ENEX12001 *Electrical Power and Machines*
Term 2 - 2017

Profile information current as at 15/05/2024 03:06 pm

All details in this unit profile for ENEX12001 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 model basic power system components and electrical machines using simplified linear equivalent circuits. You will explain the relationship between power and energy, and calculate power and energy in power networks and electrical machines. You will apply problem solving techniques in the analysis of balanced three-phase power circuits using per-unit methodology. You will also investigate and compare the construction and operational characteristics of direct current (DC) and alternating current (AC) electrical machines. You will explain different drive system topologies for the electrical machines. You will explain electrical machine protection and control schemes. Distance students are required to participate in the compulsory Residential School.

Details
Career Level: *Undergraduate*
Unit Level: *Level 2*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites
Prerequisite: (ENEG11009 Fundamentals of Energy and Electricity or PHYS11185 Engineering Physics B) AND MATH11218 Applied Mathematics
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 - 2017

- Distance
- Mackay

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 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 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. **Written Assessment**
Weighting: 20%
2. **Online Quiz(zes)**
Weighting: 20%
3. **Practical and Written Assessment**
Weighting: 20%
4. **Examination**
Weighting: 40%

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 Course survey

Feedback
Students have commended that course lectures, tutorials, assignment and quizzes were well done.

Recommendation
These good practices will be continued.

Feedback from Course survey

Feedback
Students have commended practical labs as helpful and explain much of the course

Recommendation
These good practices will be continued.

Feedback from Course survey

Feedback
Students pointed out the need for more time to complete labs

Recommendation
Lab session times will be increased.

Feedback from Course survey

Feedback
Students have pointed out the need to increase the experimental facilities in Mackay

Recommendation
This need will be informed to the management for action.

Unit Learning Outcomes

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

1. Model basic power system components and machines using simplified linear equivalent circuits
2. Explain the relationship between power and energy; calculate power and energy in power networks and electrical machines
3. Compare and explain features of DC and AC electrical machines with regard to their construction and operational characteristics
4. Compare and explain features of drive systems, protection and control schemes for electric machines
5. Apply appropriate laboratory techniques and software tools to understand power systems and electrical machines
6. Create professional documentation of the solutions, designs and analysis processes using electrical terminology, diagrams and symbols that conform to Australian or International Standards
7. Work individually and collaboratively in a team to produce high quality outputs

The learning outcomes are linked to Engineers Australia Stage 1 Competencies and also discipline capabilities. You can find the mapping for this on the Engineering Undergraduate Course website.

Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level | • Introductory Level | • Intermediate Level | • Graduate Level | ◦ Professional Level | ◦ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes						
	1	2	3	4	5	6	7
1 - Written Assessment - 20%	•	•	•	•		•	•
2 - Online Quiz(zes) - 20%	•	•	•	•			
3 - Practical and Written Assessment - 20%	•	•	•	•	•	•	•
4 - Examination - 40%	•	•	•	•		•	•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes						
	1	2	3	4	5	6	7
1 - Communication	•	•	•	•	•	•	•
2 - Problem Solving	•	•	•	•	•		
3 - Critical Thinking	•	•	•	•	•	•	•
4 - Information Literacy	•	•	•	•	•	•	•
5 - Team Work					•		•
6 - Information Technology Competence					•	•	•
7 - