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Office Hour Friday 10.30 to 11.30 •  
<https://zoom.us/j/4730677767>

Wednesday 9–10 Weekly review class (Nancy Rothwell Building Theatre A)  
Thursday 3–4 or 4–5 Tutorial class (different locations)

### Assessment

Test in week 9 20%  
Final Exam 80%

### Useful resource

- ★ Helping Engineers Learn Mathematics (HELM)  
<https://www.mub.eps.manchester.ac.uk/helm/>

### Outline syllabus

- *Integrals over shapes.* Concepts of volume, mass, force, weight, moment of inertia. Double and triple integrals in different coordinate systems.
- *Vector calculus.* Gradient, divergence and curl operators. Curves in three dimensions. Conservative vector fields. Vector integral theorems.
- *Laplace transforms.* Partial fractions. Shift theorems. The study of mechanical vibrations. Causal functions.
- *Numerical methods.* Interpolation. Least squares approximation. Quadrature.
- *Probability and statistics.* Random variables. Discrete and continuous probability distributions. Central limit theorem. Estimation and confidence intervals. Hypothesis testing.