School of Electrical Engineering & Telecommunications

UNSW Engineering

ELEC3104

Digital Signal Processing

Term 3, 2022

Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Professor Eliathamby Ambikairajah	e.ambikairajah@unsw.edu.au	Monday and Thursday 11 - 5 pm	Room 226, Elec Eng building (G17)	

School Contact Information

Consultations: Lecturer consultation times will be advised during the first lecture. You are welcome to email the tutor or laboratory demonstrator, who can answer your questions on this course and can also provide you with consultation times. ALL email enquiries should be made from your student email address with ELEC/TELExxxx in the subject line; otherwise they will not be answered.

Keeping Informed: Announcements may be made during classes, via email (to your student email address) and/or via online learning and teaching platforms – in this course, we will use Moodle https://moodle.telt.unsw.edu.au/login/index.php. Please note that you will be deemed to have received this information, so you should take careful note of all announcements.

Student Support Enquiries

For enrolment and progression enquiries please contact Student Services

Web

Electrical Engineering Homepage

Engineering Student Support Services

Engineering Industrial Training

UNSW Study Abroad and Exchange (for inbound students)

UNSW Future Students

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

Email

Engineering Student Support Services – current student enquiries

- e.g. enrolment, progression, clash requests, course issues or program-related queries

Engineering Industrial Training – Industrial training questions

UNSW Study Abroad – study abroad student enquiries (for inbound students)

UNSW Exchange – student exchange enquiries (for inbound students)

UNSW Future Students – potential student enquiries

- e.g. admissions, fees, programs, credit transfer

Course Details

Units of Credit 6

Summary of the Course

Processing and analysis of continuous (analogue) and discrete-time (digital) signals. Sampling continuous signals: the sampling theorem, reconstruction, aliasing, and the z-transform. Filter impulse and frequency responses, stability and digital oscillators. The discrete Fourier transform (DFT). Fundamentals of the design and realisation of finite impulse response (FIR) and infinite impulse response (IIR) digital filters. Linear and non-linear phase filters. Decimation, interpolation, multi-rate digital signal processing.

Course Aims

The course aims to equip students with:

1. An understanding of the time and frequency domain representations of signals and systems.

2. The skills to identify the correct type of filter required for a given problem and to demonstrate the design and implementation of a digital filter.

3. An understanding of multi-rate processing and multi-rate systems.

Course Learning Outcomes

After successfully completing this course, you should be able to:

Learning Outcome	EA Stage 1 Competencies
1. Analyse linear time-invariant systems	PE1.1, PE1.2, PE2.2, PE3.1, PE3.5
2. Demonstrate competency in time and frequency domain analysis of signals and systems including transform methods	PE1.1, PE1.3, PE1.5, PE2.1, PE2.2, PE3.1, PE3.5
3. Design and analyse digital filters for a given specification	PE1.3, PE1.5, PE2.1, PE3.1, PE3.3, PE3.5
4. Implement a simple multi-rate system	PE1.3, PE1.5, PE2.1, PE2.2, PE3.1, PE3.2, PE3.3, PE3.5

Teaching Strategies

Delivery Mode

The entire analytical component of the course will be delivered via online/face to face lectures and face to face/online laboratories and discussions with assigned lab demonstrators.

Learning in this course

1. You are expected to learn from all lectures every week and participate in the weekly labs with allocated lab demonstrators.
2. You must prepare well for your weekly MATLAB coding laboratory discussion with the demonstrators
3. Each week, you must reflect on the content that you have learnt from the topics that has been taught in the lectures.
4. You must attend all the-labs/mini-project sessions, assessments, and exams.
5. Reading additional texts will further enhance your learning experience.
6. Group learning is also encouraged (each lab group will have 16 students per lab demonstrator).
7. For a primarily face-to-face and partially online course such as this course, it is *vital* that you undertake adequate self-directed study every week during the term. The Tiered Learning Taxonomy (TLT) - A self-driven learning framework which is presented in Appendix A will help guide you on this.

Additional Course Information

A. Course Details

Credits: This is a 6 UoC course and the expected workload is at least 12 hours per week throughout the 10-week term.

