

## Fluids Energy Conversion Engineering

2 units (selection)

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**Target** This class introduces united interpretation and manipulation for principles which dominates characteristics of turbomachinery which transforms dynamical energy in fluids to mechanical work. This class also aims to understand dynamics of viscous fluid which is fundamental to utilize fluid energy.

**Outline** 1.Theoretical and experimental analysis method is introduced on flow condition of turbomachinery and its characteristic. 2.Dynamics of viscous fluid which is fundamental to utilize fluid energy is introduced. Lecture heads are as follows. (1) Outline of fluid energy conversion, (2) Internal flow and performance of centrifugal turbomachinery, (3) Internal flow and performance of axial turbomachinery, (4) Anomalous phenomena of the turbomachinery, (5) Nature of viscous fluid, (6) Equations of motion for viscous fluid

**Style** Lecture

**Keyword** *viscous fluid, equation of motion, energy conversion, turbomachinery*

**Fundamental Lecture** “Fluid Dynamics”(1.0), “Fluid Dynamics”(1.0), “Fluid Machinery”(1.0)

**Goal** To understand the principle which dominate the characteristic of turbomachinery and dynamics of viscous fluid

**Schedule**

1. Nature of viscous fluid
2. Motion of viscous fluid
3. Difference between viscous and inviscid fluids, cylinder in inviscid fluid
4. Difference between viscous and inviscid fluids, cylinder in viscous fluid
5. Similarity between viscous and inviscid fluids
6. Derivation of equations of motion for viscous fluid
7. Interpretation of equations of motion for viscous fluid
8. Summary and examination for viscous fluid
9. Hydrodynamics of centrifugal and diagonal turbomachinery
10. Hydrodynamics of axial turbomachinery
11. Characteristics of turbocharger for automobile
12. Numerical simulation of internal flow
13. Turbomachinery and noise
14. Anomalous phenomena of turbomachinery

15. One-dimensional flow of compressible fluid

16. Examination for turbomachinery

**Evaluation Criteria** Examination for viscous fluid counts 50 points and examination for turbomachinery counts 50 points.

**Textbook** Not used

**Reference** Will be introduced in the class

**Contents** <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216902>

**Student** Able to be taken by student of other department

**Contact**

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