

## 1. Degree Programs

Both M.S. and Ph.D. degrees will be offered, and students will have "Space Exploration Engineering" and major of their departments in their diplomas.

Programs	Main goals for Education
Master Program	<ul style="list-style-type: none"><li>○ Basic theory in space technology</li><li>○ Mission design/analysis</li><li>○ Understand spacecraft system, and system integration</li><li>○ Applied research and system integration capability</li></ul>
Ph.D. Program	<ul style="list-style-type: none"><li>○ Advanced mission design/analysis</li><li>○ Advanced spacecraft system integration and design</li><li>○ Train experts in core technologies</li><li>○ International cooperation</li></ul>

## 2. Education and Research Activity

The Space Exploration Engineering Program has four major education and research areas.

### ◦ Space Exploration Mission Design

The primary goal of this area is mission design for space exploration. It is essential to design space missions with success for the spacecraft to reach moon or solar system. For this goal, technological elements such as optimal mission design, guidance and control, autonomy, and fault diagnosis of spacecraft. Docking technology for robotics on the planet surface and reentry technology to deliver samples collected on the planet to the earth are included. The mission design area essentially covers technologies for guarantee of mission success.

### ◦ Core Spacecraft Technology Engineering

The main objective is to study core technologies on spacecraft design. In general, spacecraft requires high reliability light-weight structure and propulsion systems during flight or landing stage. Also, high reliability onboard computer, large high speed memory, deep space communication system hardware and algorithm will be investigated. For long-duration mission, efficient power system is another key element. For space flight and attitude control, highly efficient main and auxiliary thruster systems technology will be studied. In order to survive in space environment, light-weight composite material and associated structural sub-systems design will be investigated in this Core Spacecraft Technology Engineering area.

### ◦ Mission Payload and Image Processing Research

The primary goal of this area is to conduct advanced research on space payloads and data processing technology. For lunar and solar system exploration, payload design to meet the mission objectives is required. The recent trend of space exploration is more focused on detecting resources rather than purely scientific purpose. In order to keep pace with such trends, space robotics, micro-wave and optical payload technologies are main research subjects. Unlike conventional Earth-mission spacecraft, new technology paradigms such as miniaturization, low-power, and light-weight are will be investigated in this field.

### ◦ Space Robotics Research

Research on core-technologies for space robotics which will land on lunar surface to perform missions is primary goal of this field. One of the reason why lunar exploration mission has received intense focus recently among many nations is because of natural resources on the moon. The space robotics research is target to searching natural resources on lunar surface or other planets. Mars exploration robotics is another potential area being considered. Considering space environment which is different from the Earth environment

in many ways, key technologies will be investigated which include communication, control, mechanism, remote control under communication time delay, information analysis, and sensor network. In particular, obstacle avoidance on lunar surface efficient mechanism design, and deepspace communication will be the focus of research subjects.