Course content for MT3220/4220, Dynamics of Real Fluids

Prerequisites:
MT2220

Aims:
This course aims to give an overview of how the theory of ideal fluids met in MT2220 can be extended to a more realistic model. It will show how the equations can be solved in simple cases and how other methods such as conservation laws and dimensional analysis can be used in more complicated cases.

Learning outcomes:
On completion of the course the student should be able to:
- demonstrate an understanding of the essential features of compressible flow, sound waves and shock waves;
- tackle a variety of problems involving surface waves on a liquid;
- solve simple problems in viscous flows;
- apply appropriately and with confidence basic vector analysis techniques and the additional general mathematical techniques introduced in this course.

Course content:
Viscous fluids: Discussion of the effects of viscosity by means of a stress tensor leading to the extra terms that need to be included in the equation of motion. Problems for which exact solutions can be found. The Reynolds number as a measure of the importance of viscosity.