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**Description:** Intermediate study of heat transfer, transport coefficients, steady-state conduction, transient conduction, forced and natural convection, and thermal radiation.

**Textbook:** Fakheri A. *Intermediate Heat Transfer,* CRC Press Taylor & Francis Group, 2014

**Grading:** homework sets 250

special project 50

midterm exam 100

final exam 100

**Total 500**

Students are required to adhere to the Institute Attendance Policy (<http://www.catalog.gatech.edu/rules/4/>)

Adherence to the Academic Honor Code (<http://www.policylibrary.gatech.edu/student-affairs/academic-honor-code#Article_II:_Academic_Honor_Code>) is mandatory

Information about disability services offered to students needing them is available at the Office of Disability Statement (<https://disabilityservices.gatech.edu/content/supporting-students-disabilities>)

**Examinations:** Notes are not be allowed during theexaminations unless otherwise specified. You may use your book during the exam for equations and properties along with a calculator. Make-up examinations will only be given in extreme situations (*e.g.,* serious illness with a note from a physician).

**Project:** An individual project will be assigned in the middle of the semester, which will require defining a heat and mass transfer problem within your research field. Individual meetings will be held to discuss the project. The findings will be disseminated in a project report and presentation.

**Homework:** Five homework sets will be assigned. No credit will be given for late homework. The homework sets will be posted on T-square. Homework is and must be a primarily individual efforts. Many of the homework sets will require knowledge of a computer software package (*e.g.,* MatLAB). Engineering Equation Solver (EES) should not be used to complete assignments.

**Course Information and Grades:** Course information and grades will be available on T-square.

(over)

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| --- | --- | --- | --- |
| 1 | 1 | Aug 17 | Conservation of energy, conduction, convection, and radiation (1) |
|  | 2 | 19 | - |
| 2 | 3 | 24 | Fins: Quasi-1-D heat transfer (3.1-3.4) |
|  | 4 | 26 | Fins: Variable area analytical and numerical solutions (3.5-3.7) |
| 3 | 5 | 31 | Multidim Conduction: Steady 2-D analytical solutions (4.1-4.2) |
|  | 6 | 2 | Multidimensional Conduction: Numerical solutions (4.4) |
| 4 | - | 7 | **Official School Holiday (Labor Day)** |
|  | 7 | 9 | Transient conduction: Lumped capacitance (5.1 – 5.2) |
| 5 | 8 | 14 | Transient conduction: Multidimensional solutions (5.3 – 5.4) |
|  | 9 | 16 | Transient conduction: Numerical solutions (5.5) |
| 6 | 10 | 21 | Convection: Conservation equations (6.1 – 6.2) |
|  | 11 | 23 | Convection: Streamlines and stream functions (6.3 – 6.5) |
| 7 | 12 | 28 | Convection: Nondimensionalization (6.6-6.7) |
|  | 13 | 30 | **Midterm Exam** |
| 8 | 14 | Oct 5 | External flow: Boundary layer flow over flat plate (7.1 – 7.2) |
|  | 15 | 7 | External flow: Boundary layer in curvilinear coordinates (7.3-7.4) |
| 9 | - | 12 | **Fall Recess (Oct. 10-13)** |
|  | 16 | 14 | External flow: Nonsimilar boundary flow (7.5–7.6) |
| 10 | 17 | 19 | Internal flow: Introduction and Couette flow (8.1-8.2) |
|  | 18 | 21 | Internal flow: Mean temperature analysis/Nusselt numbers (8.3) |
| 11 | 19 | 26 | Internal flow: Laminar developed(ing) flow (8.4-8.5) |
|  | 20 | 28 | Radiation heat transfer: Definitions and blackbody (12.1 – 12.2) |
| 12 | 21 | Nov 2 | Radiation heat transfer: Properties and non-ideal surfaces (12.3) |
|  | 22 | 4 | Radiation heat transfer: Exchange between surfaces (12.4) |
| 13 | 23 | 9 | Participating Medium: Equation of transfer (13.1 – 13.2) |
|  | 24 | 11 | - |
| 14 | 25 | 16 | Project Work Days |
|  | 26 | 18 |  |
| 15 | 27 | 23 | Participating Medium: Mixed-mode heat transfer (13.4) |
|  | - | 25 | **No Class** |
|  |  |  | **Thanksgiving Break (Nov. 26-27)** |
| 16 | 29 | 30 | Project Presentations |
|  | 30 | Dec 2 | - |
| Dec. 9 from 2:50 – 5:40 pm **Final Exam** | | | |