

Course Outline

Topics in Applied Mathematics I (Math3320)

2019/2020, First Term: 2 September 2019 (Mon) 30 November 2019 (Sat)

No Teaching Days:

Oct. 1 (Tue, National Day), Oct. 7 (Mon, Chung Yeung Festival).

Course Homepage:

<http://www.math.cuhk.edu.hk/course/1920/math6211>

Lectures:

Mo 14:30AM - 17:15AM LSB222

Teacher: Professor Tiejong Zeng

Course Description:

Usually, more than one sections with various topics selected from advanced applied mathematics will be offered.

1. Total Variation for Image Recovery
2. Non-Gaussian Noise Removal
3. Image Segmentation
4. Block Method for Image Recovery
5. Low Rank Minimization
6. Deep Learning for Image Recovery
7. Image Registration
8. Image Compression
9. Optimization in Imaging
10. Medical Imaging
11. 3D Imaging
12. Phase Retrieval

Course prerequisite:

Most fundamental: advanced calculus and linear algebra.

Grade policies:

Project and Presentation.

Lecture Notes: will be mainly according to the papers.

References:

1. Paragios Nikos, Chen Yunmei and Faugeras, Olivier D. (Eds.), *Handbook of Mathematical Models in Computer Vision*, Springer, 2006.

2. **Scherzer Otmar (Ed.)**, *Handbook of Mathematical Methods in Imaging*, Springer, 2015.
3. **Tony F. Chan and Jianhong (Jackie) Shen**, *Image Processing and Analysis: Variational, PDE, Wavelet and Stochastic Methods*. SIAM 2005.

Academic Honesty:

<http://www.cuhk.edu.hk/policy/academichonesty/>