Module code	SM-4316			
Module Title	Fluids and Waves			
Degree/Diploma	Bachelor of Science (Mathematics)			
Type of Module	Major Option			
Modular Credits	4	**Total student Workload**	10	hours/week
		Contact hours	4	hours/week
Prerequisite	SM-4311 Applied Mathematical Method I			
Anti-requisite	None			

Aims

The module is designed for students to develop a mathematical understanding of fluid mechanics and wave propagation, especially in fluids.

Learning Outcomes

On successful completion of this module, a student will be expected to be able to:

Lower order :	40%	- understand the basic principles of fluid mechanics and wave propagation - Understand how to apply these principles in scientific problems.
Middle order :	40%	- analyse the various equations and how to use them in solving real scientific problems.
Higher order:	20%	- interpret the results of analyses, and make an appropriate report for an effective communication - work independently and play effectively in collaboratively in a team, especially in tutorial class.

Module Contents

- Fluid Mechanics. Conservation equations, pressure tensor, gravity, Eulerian and Lagrangian descriptions, rates of change of material integrals, fundamental fluid model, ideal fluid motion, vorticity and irrotational flow, subsonic flow and the incompressible approximation, potential flow, pressure variation in ideal subsonic flow, boundary layers, vortices, Stokes flow past a sphere, exact viscous flow solutions, singular perturbation theory.
- Wave propagation. One-dimensional wave equations (first and second order), review of the vibrating string, vibrating membrane, d'Alembert solution, Traffic flow problem (characteristics and shock waves), water waves, sound waves.

Assessment	Formative assessment	Tutorial and feedback.
	Summative assessment	Examination: 60%
		Coursework: 40% - 3 class tests (40%)