

ENTC 370 – Thermodynamics for Technologists – Fall 2009

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Office Hours: W 2:30-3:30 p.m. or by appointment

Lecture: 6:00-7:15 p.m.; Thompson 122

Lab Teaching Assistant: Aravind Kamath
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Course Objective:

1. To learn and understand the principles of thermal and mechanical energy. This includes the study of energy transformations and thermodynamic relationships applied to flow and non-flow processes in power and refrigeration cycles. Equipment studied includes compressors, steam turbines, gas turbines, heat exchangers, nozzles, diffusers, pumps and piston-cylinder devices.
2. To provide the student the necessary analytical skills to solve and analyze a variety of energy related problems.

Prerequisites:

PHYS 218 and upper-level in engineering technology (U3 or above)

Text:

Thermodynamics: An Engineering Approach, Cengel & Boles; **Sixth Edition**

References:

Thermodynamics and Heat Power, Granet
Fundamentals of Engineering Thermodynamics, Howell & Buckius

Notes:

1. Mr. McDaniels has responsibility for the lecture portion of this course.
2. Dr. Alvarado has responsibility for the laboratory portion of this course.

Course Webpage:

<http://etidweb.tamu.edu/ftp/entc370/>

Lecture Topics to include:

Introduction	Chap. 1
The Thermodynamic System	Chap. 1
Energy Transfer	Chap. 2
Properties of Pure Substances	Chap. 3
Energy Analysis of Closed Systems	Chap. 4
Energy Analysis of Control Volumes	Chap. 5
Second Law of Thermodynamics	Chap. 6
Entropy	Chap. 7
Gas Power Cycles	Chap. 9
Vapor Power Cycles	Chap. 10
Refrigeration Cycles	Chap. 11

Topics may be added or changed at the discretion of the instructor.

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Exam Schedule:

Exam 1 M 10/05
Exam 2 M 11/09

Attendance: Attendance is per University Regulations and is strongly recommended. Beginning with week 3, each unexcused absence more than three reduces your final course grade by one percentage point up to a maximum of five percentage points. See below for excused absence rules.

Excused Absences

- See Student Rule 7 (<http://student-rules.tamu.edu/rule07>). In the event of illness, confirmation of visit to a health care professional affirming date and time of visit must be presented according to Section 7.1.6.2.b.
- Make-up of labs and scheduled exams will not be allowed except for an excused absence.** Due dates will be set by the lecture instructor or the lab TA as appropriate.

Grading:

Exams (2x) ⁽¹⁾	50%	90% ≤ A
Final Exam) ⁽¹⁾	25%	80% ≤ B < 90%
Laboratory ⁽¹⁾	15%	70% ≤ C < 80%
Attendance and Participation ⁽³⁾	5%	60% ≤ D < 70%
Homework ⁽²⁾	5%	F < 60%

Notes:

- Makeup exams and late work in lecture and lab will not be accepted except for excused absences per TAMU regulations. Due dates will be set by Mr. McDaniels or the lab TA as appropriate.
- Homework will be regularly assigned and is due at the beginning of the designated lecture session. Answers will be posted at <http://etidweb.tamu.edu/ftp/ENTC370/>
- Attendance and Participation grade also includes pop quizzes.
- Final Exam: Friday, December 11, 7:30-9:30 a.m.

Lab:

All aspects of lab participation and lab report grading must be approved by Dr. Alvarado or the lab TA.

The lab manual is posted at <http://etidweb.tamu.edu/ftp/ENTC370/>

Laboratory reports are required for each lab covering one or more topics. Each lab report will consist of no less than two full pages of text plus a professional appearing cover. Sections of the report will include:

Objective
Procedure
Findings
Sources (as appropriate)
Conclusions

Students may work on the application topics in groups not to exceed 4 students. All students in the group are responsible for the content and appearance of the report. Reports are due within one week, at the beginning of the following lab. **Late lab reports will get NO POINTS.**

Plagiarism and Intellectual Property: The handouts used in this course are copyrighted. “Handouts” means all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless you are expressly granted permission by the copyright holder.

