Primary energy sources—including fossil fuels such as coal, petroleum and natural gas, as well as nuclear power and natural energy—are used to operate the electrical devices, automobiles and suchlike that we depend on, and the form of the energy is changed until it eventually becomes heat. The energy-conversion technology which transforms one sort of energy into another is vitally important for effectively utilizing limited energy resources to establish a sustainable society. Our research group studies and develops environment-friendly energy-conversion technologies and networks.

**Energy and Environmentology** (Representative: Professor Hideaki Monji)

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**Space Exploration Engineering** (Representative: Professor Makihito Nishioka)

Our research group studies the engineering theory and technology necessary for expanding the frontiers of space. Utilizing theories of combustion mechanism, improvement in performance of new materials, use of plasma, and physical phenomena at extremely low temperatures, we conduct applied research in advanced engineering technologies such as the development of next-generation aircraft and rocket engines, small-scale satellites, atmospheric re-entry craft, thermal control devices, planetary exploration rovers, experiments on board the ISS, and so on. This work is done with the collaboration of neighboring research institutes, such as JAXA and AIST. Our wide-ranging interests are always energetically seeking new interdisciplinary research fields such as preserving the Earth’s environment, medical technology in space, and space art.

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**Multi-Scale Solid Materials Engineering** (Representative: Professor Masamichi Kawai)

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**Disaster Control** (Representative: Professor Yuki Sakai)

The threats of earthquakes, tsunamis, fires, heavy rain and suchlike pose grave dangers to our lives and cause great damage. In addition to these sudden occurrences, serious damage may also be caused by the deterioration of materials, and long-term environmental disturbances. This group conducts research to develop advanced engineering technology to control disasters, and disaster-prevention systems, by understanding the effects of these disturbances on the ground. Lifelines, buildings and bridges and by studying the causes of damage in detail.

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**Message from the Chair**

**DREAMS AWAITS YOUR CHALLENGE**

To potential students in Engineering Mechanics and Energy

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Prof. Takashi Matsushima, Chair, Department of Engineering Mechanics and Energy  
E-mail: tmatsuz@kz.tsukuba.ac.jp

Our department provides interdisciplinary education and research covering a wide range of engineering and scientific fields. Our course of study helps students acquire a comprehensive picture of our highly specialized society from scientific and technological perspectives, and helps them find optimal solutions towards a sustainable world. Moreover, our faculty members offer state-of-the-art research topics such as the ones shown in this brochure, and students can develop in-depth expertise through their research project. Please visit our webpage for more details, and contact our faculty members related to your areas of interest if you are considering joining us. We look forward to seeing you on our lush green campus located in the midst of Tsukuba Science City!