MTH5105 Differential and Integral Analysis 2009-2010

Level 5: Semester 4

Lecturer: Dr T. Prellberg (Mathematics)

Lecture times: Monday 11-12 (CMLT), Thursday 9-10 (PP2) and Friday 12-1 (CMLT)

Exercise class: (starting Friday, January 22):
Friday 10-11 (PLG1): Surnames A-K
Friday 3-4 (CMLT): Surnames L-Z

Office hours: Monday 1:30-2:30, Wednesday 1:30-2:30, Thursday 10:30-11:30, Friday 1:30-2:30 (MAS B51)

Weekly exercise routine: Exercise sheet available on Monday from the web page
http://www.maths.qmul.ac.uk/∼tp/MTH5105/
Please hand in work to the Differential and Integral Analysis box (red box, on the ground floor) by 5pm on Monday. Include your **name** and **student number** on each sheet handed in. Cwk/test marks will be posted weekly on Saturdays to your college email address, the first posting will be at the end of week 4.

Random attendance registers: Attendance will be checked during exercise classes. We will terminate college registration of students who fail to submit coursework and do not attend exercise classes.

Test/revision week: There will be a midterm test in week 7.

Calculators: Calculators may NOT be used in the final examination or in the midterm test.

Assessment: 80% final examination + 10% mid-term test + 10% coursework

Syllabus

1. Differentiable functions: Definition of differentiability. Algebra of derivatives, chain rule. Derivative of inverse function. Rolle's Theorem, Mean Value Theorem and applications. Taylor's Theorem.
2. Integration: Darboux definition of Riemann integral, simple properties. Continuous functions are integrable (via uniform continuity). Fundamental Theorem of the calculus, integral form of the Mean Value Theorem and of the remainder in Taylor's Theorem; applications to some well known series (log, arctan, binomial). Improper integrals.
3. Sequences of functions: pointwise and uniform convergence. Weierstraß M-test. Term-by-term integration of power series.

Books

Main text:

- R Haggerty, Fundamentals of Mathematical Analysis (Addison-Wesley)

Other texts:

- J Stewart, Single Variable Calculus, (Brooks/Cole Publishing Company, 4th edition, 1999)
- C Clark, Elementary Mathematical Analysis (Wadsworth, 1982)
- M D Hatton, Mathematical Analysis (Hodder and Stroughton, 1977)
- B M Mitchell, Calculus (without analytic geometry) (Heath, 1969)

Thomas Prellberg, January 2010