**ES7015 / ES7018 Supervised Independent Study Course Content**

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| PROJECT TITLE | Using solid mechanics and inverse theory to study faulting |
| OBJECTIVES AND DESCRIPTION OF THE PROJECT | Earthquakes and various associated aseismic processes can be modelled with a basis in mechanics and using laboratory-derived constitutive relations. Observations of these phenomena allow us to compare our numerical simulations with real world data. In this course, we will cover fundamental concepts in solid mechanics and derive the governing equations of earthquake cycle processes. We will numerically simulate earthquakes and then discuss the various parameters that control their variability and recurrence. In this course, we will also study inverse methods used to image seismic and aseismic processes. We will apply the basics of statistics and probability theory to observational data, to infer the underlying physical processes that generate the data. By comparing earthquake cycle models with inverse methodologies, we will develop a quantitative understanding of the strengths and limitations of observational techniques used to image fault slip. |
| LEARNING OUTCOMES | 1. Appreciate the difference between elastic, frictional, viscous and plastic materials, and their mathematical descriptions 2. Develop/apply numerical routines to solve governing equations of earthquake cycle processes 3. Quantification of errors and uncertainties in geophysical inverse methods, applied to fault slip studies |
| ASSESMENT CRITERIA | Continuous evaluation  Project and presentation |
| NAME OF THE ES7015/ES7018 COURSE COORDINATOR   * Designation: * School / Research Centre : | Emma Hill  Associate Professor  Asian School of the Environment |
| NAME OF THE STUDENT | 1. Intan Fitri 2. Grace Ng 3. Cheryl Tay |
| Work hours requirement | 39 hours class work + 39 hours self-guided study and assignments |

Yours sincerely,

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Associate Chair (Research)

Asian School of the Environment