INSTRUCTOR:	Credits: 3	Language of instruction: Chinese / English			
REQUIRED COURSE OR ELEC	TIVE COURSE:	TERMS OFFERED:			
Required		Spring semester			
COURSE STRUCTURE/SCHEDULE:		PRE-REQUISITES:			
1. Lecture-2 days per week at 4 credits hours		ME 300 Thermodynamics I			
		ME 300 Heat Transfer			
ASSESSMENT TOOLS:		PROFESSIONAL COMPONENT:			
1. Project & discussions—3	0%	1. Engineering Topics:			
2. One comprehensive final	exam—70%	Engineering Science-2credits			
		Engineering Design and experiments-1credit			
TEXTBOOK/READING LIST					
Textbook:	heem, and Technolog	y, Beijing: China Science Press, 2005. (in Chinese)			
nazina wang, nemgeration n					
Reference:					
	n Theory and Equipn	nent. Beijing: China Machine Press. 1987. (in Chinese)			
 Zhiyou Zhang. Refrigeration Theory and Equipment. Beijing: China Machine Press, 1987. (in Chinese) Yezheng Wu. Refrigeration Theory and Equipment. Xi'an: Xi'an Jiao Tong University Press, 1997. (in 					
2. Yezheng Wu. Refrigeration Chinese)	Theory and Equipm				
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and 	Theory and Equipm	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpr 4. JARN, Japan Air Conditioni 	Theory and Equipm Air Conditioning, An reter). Shanghai: Sha ng, Heating and Refr	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> .			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpr 4. JARN, Japan Air Conditioni 5. Journal <refrigeration li="" tech<=""> </refrigeration>	Air Conditioning, An reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese)			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpr 4. JARN, Japan Air Conditioni 5. Journal <refrigeration tect<br="">COURSE DESCRIPTION: Histor</refrigeration> 	Air Conditioning, An reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, v	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) rapor compression cycle, refrigeration methods,			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpr 4. JARN, Japan Air Conditioni 5. Journal <refrigeration tect<br="">COURSE DESCRIPTION: Histor thermodynamic calculation of</refrigeration> 	Air Conditioning, An reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese)			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpr 4. JARN, Japan Air Conditioni 5. Journal <refrigeration tech<br="">COURSE DESCRIPTION: Histor thermodynamic calculation of components in refrigeration 3</refrigeration> 	Air Conditioning, An- reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, v of simple refrigeration systems.	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, n cycle, properties of refrigerants, equipments and			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpr 4. JARN, Japan Air Conditioni 5. Journal <refrigeration tect<br="">COURSE DESCRIPTION: Histor thermodynamic calculation of components in refrigeration and COURSE OUTCOMES [Related</refrigeration> 	Air Conditioning, An reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, v of simple refrigeration systems. d ME Program Outco	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, n cycle, properties of refrigerants, equipments and mes in brackets]			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpresent JARN, Japan Air Conditioni 5. Journal <refrigeration tect<br="">COURSE DESCRIPTION: Histor thermodynamic calculation of components in refrigeration 3 COURSE OUTCOMES [Related 1. Provide a thorough under Course Network Course Cours</refrigeration>	Air Conditioning, An reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w of simple refrigeration systems. d ME Program Outco rstanding of refrigera	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, n cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1]			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpr 4. JARN, Japan Air Conditioni 5. Journal <refrigeration tech<br="">COURSE DESCRIPTION: Histor thermodynamic calculation of components in refrigeration 2 COURSE OUTCOMES [Related 1. Provide a thorough unde 2. Introduce and understan</refrigeration> 	Air Conditioning, An reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w of simple refrigeration systems. d ME Program Outco rstanding of refrigera d the process of refri	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) rapor compression cycle, refrigeration methods, in cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1] igeration and analysis method of thermodynamic			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpresent JARN, Japan Air Conditioni 5. Journal <refrigeration tect<br="">COURSE DESCRIPTION: Histor thermodynamic calculation of components in refrigeration and COURSE OUTCOMES [Related 1. Provide a thorough under 2. Introduce and understan cycles, know the main approximation</refrigeration> 	Air Conditioning, An reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w of simple refrigeration systems. d ME Program Outco rstanding of refrigera d the process of refri	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, n cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1]			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpresent JARN, Japan Air Conditioni 5. Journal <refrigeration tect<br="">COURSE DESCRIPTION: Histor thermodynamic calculation of components in refrigeration 3 COURSE OUTCOMES [Related 1. Provide a thorough unde 2. Introduce and understan cycles, know the main ap [A2,A3]</refrigeration> 	Air Conditioning, And reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w of simple refrigeration systems. d ME Program Outco rstanding of refrigera d the process of refri pproaches and basic p	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, n cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1] igeration and analysis method of thermodynamic principles of improving energy utilization efficiency.			