| Course Information | |
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| Course title | Thermodynamics |
| Semester | 110-1 |
| Designated for | DEPARTMENT OF MECHANICAL ENGINEERING |
| Instructor | CHEN-LI SUN |
| Curriculum Number | ME2005 |
| Curriculum Identity Number | 502 23100 |
| Class | 01 |
| Credits | 3.0 |
| Full/Half Yr. | Half |
| Required/ Elective | Required |
| Time | Tuesday 7(14:20~15:10) Thursday 3,4(10:20~12:10) |
| Remarks | Restriction: within this department (including students taking minor and dual degree program)<br>The upper limit of the number of students: 55. |
| Ceiba Web Server | http://ceiba.ntu.edu.tw/1101ME2005_01 |
| Course introduction video | |
| Table of Core Capabilities and Curriculum Planning | Table of Core Capabilities and Curriculum Planning |
| **Course Syllabus** | |
| **Please respect the intellectual property rights of others and do not copy any of the course information without permission** | |
| Course Description | This course begins with introductory level coverage of basic principles of thermodynamics. |
| Course | This course begins with introductory level coverage of basic principles of thermodynamics: conservation of mass, conservation of energy, the Second Law of thermodynamics, power cycles, |

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| Objective | refrigeration, thermodynamic relations, and gas mixtures. The applications to various areas of engineering are also discussed. |
| Course Requirement | Quiz 10%, two midterms 60% (30% each), final 30%. |
| Office Hours | 每週五 14:00~17:00 |
| References | 待補 |
| Designated reading | Yunus A. Çengel, Michael A. Boles and Mehmet Kanoğlu, 2020, Thermodynamics: An Engineering Approach, 9th ed. McGraw-Hill, New York. |
| Grading | |

| No. | Item | % | Explanations for the conditions |
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| 1. | Quiz | 10% | |
| 2. | 2 Midterms | 60% | |
| 3. | Final Exam | 30% | |

**Progress**

| Week | Date | Topic |
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| Week 1 | 9/23, 9/28 | Introduction and basic concepts: Units, system/control volumes, properties, processes and cycles, 0th Law of thermodynamics, pressure, temperature |
| Week 2 | 9/30, 10/05 | Forms of energy, general energy analysis |
| Week 3 | 10/07, 10/12 | Phases and phase-change processes of pure substances, property diagram, property tables |
| Week 4 | 10/14, 10/19 | Property diagram, property table, ideal-gas equation of state, compressibility, energy analysis of closed systems, internal energy |
| Week 5 | 10/21, 10/26 | Enthalpy, and specific heats, mass analysis of control volumes, flow work, energy analysis of steady-flow (1st Midterm on 10/26) |
| Week 6 | 10/28, 11/02 | Mass analysis of control volumes, flow work, energy analysis of steady-flow and unsteady-flow processes |
| Week 7 | 11/04, 11/09 | PMM I&II, Carnot cycle, 2nd Law of thermodynamics |
| Week 8 | 11/11, 11/16 | Entropy, isentropic processes, T ds relations |
| Week 9 | 11/18, 11/23 | Entropy change of liquids, solids, and ideal gases, reversible steady-flow work, isentropic efficiencies |
| Week 10 | 11/25, | Air-standard assumption, Otto cycle, Diesel cycle (2nd Midterm on 11/30) |

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| | 11/30 | |
| Week 11 | 12/02, 12/07 | Stirling and Ericsson cycle, Brayton cycle, ideal jet-propulsion cycle |
| Week 12 | 12/09, 12/14 | Carnot vapor cycle, Rankine Cycle |
| Week 13 | 12/16, 12/21 | Ideal reheat/regenerative Rankine cycle, cogeneration |
| Week 14 | 12/23, 12/28 | Reversed Carnot cycle, ideal vapor-compression/gas refrigeration cycle, absolute and relative humidity |
| Week 15 | 12/30, 1/04 | Gas-vapor mixtures and air-conditioning |