Advanced slope disaster reduction

2 units

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Target〉 1. The first objective of this subject is to learn models and theories on rainwater and solute runoff system in river basin. 2. The second objective of this subject is to make students aware of the slope stability methods and to develop an understanding of the procedures and processes involved in the design of engineered slopes and slope stabilization works.

Outline〉 In the first part of this subject, models and theories on rainwater and solute runoff system in river basin are introduced. The Muskingum method is a commonly used lumped flood routing method for handling a variable discharge-storage relationship. The kinematic wave model is the simplest distributed model defined by the continuity equation for an unsteady flow and the momentum equation assuming the friction and gravity forces balance each other. A report of solving problems related to lecture items is imposed. Topics of the second part covered include slope stability analysis methods, types of shear strengths for both engineered and natural slopes, selection of strength parameters, types of slope stabilization works and their design, and seismic instability of slopes. This subject is related on engineering.

Style〉 Lecture

Keyword〉 Linear and non-linear lumped flood routing method, Kinematics distributed flood routing method, stability analysis, shear strengths, slope stabilization

Relational Lecture〉 "**Advanced Disaster Reduction Engineering**"(0.5), "**Advanced Geomechanics**"(0.5), "**Advanced Soil Mechanics**"(0.5)

Requirement〉 not specified

Goal〉

1. On the completion of this subject, students should have a knowledge of slope engineering practices in static and seismic stability analyses, determination of shear strengths, and design of slope remedial works.
2. The students should understand the measurement and selection of the peak, fully softened, and residual shear strengths for use in stability analyses, and understand the design outline of slope stabilization works.

Schedule〉

1. Examples and causes of slope failure
2. Introduction of slope disaster reduction
3. Static slope stability methods (Part 1)
4. Static slope stability methods (Part 2)
5. Total stress analysis and effective stress analysis
6. Types of shear strengths for engineered and natural slopes
7. In-situ determination of shear strengths
8. Laboratory determination of shear strengths
9. Determination of shear strengths by back analysis (Part 1)
10. Determination of shear strengths by back analysis (Part 2)
11. Slope stabilization (unloading and drainage)
12. Slope stabilization (anchors)
13. Slope stabilization (piles)
14. Slope stabilization (soil reinforcement)
15. New development of slope disaster reduction
16. Examination

Evaluation Criteria〉 Reports and tests.

Textbook〉 Reading and discussing materials are distributed.

Reference〉 Soil Strength and Slope Stability by Michael J. Duncan and Stephen G. Wright (John Wiley & Sons)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=185142

Contact〉

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