ITEC851

Mobile Data Networks

S2 Evening 2019

Dept of Computing

Contents

General Information

Unit convenor and teaching staff
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Credit points
4

Prerequisites
ITEC647 or admission to MCyberSec with a specialisation in Internetworking

Corequisites

Co-badged status

Unit description
This unit will aim to provide a sound understanding of the architecture and operating principles of mobile and wireless networks. The unit will cover two fronts: introduce students to the diverse literature on mobile data networks, and expose them to the fundamental issues in design and analysis of different mobile network architectures. A healthy mix of technological and research issues will be covered pertaining to a wide range of topics in mobile networking including wireless LANs, mobile network layer design, location management and mobility tracking, mobile transport layer design issues, and ad hoc networks.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

Demonstrate in-depth knowledge and understanding of mobile technologies and apply them to solve practical real world problems in a professionally responsible manner.

Demonstrate an understanding of the fundamental principles required to design mobile networks.

Analyse the protocol architecture of mobile data and cellular networks.

Exemplify a wide range of problems and research issues in the field of mobile networking.

Demonstrate an understanding of the concepts, techniques, algorithms, and protocols employed in mobile data and cellular networks and be able to communicate these ideas to wider audience

Evaluate critically a wide range of current trends and technologies in the field of mobile networking

Engage in independent professional work with a high level of autonomy and accountability.

General Assessment Information

The three Quizzes constitute **20%** of the total mark and serve as a feedback mechanism to monitor your progress in the unit.

Assignments constitute **30%** of the total mark. Assignment must be submitted on time.

Late Submission

No extensions will be granted without an approved application for Special Consideration. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late. For example, 25 hours late in submission for an assignment worth 10 marks – 20% penalty or 2 marks deducted from the total. No submission will be accepted after solutions have been posted.

Assignment work must be written clearly, with good grammar, correct word usage, correct punctuation, and lack of spelling errors. Poor or bad expression will be penalized. Wherever required, all written work must be properly referenced and conform to standard stylistic conventions.

General notes on assignment

For all submittable assignment work you are encouraged to:

- set your personal deadline earlier than the actual one;
- keep backup of all important files;
- make sure that no one else picks up your printouts.

Examination

The examination is a **hurdle** in this unit with a weighting of **50%**. Concretely, in order to pass the

unit, you must get at least **40%** of the marks in the final examination. Students who score between **30%** and **40%** will be eligible for a second chance examination.

Supplementary Exam

If you receive Special Consideration for the final exam, a supplementary exam will be scheduled after the normal exam period, following the release of marks. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

If you are given a second opportunity to sit the final examination as a result of failing to meet the minimum mark required, you will be offered that chance during the same supplementary examination period and will be notified of the exact day and time after the publication of final results for the unit.

Assessment Tasks

Name	Weighting	Hurdle	Due
Quiz 1	10%	No	Week 5 (in class)
Quiz 2	10%	No	Week 10 (In class)
Assignment 1	10%	No	Week 8
Assignment 2	20%	No	Report Due: Week 11
Final Exam	50%	Yes	Sem 2 Exam Period

Quiz 1

Due: **Week 5 (in class)**
Weighting: **10%**

Quiz 1 is a short test (close book) that will be based on your previously covered lecture material for weeks 1-4. The quiz questions will be handed over to you at the beginning of your Lecture class. Quiz 1 contributes 5% of the total mark.

On successful completion you will be able to:

- Demonstrate in-depth knowledge and understanding of mobile technologies and apply them to solve practical real world problems in a professionally responsible manner.
- Demonstrate an understanding of the fundamental principles required to design mobile networks.
- Exemplify a wide range of problems and research issues in the field of mobile

networking.

- Demonstrate an understanding of the concepts, techniques, algorithms, and protocols employed in mobile data and cellular networks and be able to communicate these ideas to wider audience

Quiz 2

Due: **Week 10 (In class)**
Weighting: **10%**

Quiz 2 is a short test (close book) that will be based on your previously covered lecture material for Weeks 5-9. The quiz questions will be handed over to you at the beginning of your Lecture class. Quiz 2 contributes 5% of the total mark.

On successful completion you will be able to:

- Demonstrate in-depth knowledge and understanding of mobile technologies and apply them to solve practical real world problems in a professionally responsible manner.
- Demonstrate an understanding of the fundamental principles required to design mobile networks.
- Exemplify a wide range of problems and research issues in the field of mobile networking.
- Demonstrate an understanding of the concepts, techniques, algorithms, and protocols employed in mobile data and cellular networks and be able to communicate these ideas to wider audience

Assignment 1

Due: **Week 8**
Weighting: **10%**

Individual Assignment

Assignment Type: Problem Solving:

The purpose of the problem solving assignment is to help the students to get accustomed to dealing with real world problem situations/issues.It is designed to help students analyse a particular problem and find its best solution. Some questions may require an in depth research and will be a process to come up with an acceptable and reasonable answer

On successful completion you will be able to:

- Demonstrate in-depth knowledge and understanding of mobile technologies and apply them to solve practical real world problems in a professionally responsible manner.

