Subject code	2MR306	Subject Name	Strength of Material
Teaching scheme		Examination scheme (Marks)	
(Per week)	Lecture(DT)		Total
	L	TU	
Credit	Practical(Lab.)		Total
	P	TW	
Hours	3	0	5
		CE	SEE
		40	60
		25	25
		100	50

Pre-requisites:

Learning Outcome:

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

- Comply with the TAR Book Competency number 4.5 & 9.5

Theory syllabus

Unit	Content	Hrs
<b>1.</b>	<b>Strain Energy in Simple Stresses:</b> Concept of Strain Energy; Strain Energy due to normal and Shear Stresses; Strain Energy due to impact loads; Resilience.	<b>3</b>
<b>2.</b>	<b>Bending Stress:</b> Pre bending, 2nd moment of area, Stresses due to bending.	<b>6</b>
<b>3.</b>	<b>Shear &amp; Torsion:</b> Shear Stress and Shear Strain, Twisting of solid and hollow shafts, Stiffness and Strength. Power and Torque relation. Shafts with linear and compound shafts, Partial hollow shafts, Calculations for mean diameter of springs, wire diameter & number of coils. Strain Energy in torsion, Plastic yielding of materials in Torsion.	<b>9</b>
<b>4.</b>	<b>Compound Stress and strain:</b> Stresses on an oblique section, General two dimensional stress system Materials subjected to direct and shear stresses, Principal planes and principal stresses, Strain on an oblique section, Determination of principal strains, Principal strain in three dimensions, Principal stresses determined from principal strains, Mohr's Diagram for stress strain and strain rosette, Combine bending and twisting, Equivalent B.M. and Torsion, Shear, bending and torsion, Theories of failure. Stresses due to restricted expansion or contraction of single member	<b>7</b>
<b>5.</b>	<b>Thin Curved bar:</b> Strain energy due to bending. Castigliano's theorem and its application to curved bars, strain energy due to twisting. Applied problems.	<b>5</b>
<b>6.</b>	<b>Thick Cylinders:</b> Thick cylinders, Lamé's theory, compound cylinders, The Lamé Line; Shrinkage Allowance; Solid shaft subjected to radial pressure. Compound Cylinders; Applied problems.	<b>6</b>

<b>7.</b>	<b>Deflection of Beams:</b> Strain energy due to bending. Application of impact. Deflection by integration, Macaulay's Method. Moment area Methods of deflection coefficient. Deflection due to shear, Deflection by graphical method. Applied problems.	<b>6</b>
<b>8.</b>	<b>Springs:</b> Spring with axial load, Calculations for mean diameter of springs, wire diameter & number of coils. Closed coiled helical spring.	<b>6</b>
<b>9.</b>	<b>Struts:</b> Euler's theory and Euler's buckling load. Struts with both ends pin joined, both ends fixed, one end fixed and one end free, one end hinged. Pin joined strut with eccentric load, Rankin Gordon Formula. Applied problems.	<b>6</b>
	<b>TOTAL</b>	<b>54</b>
<b>Practical content</b>		
<ul style="list-style-type: none"> <li>• To determine the behaviour of different materials when subjected to tension</li> <li>• To obtain tensile properties on UTM (Yield stress and Young's Modulus)</li> <li>• To obtain tensile properties on UTM (Breaking stress and % elongation)</li> <li>• Plotting of Stress v/s Strain curve.</li> <li>• Determination of modulus of rigidity of shaft on torsion testing machine</li> <li>• Determination of deflection of simply supported beam for a point load at the centre.</li> <li>• Determination of slope and deflection of simply supported beam using moment area method (graphical analysis)</li> </ul>		
<b>Text Books</b>		
1	Strength of Materials - R. S. Khurmi	
<b>Reference Books</b>		
1	Strength of Materials - G. H, Ryder	
2	Strength of Materials - Stephen Timoshenko	
3	Strength of Materials - R. K. Rajput	
4	Mechanics of solid - R. P. Rethaliya	

# GANPAT UNIVERSITY

## FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	Marine Engineering
Semester	III	Version	2.0.0.0
Effective from Academic Year	2017-18	Effective for the batch Admitted in	July 2016
Subject code	2MR307	Subject Name	Marine Internal Combustion Engine - I
Teaching scheme		Examination scheme (Marks)	
(Per week)	Lecture(DT)		Total
	L	TU	
Credit	Practical(Lab.)		Total
	P	TW	
Hours	3	0	0
	3	0	0
	3	0	0

Pre-requisites:

Learning Outcome:

