Forensic DNA Profiling 3017NSC - Tri 1 2021 - Nathan Campus - Blended

1. General Course Information

1.1 Course Details

Course code	3017NSC
Course title	Forensic DNA Profiling
Academic organisation	ESC School of Environment and Science
Trimester	Trimester 1 2021
Mode	Blended
Level	Undergraduate
Location	Nathan, On Campus
Credit point value	10

Restrictions:

Restriction: Students must be enrolled in the following programs: 1264 B Forensic Science, 1433 B Forensic Sc/B Crim Crim Just

Course Description:

This course describes the principles of short tandem repeat (STR) analysis using multiplex PCR-based systems for human identification; match probabilities and likelihood ratios; the status of single nucleotide polymorphism (SNP) technology; future trends for forensic DNA analysis techniques. Pre-requisite: 1042SCG Genetics & Evolutionary Biology AND 1003ENV Statistics or 1014SCG Statistics or 2009CCJ Statistics for Social Research

Assumed Background:

Students should have completed and passed the following courses prior to undertaking 3017NSC Forensic DNA Profiling:

1042SCG Genetics and Evolutionary Biology and

1008NSC Principles of Forensic Investigation.

1.2 Course Introduction

The use of DNA in forensic biology has expanded since its first introduction. This course will cover technologies and methods that are being used in some forensic laboratories around the world (mini-STRs, Y-STRs, mtDNA and SNPs) and technologies that may be employed in the future (MPS, phenotypic characterisation, ancetral markers). This course will also cover the different ways in which the standard DNA profiling (STRs) can be used in relationship testing, reverse paternity testing and familial testing and how it can be applied to Disaster Victim Ientification (DVI). This course will also cover how these technologies are being used in other types of laboratories (medical genetic testing, genetic genealogical testing, parentage testing). Students will learn how this DNA data is generated and interpreted. An overview of the history and development of these DNA profiling methods will also be presented. The content will have core themes running throughout which include: the role of the molecular geneticist or forensic biologist; standard quality practices; how new technologies are being used in forensic investigations; how new technology are being introduced into the court room. Relevant cases will be reviewed that have shaped the use of DNA in court in Australia and around the world.

Previous Student Feedback

- I found the course to be interesting and applicable to the industry.
- Very well-organised course even with the impact of COVID 19.
  The lecturers are very interesting and Carney is extremely helpful and his knowledge is amazing.

- I really enjoyed the wide range of topics this course discussed and the variety of assessment pieces really helped develop relevant skills and stay engaged in the course.
- The lecturer was incredibly knowledgeable and could answer all of our questions.
- The DNA profiling course was engaging with plenty of interesting content from an equally interesting lecturer, who had copious amount of experience in the field which gave the course an edge.
- Overall, I loved this course and really enjoyed it. I found the content to be engaging and interesting to learn - particularly in applying it to the case studies towards the end.
- I like that the lecturer worked with the students, giving feedback as well as pushing assessments back when knowing students were struggling with deadlines or had a lot of improvements to make. Very much appreciated these aspects of the course

1.3 Course Staff

Primary Convenor
APro Carney Matheson

Phone	737358537
Email	c.matheson@griffith.edu.au
Campus	Nathan Campus
Building	Science 1 (N25)
Room	2.23

1.4 Timetable

Timetables are available on *the Programs and Courses website*.

NB: Details contained in this Section of the course profile and Section 4.1 Learning Activities are to be read in conjunction with the official class timetable. The published class timetable which is the authoritative source for timetabling information for all campuses can be located by clicking on the above link.

Additional Timetable Information

The workshops are actually tutorials and your attendance is expected.

1.5 Lecture Capture

It is standard practice at Griffith University that lectures timetabled in lecture capture-enabled venues are recorded and made available to students on the relevant course site, in accordance with the University's Lecture Capture Policy.

The lecture series delivered as part of this course will be recorded and accessible via the Learning@Griffith course site.

