



ENEE20003 *Advanced Communications Systems*

Term 2 - 2021

Profile information current as at 24/04/2024 07:18 pm

All details in this unit profile for ENEE20003 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

General Information

Overview

In this unit, you will expand your understanding of communications systems encompassing both optical and wireless technologies. You will gain advanced knowledge of operation of devices and systems and the ability to analyse various parameters such as loss, bandwidth, and signal quality. You will verify the developed theories using advanced simulation tools or practical demonstrations. Upon completion of the unit, you will gain advanced knowledge of communications systems and their technologies. Prior knowledge of basic electrical circuit analysis, signals and systems and fundamental electromagnetic theory is assumed.

Details

Career Level: *Postgraduate*

Unit Level: *Level 9*

Credit Points: *12*

Student Contribution Band: *8*

Fraction of Full-Time Student Load: *0.25*

Pre-requisites or Co-requisites

There are no requisites for this unit.

Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure \(Higher Education Coursework\)](#).

Offerings For Term 2 - 2021

- Melbourne
- Mixed Mode
- Perth
- Rockhampton

Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

Residential Schools

This unit has a Compulsory Residential School for distance mode students and the details are:

Click here to see your [Residential School Timetable](#).

Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

Class and Assessment Overview

Recommended Student Time Commitment

Each 12-credit Postgraduate unit at CQUniversity requires an overall time commitment of an average of 25 hours of study per week, making a total of 300 hours for the unit.

Class Timetable

[Regional Campuses](#)

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

[Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. **Online Quiz(zes)**

Weighting: Pass/Fail

2. **Online Test**

Weighting: 15%

3. **Project (applied)**

Weighting: 25%

4. **Practical Assessment**

Weighting: 15%

5. **Online Test**

Weighting: 45%

Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the [University's Grades and Results Policy](#) for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the [CQUniversity Policy site](#).

You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the [CQUniversity Policy site](#).

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from Unit's survey

Feedback

The unit covers all essential aspects of optical communications.

Recommendation

The unit's material is constantly improved and updated with the latest developments in the fast growing field of optical communications.

Feedback from Unit's survey

Feedback

The best thing about this unit is the experience in learning how to use the VPIPhotonics Design Suite software to simulate optical systems.

Recommendation

VPIPhotonics Design Suite is a state of the art photonics simulation software. It provides students with a virtual environment to learn and experience the sophisticated behaviors of optical components and systems. This software will continue to be used to enrich learning in the future offering of the unit.

Feedback from Unit's survey

Feedback

Due to COVID-19, the practical laboratory was replaced by a video laboratory demonstration and Zoom session. This has negatively impacted on the hands-on skills that could be gained.

Recommendation

The laboratory is an important and integral part of the unit's learning and it is also aimed to provide students with hands-on experience of optical components and systems. The laboratory will be resumed to face to face and hand-on mode in the future when the restrictions are lifted.

Feedback from Unit's survey

Feedback

More tutorials on how to use the VPIPhotonics Design Suite would be helpful in learning how to use the software.

Recommendation

Weekly VPIPhotonics Design Suite's tutorials will be developed to assist students in gaining know-hows in using the software.

Unit Learning Outcomes

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

1. Analyse communications systems both theoretically and practically
2. Calculate power, bandwidth and signal quality of communications systems
3. Characterise common communications components and systems through simulations or measurements
4. Design sophisticated communications systems and predict their performance
5. Communicate professional engineering information including computer-based simulations and drawings using appropriate electrical engineering standards, terminology, and symbols
6. Scope, plan, manage, and successfully complete engineering projects autonomously and in teams with a responsible, ethical, and professional attitude regarding the role of engineers.

The Learning Outcomes for this unit are linked with the Engineers Australia Stage 1 Competency Standards for Professional Engineers in the areas of 1. Knowledge and Skill Base, 2. Engineering Application Ability and 3. Professional and Personal Attributes at the following levels:

Introductory

- 3.1 Ethical conduct and professional accountability. (LO: 5N 6N)
- 3.2 Effective oral and written communication in professional and lay domains. (LO: 5N 6N)
- 3.5 Orderly management of self, and professional conduct. (LO: 5N 6N)
- 3.6 Effective team membership and team leadership. (LO: 3N 4N 5N 6N)

Intermediate

- 1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 1I 2I 3I 4I)
- 1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 1I 2I 3I 4I)
- 2.1 Application of established engineering methods to complex engineering problem solving. (LO: 1I 2I 3I 4I)
- 2.3 Application of systematic engineering synthesis and design processes. (LO: 4I)
- 2.4 Application of systematic approaches to the conduct and management of engineering projects. (LO: 2I 3I 4I 6I)
- 3.4 Professional use and management of information. (LO: 1I 2I 3I 4I)

Advanced

- 1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 1I 2I 3I 4A)
- 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 1I 2A 3I 4A)
- 2.2 Fluent application of engineering techniques, tools and resources. (LO: 1I 2I 3I 4A 5I 6I)

Note: LO refers to the Learning Outcome number(s) which link to the competency and the levels: N - Introductory, I - Intermediate and A - Advanced.

