

April 2022

**2022 Screening Examination for International Master's Program in Civil Engineering,
Graduate School of Engineering, Kyushu University:**

Main Contents of Written Examination for Each Subject

[Mathematics]

- 1) Differential and Integral Calculus: 2 questions with sub-questions
 - Differentiation and integration of functions of one variable
 - Integration by substitution, Integration by parts
- 2) Ordinary differential equation: 1 question with sub-questions
- 3) Linear Algebra: 2 questions with sub-questions
 - Matrix eigenvalue problem, Determinant of matrix, Inverse matrix
 - Inner product and cross product of two vectors
- 4) Probability and Statistics: 1 question with sub-questions
 - Probability distributions, Expected Value, Variance

[Engineering Subjects]

- 1) Structural Mechanics: 1 question with sub-questions
 - Equilibrium of truss structure, Statically determinate structure (beam, rigid frame and column structure), Statically indeterminate structure (Castigliano's theorem)
- 2) Hydraulics: 1 question with sub-questions
 - Hydrostatic pressure, Bernoulli's theorem, Momentum theorem, Pipe flow
- 3) Soil Mechanics: 1 question with sub-questions
 - Physical properties of soils, Compaction, Consolidation and Settlement, Seepage and Groundwater Flow, Shear strength of soils, Earth pressure, Slope stability, Bearing capacity
- 4) Concrete Engineering: 1 question with sub-questions
 - Cement, aggregates and admixtures, Fresh and hardened properties, Durability and deterioration, Fundamentals of reinforced concrete
- 5) Planning Theory: 1 question with sub-questions
 - Transportation survey, Modal split, Network assignment, Road traffic flow
- 6) Environmental System Engineering: 1 question with sub-questions
 - Natural environmental system, Environmental policy
 - Environmental aquatic chemistry, Water/wastewater treatment, Transport phenomena

(You have to select 3 subjects from the 6 engineering subjects listed above when you submit the application form)