Relationship to Other Courses: This is a 3rd year course in the School of Electrical Engineering and Telecommunications at the University of New South Wales. It is a core course for students following a BE (Electrical) or (Telecommunications) program and other combined degree programs, and an elective for Computer Engineering students.

Pre-requisites and Assumed Knowledge: The pre-requisite for this course is ELEC2134, Circuits and Signals. It is essential that students are familiar with basic circuit theory, signal analysis and transform methods. It is further assumed that students are familiar with the MATLAB environment, and have good computer literacy.

Note: MATLAB Tutorial Videos: **http://eemedia.ee.unsw.edu.au/MatlabTutorial/index.htm**

Subsequent Courses: The course is a pre-requisite for all professional electives in the Signal Processing group, including ELEC4621 Advanced Digital Signal Processing and ELEC4622 Multimedia Signal Processing.

B. Primary Learning Mode (This course is delivered online/face-to-face)

- 2-hour weekly lectures are delivered in an online/face-to-face mode.
- 1-hour weekly lectures/tutorials are delivered in online/ face-to-face mode.
- 2-hour weekly laboratories (approximately 16 students per group, per tutor) are primarily delivered in- person, except one online group.
- In Weeks 3 and 8 (during the Thursday laboratory classes) there will be a 30-minute Multiple Choice Quiz, consisting of 4 questions (Analytical) and 2 MATLAB questions.
- In week 5 (During your laboratory time) there will be a 1.5 - hour written exam (open-book) covering the lecture content from weeks 1 to 4 . The exam questions will be based on Tiered

Learning Taxonomy (TLT) Framework– Appendix A

- At the end of week 5, the mini-project will be released.
- In Week 11 (Monday/Tuesday), there will be a 20 min oral presentation exam for the mini-project. The students who are unavailable during Week 11 (Monday or Tuesday), should contact their lab demonstrators to organise their oral presentation slot to occur in Week 10.
- There will be a final exam (open book) of 2-hour duration covering the lecture content from weeks 1 to 10.
- You are required to commit at least 15 hours per week to your learning, including self-study in order to complete the above assessments successfully.
- This course has been re-designed based on Tiered Learning Taxonomy (TLT) – A self-driven learning framework **(Appendix A)**

Indicative Course Schedule

Week	Lecture	Mode
1	Topic 1: DSP Fundamentals	Online/ face to face
2	Topic 1: DSP Fundamentals Topic 2: Discrete- time systems	
3	Topic 2: Discrete- time systems Topic 3: Digital filter fundamentals & **Multiple Choice Quiz 1 (Topics 1 & 2)**	
4	Topic 3: Digital filter fundamentals	
5	Topic 4: Digital Oscillator fundamentals & mid-term **written exam** (**Topics 1 to 3**)	
6	***Flexibility Week – No new material taught***	Online/ face to face
7	Topic 5: Digital Filter designs	
8	Topic 5: Digital filter designs & **Multiple Choice Quiz 2 (Topics 4 & 5)**	
9	Topic 6: Multirate systems	
10	Topic 6: Multirate systems	

Appendix A

Tiered Learning Taxonomy (TLT) Framework

- Tiered Learning Taxonomy (TLT) is a self-driven learning framework for analysing students' depth of knowledge or for measuring how well a student understands a topic.
- TLT divides the learning curve within the course into 5 Hierarchical levels of increasing complexity in student's understanding of topics studied.

Why does this matter to you?

- The taxonomy encourages students to think about which level they are currently at with their learning, and what they need to do in order to progress to the next level.
- Within this TLT framework, students have more control and choice over how much they want to learn and deepen their knowledge.
- The TLT framework has been designed to include Pass, Credit, Distinction and High Distinction levels to help students understand the different levels (Levels 0 to 5) on the learning curve, and what they need to do to progress.
- If you are happy with your current level of learning and don't want to deepen your knowledge to

progress to the next level, that is entirely your choice. At an absolute baseline, all students must achieve a Pass level (i.e. be at Level 2) as a total final mark (≥50%) at completion of the course, if you want to pass the course.