1.6 Technical Specifications

No additional technical specifications are required.

2. Aims, Outcomes & Graduate Attributes

2.1 Course Aims

Welcome to 3017NSC, Forensic DNA Profiling.

This 10 CP course is available only to students enrolled in the programs 1264 Bachelor of Forensic Science, 1265 Bachelor of Forensic Science/ Bachelor of Criminology and Criminal Justice and 1368 Bachelor of Forensic Science/ Bachelor of Criminology and Criminal Justice. It is a core course for the Forensic Molecular Biology Major and an elective course for the Forensic Chemistry Major.

Communication and correspondence
Carney Matheson is 3017NSC Course Convenor. Correspondence and appointment requests can be emailed to the course convenor c.matheson@griffith.edu.au. Please include the course code, your full name and student number in any email communication.

All course correspondence will be sent only to your student email accounts. If you elect to have email forwarded to another email account, it is your responsibility to ensure that you can access all course correspondence in a timely manner through that account.

Course Aims and Overview
This course aims to provide you with a detailed understanding of the techniques and processes used in NATA-accredited forensic biology laboratories. This includes DNA extraction, quantitation, genetic profiling and interpretation.

It further aims to demonstrate how such information can contribute to assisting police in identifying the person or persons responsible for the crime and, of equal importance, how such information can result in excluding suspects from further investigation.

2.2 Learning Outcomes

After successfully completing this course you should be able to:

1.CONTENT-BASED OUTCOMES

1.1 Understand the field of forensic biology, its history and development.

1.2 Understand and explain the basic processes and techniques involved in forensic DNA analysis as practiced in NATA-accredited Australian forensic DNA laboratories.

1.3 Understand and explain how such evidence can assist police in identifying the person or persons responsible for the crime.

1.4 Understand and explain how such evidence may also result in exclusion of suspects from further investigation.

1.5 Understand, in a fundamental way, how the outcomes of analysis of items of evidentiary value impact significantly on presentation of expert evidence in court, and how such evidence may be challenged by the Defence.

2.COGNITIVE OUTCOMES

2.1 Evaluate the evidentiary value of genetic data and understand the limitations of DNA analysis.

2.2 Discuss forensic DNA analytical techniques currently used in NATA-accredited Australian forensic biology laboratories and objectively interpret the results produced by such techniques.

2.3 Understand and discuss the principles underlying the ethical responsibilities of forensic DNA experts who analyse collected biological evidence and provide, as expert witnesses in court, evidence of fact as well as opinion evidence.

3.APPLICATION OUTCOMES

3.1 Demonstrate the ability, in relation to the forensic DNA techniques covered by this course, to communicate using professional forensic/ scientific terminology.

3.2 Demonstrate a fundamental understanding of the role and importance of problem-solving skills in forensic DNA analysis.

3.3 Continue the process of acquiring demonstrable skills and knowledge relevant and applicable to future study or employment in forensic laboratory organisations or in other professions associated with the criminal justice system.

2.3. Graduate Attributes

For further details on the Griffith Graduate please click here

Griffith University prepares influential graduates to be:

- Knowledgeable and skilled, with critical judgement
- Effective communicators and collaborators
- Innovative, creative and entrepreneurial
- Socially responsible and engaged in their communities
- Culturally capable when working with First Australians
- Effective in culturally diverse and international environments

This table demonstrates where each of the Griffith Graduate Attributes is taught, practised and assessed in this course.

For further details on the Griffith Graduate Attributes please refer to The Griffith Graduate policy.

University wide attributes

Graduate Attribute	Taught	Practised	Assessed

Knowledgeable and skilled, with critical judgement	•	•	•
Effective communicators and collaborators	•	•	•
Innovative, creative and entrepreneurial	•		
Socially responsible and engaged in their communities	•	•	•

3. Learning Resources

3.1 Required Resources

Details of your Required Learning Resources are available from the Reading List.