Refer to the Engineering Postgraduate Units Moodle site for further information on the Engineers Australia's Stage 1 Competency Standard for Professional Engineers and course level mapping information

<https://moodle.cqu.edu.au/course/view.php?id=11382>

Alignment of Learning Outcomes, Assessment and Graduate Attributes



Alignment of Assessment Tasks to Learning Outcomes

| Assessment Tasks | Learning Outcomes | | | | | |
|---------------------------------------|-------------------|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 - Online Test - 15% | | • | | | | |
| 2 - Practical Assessment - 15% | | | • | | • | • |
| 3 - Project (applied) - 25% | • | | | • | • | • |

| Assessment Tasks | Learning Outcomes | | | | | |
|-----------------------|-------------------|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 4 - Online Test - 45% | • | • | | | | |

Alignment of Graduate Attributes to Learning Outcomes

| Graduate Attributes | Learning Outcomes | | | | | |
|--|-------------------|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 - Knowledge | | | ○ | ○ | | |
| 2 - Communication | | | ○ | | ○ | ○ |
| 3 - Cognitive, technical and creative skills | ○ | ○ | ○ | ○ | | |
| 4 - Research | | | | ○ | | |
| 5 - Self-management | | | | | ○ | ○ |
| 6 - Ethical and Professional Responsibility | | | | | ○ | ○ |
| 7 - Leadership | | | | | | ○ |
| 8 - Aboriginal and Torres Strait Islander Cultures | | | | | | |

Alignment of Assessment Tasks to Graduate Attributes

| Assessment Tasks | Graduate Attributes | | | | | | | |
|--------------------------------|---------------------|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 - Online Test - 15% | ○ | | ○ | | | | | |
| 2 - Practical Assessment - 15% | ○ | ○ | ○ | | ○ | ○ | | |
| 3 - Project (applied) - 25% | ○ | ○ | ○ | ○ | ○ | ○ | | |
| 4 - Online Test - 45% | ○ | | ○ | | | | | |

Textbooks and Resources

Textbooks

ENEE20003

Prescribed

Modern Wireless Communication Systems

Edition: 2 (2002)

Authors: Theodore S. Rappaport

Pearson

Upper Saddle River , New Jersey , USA

ISBN: 978-0130422323

Binding: Paperback

ENEE20003

Prescribed

OPTICAL FIBER COMMUNICATIONS: PRINCIPLES AND PRACTICE

Edition: 3rd (2008)

Authors: John Senior

Pearson

Harlow , Essex , England

ISBN: 978-0-130-32681-2

Binding: Paperback

Additional Textbook Information

Students are not required to obtain the textbook as the relevant textbook readings are provided in the unit's eReading list.

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Zoom app on your smart phone or access to Zoom on your laptop
- Pdf creator/scanner
- Microsoft Office (Word, Excel, PowerPoint)

Referencing Style

All submissions for this unit must use the referencing style: [American Psychological Association 7th Edition \(APA 7th edition\)](#)

For further information, see the Assessment Tasks.

Teaching Contacts

Lam Bui Unit Coordinator

l.bui@cqu.edu.au

Schedule

Week 1 - 12 Jul 2021

| Module/Topic | Chapter | Events and Submissions/Topic |
|--|----------------------|------------------------------|
| Teaching Arrangements & Introduction to Optical Fibre Communications | Textbook's Chapter 1 | |

| Week 2 - 19 Jul 2021 | | |
|--|----------------------------------|---|
| Module/Topic | Chapter | Events and Submissions/Topic |
| Introduction to Optical Fibre | Textbook's Chapters 2 and 3 | |
| Week 3 - 26 Jul 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| Optical sources - Lasers | Textbook's Chapters 6 and 7 | Pretest Pretest Due: Week 3 Friday (30 July 2021) 11:59 pm AEST |
| Week 4 - 02 Aug 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| Optical receivers - Photodetectors | Textbook's Chapters 8 and 9 | |
| Week 5 - 09 Aug 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| How to do a scientific literature review | | |
| Vacation Week - 16 Aug 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| None teaching week | | |
| Week 6 - 23 Aug 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| Optical Amplifiers | Textbook's Chapter 10 | Online Test A is due on Monday |
| Week 7 - 30 Aug 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| Introduction to Optical Modulation | Textbook's Chapters 12 and 13 | |
| Week 8 - 06 Sep 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| Introduction to Optical Devices | Textbook's Chapters 5, 11 and 15 | |
| Week 9 - 13 Sep 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| Wavelength Division Multiplexing (WDM) | Textbook's Chapter 12 | Assignment 1 Due: Week 9 Monday (13 Sept 2021) 11:59 pm AEST |
| Week 10 - 20 Sep 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| Link Design - System Rise Time and Bandwidth | Textbook's Chapter 12 | Online Test B is due on Monday |
| Week 11 - 27 Sep 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| Probability of Errors and Bit Error Rate (BER) | Textbook's Chapter 12 | Assignment 2 Due: Week 11 Monday (27 Sept 2021) 11:59 pm AEST |
| Week 12 - 04 Oct 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| Consolidations | | |
| Review/Exam Week - 11 Oct 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| | | |
| Exam Week - 18 Oct 2021 | | |
| Module/Topic | Chapter | Events and Submissions/Topic |
| | | |

