Course Outline

Advanced Fluid Mechanics
ENGG*6020

Winter, 2001

Instructor: D. Joy

This course is targeted at graduate students for which knowledge in the basics of fluid mechanics beyond the normal undergraduate level is required or would be beneficial to their graduate research programs. In general, the objective is to provide the students with the basic physical characteristics of momentum transfer and its application to fluid flow processes. In addition, time is spent on contemporary research and research methods in the area of fluid mechanics.

Topics


2. Turbulence and turbulence modelling: mixing length, algebraic, two equation and turbulent shear modelling, concepts of scales and turbulence energy, experimental observations.

3. Analysis of simple turbulent flows. Reynolds stresses.

4. Boundary layer flows: wall boundary layers, jets and wakes.

5. Potential flow: stream function, complex potential, conformal mapping.


7. Special topics of interest to students registered for the course: e.g. mixing theories, sediment transport, flow through porous media, numerical modelling, etc.

Course Format

3 hours of lecture/week
Method of Evaluation

Through the course of the semester a series of assignments (4 or 5) are to be completed by each student. In addition, each student will complete a project (literature review of a topic of interest, computational exercise, experiment, etc.) with a written submission of approximately 20 pages in length. The projects will be presented at the end of the semester in a seminar given by each student of 30 minutes in length. Topics of these projects are the student's choice although the instructor will make available a list of suggested topics if required.

Distribution of Marks

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<tbody>
<tr>
<td>Assignments</td>
<td>60%</td>
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<tr>
<td>Project &amp; Seminar</td>
<td>40%</td>
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Text

No single text is required beyond the text used in the undergraduate course. Reference texts and materials beyond this will be discussed during the course of the lectures with essential material either given out as copies in class or put on reserve in the library.