

Khulna Polytechnic Institute
Refrigeration & Air Conditioning Technology
Semester Plan

Subject Name: **REFRIGERATION CYCLES & COMPONENTS**

Subject Code -**27231**

Semester: 3rd

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Week	Type of Class	Content	Remarks
1 st	Theory	1. Understand the characteristics of conventional refrigeration cycles. 1.1 List the various conventional refrigeration cycles.	
	Theory	1.2 Mention advantages and disadvantages of vapor compression refrigeration cycles	
	Theory	1.3 Discuss the application of vapor compression refrigeration cycles.	
	Practical	1. Study the vapor compression refrigeration cycle: a) Identify the components of refrigeration cycle. b) Start the refrigeration cycle c) Measure suction & discharge pressure d) Observe temperature on discharge line, condenser, liquid line ,suction line & evaporator. e) Observe the effect of refrigeration cycle.	
2 nd	Theory	1.4 Mention advantages and disadvantages of vapor absorption refrigeration cycles.	
	Theory	1.5 Discuss the application of vapor absorption refrigeration cycles.	
	Theory	1.6 Illustrate thermoelectric refrigeration system with its advantages & disadvantages	
	Practical	2. Study the thermo-electric refrigeration system: a) Observe the position of heating & cooling side of the thermoelectric system. b) Start the system. c) Measure ampere of the cycle. d) Observe the temperature on cooling & heating element .	
3 rd	Theory	2. Understand the characteristics of non- conventional refrigeration cycles. 2.1 List the various non- conventional refrigeration system. 2.2 State basic ice refrigeration & dry ice refrigeration method.	
	Theory	2.3 Describe evaporative refrigeration system with its application	
	Theory	2.4 Describe air cycle refrigeration method.	
	Practical	3. Study the evaporative refrigeration system: a) Identify the components of evaporative refrigeration cycle. b) Check the voltage & ampere rating of the unit. c) Start the unit. d) Measure room temperature & the grill temperature of the unit. e) Check the performance of the unit.	
4 th	Theory	2.5 Describe the working principle of steam jet refrigeration with its application	
	Theory	2.6 Illustrate expendable refrigerant refrigeration with its application. 2.7 State eutectic plate refrigeration method.	
	Theory	Quiz-01	
	Practical	4. Dismantle and identify all the major working parts of a open type reciprocating compressor: a) Identify the external parts of the open type compressor.	

		b) Mark on the compressor head, valve plate & compressor body. c) Dismantle the compressor. d) Identify the internal parts of the compressor. e) Observe the operation of the compressor. f) Assemble the compressor parts.	
5 th	Theory	3. Understand the characteristics of open and close cycle refrigeration. 3.1 state the meaning of open and close cycle. 3.2 Distinguish between open and close cycle refrigeration.	
	Theory	3.3 List the open and close cycle refrigeration	
	Theory	3.4 Mention the advantages of close cycle refrigeration.	
	Practical	5. Dismantle and identify all the major working parts of a rotary compressor: a) Identify the external parts of the rotary type compressor. b) Dismantle the compressor c) Identify the internal parts of the compressor. d) Observe the operation of the compressor. e) Assemble the compressor parts .	
6 th	Theory	4. Understand the features of vapor compression and absorption refrigeration system. 4.1 Describe operating principle of vapor compression refrigeration system.	
	Theory	4.2 Explain the operating principle of ammonia-water vapor absorption system.	
	Theory	4.3 Describe the working principle of water- lithium bromide absorption system. 4.4 Discuss the application of different absorption system.	
	Practical	6. Dismantle and identify all the major working parts of a scroll compressor: a) Identify the external parts of the scroll compressor b) Dismantle the compressor. c) Identify the internal parts of the compressor. d) Observe the operation of the compressor. e) Assemble the compressor parts .	
7 th	Theory	4.5 Distinguish between water ammonia and lithium bromide absorption system. 4.6 Compare vapor compression and absorption system.	
	Theory	Class Test-01	
	Theory	5. Understand the features of vapor compression refrigeration cycle components. 5.1 Mention the basic components of vapor compression refrigeration cycles.	
	Practical	7. Dismantle and reassemble a thermostatic expansion valve and identify internal parts: a) Identify the external parts of the thermostatic expansion valve. b) Dismantle the thermostatic expansion valve c) Identify the internal parts d) Reassemble the TEV.	
8 th	Theory	5.2 Describe the types, construction and operation of compressors used in refrigeration cycles.	
	Theory	5.3 Mention the specific application of each type of compressor.	
	Theory	5.4 Explain bore, stroke, swept volume, clearance volume, total volume, compression ratio and capacity of compressor.	
	Practical	8. Dismantle and reassemble an automatic expansion valve and identify internal parts: a) Identify the external parts of the automatic expansion valve.	

		b) Dismantle the automatic expansion valve. c) Identify the internal parts. d) Reassemble the expansion valve.	
9 th	Theory	Mid Semester	
	Theory	Mid Semester	
	Theory	Mid Semester	
	Practical	Mid Semester	
10 th	Theory	5.5 Describe the types, construction , operation and application of each condenser.	
	Theory	5.6 Describe the types, construction and operation of automatic, thermostatic, low side float, high side float, orifice and thermoelectric expansion device.	
	Theory	5.6 Describe the types, construction and operation of automatic, thermostatic, low side float, high side float, orifice and thermoelectric expansion device.	
	Practical	9. Identify the different refrigerants used in present situation by pressure temperature method. a) Mark 1,2 &3 on three different refrigerant cylinder. b) Measure room temperature. c) Measure the pressure of refrigerant cylinder 1,2 & 3. e) Compare temperature pressure with the refrigerant temperature- pressure chart. f) Decide the name of the refrigerant of cylinder 1,2 & 3 .	
11 th	Theory	5.7 Describe types, construction and operation and application of each evaporator.	
	Theory	6. Understand the accessories and auxiliaries of refrigeration cycles. 6.1 State the meaning of accessories and auxiliaries of refrigeration cycles. 6.2 List the important accessories used in refrigeration cycles.	
	Theory	6.3 List few numbers of auxiliaries used in refrigeration cycles.	
	Practical	10. Transfer refrigerant from storage cylinder to service cylinder: a) Evacuate service cylinder b) Measure weight of the service cylinder c) Connect hose between storage & service cylinder. d) Cool the service cylinder e) Purge connected hose f) Open the cylinder valve g) Observe weight of the service cylinder for required amount of refrigerant. h) Close the storage cylinder valve & service cylinder valve.	
12 th	Theory	6.4 Describe the function, construction and position in refrigeration cycle of the following accessories: strainer, filter drier, accumulator, flush chamber, heat exchanger	
	Theory	6.4 Describe the function, construction and position in refrigeration cycle of the following accessories: pressure relief valve, service valve, receiver, oil, separator, liquid indicator, liquid moisture indicator,	
	Theory	6.4 Describe the function, construction and position in refrigeration cycle of the following accessories: solenoid valve , reversing valve, check valve, bypass, valve	
	Practical	11. Recover CFC-12, HCFC-22 and HFC-134a from refrigeration system by passive method: a) Cool the recovery cylinder by ice and water. b) Observe the pressure of the refrigerant of the refrigerating unit to be recovered. c) Connect charging hose with the recovery cylinder and the refrigerating unit to be recovered. d) Cool the recovery cylinder & set on a weighing scale. e) Open the valve of the refrigerating unit & purge the charging hose.	

		f) Open the cylinder valve g) Observe the pressure & close the valve till the pressure stands. h) Observe the weight & close the valves.	
13 th	Theory	6.4 Describe the function, construction and position in refrigeration cycle of the following accessories: sight glass, safety valve, vibration eliminator , bypass regulator, fusible plug, purger etc.	
	Theory	Quiz-02	
	Theory	. 7. Understand the characteristics of refrigerant. 7.1 Explain CFCs and the effect of CFCs on environment and alternative of CFCs. 7.2 Explain ODS, Ozone layer and global warming	
	Practical	12. Recover CFC-12, HCFC-22 and HFC-134a from refrigeration system using active method: a) Observe the pressure of the refrigerant of the refrigerating unit to be recovered . c) Connect charging hose with the recovery machine, recovery cylinder and the refrigerating unit to be recovered. d) Purge the connected hoses. e) Open the cylinder valve & the refrigerating unit valve . f) Start the recovery machine. g) Observe the suction pressure & close the cylinder valve until the pressure at zero. h) Stop the recovery machine.	
14 th	Theory	7.3 Mention the ODP and GWP value of refrigerant. 7.4 Mention the meaning, composition with example of CFC, HCFC, HFC, HC and HC-blend refrigerant	
	Theory	7.5 Explain with example halocarbons, azeotropics , geotropic and natural refrigerant. 7.6 Explain saturation pressure-temperature table of refrigerant and its application.	
	Theory	Class Test-02	
	Practical	13. Build up a refrigeration cycle with auxiliaries: a) Plan draw a refrigeration cycle. b) Put at least five auxiliaries in the drawing. c) Select all appropriate auxiliaries. d) Install compressor, condenser, expansion device and evaporator with all auxiliaries. e) Perform leak test & evacuation, f) Charge refrigerant for perfect cooling.	
15 th	Theory	8. Understand the characteristic of refrigerant oil. 8.1 Mention the different types of refrigerant oil. 8.2 Describe the properties of refrigerant oil.	
	Theory	8.3 Explain SAE viscosity number and ISO viscosity rating of refrigerant oil. 8.4 Mention the factors for selecting refrigerant oil.	
	Theory	8.5 Make a table of important refrigerant and refrigerant oil in present situation. 8.6 prepare a table of important refrigerant, types of refrigerant oil and ISO viscosity rating in present situation.	
	Practical	Model Test-01	
16 th	Theory	Review Class	
	Theory	Review Class	
	Theory	Review Class	
	Practical	Model Test-02	

