

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									
• Comply with the TAR Book Competency number 4.3.4, 4.5 & 9.6									
Theory syllabus									
Unit	Content								Hrs
1.	<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>								4
2.	<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>								3
3.	<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>								8
4.	<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>								5
5.	<b>Air Conditioning: Introduction:</b> <ul style="list-style-type: none"><li>Specific humidity, Relative humidity, Due point, Unsaturated and Saturated air.</li><li>Psychometric, Psychometric 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>								5
6.	<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>								11
	<b>TOTAL</b>								<b>36</b>

Practical content	
<ul style="list-style-type: none"> <li>• To understand different components of VCR system and to determine it's COP</li> <li>• To understand construction and working of reciprocating, rotary and centrifugal compressor used for R&amp;AC.</li> <li>• To understand various tools used for refrigeration tubing and to perform various operations like flaring, swaging, bending, brazing etc.</li> <li>• To perform different psychometric processes and analyse the same using psychometric chart.</li> <li>• To understand construction and working of window air-conditioner/ split air-conditioner and to determine its capacity.</li> <li>• Study of domestic refrigerator and to determine % running time at different thermostat settings.</li> <li>• To study the Tool kit used for the maintenance of the Refrigeration system.</li> <li>• To study different types of expansion valves used for refrigeration systems</li> </ul> <p><b><u>Training Manual Assignments:</u></b></p> <p><b><u>Assignment No: 68</u></b></p> <p>Refrigeration-provision refrigerating plant</p>	
Text Books	
1	General Engineering Knowledge - H. D. McGoeorge
Reference Books	
1	Refrigeration at Sea - J. R. Stot
2	Marine Air-conditioning - S. D. Srivasatav
3	Advanced Marine Engineering - J. K. Dhar