3.2 Recommended Resources

Details of your Recommended Learning Resources are available from the Reading List.

3.3 University Learning Resources

The University provides many facilities and support services to assist students in their studies. Links to information about University support resources that are available to students are included below for easy reference.

Readings - New online service enabling students to access Required and Recommended Learning resources. It connects to the library catalogue to assist with quickly locating material held in Griffith libraries and enables students to manage and prioritise their readings, add personal study notes and export citations.

Learning@Griffith - there is a dedicated website for this course via the Learning@Griffith at myGriffith.

Academic Integrity Tutorial - this tutorial helps students to understand what academic integrity is and why it matters. You will be able to identify types of academic misconduct, understand what skills you will need in order to maintain academic integrity, and learn about the processes of referencing styles.

Student Support - provides a range of services to support students throughout their studies including personal support such as Counselling and Health Services; Academic support; and Financial and Welfare support.

The Careers and Employment Team provides: Career Wellbeing, Career Planning and Decision Making, Finding Jobs, Skills Identification and Development, Graduate Employment Information, LinkedIn Profile Review, Interview Preparation, Online Psychometric and Aptitude Test Preparation, International Student Support, Disability Disclosure Strategies and Higher Degree Research (HDR) Career Consultations.

Library and Learning Services: Library and Learning Services provides a wide range of quality client-focused services and programs to students, researchers and staff of the University. Library and Learning Services works in collaboration with the academic community to achieve academic and research outcomes.

Support for learning - the University provides access to common use computing facilities for educational purposes.

Code of Practice - Griffith Information Technology Resources.

3.5 Other Learning Resources & Information

REQUIRED RESOURCE for this course: Butler, JM: Fundamentals of Forensic DNA Typing. Academic Press, USA 2010

There are a number of forensic websites that can provide additional resources to students (listed below). However, students are encouraged to independantly explore other resources.

- STR Base - John Butler & Team

www.cstl.nist.gov/biotech/strbase

http://www.nfstc.org/pdi/Subject00/pdi_s00.htm

- DNA Resource

www.dnaresource.com

- National Institute of Justice

www.gene-watch.org

- European Network of Forensic Science Institutes (ENFSI)

www.enfsi.eu

- International Society of Forensic Genetics

www.isfg.org

- National Institute of Forensic Science (Australia)

www.nifs.com.au

- Australian New Zealand Forensic Science Society

http://www.anzfss.org.au

- The Australian Academy of Forensic Sciences

http://www.forensicacademy.org

Additional Material

During the lectures additional material will be provided including web sites of interest.

