Course Outline and Instructor Information
—for MECG 7160: Convective Heat Transfer

1. Term and Section
   Term: Winter term (January–April, 2009)
   Section: A01
   CRN: 25232

2. Instructor Information
   Instructor: Dr. Bing-Chen Wang
   Office: E1-406
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   Tel: (204) 474-9305
   Fax: (204) 275-7507

3. Office Hour
   MWF afternoon: 1:00–2:00PM.
   In order to receive individual guidance, a student is encouraged to visit the instructor in his office to discuss the subjects of study on a regular base.

4. Objective
   The objective of this course is to provide a solid grounding in the classical and modern theories of convective heat and fluid flows, centered on the analytical and numerical solutions of the Navier-Stokes and thermal energy equations. The emphasis is on both the laminar and turbulent boundary-layer heat and fluid flows. It is expected that the students are challenged in terms of their understanding of the physical mechanisms, their related mathematical skills, and most importantly, their passion for studying thermal-fluid science and engineering.

5. Evaluation Method
   The performance of a student will be evaluated based on their assignments, a research report and presentation, and mid-term and final examinations. Specifically, the mark distribution follows:
   Assignments: 15%
   Research report & Presentation: 15%
   Mid-term exam: 30%
   Final exam: 40%

6. Class Discussion
   In order to help the student to build a deeper insight into the physical problem and also to create a dynamic teaching–learning environment, some carefully-designed questions to the students will be included in the class. Students are encouraged to participate in class discussions by volunteering answers, even though their answers may be incorrect sometimes.

7. Assignments, and Research Report and Presentation
   The course will involve perhaps 6 assignments, and 1 research report and associated presentation.
The purpose of the assignments is not to obtain the answer but “practise” a solution methodology and theory. Assignments to solutions should be both complete and concise; where applicable, a word-processed mini-report format should be used.

At the beginning of the term, each student is required to consult his/her program advisor to propose a small research project that is relevant to both his/her thesis research program and the subjects of convective heat transfer. By the end of the term, each student is required to submit a research report and give an oral presentation. The research report should exhibit a sound professional writing style (matching, e.g. a journal standard), and the length should not exceed 15 letter-size pages (font 11, single space, with 1 inch margin on four sides). Each presentation should include approximately 15–20 slides and last no more than 15 minutes (including 3 minutes for questions and answers). The questions raised from the audience need to be addressed concisely and precisely.

8. Policy on Late Submission of Assignments and Research Report
A deduction of 10% of the mark per day will be applied.

9. Academic Integrity and Respectful Teaching–Learning Environment
Academic integrity and a respectful teaching–learning environment will be maintained in this class following the general policy stated in the University Graduate Calendar.

10. Reference Books
It is strongly recommended that a student has a convenient access to the following textbook:

Other frequently used reference books include:

11. How to Succeed in this Course
• Attend all lectures and tutorials;
• Take lecture notes;
• Participate in class discussions;
• Bring the textbook to the class;
• Keep up to date with the course material: after each lecture;
• Review and expend the lecture notes;
• Read the related material from the textbook and reference books;
• Solve the assigned problems and submit the assignments on time;
• Consult the instructor regarding difficulties in understanding the course material and procedure;
• Work carefully and diligently on the assigned research project;
• Show professionalism when presenting the research report;
• Be self-motivated and be passionate about the thermal-fluid science and engineering.
12. Course Coverage Outline

[1] Introduction;
[5] Laminar Internal Flow: Momentum Transfer;
[10] Fundamentals of Large-Eddy Simulation (LES);