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpr 4. JARN, Japan Air Conditioni 5. Journal <refrigeration tech<br="">COURSE DESCRIPTION: Histo thermodynamic calculation of components in refrigeration 3 COURSE OUTCOMES [Related 1. Provide a thorough unde 2. Introduce and understan cycles, know the main ap [A2,A3]</refrigeration> Understand and apply th 	Air Conditioning, And reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w of simple refrigeration systems. d ME Program Outco rstanding of refrigera d the process of refri pproaches and basic p e common refrigerar	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) 'apor compression cycle, refrigeration methods, in cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1] igeration and analysis method of thermodynamic principles of improving energy utilization efficiency.			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpr 4. JARN, Japan Air Conditioni 5. Journal <refrigeration tect<br="">COURSE DESCRIPTION: Histo thermodynamic calculation of components in refrigeration and COURSE OUTCOMES [Related 1. Provide a thorough unde 2. Introduce and understan cycles, know the main ap [A2,A3]</refrigeration> Understand and apply th diagram) and software to 	Air Conditioning, An reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, v of simple refrigeration systems. d ME Program Outco rstanding of refrigerat d the process of refri proaches and basic p e common refrigerar o calculate the basic r	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, in cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1] igeration and analysis method of thermodynamic principles of improving energy utilization efficiency.			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpresent JARN, Japan Air Conditioni 5. Journal <refrigeration tect<br="">COURSE DESCRIPTION: Histor thermodynamic calculation of components in refrigeration 3 COURSE OUTCOMES [Related 1. Provide a thorough unde 2. Introduce and understan cycles, know the main ap [A2,A3]</refrigeration> Understand and apply th diagram) and software to 4. Know the common refrigeration 	Air Conditioning, And reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w of simple refrigeration systems. d ME Program Outco restanding of refrigerat d the process of refri pproaches and basic p e common refrigerar o calculate the basic p	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, n cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1] igeration and analysis method of thermodynamic principles of improving energy utilization efficiency. ht properties equations, table and diagrams (logP-h refrigeration thermodynamic cycle.[A2,A3] equipments and operation theories and establish the			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpri 4. JARN, Japan Air Conditionii 5. Journal <refrigeration tech<br="">COURSE DESCRIPTION: Histo thermodynamic calculation of components in refrigeration is</refrigeration> COURSE OUTCOMES [Related 1. Provide a thorough under 2. Introduce and understan cycles, know the main ap [A2,A3] Understand and apply th diagram) and software to 4. Know the common refrig general ability to solve the 	Air Conditioning, And reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w of simple refrigeration systems. d ME Program Outco erstanding of refrigerat d the process of refri proaches and basic p e common refrigerar o calculate the basic of geration devices and of the practical refrigerat	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, n cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1] igeration and analysis method of thermodynamic principles of improving energy utilization efficiency. In properties equations, table and diagrams (logP-h refrigeration thermodynamic cycle.[A2,A3] equipments and operation theories and establish the cion problems. [A3]			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpride JARN, Japan Air Conditioni JOURSE DESCRIPTION: Historic thermodynamic calculation of components in refrigeration for COURSE OUTCOMES [Related Provide a thorough under Introduce and understan cycles, know the main ap [A2,A3] Understand and apply the diagram) and software to Know the common refrige general ability to solve the 	Air Conditioning, And reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w of simple refrigeration systems. d ME Program Outco erstanding of refrigerat d the process of refri proaches and basic p e common refrigerar o calculate the basic of geration devices and of the practical refrigerat	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, n cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1] igeration and analysis method of thermodynamic principles of improving energy utilization efficiency. In properties equations, table and diagrams (logP-h refrigeration thermodynamic cycle.