MAE 521 – ADVANCED THERMODYNAMICS 1

Fall 2018, MWF 02:00 – 02:50 PM, ESB 201

Instructor: Dr. V’yacheslav (Slava) Akkerman

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Textbook: Fundamentals of Engineering Thermodynamics, 8th Edition, M.J. Moran, H.N. Shapiro, D.D. Boettner, and M.B. Bailey, John Wiley & Sons, 2014

Office Hours: 3:10 – 3:50 pm on MWF (unless cancelled!) or by appointment.

Attendance Policy: Class attendance is ultimately strongly recommended but not mandatory.

Course Grading:

Homework Assignments 20% A 90~100

1st Midterm Exam 20% B 80~89

2nd Midterm Exam 15 % C 70~80

Quiz 15 % D 60~70

Final Exam 30 % F < 60

Course Content:

1. Math/Calculus Trivia
2. Thermodynamics Concepts and Definitions
3. First Law of Thermodynamics
4. Second Law of Thermodynamics
5. Third Law of Thermodynamics
6. Available Energy Concepts, Exergy
7. Introduction to Properties of Pure Substances
8. Property Relationships – Pure Substances
9. Equations of State
10. Equilibrium
11. Introduction to Irreversible Thermodynamics
12. Thermodynamics Potentials and Relations
13. Basics of Combustion Thermodynamics
14. Thermodynamics of Internal Combustion Engines

Comments:

1. Students are responsible for lecture material, handouts and reading assignments
2. Homework is due at the beginning of the class
3. Attendance is not mandatory but students are responsible for any missed material
4. The final exam will be comprehensive

Social Justice Statement:

West Virginia University is committed to social justice. I concur with the commitment and expect to maintain a positive learning environment based upon open communication, mutual respect, and nondiscrimination. Our university does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, and color or nation origin. Any suggestion as to how to further such a positive and open environment in this class will be appreciated and given serious consideration.

If you are a person with a disability and anticipate needing any type of accommodations in order to participate in this class, please advise me and make appropriate arrangement with Disability Service (293 – 6700).

Inclusivity Statement: The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Disability Services (304-293-6700). For more information, please see <http://diversity.wvu.edu>.

Days of Special Concern: WVU recognizes the diversity of its students and the needs of those who wish to be absent from class to participate in Days of Special Concern, which are listed in the Schedule of Courses. Students should notify their instructors by the end of the second week of classes or prior to the first Day of Special Concern, whichever is earlier, regarding Day of Special Concern observances that will affect their attendance. Further, students must abide by the attendance policy of their instructors as stated on their syllabi. Faculty will make reasonable accommodation for tests or field trips that a student misses as a result of observing a Day of Special Concern.

Academic Integrity: The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see http://studentlife.wvu.edu/office\_of\_student\_conduct/student\_conduct\_code. Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me before the assignment is due to discuss the matter.

Class Cancelation: University-related closing due to environmental (weather) or other (human or health) reasons will be posted on University-related sites and media outlets. In the event that the instructor must cancel class, you will be notified by your MIX account.

**MAE POLICY OF ZERO TOLERANCE FOR ACADEMIC DISHONESTY**

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| Case | Violation | Penalty |
| **1** | Cheating on an assignment | Zero in the assignment + Letter reduction in final grade |
| **2** | Cheating on a term project | Failure in the Course + UF recommendation |
| **3** | Cheating on an exam | Failure in the Course + UF recommendation |
| **4** | Cheating on the final | Failure in the Course + UF + Suspension recommendation |
| **5** | Other (doc. alteration, tampering with records, etc.) | F, Rec: UF, Probation, Suspension, Dismissal |
| **6** | Disrespect, harassing of any kind to instructor or TA | Police report, UF, Suspension or Dismissal |
| **7** | Physical contact, or threat of any kind | Police report + Expulsion |
| FORBIDDEN: The use of smart devices (smart-phones, pads, or wearable devices) in exams or quizzes, and the use of programmable calculators as directed by instructor. | | |

