Module Information

Module Identifier	**CS36510**
Module Title	**Space Robotics**
Academic Year	**2015/2016**
Co-ordinator	**Dr Thomas Jansen (mailto:thj10@aber.ac.uk?subject=CS36510)**
Semester	**Semester 1**
Pre-Requisite	**Basic GCSE level maths**

Course Delivery

Delivery Type	Delivery length / details
Lecture	20 Lectures

Assessment

Assessment Type	Assessment length / details	Proportion
Semester Exam	2 Hours WRITTEN EXAM	100%
Supplementary Exam	2 Hours	100%

Learning Outcomes

On successful completion of this module students should be able to:

Explain the detailed characteristics of space and planetary robot systems.

Analyse potential space and planetary robot applications and design appropriate robotic solutions.

Demonstrate an advanced understandign of the principles of operation of space and planetary robots.

Brief description

This module provides an introduction to the basic design and operation of robotic systems for space and planetry applications.

Content

1) Introduction to space robotics. (1 lecture)

Includes syllabus, reading list, lecture notes etc.

2) History and future of space robotics. (1 lecture)

Includes satellites, orbiters, deep space probes, landers and rovers.

3) Space and planetary robot manipulator kinematics and control. (4 lectures)

Includes forward and inverse kinematics and PID control.

4) Space and planetary robot manipulator calibration. (1 lecture)

Includes examples from Beagle 2.

5) Planetary rover localisation, path planning, navigation and obstacle avoidance. (4 lectures)

Includes examples from NASA's Sojourner and MER rovers, and the ESA ExoMars rover.

6) Aerobots for planet and moon exploration. (3 lectures)

Includes aerostatics, aerobot design, localisation and navigation.

7) Advanced simulators for planetary robot surface operations. (2 lectures)

Includes examples from Beagle 2, shadow prediction and modelling Martian terrain and meteorology.

8) Autonomous space and planetary robot architectures and methods. (2 lectures)

Includes examples from Deep Space 1 and the robot planetary scientist project.

9) Autonomous planetary robot survivability and longevity. (2 lectures)

Includes qualitative kinematics modelling and model damage remediation.

Notes

This module is at CQFW (http://wales.gov.uk/topics/educationandskills/qualificationsinwales
/creditqualificationsframework/?lang=en) Level 6