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

- Comply with the TAR Book Competency number 4.1.1,4.1.9,4.3.1, 3 & 4.6

Theory syllabus

Unit	Content	Hrs
<b>1.</b>	<p><b>Introduction &amp; Characteristics of IC Engine:</b></p> <ul style="list-style-type: none"> <li>• 4-Stroke and 2-stroke cycles; Deviation from Ideal condition in actual engines; Limitation in parameters.</li> <li>• Timing Diagrams of 2 - Stroke and 4-Stroke engines. Comparative study of slow speed, medium speed and high speed diesel engines - suitability and requirements for various purposes Mean Piston speed.</li> <li>• M.C.R. &amp; C.S.R. ratings. Practical heat balance diagrams and thermal efficiency.</li> </ul>	<b>6</b>
<b>2.</b>	<p><b>General Description of I.C. Engines:</b></p> <ul style="list-style-type: none"> <li>• Constructional Details of I.C. Engines: Principal Components: fuel Injectors, Air Starting Valves, Relief Valves, hydraulic exhaust valves, air distributors, Jackets and Liners, Cylinder heads, Piston, Cross heads, Connecting rods, Bed Plates, A-frames, Welded construction for Bed plates &amp; frames, Tie rods.</li> </ul>	<b>10</b>
<b>3.</b>	<p><b>Scavenging and Supercharging System:</b></p> <ul style="list-style-type: none"> <li>• Scavenging arrangements in 2-Stroke engines; Air charging and exhausting in 4-Stroke engines; Various types of Scavenging in 2-stroke engines; Uni-flow, loop, cross loop and reverse loop scavenging, their merits and demerits.</li> <li>• Scavenge pumps for normally aspirated engines; under piston scavenging, Scavenge manifolds.</li> </ul>	<b>3</b>
<b>4.</b>	<p><b>Supercharging arrangements:</b></p> <ul style="list-style-type: none"> <li>• Pulse and constant pressure type; their relative merits and demerits in highly rated marine propulsion engine.</li> <li>• Air movements inside the cylinders. Turbocharger and its details. Two stage, un-cooled, radial turbochargers.</li> </ul>	<b>3</b>
<b>5.</b>	<p><b>Cooling of I.C. Engines:</b></p> <ul style="list-style-type: none"> <li>• Various Cooling media used; their merits and demerits, cooling of Pistons, cylinder jackets &amp; cylinder heads, Bore cooling, coolant conveying mechanism and system, maintenance of coolant and cooling system.</li> </ul>	<b>4</b>
<b>6.</b>	<p><b>Combustion &amp; Dissociation:</b></p> <ul style="list-style-type: none"> <li>• Definition of Fuel, combustion. Combustion Equation, Analysis of the Products of Combustion, stoichiometric combustion, Actual combustion, Excess Air, Mixture strength. Dissociation. Effect of Dissociation on LC-Engines.</li> <li>• Combustion of Fuels: Grades of suitable fuels, Preparation of fuels for efficient combustions, fuel atomization, ignition quality, fuel injectors and its details, ignition delay, afterburning,.</li> </ul>	<b>9</b>

	Compression Pressure Ratio and its effects on Engine. Reasons for variation in compression pressure and peak pressure. Design aspects of combustion chamber. Control of NOX and SOX in Exhaust emission.	
7.	<b>Fuels &amp; Lubricants:</b> <ul style="list-style-type: none"> <li>• Composition, properties and characteristics of different fuels and lubricants, additives used, flash point &amp; viscosity as applicable to petrol, kerosene, marine diesel oil, boiler fuel oil, lube oil.</li> <li>• Sampling and testing procedure, storage and transfer of fuel and lubricants.</li> <li>• Contamination of fuel and lubricants including microbes.</li> </ul>	6
8.	<b>Medium speed Engines:</b> <ul style="list-style-type: none"> <li>• Different types of medium speed marine diesel engines, couplings, and reduction gear used in conjunction with medium speed Engine, Development in exhaust valve design, V-type engine details.</li> <li>• Use of poor quality residual fuels and their consequences.</li> <li>• Improvements in designs for higher power output.</li> <li>• Fuels, combustion process – fundamentals.</li> </ul>	8
9.	<b>Special features of I.C. Engines:</b> <ul style="list-style-type: none"> <li>• Development of long-stroke Engines, Implication of stroke-bore ratio.</li> <li>• Development in materials in construction &amp; heat treatment of M.E. components.</li> </ul>	5
	<b>TOTAL</b>	<b>54</b>
<b>Practical content</b>		
<b>Text Books</b>		
1	"Marine Diesel Engine" by Deven Arhana	
<b>Reference Books</b>		
1	Wood yard, Goug, "Pounder's Marine Diesel Engines". 8th Edition, Butter Worth Heinemann Publishing, London, 2001.	
2	D K Sanyal, "Principle'& Practice of Marine Diesel Engines", 2d Edition, Bhandarkar Publication, Mumbai, 1998.	
3	"Lamb's Marine diesel Engine"	

# GANPAT UNIVERSITY

## FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology				Branch/Spec.	Marine Engineering			
Semester	III				Version	2.0.0.0			
Effective from Academic Year			2017-18		Effective for the batch Admitted in			July 2016	
Subject code	2MR308		Subject Name		General Performance				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	0	0	0	1	1	Theory	0	0	0
Hours	0	0	0	0	0	Practical	50	50	100
Pre-requisites:									
Learning Outcome:									
Theory syllabus									
Unit	Content								Hrs
Practical content									
Text Books									
Reference Books									

\*\*\*\*\* END of Semester III \*\*\*\*\*