- The Course is designed to provide an increasing complexity from Pass (Level 2) to High Distinction (Level 5) levels as shown on the Taxonomy Framework diagram below.
- All **Tutorial questions** will be levelled as per the TLT for this course. You must do Level 2 (Pass) questions as a baseline. If you choose to attempt any other questions in the tutorial beyond Level 2, please complete other questions in sequential order (i.e. attempt Level 3 first, before doing Level 4 etc)

Different Stages of the TLT Framework

- **Level 0:** The students don't have any understanding about the topic, but have the pre-requisite knowledge to commence this course.

- **Level 1:** Very basic understanding, where their knowledge accrues in greater quantity. They understand all of the concepts.

- **Level 2:** Students know all the concepts and are able to link many of the concepts to each other.

- **Levels 3, 4 & 5:** All concepts known, and additionally there is a deep understanding that comes with a qualitative change in how the concepts are understood. They are able to connect the concepts in multiple ways. Surface knowledge (Levels 1 & 2) is required as a baseline, in order to develop deep knowledge

C. Class Timetable: You can find the detailed class schedule at the following links: http://timetable.unsw.edu.au/2021/ELEC3104.html

- **You must attend the same lab timeslot throughout Week 1 to Week 10.**
- **You cannot move timeslots once you have chosen your preferred lab times in Week 1.**

D. Protocol for Consultations:

- You are encouraged to contact the Head Tutor or your Lab Demonstrator in the first instance, who can respond to your questions on course logistics
- The Head Tutor Aryan Sharma (aryan.sharma@unsw.edu.au) should be contacted in the first instance about course learning, feedback, your marks and content-related questions.
- You are welcome to contact me for any course related matters.
- All email enquiries should be made from your UNSW student email address (please do not use any other email address) with ELEC3104 in the subject line, to ensure that they can be addressed promptly.
- Online students will be required to submit a scan/photo of your student ID pass to your Lab demonstrator in Week 1

E. Course Staff

Head Tutor:

Mr. Aryan Sharma (aryan.sharma@unsw.edu.au)

Lab Demonstrators:

Mr. Antoni **Dimitriadis** antoni.dimitriadis@unsw.edu.au

Ms. Hanyu Meng (hanyu.meng@student.unsw.edu.au);

Ms Jingyao Wu (jingyao.wu@unsw.edu.au);

Mr Junye Li (junye.li@unsw.edu.au);

Ms Deboshree Bose (deboshree.bose@unsw.edu.au)

Dr Sirojan Tharmakulasingam (s.tharmakulasingam@unsw.edu.au)

F. Consutation:

Consultations (Optional)	Thursday	6pm – 7pm (For Thursday Morning lab students)	Online/ Ms Deboshree Bose & Prof E Ambikairajah
	Wednesday	6pm – 7 pm (For Thursday afternoon lab students)	Online/ Ms Deboshree Bose & Prof E Ambikairajah

Table 2: Overview: Activities and Assessments

Week	**Activities and Assessments**	**Date**	**Time**
3	Multiple Choice Quiz 1 on Moodle (7.5%)	29/09/22 Thursday	11:30am (Morning group) 3:30pm (Afternoon group)
4	Mid-term written exam sample paper released	0710/22 Tuesday	Release time: 9:00am
5	Mid-term written exam (20%)	13/10/22	11:00 am – 1pm (Morning group)

		Thursday	3:00pm to 5:00pm (Afternoon group)
	Release of mini-project (individual)	14/10/22 Friday	Release time: 9:00am
8	Multiple Choice Quiz 2 on Moodle (7.5%)	3/11/22 Thursday	11:30am (Morning group) 3:30 pm (Afternoon group)
10	Final written exam sample paper released	18/11/22 Friday	Release time: 9:00am
	Submission of Mini-project slides	18/11/22 Friday	Submission time: 9 am to 9 pm
11	Mini-Project Presentation Exam (30%)	21/11/22 Monday & 22/11/22 Tuesday	20 min slot for each student **Note:** The students who are unavailable during Week 11 (Monday or Tuesday), should contact their lab demonstrators to organise their oral presentation slot to occur in Week 10.
Note: Please forward any feedback on the course to the weekly comments link in **SurveyMonkey on Moodle**. Open on Friday 9:00am and will close on the same day at 9:00pm			

Assessment

Assessment

The assessment scheme in this course reflects the intention to assess your learning progress through the term. Ongoing assessment occurs through online assessments such as the midterm exam (Week 5), Multiple Choice Quizzes (Weeks 2, 4 & 8) and the mini-project project exam in Week 10 (plus the project report) and then the final exam.