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| **Month** | **Date** | **Day** | **Period** | **Week** | **Tentative Activity** | **Assignment** |
| **August** | 15 | W | 1 | 1 | Introductory lecture / Math Trivia |  |
| 16 | F | 2 | Ch. 1.1-1.4 |  |
| 20 | M | 3 | 2 | Ch. 1.5-1.9 |  |
| 22 | W | 4 | Ch. 2.1; ***Quiz #1*** |  |
| 24 | F | 5 | Ch. 2.2-2.4 |  |
| 27 | M | 6 | 3 | Ch. 2.5-2.7 |  |
| 29 | W | 7 | Review for HW #1; ***Quiz #2*** |  |
| 31 | F | 8 | Ch. 3.1, 3.2 | **HW #1 due** |
| **September** | *3* | *M* | *Labor Day; Recess* | | | |
| 5 | W | 9 | 4 | Ch. 3.3-3.5 |  |
| 7 | F | 10 | Ch. 3.6-3.8 |  |
| 10 | M | 11 | 5 | Ch. 3.9-3.11 |  |
| 12 | W | 12 | Ch. 3.12-3.15 |  |
| 14 | F | 13 | Review for HW #2; ***Quiz #3*** |  |
| 17 | M | 14 | 6 | Ch. 4.1-4.3 | **HW #2 due** |
| 19 | W | 15 | Ch. 4.4-4.7 |  |
| 21 | F | 16 | Ch. 4.8-4.10 |  |
| 24 | M | 17 | 7 | Ch. 4.11, 4.12 |  |
| 26 | W | 18 | Review for HW #3; ***Quiz #4*** |  |
| 28 | F | 19 | Ch. 5.1, 5.2 | **HW #3 due** |
| **October** | **1** | **M** | 20 | 8 | Ch. 5.3-5.5 |  |
| 3 | W | 21 | Ch. 5.6-5.8;  ***Midterm Reports Due*** |  |
| 5 | F | 22 | Ch.5.9-5.11; Review for HW #4 |  |
| 8 | M | 23 | 9 | Review for Midterm Exam #1 | **HW #4 due** |
| 10 | W | 24 | **Midterm Exam # 1** |  |
| *12* | *F* | *Fall Break; Recess* | | | |
| 15 | M | 25 | 10 | Ch. 6.1-6.3 |  |
| 17 | W | 26 | Ch. 6.4-6.8 |  |
| 19 | F | 27 | Ch 6.9-6.11; |  |
| 22 | M | 28 | 11 | Ch. 6.12, 6.13  ***Last Day to Drop*** |  |
| 24 | W | 29 | ***Quiz #5*** |  |
| 26 | F | 30 | Review for HW #5; |  |
| 29 | M | 31 | 12 | Ch. 7.1, 7.2 | **HW #5 due** |
| 31 | W | 32 | Ch. 7.3, 7.4 |  |
| **November** | 2 | F | 33 | Ch. 7.5, 7.6 |  |
| 5 | M | 34 | 13 | Ch .7.7 |  |
| 7 | W | 35 | Review for HW #6; ***Quiz #6*** |  |
| **9** | **F** | 36 | Review for Midterm Exam #2 | **HW #6 due** |
| 12 | M | 37 | 14 | **Midterm Exam # 2** |  |
| 14 | W | 38 | Ch. 8 |  |
| 16 | F | 39 | Ch. 8-9 |  |
| *19–23* | *MWF* | *Thanksgiving; Recess* | | | |
| 26 | M | 40 | 15 | Ch. 9 |  |
| 28 | W | 41 | Ch. 9-11 |  |
| 30 | F | 42 | Ch.14 |  |
| **December** | 3 | M | 43 | 16 | Review for HW #7; ***Quiz #7*** |  |
| 5 | W | 44 |  | Review for Final; ***Last day of Class*** | **HW #7 due** |
|  |  | ***Final Exam: Monday, December 10, 11 am – 1 pm, ESB 201*** | | | |