LTCC Proposed Course

- Title: Constant mean curvature surfaces in $\mathbb{R}^3$

- Basic Details:
  - Core Audience: 3rd year or graduate students in pure mathematics
  - Course Format: 10 hours at 2 hours per week

- Course Description:
  - Keywords:
  - Syllabus: The theory of constant mean curvature surfaces is a very classical one, overlapping with many different classical fields of mathematics such as the Calculus of Variations and Partial Differential Equation. In this class, we will begin by reviewing the basic theory of surfaces in $\mathbb{R}^3$ with emphasis on constant mean curvature surfaces. Then we will discuss some famous characterizations of the round sphere such as the Hopf Theorem, the only closed surface in $\mathbb{R}^3$ with constant mean curvature which is topologically a sphere is the round sphere, the Alexandrov Theorem, the only closed surface embedded in $\mathbb{R}^3$ with constant mean curvature is the round sphere, and the Barbosa-Do Carmo Theorem, the only closed stable surface in $\mathbb{R}^3$ with constant mean curvature is the round sphere
  - Recommended reading: Kenmotsu, Surfaces with constant mean curvature.
  - Prerequisites: Calculus, Geometry of Surfaces

- Format:
  - No of discussion/problem sheets (typically 4 for extended courses, and 1 for intensive courses, with solutions): 4
  - Electronic lecture notes (these are strongly encouraged, as they will form the core of the individual study of the students): Yes
  - Necessary support facilities: Standard classroom
  - Necessary software requirements for computing facilities: None.
  - Proposed timing: early autumn.
  - Lecture/computer session/tutorial/discussion split (hours of each): 8/0/0/2/

- Lecturer Details:
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