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Final Exam	35%	Not Applicable	1, 2, 3, 4
2. Multiple Choice Quiz	15%	Not Applicable	1, 2, 3
3. Project	30%	Not Applicable	1, 2, 3, 4
4. Mid-term written exam	20%	Not Applicable	1, 2

Assessment 1: Final Exam

Assessment length: 2 hours

Final exam(35%): There will be one final examination (2- hr duration) , testing understanding of the principles and analytical skills through a number of set problems covering the content from weeks 1 to 10.. The final exam questions will be based on the Tiered Learning Taxonomy (TLT) framework.

Additional details

Final exam: A sample paper will be released on Moodle in Week 10.

Assessment 2: Multiple Choice Quiz

In Weeks 3 and 8, there will be a 30-minute Multiple Choice Quiz (each worth 7.5%) consisting of 6 multiple choice questions (4 analytical questions and 2 MATLAB questions) during the Thursday laboratory class.

Assessment criteria

Four analytical questions will be mainly based on the lecture content, and the remaining **two** questions

will be based on MATLAB exercises that you are doing, or have done, during the laboratory classes. Only one attempt of each of these quizzes is allowed. There will be no negative marking of multiple-choice questions – you will only receive marks for correct answers and will not be marked down for incorrect answers.

Assessment 3: Project

The mini-project (individual work) will be released at the end of Week 5 and you are expected to complete it by the end of Week 10. This mini-project must be completed individually, it is not a team project. The mini-project will be assessed in Week 11 in the form of a 20-min presentation/question and answer format (30%). Students must submit their presentation slides (format will be given in Week 9) at the end of Week 10.

The mini-project is designed to provide an increasing complexity from Pass (Level 2) to High Distinction (Level 5) levels as per the TLT framework.

The mini-project presentation exam will be marked on the basis of:

- the depth of understanding of the project,
- successful implementation of the project,
- presentation of the results,
- ability to answer questions and
- clarity of communication exhibited in the presentation.

Please note that there will be **no** requirement for a mini-project report submission.

Bonus Scheme: Students normally implement the mini project using MATLAB and it is ok to do so for this course. However, to encourage students to write their code in Python (which is an industry-standard coding language) bonus marks will be awarded. A maximum of 10 bonus marks can be attained. Complete and working code in Python for the entire mini-project gets 10 bonus marks and this will be added to your mini-project exam mark (which will be marked out of 100, but note that it will also be capped at 100).

It is worth learning Python and it will be very useful for your final year project (particularly for signal processing based projects) and also when you work in industry that has a signal processing focus or specialty.

Hurdle requirement

You must pass the mini-project presentation exam in order to pass the overall course

Assessment 4: Mid-term written exam

Assessment length: 1.5 hours

There is a midterm exam, on **Thursday of Week 5 during your lab time**. This exam will be 1.5 hour long. The exam will cover all the topics covered in the lectures from Week 1 to Week 4 (inclusive).

The exam consists of 4 analytical questions (with many parts). Questions must be answered as per the

Tiered Learning Taxonomy Framework

Additional details

A sample paper will be released on Moodle in Week 4.

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Course Schedule

Attendance and Online Participation

Weekly participation in online labs with the assigned tutor is vital for this course. If you do not participate in the weekly labs you may be removed from this course.

