Annexe A: New/Revised Course Content in OBTL+ Format

Course Overview

Expected Implementation in Academic Year (New format)	AY2026-2027
Semester/Trimester/Others (specify approx. Start/End date)	Semester 2
Course Author * Faculty proposing/revising the course	Sumod Pullarkat
Course Author Email	sumod@ntu.edu.sg
Course Title	FORENSIC SCIENCE
Course Code	CM5002
Academic Units	3
Contact Hours	39
Research Experience Components	Not Applicable

Course Requisites (if applicable)

Pre-requisites	
Co-requisites	
Pre-requisite to	
Mutually exclusive to	CM5012 Introduction to Forensic Science and CM5022 Applications of Forensic Science
Replacement course to	
Remarks (if any)	

Course Aims

On completing this course, you will understand and appreciate how basic science can be applied to the solution of criminal cases. You will understand the basic chemistry, physics and biology behind forensic science and see how this knowledge can be applied. You will understand how forensic science fits into the legal system alongside other forms of police work. You will appreciate not only what forensic science can do, but also what is beyond its scope i.e. the limits of forensic science.

Course's Intended Learning Outcomes (ILOs)

Upon the successful completion of this course, you (student) would be able to:

ILO 1	explain the principles and scope of forensic science.
ILO 2	describe how the techniques of chemical analysis can be used in forensic science and interpret simplified chromatograms and spectra.
ILO 3	describe the various post mortem processes of the human body, and be able to apply them in estimation of the time of death
ILO 4	describe the nature of blood, and apply that knowledge in the analysis of crime scene blood spatter
ILO 5	describe the main principles of DNA analysis.
ILO 6	describe the main principles of forensic toxicology
ILO 7	describe the chemistry and morphology of polymers and fibres (including hair) and to explain to what extent this information can be used forensically
ILO 8	describe the limitations of the three principles of fingerprinting
ILO 9	describe the main principles of Digital Forensics and Forensic Psychology
ILO 10	critically combine some or all of the learning outcomes 1-9 and also the knowledge gained from guest lectures in the analysis of a given crime scene

Course Content

Introduction to Forensic Science: an overview of the subject, how forensic science developed and how it works within the legal system. Atomic spectroscopy: how the analysis of the elemental composition of a sample can yield information. Molecular spectroscopy: determination of the compounds present in a sample by chromatographic and spectroscopic means. Determination of the time of death: how this can be determined by chemical, biological and circumstantial means. Blood: the composition of blood, how blood can be analysed and identified; blood spatter analysis. DNA: the basic concepts of DNA and how it is inherited; forensic DNA profiling. Toxicology: Overview of poisons and their identification . Polymers and fibres: the role of fibre and hair evidence in forensic science, including the identification of fibres by chemical means and by microscopy. Fingerprinting: how fingerprinting, one of the earliest forensic methods, developed as a means of identification; the three principles of fingerprinting; methods to visualise fingerprints.

The following topics will (subject to guest speaker availability) be taught by guest lecturers: Digital forensics, Forensic Psychology, physical evidence, document examination, Forensic Biology , narcotics, the presentation of evidence in court and the role of the Singapore Police Force.

Reading and References (if applicable)

Criminalistics, An Introduction to Forensic Science,Richard Saferstein (Pearson), 11th Ed., 2015, ISBN-13: 978-1-292-06202-0

NOTE: The above listing comprises the foundational readings for the course and more up-to-date relevant readings will be provided when they become available.

