MATH2242/MATH6242 Introduction to Geometry: Curves and Surfaces

Course Title: Introduction to Geometry: Curves and Surfaces

Instructor: Po Lam Yung

Time and venue: Mondays 10am-noon (Lectures), Tuesdays noon-1:30pm (Workshops) in the following ZOOM meeting room: Meeting ID: 719 601 937, Password: 721831

Content: This course introduces students to basic concepts in differential geometry and topology. While we focus on curves and surfaces in the three dimensional Euclidean space, part of the goal is to gently introduce some more modern perspectives, coming from Riemannian geometry.

Reference: Manfredo P. Do Carmo's *Differential Geometry of Curves and Surfaces*

Format: Some videos will be pre-recorded and students are expected to watch them *before* the class meets. Class meetings will be forums where students discuss the course material with the instructor. Some further examples will also be given then.

Assessment: Homework assignments will be handed out every other week. Written solutions to the assignment questions should be uploaded to Wattle as one single pdf file by the due date. Subsequently, students will present their solutions to assignment questions (or small variants thereof) during the workshops – please sign up at the Wattle forum after each assignment is posted. There will be 5 quizzes throughout the semester, on weeks 4, 6, 8, 10 and 12 respectively, to be held on Wattle at the beginning of the workshops on those weeks (there will be a mock quiz at the beginning of the workshop on week 3, just to make sure everything works – please attend with the necessary equipment). Only 4 of the 5 quizzes count towards the final grade – your lowest quiz score will be dropped. A final exam will be given during the exam period. Your overall score will be

20% Assignments and Workshop presentations + 40% Quizzes + 40% Final Exam.

Prerequisite: CD in MATH1116 or HD in MATH2305. Throughout the course, we will need to use multivariable calculus (particularly, differentiability in higher dimensions, the inverse and implicit function theorems, path and surface integrals via parametrizations, and Stokes theorem), linear algebra (particularly, dot and cross products in Euclidean spaces, and diagonalizability of real symmetric matrices) and results about solvability of systems of ordinary differential equations.

You are not able to enrol in this course if you have previously completed MATH2242, MATH3342 or MATH6242.

Academic honesty: Please become familiar with the information regarding academic honesty and plagiarism at http://www.anu.edu.au/students/program-administration/assessments-exams/academichonesty-plagiarism. In particular, it is not acceptable to ask someone else, with or without pay, to assist you with any items of assessment in this course, nor is it acceptable to copy from someone else's work.

Homework Policy: Students are welcome to discuss homework problems with your classmates. However, when writing up solutions, they must do so on their own. Where an assignment is submitted after the due date, students are penalised by 5% of the possible marks available for the assessment task per working day or part thereof. No extension for homework will be granted, unless it is an exceptional situation beyond a student's control. In that case, an application for an extension of the due date for an assessment task should be submitted on or before the assessment due date. The only exception is where the student could not reasonably be expected

to have applied by the appropriate date due to illness or other medical conditions. Appropriate documentation should be provided with the request for an extension to allow the claims to be verified. For more details, see https://policies.anu.edu.au/ppl/document/ANUP_004604.

Final Remarks: The prerecorded videos will provide a highlight to the most important concepts in this course. They will be briefer than a normal classroom treatment. This is intentional, because if you read a book / lecture notes, you can easily skim over it and fast forward to the places where you want to spend time on – this is not as easy with videos. Hence to maximize your efficiency in watching the videos, the treatment in the videos will tend to be concise. Some of the details are best discussed in person anyway, which is what we will do during the class meetings.

Also, there will be numerous questions / exercises throughout the videos. Please do spend time to pause whenever you see one of these, and try working out the questions / exercises *before* moving on – this will make sure you understand one concept well before you tackle another. As a result, you may need 30 – 40 minutes to watch a video that is only 20 minutes long.

Finally, if you have any questions about the material presented in the videos (no matter how simple they might seem), I will be very happy to discuss with you during the class meetings. So please do watch the videos and think about them before we meet – in other words, this class is going to be run like one of those flipped classrooms. By having thought about the material before we meet, we will again maximize the usefulness of our meetings.