

Reality Capture and Precision 3D Sensing (CEGE0092)

Description

This course covers advanced topics of 3D sensing. It is comprised of three roughly equal parts: photogrammetry, LiDAR and GNSS. The module introduces the fundamental principles and mathematical concepts for each sensing technique, which are independent of specific applications (airborne, mobile, static ...). It then shows how these techniques are used in wide varieties of application from industrial to space-borne. In the first part the course will introduce the mathematical and geometric foundation of photogrammetry, camera calibration and its application. The second part covers theory and practice of producing and validating digital models and from laser scanning (LiDAR). The module also introduces approaches for automated point cloud processing and feature extraction. The third part introduces advanced aspects of the fundamental GNSS principles, applications and integration of GNSS phase observables and other positioning and navigation systems. Special emphasis is placed on the modelling of errors and on the control and assessment of quality.

Learning Outcomes

Students will be competent to read and follow current research literature on the techniques, technologies and applications of photogrammetry, LiDAR and GNSS. They can critically assess data quality and understand the nature of the errors which affect products. Students understand capabilities of technologies as well as their limitations. They will be able to derive solutions to given problems of 3D sensing and will have an understanding of the sensor technologies available. The students will understand the concepts, principles and process of point cloud generation and processing.

Key information

Year	2019/20
Credit value	15 (150 study hours)
Delivery	PGT L7, Campus-based
Reading List	View on UCL website
Tutor	Prof Stuart Robson
Term	Term 2
Timetable	View on UCL website

Assessment



- Coursework: 50%
- Oral Presentation: 50%

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