Online Test C is due on Monday

Final Online Test/Examination Due:
Exam Week Monday (18 Oct 2021)
11:45 pm AEST

Term Specific Information

Unlike previous offer of the unit, for term 2 2021, the laboratory and design project are replaced by assignments 1 and 2 respectively which provide students with opportunities to consolidate their learning and apply them in solving practical optical-fiber-communications problems. Both assignments are individual work and they form the major assessments for the unit.

Assessment Tasks

1 Pretest

Assessment Type

Online Quiz(zes)

Task Description

The pretest aims to assess student prerequisite knowledge necessary for learning and thus ensuring students having a good chance of passing the unit. This test therefore provides a means to gauge student level to provide some awareness of shortcomings for better learning support. The test is multiple choice in format and aims to test basic knowledge of signals and systems, communications engineering and some mathematics foundations. Although this test does not contribute any mark to the unit's final result, the test is compulsory and therefore students who fail to attend the pretest will also fail the unit.

Number of Quizzes**Frequency of Quizzes****Assessment Due Date**

Week 3 Friday (30 July 2021) 11:59 pm AEST
online test

Return Date to Students

Week 4 Friday (6 Aug 2021)

The test results will be available to students a week after the test completion

Weighting

Pass/Fail

Assessment Criteria

This test aims to assess student prior knowledge which is necessary for effective learning of this unit. The basic electrical engineering concepts will be tested. The test result will provide students with feedback on areas that they need further support and self-learning to ensure that they have a better chance of passing this unit.

Referencing Style

- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

Submission

Online

Submission Instructions

Test will be administered online.

2 Online Tests

Assessment Type

Online Test

Task Description

The online tests consist of three online tests A, B, and C designed to assess student understanding and application of the materials of weeks 1-4, weeks 6-8 and weeks 9-11 respectively. They are multiple-choice questions and timed. Some of the questions may require students to perform calculations or design to arrive at the correct answer. It is advisable that

students review the relevant learning and read the suggested textbook chapters and follow the instructions accompanied the test strictly. When the test ends, all questions are submitted automatically including unanswered questions and thus do not spend much time on one question - if stuck, move on to other questions. PLEASE NOTE that only ONE attempt of the test is allowed and thus the test must be completed in one sitting. Students are advised to start the test only when fully ready.

Assessment Due Date

Online tests A, B, and C are due on Monday of Week 6, Week 10 and Week 13 at 11:59 pm respectively

Return Date to Students

Online tests' results are available to students a week after the tests' ending dates.

Weighting

15%

Minimum mark or grade

50%

Assessment Criteria

The online tests aim to assess understanding and applications of the the key concepts covered by the unit. Particularly, online tests A, B, and C cover weeks 1-4, weeks 6-8 and weeks 9-11 respectively. Each test consists of 25 multiple choice questions that must be answered within 40 minutes (~1.5 minutes/question). If there are multiple correct answers, choose the most correct answer. No and wrong answer will receive zero mark. Each online test contributes 5% of the unit total marks (15% of marks for the three tests). The minimum passed grade for the combined online tests is 50%; that is at least 7.5% of the unit marks is achieved for the three online tests.

Referencing Style

- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

Submission

Online

Submission Instructions

It is important that the online tests MUST be completed within their opening periods since they cannot be reopened after closing.

Learning Outcomes Assessed

- Calculate power, bandwidth and signal quality of communications systems

Graduate Attributes

- Knowledge
- Cognitive, technical and creative skills

3 Assignment 1

Assessment Type

Project (applied)

Task Description

This assignment consists of several problems relating to lasers, photodetectors, optical fibers and optical components to assess student understanding and applying of the materials between weeks 1 to 8. Through solving these problems, students will enhance their understanding of the materials learned in this unit. The assignment involves both calculation questions, design problems and analysis discussions. It thus provides opportunity for consolidation and integration of learning.