Resources

Prescribed Resources

Reference books

- E. Ambikairajah, ELEC3104: Lecture Notes, (2021)
- A. Andreas, Digital Filters Analysis Design and Signal Processing, McGraw-Hill, 2018.
- A. V. Oppenheim, R. W. Schafer, & P. Buck, Discrete-Time Signal Processing, Prentice-Hall, 2010.
- S. K. Mitra, Digital Signal Processing, McGraw-Hill, 2011.
- J. Proakis & D. Manolakis, Digital Signal Processing, Prentice-Hall, 2007.
- A. Antoniou, Digital Signal Processing – Signals, Systems and Filters, McGraw-Hill, 2016

Recommended Resources

Note: MATLAB Tutorial Videos: http://eemedia.ee.unsw.edu.au/MatlabTutorial/index.htm

Course Evaluation and Development

Continual Course Improvement

This course is being offered for the second time based on TLT framework for the partial online/primarily face to face offering. The TLT framework includes 6 Hierarchical levels and the taxonomy encourages students to think about which level they are currently at with their learning, and what they need to do in order to progress to the next level.

Your feedback is valuable to improve the course. Please forward any feedback (positive or negative) on the course to the course convener **or** via the **weekly comments link** in **SurveyMonkey on Moodle**. This will ensure we can make adaptive changes throughout the term.

- Towards Week 10, you will be asked by UNSW to provide feedback via the online student survey myExperience.

- You can also provide feedback to ELSOC who will raise your concerns at student focus group meetings.

- As a result of the feedback received last year for this course, and in our efforts to provide a rich and meaningful learning experience, we have continued to evaluate and modify our delivery and assessment methods:

1. The majority of the students appreciated the TLT framework (it was called modified SOLO framework last year) as it provides a self-assessment in measuring how well a student understands a topic.
2. Many students found that this TLT framework encouraged them to push themselves to achieve a higher level of understanding.
3. Many students found the three-hour labs were too long and not effective. For this year, we have reduced it to a 2hr lab plus 1 hour of mentoring from the lab demonstrator to provide personalisation.
4. Many students found the ratio of 25 students: 1 lab demonstrator was not effective, so we have

now reduced the numbers to 16 students per lab demonstrator
5. The Mini-project written exam and mini-project report have been removed and a mini-project presentation exam has been introduced. This provides an opportunity to reflect on the mini-project that the students have implemented. Student can then present their understanding of the implementation in more depth, and with supporting results.
6. A bonus mark scheme has been introduced for those students who wish to implement the project in Python (industry standard), instead of MATLAB.

Laboratory Workshop Information

Weekly Laboratory classes : The laboratory program is an important aspect of this course and will **commence in Week 1**. Through the laboratory component, you will progressively encounter the elements of the syllabus. The laboratory sessions are designed to help you develop your practical skills using MATLAB. The aim of the laboratory component is to ground the analytical subject material in a real-world problem, where the skills and knowledge you learn throughout the course will be applied in real engineering design work.

The mini-project which will be released in Week 5 is designed to provide hands-on exposure to the applications of the concepts learnt in the course, in implementing a DSP system. You are strongly encouraged to discuss your mini-project implementation with your lab demonstrators to complement your self-directed learning.

The mini-project is designed to provide an increasing complexity from Pass (Level 2) to High Distinction (Level 5) levels as per TLT (Appendix A). The taxonomy encourages students to think about which level they are currently at, with their mini-project learning, and what they need to do in order to progress to the next level.

Laboratory Exemption : There is no laboratory exemption for this online course. Regardless of whether equivalent labs have been completed in previous courses, all students enrolled in this online course must take the labs and mini-project. If, for medical reasons, (note that a valid medical certificate must be provided) you are unable to attend a lab, please contact your assigned demonstrator.

Academic Honesty and Plagiarism

Academic Honesty and Plagiarism

Plagiarism is the unacknowledged use of other people's work, including the copying of assignment works and laboratory results from other students. Plagiarism is considered a form of academic misconduct, and the University has very strict rules that include some severe penalties. For UNSW policies, penalties and information to help you avoid plagiarism, see https://student.unsw.edu.au/plagiarism. To find out if you understand plagiarism correctly, try this short quiz: https://student.unsw.edu.au/plagiarism-quiz.

General Conduct and Behaviour

Consideration and respect for the needs of your fellow students and teaching staff is an expectation. Conduct which unduly disrupts or interferes with a class is not acceptable and students may be asked to leave the class.

