



## UNIVERSITI TEKNOLOGI MARA

### FRS581: FORENSIC CHEMISTRY

<b>Course Name (English)</b>	FORENSIC CHEMISTRY <b>APPROVED</b>
<b>Course Code</b>	FRS581
<b>MQF Credit</b>	4
<b>Course Description</b>	This course gives an introduction and principle of chemistry- related evidences in forensic investigation. Forensic chemistry usually involves mainly in cases such as arson and explosion. Day to day common cases may also involves evidence related to forensic chemistry such as soil, fibers, paints and ink. This course will covers in-depth information on how to investigate cases involving evidence of importance as mentioned in the above cases and each of their current method of analysis. Students will be exposed to the chemistry behind every principle of chemical analysis on evidence collection and crime scene interpretation.
<b>Transferable Skills</b>	Excellent attention to detail High level of patience and concentration Analytical and investigative skills Logical, unbiased and methodical approach to solving problems Inquisitive and open-minded Work well on a team and independently Strong verbal and presentation skills Ability to summarize findings and write technical reports Present complex scientific information in clear manner that others can understand Computer/technical skills Problem solving abilities Skilled at putting pieces of a puzzle together
<b>Teaching Methodologies</b>	Lectures, Lab Work, Case Study, Problem Based Learning (PBL), Presentation
<b>CLO</b>	CLO1 Analyse forensic chemistry evidence relating to crime scene investigations CLO2 Display practical skills in forensic chemistry CLO3 Demonstrate managerial skill in forensic chemistry
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	<b>1. Fire Investigation</b> 1.1) 1.1 Chemistry of fire 1.2) 1.2 Factors affecting flame propagation 1.3) 1.3 Causes of fire 1.4) 1.4 Burn pattern 1.5) 1.5 Arson investigation 1.6) 1.6 Safety in fire and arson investigation 1.7) 1.7 Collection and preservation of arson evidence 1.8) 1.8 Analysis of flammable residues 1.9) 1.9 Sources of interference in fire debris <b>2. Explosion Investigation</b> 2.1) 2.1 The history, development, and characteristics of explosives and propellants 2.2) 2.2 Explosion and explosives 2.3) 2.3 Different types of explosives 2.4) 2.4 Effects of explosions 2.5) 2.4.1 Blast pressure effect 2.6) 2.4.2 Thermal effect 2.7) 2.4.3 Fragmentation effect 2.8) 2.5 Explosives trains and technology 2.9) 2.6 Investigation of explosion scene

- 2.10) 2.6.1 Detection of hidden explosives
- 2.11) 2.6.2 General protocols at the scene of an explosion
- 2.12) 2.7 Safety in explosion scene
- 2.13) 2.8 Collection and analysis of explosives
- 2.14) 2.8.1 Recovery of material from an explosion scene
- 2.15) 2.8.2 Techniques in detection
- 2.16) 2.8.3 Technique of analysis

### **3. Drugs of Abuse**

- 3.1) 3.1 Classification and categories
- 3.2) 3.2 Classification by Schedule: The controlled substances act and listed chemicals
- 3.3) 3.3 Drug-control laws
- 3.4) 3.3.1 Malaysian perspectives
- 3.5) 3.3.2 World perspectives
- 3.6) 3.4 Drug Identification and analysis
- 3.7) 3.5 Profiling of drugs of abuse

### **4. Ink and paint analysis**

- 4.1) 4.1 Physical properties of inks
- 4.2) 4.2 Colorants in inks
- 4.3) 4.3 Physical properties of paints
- 4.4) 4.4 Colorants in paints
- 4.5) 4.4.1 Binders and resins
- 4.6) 4.4.2 Additives
- 4.7) 4.4.3 Automotive paints
- 4.8) 4.5 Collection and preservation of paint evidence
- 4.9) 4.6 Analysis of paint evidence

### **5. Fibers**

- 5.1) 5.1 Sources and types of fibers
- 5.2) 5.1.1 Natural
- 5.3) 5.1.2 Man-made
- 5.4) 5.2 Fiber morphology
- 5.5) 5.3 Identification and comparison of manufactured fibers
- 5.6) 5.4 Collection and preservation of fiber evidence
- 5.7) 5.5 Analysis of fiber evidence

### **6. Soils as evidence**

- 6.1) 6.1 Types of soil
- 6.2) 6.2 Soil composition
- 6.3) 6.3 Collection and preservation of soil evidence
- 6.4) 6.4 Soil analysis
- 6.5) 6.5 The use of soil in forensic taphonomy

### **7. Serial number restoration**

- 7.1) 7.1 Collection of evidence
- 7.2) 7.1.1 Nature of evidence
- 7.3) 7.1.2 Packaging
- 7.4) 7.2 Laboratory restoration of obliterated serial numbers
- 7.5) 7.2.1 Methods of restoration
- 7.6) 7.2.2 Chemical restoration
- 7.7) 7.2.3 Electrolytic method

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Video presentation	10%	CLO3
	Test	Test Part A	30%	CLO1
	Written Report	Summary of lab reports 1-3	20%	CLO2

Reading List	Recommended Text	<ul style="list-style-type: none"> <li>• Bertino, A. 2011, <i>Forensic Science: Fundamentals and Investigations 2012 Update</i>, 1st edition Ed., Cengage Learning [ISBN: 9780538731553]</li> <li>• Houck, M.M., &amp; Siegel, J.A. 2010, <i>Fundamentals of Forensic Science</i>, 2nd edition Ed., Academic Press [ISBN: 9780123859143]</li> <li>• Bell, S. 2012, <i>Forensic Chemistry</i>, 2nd edition Ed., Pearson Educacion [ISBN: 9780321816870]</li> </ul>
	Reference Book Resources	<ul style="list-style-type: none"> <li>• Safferstein, R. 2014, <i>Criminalistics: An Introduction to Forensic Science</i>, 11th edition Ed., Pearson Education [ISBN: 9780133458824]</li> </ul>
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	