Assessment Due Date

Week 9 Monday (13 Sept 2021) 11:59 pm AEST

Assignment must be converted into a pdf file for submission

Return Date to Students

Week 11 Monday (27 Sept 2021)

Marked assignments are returned to students approximately two weeks after the submission deadline.

Weighting

25%

Minimum mark or grade

50%

Assessment Criteria

The detailed marking criteria is provided in assignment 2 document. It is an individual work. Students must answer all questions in the assignment 2 documents. It is advisable that students review the learning materials for weeks 1 to 8, especially the tutorial problems prior to their attempts of the assignment questions. Assignment 2 has a minimum passed mark of 50%.

Referencing Style

- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

Submission

Online

Submission Instructions

submit assignment 2 in pdf file format.

Learning Outcomes Assessed

- Analyse communications systems both theoretically and practically
- Design sophisticated communications systems and predict their performance
- Communicate professional engineering information including computer-based simulations and drawings using appropriate electrical engineering standards, terminology, and symbols
- Scope, plan, manage, and successfully complete engineering projects autonomously and in teams with a responsible, ethical, and professional attitude regarding the role of engineers.

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility

4 Assignment 2

Assessment Type

Practical Assessment

Task Description

This is a literature review assignment which provides an opportunity for students to review a topic of their own chosen and thus learn it in depth. The topic of literature review is chosen by the unit coordinator/lecturer from the three topics proposed by the students in week 4. Students must follow the scientific literature review process to do this assessment and write a report on their finding. The report is limited to a maximum of 5 pages in length and must consist of at least 5 reviewed literature.

Assessment Due Date

Week 11 Monday (27 Sept 2021) 11:59 pm AEST

Please be aware that there is a deduction of 5% per day for late submission

Return Date to Students

Review/Exam Week Monday (11 Oct 2021)

Marked reports are returned to students two weeks after submission deadline

Weighting

15%

Minimum mark or grade

50%

Assessment Criteria

The report will be assessed the relevance and quality of the following:

- Review of the approved topic
- Follow the scientific literature review method
- Clearly state the reviewing aims - the specific thing about the topic that the students want to learn about
- Review of at least 5 literatures

- Brief summaries of the 5 literatures and their key, peculiar features
- Discussions of what have been learned from the review: any surprise, unexpected findings, limitations, frontiers
- Provide a brief concluding remarking of the review.

Assignment 1 has a minimum passed mark of 50%.

Referencing Style

- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

Submission

Online

Submission Instructions

Report must be converted to pdf file. Please observe the length limit of 5 A4 pages

Learning Outcomes Assessed

- Characterise common communications components and systems through simulations or measurements
- Communicate professional engineering information including computer-based simulations and drawings using appropriate electrical engineering standards, terminology, and symbols
- Scope, plan, manage, and successfully complete engineering projects autonomously and in teams with a responsible, ethical, and professional attitude regarding the role of engineers.

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Self-management
- Ethical and Professional Responsibility

5 Final Online Test/Examination

Assessment Type

Online Test

Task Description

The final online test will be in a form of several short questions. The questions are relating to the entire scope of materials taught in this unit and require students to apply knowledge and skills developed in the unit to answer. Students will have three hours (180 minutes) of working. All answers will be automatically submitted at the end of the test, non-attempted questions will be submitted without an answer and thus receive no mark. Students must achieve at least 50% of the test/examination score to pass this unit.

Assessment Due Date

Exam Week Monday (18 Oct 2021) 11:45 pm AEST

Online final test will be held during the exam week

Return Date to Students

Examination results are available to students after grade certification date.

Weighting

45%

Minimum mark or grade

50%

Assessment Criteria

Detailed instructions are provided with the online final test/examination at the start of the test. The final test will cover the entire unit materials and it is intended to test student understanding and applying of the knowledge taught in this unit. Students must achieve at least **50% marks** for the final online test to pass the unit.

Referencing Style

- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

Submission

Online

Submission Instructions

Timed online test administered as several short questions. All answers will be automatically submitted at the end of the test including non attempted questions.

Learning Outcomes Assessed

- Analyse communications systems both theoretically and practically
- Calculate power, bandwidth and signal quality of communications systems

Graduate Attributes

- Knowledge
- Cognitive, technical and creative skills

Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the [Student Academic Integrity Policy and Procedure](#). This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

What is a breach of academic integrity?

A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

Why is academic integrity important?

A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

Where can I get assistance?

For academic advice and guidance, the [Academic Learning Centre \(ALC\)](#) can support you in becoming confident in completing assessments with integrity and of high standard.

What can you do to act with integrity?



Be Honest

If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



Seek Help

If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



Produce Original Work

Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem