

Mass, Heat and Momentum Transport

Department of Chemical Engineering, School of Chemical Engineering

College of Engineering and Physical Sciences

Details

Code 17125

Level of study Second Year

Credit value 20

Semester 1 and 2

Other pre-requisites Lectures, Tutorial classes, Laboratories

Module description

Part A of this module (in Semester 1) covers the critical theoretical material for mass and heat transfer. It extends the introductory material taught in Fluid Flow, Thermodynamics and Heat Transfer A & B. This includes general energy balance for conduction and common simplification for symmetrical 2-D and 1D problems. Lumped capacitance method is discussed also discussed as well as heat transfer from extended surfaces. Engineering processes such as membrane separations and adsorption are described.

Part B of this module (in Semester 2) covers the critical theoretical material for momentum transport and addresses viscous and turbulent flows between solid boundaries. The principle of similitude is applied to the design and analysis of pumped flow systems and cost optimisation is applied to the design of pipelines. Engineering applications such as complex pipe networks and combined pipe-pump systems are analysed. The heat transfer material covered in part A is further extended to cover internal/external convection and radiation. Computer based methods of solution of heat and mass transfer problems are introduced and applied to some process examples.

Teaching and learning methods

04 21831 Fluid Flow, Thermodynamics and Heat Transfer

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