HCB.412-03

Course title: Interdisciplinary Research Fundamentals II (Fundamentals of mechanical engineering)

Course description:

Fundamentals of robotics:

In this course, we introduce the basic knowledge of robotics. This course covers mechanical structures of robots, sensors and actuators, robot kinematics and its underlying algebra, and computers used for robot control.

Fundamentals of fluid dynamics:

This course introduces principal concepts of fluid dynamics. Topics covered in the course include fluid properties, fluid statics and buoyancy, Bernoulli's equation, laminar flow and flow in pipes. You will be given insight into the basic principles of fluid dynamics.

Course schedule:

Fundamentals of robotics 1:

Dr. Takahiro Kanno, Riverfield Inc.

Class 1   6/16   Robot mechanisms

        Link mechanisms, Mobile robots, Mechanical components

Class 2   6/23   Sensors and actuators

        Position and rotation sensors, Force sensors, Electric actuators

Class 3   6/30   Robot control 1

        Algebra, Kinematics

Class 4   7/7   Robot control 2

        Computer-based control system, Communication

Fundamentals of fluid dynamics:

Prof. Kenji Kawashima, The University of Tokyo

Class 4   7/14   Fluid properties

        Pressure, Density, Viscosity

Class 5   7/21   Fluid statics

        Hydrostatic force, Pascal's principle, Buoyancy, Archimedes's principle

Class 6   7/28   Fluid dynamics

        Continuity equation, Bernoulli's theorem, Laminar flow, Flow in a pipe

Grading:

The score is evaluated by the following three total points.

1. Fundamentals of robotics and mechatronics: short tests and homework assignments

2. Fundamentals of fluid dynamics: short tests

3. Final report: Discuss the relationship between your own special field and the contents of Fundamentals of fluid dynamics or Fundamentals of robotics and mechatronics, and further discuss the possibilities of new research themes, concepts, practical applications, etc. arising from the integration of the two.

Notice: Insufficient attendance to the lectures or no submission of the final report is judged as a failure.

Textbook(s): None

Contact information (e-mail and/or phone):

Assoc. Prof. Kotaro Tadano (tadano.k.aa@m.titech.ac.jp)

Notice: Do not ask Dr. Kanno and Prof. Kawashima anything about pass/fail of this course, e.g. acceptance of overdue homework assignments or reports.

Classroom: Zoom

注意事項：

・菅野先生，川嶋先生には，遅れた宿題，レポートの受領可否を含め，単位に関する問い合わせは一切しないこと．

・菅野先生，川嶋先生の講義の出席が不十分の場合，最終レポートを提出しない場合は不可と判定します．