ICE-EM Access Grid Room Project

Subject Information Form

Administration

1. Department and institution

   School of Mathematical and Geospatial Sciences

   RMIT University

2. Subject name and code

   Nonsmooth Optimization
   (Component of MATH2181, MATH2180, MATH2182, MATH2208 or MATH2207)

3. Handbook entry URL, subject homepage URL, host honours student hand-out URL

   - Handbook entry URL
     http://www.rmit.edu.au/browse;ID=BH010
   - Subject homepage URL
     http://www.rmit.edu.au/browse;ID=BH010
   - Host Honours student hand-out URL
     http://www.rmit.edu.au/browse;ID=BH010

4. **Lecturer** name and contact details

Name:	Prof. Andrew Eberhard
Phone:	03 9925 2616
Email:	andy.eberhard@rmit.edu.au
Homepage:	http://www.rmit.edu.au/staff/andrew-eberhard

5. **Honours coordinator** name and contact details

Name:	Dr Stephen Davis
Phone:	03 9925 2278
Email:	stephen.davis@rmit.edu.au

6. Start date, end date, number of teaching weeks

Start date:	29^{th} July
End date:	18^{th} October
Number of teaching weeks:	11

7. Contact hours per week

   2 hours

8. Description of electronic access arrangements for students (for example, WebCT)

   NA

Academic

1. Overview of subject content

   This course will develop nonsmooth analysis primarily from a variational analysis view point. Thus the primary mathematical tools used will be set valued mapping (and their calculus), smoothing and approximation methods and some associated tools from convex analysis. This approach is particularly well suited to analysis of nonsmooth functions in finite dimensions and hence the study of associated numerical algorithms.

   No prior requisites in these areas are assumed and this course is intended to be a first exposure to such tools. As a consequence we will not be aiming at the most general form of such a theory.

   Topic covered will include: Set values mappings, their variational properties, convex functions, their duality and their variational behaviour, metric regularity, smoothings via regularizations, subdifferentials and their calculus. We will touch on some second order theory. Numerical work will include trust regions methods, derivative free approaches and if time permits some stochastic approaches.

2. Detailed syllabus, preferably week by week

   TBA

3. Detailed breakdown of assumed prerequisite knowledge, including host prerequisite subject URLs

   Pre-requisites are undergraduate courses in real analysis, calculus of several variables, linear algebra and some prior exposure to programming (we will use Matlab as a user friendly environment for prototyping algorithms). Students will need access to Matlab.

4. Assessment

   (i) Exam/assignment/class work breakdown

Exam	50 %
Assignment	25 %
Lab work	25 %

   (ii) Assignment due dates

   TBA

(iii) Approximate exam date

TBA

5. Required student resources

- Text/printed notes

  These will be developed week by week and distributed via Blackboard.

- Software (local access)

  Matlab (preferably release >= 2011)

Institutional Honours Details

1. Weight of subject in total honours assessment at host department

   12.5%

2. Thesis/subject split at host department

   25% thesis
   75% course work (6 courses)

3. Honours grade demarcators at host department

   - H1 = 80-100 %
   - H2a = 75-79 %
   - H2b = 70-74 %
   - H3 = 65-69 %