DALHOUSIE UNIVERSITY

Faculty of Science Course Syllabus (revised June 2018)

Department of *Mathematics and Statistics*

MATH3045

Curves and Surfaces

Fall 2018

Instructor(s): *Roman Smirnov* *Roman.Smirnov@dal.ca* *Chase324*

Lectures: *MWF 1:05-2:25pm* *LSC 206*

Laboratories: *N/A*

Tutorials: *N/A*

Submit course syllabus to your Department office for posting on the Dept website prior to the start of term
Submit requests for final exam exemptions (1000, 2000 and 3000 level courses only) to the Dean's office at least 2 weeks prior to the start of term

Course Description

The course is designed as an introduction to differential geometry, the study of geometric objects by means of analysis. It presents a comprehensive study of curves and surfaces in Euclidean space. Topics include: Frenet frame and equations, curvature, torsion, first and second fundamental forms, shape operator, Gauss-Weingarten equations.

Course Prerequisites

MATH 2002.03 and (MATH 2040.03 or MATH 2135.03) or consent of instructor

Course Objectives/Learning Outcomes

Being able to use the fundamental ideas of differential geometry to classify curves and surfaces defined in Euclidean space.

Course Materials

Recommended Text:

Andrew Pressley, Elementary Differential Geometry 2nd Edition.

One copy of the textbook is put on reserves at the Killam Library

Course Assessment

Component	Weight (% of final grade)	Date
Tests/quizzes	*Midterm 20%*	*October 31 (in class)*
Final exam	*50%*	*(Scheduled by Registrar)*
Assignments *(list)*	*5 bi-weekly assignments 30%*	

Other course requirements

Attendance of the lectures

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Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (<50)
A- (80-84)	B- (70-72)	C- (55-59)	

Course Policies

Late homework will not be accepted except with the instructor's prior permission.

A missed midterm cannot be written at another time. If you miss the midterm without prior permission, then it will count as a 0. Exceptions are made in two cases: (1) if you obtain the instructor's prior permission to miss a midterm, or (2) if you have an officially valid excuse such as a medical doctor's note. In these cases, the weight of the missed midterm will be shifted to the final exam (e.g., the final exam will then count 70% instead of 50%). There is no make-up option for the final exam except in cases of an officially valid excuse such as a medical doctor's note.

The students are expected to work on the assignments individually.

Course Content

Curves in the plane and in space
How much does a curve curves
Surfaces in three dimension
The first fundamental form
Curvature of surfaces
Gaussian, mean and principal curvatures
Geodesics
Gauss' Theorema Egregium