[A2,A3] equipments and operation theories and establish the cion problems. [A3]			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpri 4. JARN, Japan Air Conditionii 5. Journal <refrigeration tech<br="">COURSE DESCRIPTION: Histo thermodynamic calculation of components in refrigeration is</refrigeration> COURSE OUTCOMES [Related 1. Provide a thorough under 2. Introduce and understan cycles, know the main ap [A2,A3] Understand and apply th diagram) and software to 4. Know the common refrig general ability to solve the 	Air Conditioning, And reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w of simple refrigeration systems. d ME Program Outco rstanding of refrigerat d the process of refri proaches and basic p e common refrigerar o calculate the basic n geration devices and he practical refrigerat and excise in real pro	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, n cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1] igeration and analysis method of thermodynamic principles of improving energy utilization efficiency. In properties equations, table and diagrams (logP-h refrigeration thermodynamic cycle.[A2,A3] equipments and operation theories and establish the cion problems. [A3]			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpresent JARN, Japan Air Conditioni 5. Journal <refrigeration tect<br="">COURSE DESCRIPTION: Histor thermodynamic calculation of components in refrigeration 3 COURSE OUTCOMES [Related 1. Provide a thorough unde 2. Introduce and understan cycles, know the main ap [A2,A3]</refrigeration> Understand and apply th diagram) and software to 4. Know the common refrig general ability to solve th 5. Strengthen the practices 	Air Conditioning, And reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w of simple refrigeration systems. d ME Program Outco erstanding of refrigerat d the process of refri proaches and basic p e common refrigerar o calculate the basic of the practical refrigerat and excise in real pro	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, n cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1] igeration and analysis method of thermodynamic principles of improving energy utilization efficiency. In properties equations, table and diagrams (logP-h refrigeration thermodynamic cycle.[A2,A3] equipments and operation theories and establish the cion problems. [A3]			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpri 4. JARN, Japan Air Conditioni 5. Journal <refrigeration tech<br="">COURSE DESCRIPTION: Histo thermodynamic calculation of components in refrigeration is COURSE OUTCOMES [Related 1. Provide a thorough unde 2. Introduce and understan cycles, know the main ap [A2,A3]</refrigeration> Understand and apply th diagram) and software to 4. Know the common refrig general ability to solve th 5. Strengthen the practices 	Air Conditioning, And reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w of simple refrigeration systems. d ME Program Outco erstanding of refrigerat d the process of refri proaches and basic p e common refrigerar o calculate the basic of the practical refrigerat and excise in real pro	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, n cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1] igeration and analysis method of thermodynamic principles of improving energy utilization efficiency. In properties equations, table and diagrams (logP-h refrigeration thermodynamic cycle.[A2,A3] equipments and operation theories and establish the cion problems. [A3]			
 Yezheng Wu. Refrigeration Chinese) Modern Refrigeration and Bracciano. Qisen Yan (Interpr 4. JARN, Japan Air Conditioni Journal <refrigeration li="" tect<=""> COURSE DESCRIPTION: Histor thermodynamic calculation of components in refrigeration 2 COURSE OUTCOMES [Related 1. Provide a thorough unde 2. Introduce and understan cycles, know the main ap [A2,A3] Understand and apply th diagram) and software to 4. Know the common refrig general ability to solve th Strengthen the practices </refrigeration>	Air Conditioning, And reter). Shanghai: Sha ng, Heating and Refr hnology>, Shanghai S ory of refrigeration, w of simple refrigeration systems. d ME Program Outco erstanding of refrigerat d the process of refri proaches and basic p e common refrigerar o calculate the basic of the practical refrigerat and excise in real pro	ent. Xi'an: Xi'an Jiao Tong University Press, 1997. (in drew D. Althouse, Carl H. Turnquist, Alfred F. nghai Jiao Tong University, 2001. (in Chinese) igeration News, <u>www.jarn.co.jp</u> . Society of Refrigeration. (In Chinese) vapor compression cycle, refrigeration methods, n cycle, properties of refrigerants, equipments and mes in brackets] ation methods and application characteristics. [A1] igeration and analysis method of thermodynamic principles of improving energy utilization efficiency. ht properties equations, table and diagrams (logP-h refrigeration thermodynamic cycle.[A2,A3] equipments and operation theories and establish the cion problems. [A3]			

ME 300 Refrigeration Theory and Equipments

Course Syllabus

Lectures: Spring Semester, 3 Credits/51 Credit Hours

COURSE INSTRUCTORS

Name:	Name:
Office:	Office:
Email:	Email:

COURSE DESCRIPTION

This course will cover the basics of refrigeration theory and equipments. Specific topics will include refrigeration methods, thermodynamics cycles of refrigeration, analysis and process of refrigeration cycles, properties of refrigerants and basic devices and components in refrigeration systems. This is also a project-based course where students will work in teams to solve or complete a real practical project. The project topic will be appointed during course.

TEXTBOOK

Ruzhu Wang, Refrigeration Theory and Technology, Beijing: Science Press, 2005. (In Chinese)

READING RERENCE

1. Zhiyou Zhang. Refrigeration Theory and Equipment. Beijing: China Machine Press, 1987. (In Chinese)

2. Yezheng Wu. Refrigeration Theory and Equipment. Xi'an: Xi'an Jiao Tong University Press, 1997. (In Chinese)

3. Modern Refrigeration and Air Conditioning, Andrew D. Althouse, Carl H. Turnquist, Alfred F. Bracciano. Qisen Yan (Interpreter). Shanghai: Shanghai Jiao Tong University, 2001. (In Chinese)

4. JARN, Japan Air Conditioning, Heating and Refrigeration News, www.jarn.co.jp.

5. Journal: <Refrigeration Technology>, Shanghai Society of Refrigeration.

COURSE PRE-REQUISITES

ME 300 Thermodynamics I and ME 300Heat Transfer are the pre-requisties for this course. You are expected to have (i) a basic overview of thermodynamic cycle, such compression, expansion, (ii) basic knowledge in thermodynamic properties, and (iii) fundamental knowledge of heat transfer process between different heat sources.

COURSE LEARNING OBJECTIVES

This course is a basic major course for refrigeration engineering, cryogenics engineering, air conditioning, heat, ventilation and equipment engineering and environmental engineering student. This course will cover the basics of refrigeration theory and equipments. Specific topics will include refrigeration methods, thermodynamics cycles of refrigeration, analysis and process of refrigeration cycles, properties of refrigerants and basic devices and components in refrigeration systems.

The goal of this course is to provide each student an understanding of (a) basic principles of refrigeration cycles, (b) analysis of refrigeration thermodynamic cycles, (c) refrigerants and other working fluids, and (c) refrigeration devices and components in refrigeration systems and relate engineering knowledge to real-world engineering problems. At the end of this course, students should be able to do the following in either a team setting or individually:

- 1. Provide a thorough understanding of refrigeration methods and application characteristics. [A1]
- 2. Introduce and understand the process of refrigeration and analysis method of thermodynamic cycles, know the main approaches and basic principles of improving energy utilization efficiency. [A2, A3]
- 3. Understand and apply the common refrigerant properties equations, table and diagrams (logP-h diagram) and software to calculate the basic refrigeration thermodynamic cycle.[A2,A3]
- 4. Know the common refrigeration devices and equipments and operation theories and establish the general ability to solve the practical refrigeration problems. [A3]
- 5. Strengthen the practices and excise in real problems. [A6]

GRADING FORMAT AND POLICY

The grade break-down for the course is as follows:

- 1, Project and in-class Discussions, 30%;
- 2, Final Exam (one piece of paper open), 70%.

