<u>Subject Information Guide</u>

Differential Geometry

Semester 2, 2017

Administration and contact details

Host Department	School of Computer Science, Engineering and Mathematics – Discipline of Mathematics and Statistics
Host Institution	Flinders University (delivered from RMIT University)
Name of lecturer	Simon Williams
Phone number	TBC
Email Address	S.Williams@flinders.edu.au
Homepage	TBC
Name of Honours coordinator	Murk Bottema
Phone number	8 82013652
Email Address	Murk.bottema@flinders.edu.au

Subject details

Handbook entry URL	TBC
Subject homepage URL	TBC
Honours student hand-out URL	TBC
Start date:	28/7/2017
End date:	3/11/2017
Contact hours per week:	4 Hours
Lecture day and time:	Tuesday 12.00-2.00pm AEST/11.30am-1.30pm ACST, Friday 12.00-2.00pm AEST/11.30am-1.30pm ACST
Description of electronic access arrangements for students (for example, WebCT)	TBC

Subject content

1. **Subject content description**

   Differential geometry comes in many flavours. This course attempts to link the classical differential geometry of surfaces embedded in 3 dimensional space with the more modern style. We shall cover:

   a. smooth surfaces, first quadratic form of a surface, isometric surfaces, principal curvatures, Gauss and mean curvatures, second quadratic form, Gauss Theorem Egregium, tangent plane, smooth functions on surfaces and their differentials, diffeomorphism, geodesic curves;
   b. differentiable manifolds, charts, atlases, tangent vectors, tangent space;
   c. Riemannian manifolds, length of a curve on a Riemannian manifold, volume of a Riemannian manifold;
   d. vector and convector fields, connections, the Levi-Civita connection, Riemann curvature tensor, Ricci tensor, scalar curvature;
   e. Einstein equations for a gravitational field.

2. **Week-by-week topic overview**

   TBC

3. **Assumed prerequisite knowledge and capabilities**

   TBC

4. **Learning outcomes and objectives**

   TBC

AQF specific Program Learning Outcomes and Learning Outcome Descriptors (if available):

AQF Program Learning Outcomes addressed in this subject	Associated AQF Learning Outcome Descriptors for this subject
Insert Program Learning Outcome here	Choose from list below

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Learning Outcome Descriptors at AQF Level 8

Knowledge

K1: coherent and advanced knowledge of the underlying principles and concepts in one or more disciplines

K2: knowledge of research principles and methods

Skills

S1: cognitive skills to review, analyse, consolidate and synthesise knowledge to identify and provide solutions to complex problem with intellectual independence

S2: cognitive and technical skills to demonstrate a broad understanding of a body of knowledge and theoretical concepts with advanced understanding in some areas

S3: cognitive skills to exercise critical thinking and judgement in developing new understanding

S4: technical skills to design and use in a research project

S5: communication skills to present clear and coherent exposition of knowledge and ideas to a variety of audiences

Application of Knowledge and Skills

A1: with initiative and judgement in professional practice and/or scholarship

A2: to adapt knowledge and skills in diverse contexts

A3: with responsibility and accountability for own learning and practice and in collaboration with others within broad parameters

A4: to plan and execute project work and/or a piece of research and scholarship with some independence

5. Learning resources

TBC

6. Assessment

Exam/assignment/classwork breakdown				
Exam	70 %	Assignment	10 % each (3 assignments)	**Class work**
Assignment due dates	TBC	TBC	TBC	
Approximate exam date			TBC	

Institution Honours program details

Weight of subject in total honours assessment at host department	
Thesis/subject split at host department	
Honours grade ranges at host department:	
H1	85+
H2a	75-84
H2b	65-74
H3	50-64