- Demonstrate an understanding of the fundamental principles required to design mobile networks.

- Analyse the protocol architecture of mobile data and cellular networks.

- Exemplify a wide range of problems and research issues in the field of mobile networking.

- Demonstrate an understanding of the concepts, techniques, algorithms, and protocols employed in mobile data and cellular networks and be able to communicate these ideas to wider audience

- Evaluate critically a wide range of current trends and technologies in the field of mobile networking

- Engage in independent professional work with a high level of autonomy and accountability.

Assignment 2

Due: **Report Due: Week 11**
Weighting: **20%**

Assignment 2 - Group Project will apply to all material taught in this course.

Students will leverage their knowledge of mobile networks to research and critically analyse relevant literature in the discipline and present conclusions. The assessment also allows students to further develop their team working and professional communication skills. The project report (5 pages with citations) is due in week **11**. The Presentations are scheduled in weeks **11** and **12**.

On successful completion you will be able to:

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- Exemplify a wide range of problems and research issues in the field of mobile networking.

- Demonstrate an understanding of the concepts, techniques, algorithms, and protocols employed in mobile data and cellular networks and be able to communicate these ideas to wider audience

- Evaluate critically a wide range of current trends and technologies in the field of mobile networking

- Engage in independent professional work with a high level of autonomy and

accountability.

Final Exam

Due: **Sem 2 Exam Period**
Weighting: **50%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

An examination allows us to individually and securely assess student's mastery of the coursework material. The examination will be closed book and three (3) hours in length.

The final exam is designed for students to demonstrate their ability to work under time-pressure while answering standardised questions. This is a **hurdle assessmen**t: Students must obtain at least **40%** in the final exam to be eligible to pass the unit. Students obtaining between **30%** and **40%** in the first attempt will be automatically given a second attempt to pass the hurdle requirement.

Hurdle

- Second chances at hurdles are marked **pass/fail**. This means that the maximum that a student can receive at a second attempt is the hurdle requirement:if the hurdle requirement is **40%**, the maximum a student can receive is **40%**
- Students only receive a second attempt if they are capable of passing the unit. This means that the maximum they can receive from the second attempt (see the previous point) must be such that their final mark would add up to **50%+**

Supplementary Exam

If you receive Special Consideration for the final exam, a supplementary exam will be scheduled after the normal exam period, following the release of marks. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

On successful completion you will be able to:
- Demonstrate in-depth knowledge and understanding of mobile technologies and apply them to solve practical real world problems in a professionally responsible manner.
- Demonstrate an understanding of the fundamental principles required to design mobile networks.

- Analyse the protocol architecture of mobile data and cellular networks.

- Exemplify a wide range of problems and research issues in the field of mobile networking.

- Demonstrate an understanding of the concepts, techniques, algorithms, and protocols employed in mobile data and cellular networks and be able to communicate these ideas to wider audience

Delivery and Resources

ITEC851 is taught via lectures and informal tutorial sessions.

Classes

Classes are held from **6-10 pm Thursday** evenings. Lectures/Tutorials and other discussion are in **12 Second Way- 315 Tutorial Room**

in the lecture slot.

Lectures

Lectures are used to introduce mobile network technologies, protocols and design and put them in a wider context. You are encouraged to ask questions of the lecturer, both during and outside the lecture, to clarify anything you might not be sure of.

It should be noted that no single text book completely covers the content of this unit. A large portion of the lecture material is drawn from research papers, white papers and standard documents . Students are encouraged to read the weekly recommended reading list to gain a solid understanding of the topics that are covered.

Quizzes

There will be two quizzes in the following weeks: **5** and **10**. A quiz is a short test that will be based on your previously covered lecture material. For example, week 5 quiz will be based on lectures done in weeks 1-4. The quiz questions will be handed over to you at the beginning of your Lecture class. Each quiz contributes **10%** of the total mark and serves as a feedback mechanism to monitor your progress in the unit.

Tutorial

The tutorial gives you the opportunity to interact with your peers and with the lecturer. The tutorial sessions involve informal discussions with your peers and the lecturer. Each week you will be given problems to solve prior to the tutorial; preparing solutions is important because it will allow you to discuss the problems effectively with your lecturer and maximise the feedback

you get on your work.

Assignments

Your assignment is to be submitted online using **Turnitin**.