Planned Schedule

Week or Session	Topics or Themes	ILO	Delivery Mode	Activities	Readings
1	Introduction to forensic science	1	In-person	Lecture	
2	Chemical Analysis, Time of Death	2,3	In-person	Lecture	
3	Blood	3	In-person	Lectures and additional online reading materials	
4	DNA	4	In-person	Lectures and additional online materials	
5	Toxicology	6	In-person	Lectures and additional online material	
6	Fingerprinting, Midterm 1	7	In-person	Lectures and assessment	
7	Polymers and fibres	8, 9	In-person	Lectures and additional online content	
8	Guest Lectures	10	In-person	Lecture and additional online materials	
9	Guest lectures	10	In-person	Lectures and additional online content.	
10	Guest lectures	10	In-person	lecture and additional online content	
11	Guest lectures Midterm 2	10	In-person	Lecture and assessment	
12	Guest lectures	10	In-person	Lectures and additional online content	
13	Guest Lectures	10	In-person	Lecture	

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
In person plus additional online material	The bulk of the content will be delivered in person with some additional content deployed as online activity. Face to face lectures will be employed also for guest/invited lectures to give you the opportunity for interact directly with the practitioners of Forensic Science.

Assessment Structure

Assessment Components (includes both continuous and summative assessment)

No.	Component	ILO	Related PLO or Accreditation	Weightage	Description of Assessment Component	Team/Individual	Rubrics	Level of Understanding
1	Continuous Assessment (CA): Test/Quiz(Midterm 1)	1-4	competence and creativity	25		Individual	Analytic	Multistructural
2	Continuous Assessment (CA): Test/Quiz(Midterm 2)	5-8	competence and creativity	25		Individual	Analytic	Multistructural
3	Continuous Assessment (CA): Test/Quiz(In class quiz)	10	competence and creativity	30	Deployed during lecture to allow students to guage their understanding of the guest lectures. MCQ format and deployed online.	Individual	Analytic	Multistructural
4	Continuous Assessment (CA): Report/Case study()	10		20	Students are provided with details of a ficticious crime scene and are expected to come up with a case report based on the knowledge gained during the course	Individual	Analytic	Multistructural

Description of Assessment Components (if applicable)

Formative Feedback

You will be given feedback in two ways:

1. By response to postings on the course discussion board.

2. Through the marking of the mid-term.

NTU Critical Core Skills+ Mapping

This course intends to develop the following Critical Core Skills+ (maximum 5 most relevant)

Critical Core Skills+	Level
Care for Society	Basic
Sense Making	Basic

Course Policy

Policy (Academic Integrity)

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values. As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information. On the use of technological tools (such as Generative AI tools), different courses / assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Policy (General)

You are expected to complete all graded activities in good time including submission of case report.

Policy (Absenteeism)

If you miss a lecture, you are expected to make up for the lost learning activities. If you miss the mid-term exam with approval, you will be offered a make up exam. You will receive a zero mark if you miss the make up exam even with a valid MC/LOA. Guest lectures will have in class quiz deployed and there will be no make up for this activity.

Policy (Others, if applicable)

Diversity and Inclusion Policy

Integrating a diverse set of experiences is important for a more comprehensive understanding of science and engineering.

It is our goal to create an inclusive and collaborative learning environment that supports a diversity of perspectives and learning experiences. That honours your identities; including ethnicity, gender, socioeconomic status, sexual orientation, religion or ability.

To help accomplish this:
- If you are neuroatypical or neurodiverse, have dyslexia or ADHD (for example), or have a social anxiety disorder or social phobia;
- If you feel your performance in the course is being impacted by your experiences outside of class;
- If something was said in the course (by anyone, including instructor/supervisor) that made you uncomfortable.

Please e-mail to Associate Chair (Undergraduate) at AC-CCEB-UG@ntu.edu.sg about how we can help facilitate your learning experience.

As a participant in course discussions you should also strive to honour the diversity of your classmates. You can do this by; using preferred pronouns and names; being respectful of others opinions and actively making sure all voices

are being heard; and refraining from the use of derogatory or demeaning speech or actions.

All members of the course are expected to strictly adhere to the student code of conduct (https://www.ntu.edu.sg/life-at-ntu/student-life/student-conduct) . If you witness something that goes against this or have any other concerns, please speak to your instructors or a faculty member.

Technical Skills To Be Developed

All skills to be developed for this course:

Digital Forensics
Forensic science, Analytical chemistry, Forensic Psychology

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