Syllabus

MEC 305: Heat and Mass Transfer

SPRING 2018

SUNY Korea

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Class Time and Location: MW: 10:30 -11:50 AM, Room: B314

Instructor: Professor Foluso Ladeinde **Office Location:** B619 (Department Office)

Preferred E-mail Address: foluso.ladeinde@stonybrook.edu

Instructor Office Hours (Tentative): TBD After Consulting with Students; Additionally, by Appointment.

Teaching Assistant (TA): Andreas Jacobs (MEC Major) jacobs.somnic@stonybrook.edu
TA Office Hours (Tentative): TBD

Textbook: Yunus Cengel and Afshin Ghajar, *Heat and Mass Transfer: Fundamentals & Applications*, 5th Ed., McGraw-Hill, 2015

Course Description:

MEC 305: Heat and Mass Transfer
The fundamental laws of momentum, heat and mass transfer, and the corresponding transport coefficients. Principles of steady-state and transient heat conduction in solids are investigated. Laminar and turbulent boundary layer flows are treated, as well as thermal radiation, and radiation heat transfer between surfaces. Applications to heat transfer equipment are covered throughout the course.

3 credits

Prerequisites: MEC 301 and 364; MEC 102 or ESG 111 or ESE 124 or CSE 114 or CSE 130 or BME 120

Contribution of course to meeting the Professional Component (CTPC): __% Engineering Science, Laboratory Experience __%, Mathematics __%, Basic Science ___%, General Education ___%, Design Experience __%

Homework: Homework to be assigned either weekly or biweekly.
Assignments will be due by the end of class a week after they are assigned, unless otherwise stated. Late homework will receive half credit until the solutions are posted and will not be accepted after that.

Exams: Two midterms (dates TBD)

One final exam. (Date will follow SUNY Korea regular final exam schedule.)
No makeup exams, unless arranged prior to the exam.

Course Outline:

1. Basic Concepts of Thermodynamics and Heat Transfer
2. Heat Conduction
   - Heat Conduction Equation
   - Steady Heat Conduction
   - Transient Heat Conduction
3. Convection
   - Fundamentals of Convection
   - Forced Convection
   - Natural Convection
4. Radiation Heat Transfer

Course Learning Objectives:

1. Demonstrate the ability to identify the three modes of heat transfer: conduction, convection, and radiation, and solve simple multi-mode heat transfer problem.
2. Demonstrate the ability to formulate and solve the differential equation of heat conduction in various coordinates systems with proper thermal boundary conditions.
3. Demonstrate the ability to develop thermal resistance networks for practical heat conduction problems.
4. Demonstrate the ability to solve transient lumped-parameter heat conduction problems.
5. Demonstrate the ability to analyze convective heat transfer in boundary layer and internal pipe flows based on Newton's law of cooling.
6. Demonstrate the ability to analyze radiative heat transfer between nonblack surfaces.

Grading Scheme (Subject to Minor Adjustments):

Midterm I: 20%, Midterm II: 20%, Final: 40%, Homework: 15%, Attendance: 5% (0% for 3 or More Absences)

Location of Blackboard: http://blackboard.stonybrook.edu

Important Notice: I will not tolerate a student infringing on another's opportunity to learn in the classroom. Thus, there will be no talking during class and you cannot use laptop computers or cell phones. These are sources of visual and and/or aural distraction. Please turn your cell phones off before class.

Americans with Disabilities Act

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services at the academic office. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information visit the Academic Office at SUNY Korea.

Statement on Academic Dishonesty

Academic dishonesty is an extremely serious offense and will not be tolerated in any form. Academic dishonesty in general is the presentation of intellectual work that is not originally yours. Examples include, *but are not limited to*, copying or plagiarizing class assignments including homework, reports, designs, and other submitted materials; copying or otherwise communicating answers on exams with other students; bringing unapproved aids, either in physical (written) or electronic form to an exam; obtaining copies of an exam prior to its administration, etc. Academic dishonesty violates both the ethical and moral standards of the Engineering profession and all infractions related to academic dishonesty will be prosecuted to the fullest via the CEAS CASA committee. For you, the honest student, academic dishonesty results in lower class curves, hence a depression in your GPA and class standing, while cheapening the degree you earn.

Allowed Calculators

Following the Mechanical Engineering Department's mandatory calculator policy, **only** the following calculators will be allowed to be used on the midterm and final exams. There will be no exceptions. This list of calculators is identical to that allowed for the *National Council for Examiners for Engineering and Surveying* (NCEES) Fundamentals of Engineering (FE) exam that many of you will take in your senior year, as well as the Professional Engineering (PE) exam that you may take several years from now. The sooner you become comfortable on one of these calculators, the better. If you have any questions on this policy please feel free to contact me. The NCEES policy on calculators can be found here: http://www.ncees.org/exams/calculators/ .

Casio:	All **fx-115** models. Any Casio calculator must contain **fx-115** in its model name.
Hewlett Packard:	The **HP 33s** and **HP 35s** models, but no others.
Texas Instruments:	All **TI-30X** and **TI-36X** models. Any Texas Instruments calculator must contain either **TI-30X** or **TI-36X** in its model name