As commonly defined plagiarism consists of passing off as one’s own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.

If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section “Scholastic Dishonesty.”

American with Disabilities (ADA) Policy Statement: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Cain Hall, Rm. B118, or call 845-1637. For additional information visit <http://disability.tamu.edu>.

Academic Integrity: “*An Aggie does not lie, cheat or steal or tolerate those who do.*” The Aggie Code of Honor is an effort to unify the aims of all Texas A&M men and women toward a high code of ethics and personal dignity. For most, living under this code will be no problem, as it asks nothing of a person that is beyond reason. It only calls for honesty and integrity, characteristics that Aggies have always exemplified. The Aggie Code of Honor functions as a symbol to all Aggies, promoting understanding and loyalty to truth and confidence in each other.

See <http://student-rules.tamu.edu/rule20> and <http://www.tamu.edu/aggiehonor/> for more information about Student Rules and the Aggie Honor System.

Disruptive behavior: If a student's behavior in class is sufficiently disruptive to warrant immediate action, the instructor is entitled to remove a student on an interim basis, pending an informal hearing with the Head of the Department offering the course. This hearing must take place within three working days of the student's removal.

This rule and supporting information may be found at <http://student-rules.tamu.edu/rule21>. Your cooperation is appreciated.

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Relation between ENTC 370 Course Objectives and MMET Program Outcomes

The Manufacturing and Mechanical ET program is designed to provide the student with several skills at the time of graduation. These skills and abilities are stated in the following MMET Program Outcomes:

A Manufacturing and Mechanical Engineering Technology graduate has the following abilities at the time of graduation:

- (a) *An appropriate mastery of the knowledge, techniques, skills and modern tools of manufacturing and mechanical systems and processes.*
- (b) *An ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology.*
- (c) *An ability to conduct, analyze and interpret experiments and apply experimental results to improve processes.*
- (d) *An ability to apply creativity in the design of systems, components or processes appropriate to program objectives.*
- (e) *An ability to function effectively on teams.*
- (f) *An ability to identify, analyze and solve technical problems.*
- (g) *An ability to communicate effectively.*
- (h) *A recognition of the need for, and an ability to engage in lifelong learning.*
- (i) *An ability to understand professional, ethical and social responsibilities.*
- (j) *A respect for diversity and a knowledge of contemporary professional, societal and global issues.*
- (k) *A commitment to quality, timeliness, and continuous improvement.*
- (l) *An ability to apply the technologies of engineering materials, manufacturing processes, automation, production operations, quality, statics, dynamics, strength of materials, fluid power or fluid mechanics, thermodynamics, and either electrical power or electronics, and statistics to the solution of manufacturing problems.*
- (m) *An ability to apply with an added technical depth: manufacturing processes, mechanical design, electro-mechanical devices and controls (automation), and production operations.*
- (n) *An ability to apply physics having an emphasis in applied mechanics, plus added technical topics in physics and inorganic chemistry principles related to manufacturing and mechanical systems and processes.*
- (o) *An ability to successfully complete a comprehensive design project related to mechanical or manufacturing fields.*

The following table indicates how this course contributes to the achievement of the overall programmatic educational outcomes. Entries with an “H”, “M”, and “L”, refer to high, medium, and low relevancy, respectively.

COURSE OBJECTIVE	MMET Program Educational Outcome														
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
(1) To learn and understand the principles of thermal and mechanical energy. This includes the study of energy transformations and thermodynamic relationships applied to flow and non-flow processes in power and refrigeration cycles. Equipment studied includes compressors, steam turbines, gas turbines, heat exchangers, nozzles, diffusers, pumps and piston-cylinder devices.	H	H	M	L		H				L	L	H		M	
(2) To provide the student the necessary analytical skills to solve and analyze a variety of energy related problems.	H	H	H		M	H	L				L	H		M	