**School of Mathematics**

**Course 2E2 — Engineering Mathematics IV**                           2005–06
(SF Engineering )

**Lecturer:** Dr Conor Houghton

**Requirements/prerequisites:** 1E1, 1E2

**Duration:** 24 weeks.

**Number of lectures per week:** 2 + tutorial

**Assessment:** Assignments counting 10%

**End-of-year Examination:** One 3 hour examination.

**Description:** More detailed information, problems sheets and problem sheet solutions can be found at `http://www.maths.tcd.ie/~houghton/2E2.html`. The course outline is

- Laplace transforms (Kreyszig Chapter 5, or James Chapter 2, or Kaplan Chapter 4) and Z-transform (James Chapter 5). This continues the work on linear constant coefficient differential and difference equations begun in 1E2. It allows a more diverse variety of input functions.

- Systems of Differential Equations. Phase space diagrams. (Kreyszig Chapter 3)

- Series Solutions of Differential Equations and an Itroduction to Special Functions. (Kreyszig Chapter 4)

- Vector Calculus, Differential Operators and the Integral Theorems (Kreyszig Chapters 8 & 9).

- Optimisation (Kreyszig Chapter 20)

- Introduction to Partial Differential Equations (Kreyszig Chapter 11).

**Objectives**
To give the participants an understanding of how to solve the differential equations that arise in engineering, and to promote an ability among the participants to apply this knowledge in new situations.
**Books**
**Main book**
Erwin Kreyszig, Advanced Engineering Mathematics, (8th edition) Wiley, 1999.
**Additional references**
Glyn James, Advanced modern engineering mathematics, Addison-Wesley, 1999.
Wilfred Kaplan, Advanced mathematics for engineers, Addison-Wesley, 1981.

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