Late Submission

No extensions will be granted without an approved application for Special Consideration. There will be a deduction of **10%** of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late. For example, 25 hours late in submission for an assignment worth 10 marks – 20% penalty or 2 marks deducted from the total. No submission will be accepted after solutions have been posted.

Practicals

Practical sessions will be held during the lecture slot. Practical sessions are not scheduled every week. All practical sessions are scheduled in the second half of the unit.

General Notes

In this unit, you should do the following:

- Attend lectures, take notes, ask questions.
- Attend your tutorial, seek feedback from your lecturer on your work.
- Prepare for and strive to do well in the three quizzes
- Read appropriate sections of the text, add to your notes and prepare questions for your lecturer/tutor.
- Prepare answers to tutorial questions.
- Work on any assignments that have been released.

Required and Recommended Texts

There is no single text book containing material that could address all topics of unit. All necessary reading material and elaborate and detailed notes on lecture topics will be provided by lecturers every week.

Other Useful Books (You need not buy unless you believe you need to own one)

- Aftab Ahmed, Wireless and Mobile Data Networks. John Wiley & Sons 2005.
- A. Jamalipour, The Wireless Mobile Internet: Protocols, Architectures, and Services, John Wiley & Sons Publishers, Chichester, UK, 2003.
- M. Grayson, K. Shatzkamer, K. Wierenga Building the Mobile Internet, Cisco Press, 2011

Unit Schedule

Lecture Schedule (Tentative)

Note: We anticipate that there may be some shifting of material depending on class progress during the lecture series.

Week	Topic		Reading
1	Introduction		Notes
2	Wireless Transmission (Physical Layer)		Notes
3	Medium Access Protocols- An Introduction		Notes
4	Wireless LAN		Notes
5	Mobile IP-Cellular IP	Quiz 1	Notes
6	Transport Protocols for Mobile and Wireless Networks		Notes
7	Cellular Networks: An Introduction		Notes
8	Convergence of Cellular and IP based Networks: LTE	Assignment 1 Due	Notes
9	Mobile Ad Hoc Networks		Notes
10	Quality of Service	Quiz 2	Notes
11	Presentation	Assignment 2 Report due	Notes
12	Presentation		
13	Exam Discussion/Guest Lecture		

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.m
q.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-centr
al). Students should be aware of the following policies in particular with regard to Learning and
Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure

- Grade Appeal Policy

- Complaint Management Procedure for Students and Members of the Public

- Special Consideration Policy *(**Note:** The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)*

Undergraduate students seeking more policy resources can visit the Student Policy Gateway (https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/study/getting-started/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Supplementary Exam

If you receive Special Consideration for the final exam, a supplementary exam will be scheduled after the normal exam period, following the release of marks. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

Late Submission

There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late. This penalty does not apply for cases in which an application for special consideration is made and approved.

Grade Appeal

In case of problems arising with your final grade, the first step is to organise a review. The Department recommends that you request an appointment with the convenor of the unit in order to review your grade. If the review does not solve the problem, a formal Grade Appeal can be lodged. For more information please refer to the grade appeal policy page at:

http://www.mq.edu.au/policy/docs/gradeappeal/policy.html

Academic Honesty

Plagiarism involves using the work of another person and presenting it as one's own. The Department, in line with University policy, treats all cases seriously. In particular, the Department, keeps a record of all plagiarism cases. This record is referred to so that an appropriate penalty can be applied to each case.

For concrete examples, refer to Academic Honesty Policy at: http://www.mq.edu.au/policy/docs/ academic_honesty/policy.html

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Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Staff-Student Liaison Committee

The Department has established a Staff-Student Liaison Committee (800 level) to provide all students studying a Computing unit the opportunity to discuss related issues or problems with both students and staff. If you would like to raise any issues or make comments, please attend a liaison committee meeting, or discuss the matter with one of the student representatives who will be attending the meeting.

The committee meets two times during the semester. For each meeting, an agenda is issued and minutes are taken. These are posted on the web at http://comp.mq.edu.au/undergrad/info/liaison/800-level/

If you have concerns about the anything related to the organisation or operation of ITEC851, please convey those concerns to the unit convenor, either directly or through the liaison committee. If you have exhausted all other avenues, then you should consult the Director of teaching (A/Prof Steve Cassidy) or the Head of Department (Professor Michael Sheng). You are entitled to have your concerns raised, discussed and resolved.

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcomes

- Demonstrate in-depth knowledge and understanding of mobile technologies and apply them to solve practical real world problems in a professionally responsible manner.
- Engage in independent professional work with a high level of autonomy and accountability.

Assessment task

- Final Exam

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- Demonstrate in-depth knowledge and understanding of mobile technologies and apply them to solve practical real world problems in a professionally responsible manner.
- Demonstrate an understanding of the fundamental principles required to design mobile networks.

- Analyse the protocol architecture of mobile data and cellular networks.
- Exemplify a wide range of problems and research issues in the field of mobile networking.
- Demonstrate an understanding of the concepts, techniques, algorithms, and protocols employed in mobile data and cellular networks and be able to communicate these ideas to wider audience
- Evaluate critically a wide range of current trends and technologies in the field of mobile networking

Assessment tasks

- Quiz 1
- Quiz 2
- Assignment 1
- Assignment 2
- Final Exam

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- Demonstrate in-depth knowledge and understanding of mobile technologies and apply them to solve practical real world problems in a professionally responsible manner.
- Demonstrate an understanding of the fundamental principles required to design mobile networks.
- Analyse the protocol architecture of mobile data and cellular networks.
- Exemplify a wide range of problems and research issues in the field of mobile networking.
- Demonstrate an understanding of the concepts, techniques, algorithms, and protocols employed in mobile data and cellular networks and be able to communicate these ideas to wider audience
- Evaluate critically a wide range of current trends and technologies in the field of mobile networking

Assessment tasks

- Quiz 1
- Quiz 2
- Assignment 1
- Assignment 2
- Final Exam

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- Demonstrate in-depth knowledge and understanding of mobile technologies and apply them to solve practical real world problems in a professionally responsible manner.
- Demonstrate an understanding of the fundamental principles required to design mobile networks.
- Analyse the protocol architecture of mobile data and cellular networks.
- Exemplify a wide range of problems and research issues in the field of mobile networking.
- Demonstrate an understanding of the concepts, techniques, algorithms, and protocols employed in mobile data and cellular networks and be able to communicate these ideas to wider audience
- Evaluate critically a wide range of current trends and technologies in the field of mobile networking

Assessment tasks

- Quiz 1
- Quiz 2
- Assignment 1
- Assignment 2
- Final Exam

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different

social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcomes

- Exemplify a wide range of problems and research issues in the field of mobile networking.
- Demonstrate an understanding of the concepts, techniques, algorithms, and protocols employed in mobile data and cellular networks and be able to communicate these ideas to wider audience
- Evaluate critically a wide range of current trends and technologies in the field of mobile networking

Assessment tasks

- Assignment 1
- Assignment 2
- Final Exam

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Learning outcomes

- Demonstrate in-depth knowledge and understanding of mobile technologies and apply them to solve practical real world problems in a professionally responsible manner.
- Engage in independent professional work with a high level of autonomy and accountability.

Assessment task

- Final Exam

Standards and Grading

Grading

At the end of the semester, you will receive a grade that reflects your achievement in the unit

- **Fail (F)**: does not provide evidence of attainment of all learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; and incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the discipline.

- **Pass (P)**: provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the field of study; and communication of information and ideas adequately in terms of the conventions of the discipline. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.

- **Credit (Cr)**: provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; plus communication of ideas fluently and clearly in terms of the conventions of the discipline.

- **Distinction (D)**: provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the discipline and the audience.

- **High Distinction (HD)**: provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application.

In this unit, the final mark will be calculated by combining the marks for all assessment tasks according to the percentage weightings shown in the assessment summary.The final examination in this unit is a hurdle requirement; you must get a mark of at least 40% in the examination to pass the unit. If you get a mark between 30% and 40% in your first attempt at the final examination, you will be given a second and final attempt.

Concretely, **in order to pass the unit**, you must obtain an overall total mark of **50%** or higher, and a mark of **40%** or higher in the final examination.

Students obtaining a higher grade than a pass in this unit will (in addition to the above)

- ◦ have a total mark of **85%** or higher to obtain High Distinction;
  ◦ have a total mark of **75%** or higher to obtain Distinction;
  ◦ have a total mark of **65%** or higher to obtain Credit.

Hurdle

- Second chances at hurdles are marked **pass/fail**. This means that the maximum that a student can receive at a second attempt is the hurdle requirement:if the hurdle requirement is **40%**, the maximum a student can receive is **40%**
- Students only receive a second attempt if they are capable of passing the unit. This means that the maximum they can receive from the second attempt (see the previous point) must be such that their final mark would add up to **50%+**

Supplementary Exam

If you receive Special Consideration for the final exam, a supplementary exam will be scheduled after the normal exam period, following the release of marks. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

You are encouraged to:

- set your personal deadline earlier than the actual one;
- keep backups of all important assessed tasks;.
- make sure no one else picks up your printouts.

All work submitted should be readable and well presented.

You should **never commit plagiarism** in any of your submitted work, including tutorial and practical answers.

Changes since First Published

Date	Description
24/07/2019	contact address of the co lecturer updated