**Global Learning Initiatives Program Course Syllabus**

**Course Information**

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| Course Name  \*provide the **English** course name of the course. | Thermodynamics (MECH250) |
| Lecturer(s)  \*provide the lecturers’ **English** name. If there are more than one lecturer, please indicate all lecturers in the column. | Prof. Hyung Gyu Park |
| Course Description  \*briefly describe the contents covered in the courses. | This course prepares both undergraduate students majoring in Mechanical Engineering and graduate students of Non-Mechanical Engineering disciplines for fundamental knowledge of ENGINEERING THERMODYNAMICS. Today, Engineering Thermodynamics contributes to addressing the challenges of our century that include efficient use of fossil fuels, promotion of renewable energy technologies, and practice of energy-efficient transportation, buildings and industrial processes. Participating also in global climate change mitigation, air pollution and water pollution, Engineering Thermodynamics extends its applied area to nanotechnology and bioengineering. This course will provide students with the tools of Engineering Thermodynamics, as well as with background knowledge for making decisions about technology related to thermodynamics. |
| Course Objectives  \*list out knowledge or skills students should acquire upon completion of course. | Upon completion of this course, students are expected to be knowledgeable on the first and second laws of thermodynamics, thermodynamic properties of pure and mixed substances, heat-to-work energy conversion, power cycles for power plants and mobility, refrigeration cycles for buildings, thermodynamic relations, and so forth. |
| Suggested Proficiencies  (if any)  \*list preferred knowledge or skills students should have before taking the course. | General Physics |
| Reading List  (if any)  \*list out the textbooks, references, or other reading materials. | Moran’s Principles of Engineering Thermodynamics, SI Version, M. J. Moran, H. N. Shapiro, D. D. Boettner and M. B. Bailey, 9th ed. Wiley (2018) (Other editions are allowed) *OR*  Fundamentals of Engineering Thermodynamics, M. J. Moran, H. N. Shapiro, D. D. Boettner and M. B. Bailey, 9th ed. Wiley (2018) (Other editions are allowed) |
| Grading Criteria  \*how would the students be assessed during the course. | Homework: 50%  Final Examination: 50% |

**Course Schedule**

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| Class | Date (YYYY/MM/DD) | Course Topic | Lecturer |
| 1 | Week 1 | *Basic properties of Engineering Thermodynamics* | *Prof. H. G. Park* |
| 2 | Week 2 | *Work-and-Heat Equivalence, Principle of Conservation, Mechanical Energy Conversion* | *Prof. H. G. Park* |
| 3 | Week 3 | *State Principle, p-v diagram, Thermodynamic expansion work pdv, Internal Energy and Enthalpy, Thermodynamic properties and processes of an ideal gas* | *Prof. H. G. Park* |
| 4 | Week 4 | *The 1st Law of Thermodynamics* | *Prof. H. G. Park* |
| 5 | Week 5 | *Entropy and Irreversibilities, The 2nd Law of Thermodynamics of a Closed System* | *Prof. H. G. Park* |
| 6 | Week 6 | *T-s and h-s diagrams, The 2nd Law of Thermodynamics of a Control Volume* | *Prof. H. G. Park* |
| 7 | Week 7 | *Evaluation of Thermodynamic Properties of Pure Substances, Thermodynamics of Pure Substances* | *Prof. H. G. Park* |
| 8 | Week 8 | *Power Generation Concept, Basic Vapor Power Cycle* | *Prof. H. G. Park* |
| 9 | Week 9 | *Basic Gas Power Cycles* | *Prof. H. G. Park* |
| 10 | Week 10 | *Equation of States, Maxwell Relations* | *Prof. H. G. Park* |
| 11 | Week 11 | *Advanced Vapor Power Cycles* | *Prof. H. G. Park* |
| 12 | Week 12 | *Advanced Gas Turbine Cycles* | *Prof. H. G. Park* |
| 13 | Week 13 | *Ideal Gas Mixture and Psychrometric Applications* | *Prof. H. G. Park* |
| 14 | Week 14 | *Reacting Mixtures, EXPERIMENT* | *Prof. H. G. Park, T.A.* |
| 15 | Week 15 | *Chemical & Phase Equilibrium, EXPERIMENT* | *Prof. H. G. Park, T.A.* |
| 16 | Week 16 | *Final Examination* | *Prof. H. G. Park, T.A.* |