Liverpool John Moores University

Title:	Optical Measurement and Sensing
Status:	Definitive
Code:	**7118DRO** (120984)
Version Start Date:	01-08-2017
Owning School/Faculty:	General Engineering Research Institute
Teaching School/Faculty:	General Engineering Research Institute

Team	Leader
Francis Lilley	Y

Academic Level:	FHEQ7	**Credit Value:**	10	**Total Delivered Hours:**	38
Total Learning Hours:	100	**Private Study:**	62		

Delivery Options
Course typically offered: Semester 2

Component	Contact Hours
Lecture	24
Practical	12

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS2	Examination	70	2
Report	AS1	Measurement Application/Programming Assignment Report. Max 2500 words	30	

Aims

To provide an overview of optical systems capable of performing measurement and sensing in an applications environment with special reference to the UAV, automotive and aerospace industries.

Learning Outcomes

After completing the module the student should be able to:

1	Assess, design and select solutions to practical measurement problems based on various optical systems.
2	Implement and critically evaluate suitable image and data processing systems for the quantified analysis of images and light levels resulting from the above techniques.
3	Specify and critically evaluate complete system solutions to common measurement problems in areas such as; length, surface, form, vibration, stress, etc.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Examination	1	2	3
Measurement/Programming Report	2	3	

Outline Syllabus

Optical Measurement Systems
Properties of light, concept of coherence, Lasers, introduction to interferometry, classical interferometers, fibre optic interferometry, fibre optic sensors, classical holography, holographic interferometry, TV holography, stereo-photogrammetry, LIDAR. Illustrations of practical systems and applications.
Digital Processing for Optical Instruments.
Image acquisition systems, concept of digital images. Image enhancement for improved data extraction. Methods for the quantitative analysis of fringe images; fringe tracking, phase stepping, Fourier transform methods. Data processing for photogrammetry and LIDAR. Sources of error and inaccuracy, analysis and quantification of errors.

Learning Activities

The module will be taught by a combination of lectures, tutorials, laboratory demonstrations, practical activities, case studies and site visits.

Notes

This module provides an overview of non-contact measurement and optical inspection in an applications environment.