4. Teaching & Learning Activities

4.1 Learning Activities

Week Commencing	Activity	Learning Outcomes
8 Mar 21 - 12 Mar 21	**Week 1 (Lecture):** Basic STR Profiling	1.1, 1.3, 1.5
8 Mar 21 - 12 Mar 21	**Week 1 (Tutorial):** Introduction to the course and assessment	1.1
15 Mar 21 - 19 Mar 21	**Week 2 (Lecture):** Alternate STR markers	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2
15 Mar 21 - 19 Mar 21	**Week 2: (Tutorial):** STR profile assessment, analysis and interpretation	1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 3.1
22 Mar 21 - 26 Mar 21	**Week 3 (Lecture):** Mitochondrial DNA profiling	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3
22 Mar 21 - 26 Mar 21	**Week 3 (Tutorial):** Mitochondrial DNA data analysis	1.2, 1.3, 1.4, 1.5, 2.1, 2.2
29 Mar 21 - 2 Apr 21	**Week 4 (Lecture):** SNP Profiling	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3
29 Mar 21 - 2 Apr 21	**Week 4 (Tutorial):** SNP data analysis	1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 3.1
12 Apr 21 - 16 Apr 21	**Week 5 (Lecture):** Parental testing	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3
12 Apr 21 - 16 Apr 21	**Week 5 (Tutorial):** Paternity and maternity calculations	1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 3.1, 3.2, 3.3
19 Apr 21 - 23 Apr 21	**Week 6 (Lecture):** Additional relationship testing	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3
19 Apr 21 - 23 Apr 21	**Week 6 (Tutorial):** Sibling and relationship calculations	1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 3.1, 3.2, 3.3
26 Apr 21 - 30 Apr 21	**Week 7 (Lecture):** DNA profiling and disaster victim identification	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3
26 Apr 21 - 30 Apr 21	**Week 7 (Tutorial):** Reverse paternity calculations	1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 3.1, 3.2, 3.3
3 May 21 - 7 May 21	**Week 8 (Lecture):** DNA profiling and quality management	1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 3.1, 3.2, 3.3
3 May 21 - 7 May 21	**Week 8 (Moots):** Expert witness Laboratory preparation	1.2, 1.3, 1.4, 1.5, 2.2, 2.3, 3.1, 3.2, 3.3
3 May 21 - 7 May 21	**Laboratory 1 (Laboratory):**	1.2, 3.1, 3.2, 3.3
10 May 21 - 14 May 21	**Week 9 (Lecture):** How to use DNA databases	1.2, 1.3, 1.4, 1.5, 2.2, 2.3, 3.1, 3.2, 3.3
10 May 21 - 14 May 21	**Week 9 (Moots):** Expert witness Laboratory preparation	1.2, 1.3, 1.4, 1.5, 2.2, 2.3, 3.1, 3.2, 3.3

Week Commencing	Activity	Learning Outcomes
10 May 21 - 14 May 21	**Laboratory 2 (Laboratory):**	1.2, 3.1, 3.2, 3.3
17 May 21 - 21 May 21	**Week 10 (Lecture):** Other areas of forensic biology	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3
17 May 21 - 21 May 21	**Week 10 (Moots):** Expert witness	1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 3.1, 3.2, 3.3
24 May 21 - 28 May 21	**Week 11 (Lecture):** The future forensic laboratory	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3
24 May 21 - 28 May 21	**Week 11 (Moots):** Expert witness	1.2, 1.3, 1.4, 1.5, 2.2, 2.3, 3.1, 3.2, 3.3
31 May 21 - 4 Jun 21	**Week 12 (Lecture):** International forensics Employment in forensic science	1.1, 1.2, 1.3, 1.4, 1.5, 2.2, 2.3, 3.1, 3.2, 3.3
31 May 21 - 4 Jun 21	**Week 12 (Moots):** Expert witness Exam preparation and revision.	1.1, 1.2, 1.3, 1.4, 1.5, 2.2, 2.3, 3.1, 3.2, 3.3

4.2 Other Teaching and Learning Activities Information

This course will be presented as a series of lectures, tutorials and laboratories. The purpose of the lectures is to provide the learning framework and primary source of content material for students through presentation of relevant forensic DNA concepts and techniques. The purpose of the tutorials is to review and discuss case studies that apply to the material presented in lectures; practice applied aspects of case investigations, genetic profile interpretation and statistical analysis; prepare statements of witness for court; and practically learn the aspects of expert witness testimony. The tutorials provide time to ensure that any student learning difficulties are identified and addressed. The tutorials may involve small group discussions and problem-based learning sessions.

Contact Summary
Attendance at lectures and tutorials in this course prepare the student for employment by allowing them to form a solid basis for professional practice. Elements and content in this course provide the necessary framework and practical application for students' learning in subsequent forensic courses in the forensic science program.

Public Holidays

If a class is usually scheduled on a day that falls on a public holiday, or is cancelled for any reason, the content will be delivered online or integrated across other classes, as appropriate.

Students Repeating a Course

Normally, students repeating a course should not carry forward marks from a previous attempt. Assessment items are usually offered to provide formative experience as well as a summative assessment. Therefore, NO MARK for any assessment item from a previous attempt will be carried forward.