Grading Rules:

1, Projects are team-oriented. Peer-evaluations will be considered in determining project grades for individual team members, and will be administered three times during the course of the semester.

2, Student is encouraged to discuss their grades with the instructor as frequently as needed. The student is always given the benefit of the doubt in all grade discussions and every effort will be made to find ways to help a student improve his/her grade throughout the semester.

DESIGN PROJEXTS

Example: Small-scaled dehumidifier/Water heater (The project topic will be appointed in the first lecture and changed in different semester) as the following steps:

- 1, Literature review and survey;
- 2, Conceptual design;
- 3, Manufacturing;
- 4, Performance test;
- 5, Final report and defense;

TEAM-WORK

Success in the project depends heavily on teamwork. Students will be assigned to groups of four that will work together the entire semester. It is expected that the students within a team will work together on in-class discussions, activities and projects. It is not unusual for teat's to experience some conflict during the semester. What is important is that the teams deal with this in a positive and constructive manner. Teams having problems working together should make every effort to resolve them by themselves. The course instructors and GSIs will be available to help and facilitate smooth team operation, but the end responsibility lies with the team.

COURSE ROAD-MAP AND SCHEDULE

Week#	Lecture#	Lecture Topic	Lecturer	Reference	Homework	Lab/Recitation Topics
1	1	Course start: course		Lecture		<u> </u>
		overview, introduction of		notes and		
		this course, project topic		textbook		
		assignment				
	2	Basic applications of		Lecture		
		refrigeration, history of		notes and		
		refrigeration		textbook		
2	3	Carnot cycle and		Lecture		
		theoretical refrigeration		notes and		
		cycles		textbook		
	4	Refrigeration cycle,		Lecture		
		Analysis in LogP-h and		notes and		
		T-s Diagram		textbook		
3	5	Real refrigeration cycle		Lecture		
		and calculation, two-		notes and		
		stage and cascade		textbook		
		refrigeration systems				
	6	Project Review #1				
4	7	Refrigerants and		Lecture		
		properties		notes and		
				textbook		
	8	Refrigerants and		Lecture		
		properties		notes and		
				textbook		
5	9	Coolant and lubricants in		Lecture		
		refrigeration system		notes and		
				textbook		
	10	Refrigeration devices:		Lecture		
		Compressors		notes and		
		-		textbook		
6	11	Refrigeration devices:		Lecture		
		Expansion devices		notes and		
				textbook		
	12	Refrigeration devices:		Lecture		
		Evaporators		notes and		
				textbook		
7	13	Refrigeration devices:		Lecture		
		Condensers		notes and		
				textbook		
	14	Project Review #2				
8	15	Refrigeration devices:		Lecture		
		Auxiliary components		notes and		
				textbook		

	16	Refrigeration systems: Refrigerator	Lecture notes and	
		Refingerator	textbook	
9	17	Refrigeration systems:	Lecture	
		Residential air	notes and	
		conditioner and heat	textbook	
		pump		
	18	Refrigeration systems:	Lecture	
		Mobile air conditioning	notes and	
		system	textbook	
10	19	Refrigeration systems:	Lecture	
		Chiller	notes and	
			textbook	
	20	Adsorption and	Lecture	
		Absorption refrigeration	notes and	
		systems	textbook	
11	21	Refrigeration devices:	Lecture	
		Auxiliary components	notes and	
			textbook	
	22	Project Review #3		
12	23	Course Review		
	24	Final Exam		