Liverpool John Moores University

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Title:	PHYSICAL EFFECTS MODELING
Status:	Definitive
Code:	**7514ENGRSK** (113879)
Version Start Date:	01-08-2019
Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Risktec Solutions

Team	Leader
Alan Wall	Y

Academic Level:	FHEQ7	**Credit Value:**	10	**Total Delivered Hours:**	16
Total Learning Hours:	100	**Private Study:**	84		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	8
Tutorial	8

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	Coursework Approx 1000 words plus calculations (spreadsheet calculations acceptable)	100	

Aims

To enable students to understand the range of hazardous physical effects that can occur and the uses and limitations of physical effect modelling.

Learning Outcomes

After completing the module the student should be able to:

1 Analyse an industrial plant/installation and devise scenarios covering the range of expected physical effects
2 Evaluate how these physical effects affect people and plant
3 Justify which of the available modelling techniques is appropriate to analyse physical effects in different circumstances.
4 Critically review the range of commercial physical effects modelling software and available specialist consultancy services.
5 Demonstrate expertise in physical effects modelling using simple hand calculation methods and/or publicly available software models, whilst understanding the limitations of these techniques

Learning Outcomes of Assessments

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

coursework	1	2	3	4	5

Outline Syllabus

•Introduction to physical effects modelling – what are physical effects and why model them?
•Overview of human vulnerability to physical effects: Toxic, thermal radiation, smoke and overpressure.
•Release and discharge calculation: Steady state, time varying, accounting for depressurization.
•Dispersion analysis: Gaussian, jet, dense gas, unified modelling.
•Fires: Jet fires, pool fires; flash fires, BLEVEs, compartment fires.
•Explosions: Confined, unconfined (congested) on and offshore, detonations. Types of models – empirical / phenomenological; computational fluid dynamics.
•Detail of human and plant vulnerability: Single value levels for thermal radiation and toxics (SLOT, SLOD, EPRG, etc.); Probit functions for thermal radiation, common toxic materials and explosions; Smoke effects, carbon monoxide and dioxide, oxygen depletion. Vulnerability of plant to fires and explosions.
•Common mitigation measures and accounting for them in analyses.
•Commercial and public domain software tools available to the analyst.
•Drawing conclusions from physical effects modelling.

Learning Activities

By a combination of lectures and group and individual exercises.

Notes

The aim of this module is to enable students to understand the range of hazardous physical effects that can occur, an overview of human and equipment vulnerability to physical effects, and the uses and limitations of physical effect modelling. This includes an introduction to physical effects modelling and the opportunity for some hands-on practice of physical effects calculations.

The assessment for this module is 100% coursework.