MODULE DESCRIPTOR

Module Title

Fire, Explosions and Firearms

Reference	PL3604	Version	1
Created	October 2023	SCQF Level	SCQF 9
Approved	June 2002	SCQF Points	30
Amended	August 2021	ECTS Points	15

Aims of Module

To provide the student with the thermodynamic, kinetic and materials chemistry principles, concepts and practice which underpin the forensic investigation of fires, explosions and firearms.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

1	Explain the principles of thermodynamics and kinetics as applied to combustion and heat transfer.
2	Assess the properties and fire behaviour of the principal materials used internally in domestic & commercial buildings.
3	Explain the concepts and principles underlying the forensic investigation of explosions, firearms and suspected arson.
4	Analyse typical productions and communicate effectively the interpretation of laboratory results from explosion, firearms or fire incidents.

Indicative Module Content

Fire dynamics: Gas laws (ideal and non ideal), thermodynamics (internal energy & work, enthalpy of combustion, heat capacity, flame temperature, flame height), kinetics (effect of temperature on reaction rate), heat transfer mechanisms. Common Materials; metals, non-metals, natural & synthetic polymers, physical & chemical properties, heat and fire damage. Fire growth & decay, Fire investigation: types of fires, location of seat of fire, laboratory examination of debris. Explosives and explosions: types and chemistry of explosives, initiation and detonation. Investigation and analysis. Safety and disposal. Firearms: mechanisms and design aspects, introduction to ballistics, scene of shooting incident, firearm discharge residues, forensic laboratory examination, proof marks. Evidence: collection, avoidance of contamination, storage, assessment of significance. This module aligns with United Nations Sustainable Development Goal 16: Peace, Justice and Strong Institutions. Students learn how to maintain the integrity of evidence during forensic examination, analysis, and interpretation, contributing towards a fair judicial system and strong institutions.

Module Ref:	PL3604 v1

Module Delivery

This is a lecture and workshop based module supplemented with tutorial sessions and case studies. External forensic practitioners and fire experts may also be involved in the delivery of material.

Indicative Student Workload	Full Time	Part Time
Contact Hours	66	N/A
Non-Contact Hours	234	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	300	N/A
Actual Placement hours for professional, statutory or regulatory body		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Examination	Weighting:	70%	Outcomes Assessed:	1, 2, 3
Description:	Closed book written examination				

Component 2

Type:	Coursework	Weighting:	30%	Outcomes Assessed:	4
Description:	A summary report of laboratory work				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

The first grade represents Component 1 (EX1) weighted as major and the second, Component 2 (CW1), weighted as minor. A minimum module grade of D is required for a pass, with compensation of grade E in Component 1 or Component 2 permitted. Non-submission of either component will result in an NS grade.

Module Grade	Minimum Requirements to achieve Module Grade:
A	AA, AB
B	AC, AD, AE, BA, BB, BC, CA
C	BD, BE, CB, CC, CD, DA, DB
D	CE, DC, DD, DE, EA, EB, EC
E	AF, BF, CF, DF, ED, EE, EF, FA, FB, FC, FD
F	FE, FF
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	Successful completion of Stage 2 Forensic and Analytical Science or equivalent.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1	STAUFFER, E. et al. *Fire Debris Analysis.* Current Edition. Elsevier.
2	BEVERIDGE, A., ed., *Forensic Investigation of Explosions*. Current Edition. Taylor and Francis.
3	WARLOW, T.A. *Firearms, the Law and Forensic Ballistics*. Current Edition. Taylor and Francis.
4	DeHAAN, J.D. *Kirk's Fire Investigation*. Current Edition. Pearson/Prentice Hall.
5	NIC DAEID, N. *Fire Investigation*. Current Edition. CRC Press
6	HAAG, M.G. *Shooting Incident Reconstruction.* Current Edition. Amsterdam, Academic Press (Elsevier). E-edition available at RGU Library.