

Title:	Explosion Prevention APPROVED
Long Title:	Explosion Prevention and Protection in Hazardous Areas
Module Code:	ELEC6021
Credits:	5
NFQ Level:	Intermediate
Field of Study:	Electrical Engineering
Valid From:	Semester 1 - 2014/15 (September 2014)
Module Delivered in	2 programme(s)
Module Coordinator:	JOSEPH CONNELL
Module Author:	JOSEPH CONNELL
Module Description:	This module outlines the ignition risks in potentially explosive atmospheres, explains the equipment and protection types, as well as organisational and installation methods. It encompasses ATEX, EN Standards, ETCI Rules (ET105) and Guide (ET202).
Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	Identify the risks in hazardous areas and describe the principles of explosion prevention.
LO2	Outline the intentions of the ATEX directives and the responsibilities of employers and employees.
LO3	Specify and select suitable equipment from a range of protective types for potentially explosive gas and dust atmospheres.
LO4	Summarise the principles and practical applications of intrinsically safe equipment.
LO5	Interpret the information available to installers and understand basic installation and maintenance techniques.
Pre-requisite learning	
Module Recommendations	
<i>This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).</i>	
No recommendations listed	
Incompatible Modules	
<i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements	
<i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.</i>	
No requirements listed	
Co-requisites	
No Co Requisites listed	

Module Content & Assessment

Indicative Content

Potentially Explosive Atmospheres.

Basic concepts, definitions/terminology. Risk assessment. Classification systems, groups, zones, temperature. LEL, UEL, MIE. MESG. Ventillation. EPL. Dust hazards. Standards. Traditional labeling.

ATEX Directives.

Equipment (94/9/EC) and Safety (99/92/EC) Directives. Background, aims, obligations, explosion risks, categories of equipment, documentation. EN Standards and guides. Equipment marking and certification.

Explosion Prevention Methods.

Common design procedures. Equipment design philosophy. Applications. Equipment category and EPL. Equipment types Ex, d, e, p, n(N), o, q, m, (s). Protection design concepts and equipment for dust hazard areas. Non-electrical equipment.

Intrinsic Safety.

Ex't. Concept and principles. Categories. Safety interface. Simple and non-simple apparatus. Associated apparatus. IS circuits. IS systems. Earthing. Galvanic isolation. Barriers for instrumentation. Cabling for IS. Inductance and capacitance. Ignition curves.

Practical Aspects.

Selecting equipment. Installation design. Cable/cable management, cable identification, environmental considerations. Junction boxes, terminations, terminals, cable glands, stopper boxes, sand traps, bonding. Static electricity and r.f. radiation. Inspection, testing, maintenance.

Assessment Breakdown

%

Course Work

100.00%

Course Work

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Short Answer Questions	Explosion Principles, ATEX directives	1	20.0	Week 3
Short Answer Questions	Risk Assessment	2	20.0	Week 5
Essay	Hazardous areas in the Pharma. Industry	3	20.0	Week 8
Short Answer Questions	Methods of protection and their applications	4	20.0	Week 10
Short Answer Questions	based on previous assessments plus on safe equipment	1,2,3,4,5	20.0	Sem End

No End of Module Formal Examination

Reassessment Requirement

Repeat examination

Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time

<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Lecture material.	3.0	Every Week	3.00
Independent & Directed Learning (Non-contact)	Self directed learning	4.0	Every Week	4.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				3.00

Workload: Part Time

<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Lecture material	3.0	Every Week	3.00
Total Hours				3.00
Total Weekly Learner Workload				3.00
Total Weekly Contact Hours				3.00

Module Resources
<i>This module does not have any book resources</i>
<i>This module does not have any article/paper resources</i>
<i>Other Resources</i>
<ul style="list-style-type: none">• http://www.etci.ie: etci 2011, <i>National rules for electrical installations in potentially explosive atmospheres</i> , etci

Module Delivered in			
Programme Code	Programme	Semester	Delivery
CR_EEPSY_8	<u>Bachelor of Engineering (Honours) in Electrical Engineering</u>	5	Elective
CR_EELEC_7	<u>Bachelor of Engineering in Electrical Engineering</u>	5	Elective