Academic Information

COVID19 - Important Health Related Notice

Your health and the health of those in your class is critically important. You must stay at home if you are sick or have been advised to self-isolate by NSW health or government authorities. Current alerts and a list of hotspots can be found here. **You will not be penalised for missing a face-to-face activity due to illness or a requirement to self-isolate**. We will work with you to ensure continuity of learning during your isolation and have plans in place for you to catch up on any content or learning activities you may miss. Where this might not be possible, an application for fee remission may be discussed.

If you are required to self-isolate and/or need emotional or financial support, please contact the Nucleus: Student Hub. If you are unable to complete an assessment, or attend a class with an attendance or participation requirement, please let your teacher know and apply for special consideration through the Special Consideration portal. To advise the University of a positive COVID-19 test result or if you suspect you have COVID-19 and are being tested, please fill in this form.

UNSW requires all staff and students to follow NSW Health advice. Any failure to act in accordance with that advice may amount to a breach of the Student Code of Conduct. Please refer to the Safe Return to Campus guide for students for more information on safe practices.

Dates to note

Important Dates available at: https://student.unsw.edu.au/dates

Student Responsibilities and Conduct

Students are expected to be familiar with and adhere to all UNSW policies (see https://student.unsw.edu.au/policy), and particular attention is drawn to the following:

Workload

It is expected that you will spend at least **15 hours per week** studying a 6 UoC course, from Week 1 until the final assessment, including both formal classes and *independent, self-directed study*. In periods where you need to complete assignments or prepare for examinations, the workload may be greater. Over-commitment has been a common source of failure for many students. You should take the required workload into account when planning how to balance study with employment and other activities.

Attendance

Regular and punctual attendance at all classes is expected. UNSW regulations state that if students attend less than 80% of scheduled classes they may be refused final assessment.

Work Health and Safety

UNSW policy requires each person to work safely and responsibly, in order to avoid personal injury and to protect the safety of others.

Special Consideration and Supplementary Examinations

You must submit all assignments and attend all examinations scheduled for your course. You can apply for special consideration when illness or other circumstances beyond your control interfere with an assessment performance. If you need to submit an application for special consideration for an exam or assessment, you must submit the application **prior to the start** of the exam or before the assessment is submitted, except where illness or misadventure prevent you from doing so. Be aware of the "fit to sit/submit" rule which means that if you sit an exam or submit an assignment, you are declaring yourself well enough to do so and cannot later apply for Special Consideration. For more information and how to apply, see https://student.unsw.edu.au/special-consideration.

Administrative Matters

On issues and procedures regarding such matters as special needs, equity and diversity, occupational health and safety, enrolment, rights, and general expectations of students, please refer to the School and UNSW policies:

https://student.unsw.edu.au/guide

https://www.engineering.unsw.edu.au/electrical-engineering/resources

Disclaimer

This Course Outline sets out description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle should be consulted for the up-to-date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline (as updated in Moodle), the description in the Course Outline/Moodle applies.

Image Credit

Synergies in Sound 2016

CRICOS

CRICOS Provider Code: 00098G

Acknowledgement of Country

We acknowledge the Bedegal people who are the traditional custodians of the lands on which UNSW Kensington campus is located.

Appendix: Engineers Australia (EA) Professional Engineer Competency Standard

Program Intended Learning Outcomes	
Knowledge and skill base	
PE1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline	✓
PE1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline	✓
PE1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline	✓
PE1.4 Discernment of knowledge development and research directions within the engineering discipline	
PE1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline	✓
PE1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline	
Engineering application ability	
PE2.1 Application of established engineering methods to complex engineering problem solving	✓
PE2.2 Fluent application of engineering techniques, tools and resources	✓
PE2.3 Application of systematic engineering synthesis and design processes	
PE2.4 Application of systematic approaches to the conduct and management of engineering projects	
Professional and personal attributes	
PE3.1 Ethical conduct and professional accountability	✓
PE3.2 Effective oral and written communication in professional and lay domains	✓
PE3.3 Creative, innovative and pro-active demeanour	✓
PE3.4 Professional use and management of information	
PE3.5 Orderly management of self, and professional conduct	✓
PE3.6 Effective team membership and team leadership	