## Syllabus Information

**Course Information**

<table>
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<th>Year</th>
<th>2017</th>
<th>School</th>
<th>Graduate School of Creative Science and Engineering</th>
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<td>Course Title</td>
<td>Advanced Coastal Engineering</td>
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<tr>
<td>Instructor</td>
<td>SHIBAYAMA, Tomoya</td>
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**Syllabus Information**

**Subtitle**
Coastal Processes—Concepts in Coastal Engineering and Their Applications to Multifarious Environments

**Course Outline**

1. Introduction—Three examples of Japanese experience of coastal environment change due to construction works
2. Review of Fundamental Fluid Mechanics (1)
   - Brief history of fluid mechanics
   - Brief review of vector analysis
3. Review of Fundamental Fluid Mechanics (2)
   - Introduction of vector and scalar operators
   - The physical meaning of rotation.
   - Conservation laws of fluid mechanics
   - Mass conservation
   - Momentum conservation
   - Energy conservation
4. Review of Fundamental Fluid Mechanics (3)
   - Conservation laws of fluid mechanics
   - Irrotational flow of inviscid fluid
   - Velocity potential
   - Stream function
   - Complex potential
5. Basic Equations for Waves
6. Linear Wave Theories
7. Wave Induced Physical Phenomena (1)
   - Mass transport velocity
8. Wave Induced Physical Phenomena (2)
   - The bottom boundary Layer
9. Wave Induced Physical Phenomena (3)
   - Wave shoaling, Wave breaking, Wave reflection and transmission
10. Wave Induced Physical Phenomena (4)
    - Wave refraction, Wave diffraction, Numerical Simulation by using Mild Slope Equation
11. Wave Induced Physical Phenomena (5)
    - Calculation of wave-induced longshore current by using Boussinesq equations
12. Examination of breaker height formula
13. Surf zone Dynamics
14. Tsunamis and Storm Surges
15. Confirmation of study results

**Textbooks**

It is necessary to bring this book to the class (この教科書は授業を受けに必ず持参)。

**Reference**

Edx (MOOC) classes by Prof. Shibayama are available in the following web site for free.
https://www.edx.org/school/wasedax

**Evaluation**

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Rate Evaluation Criteria

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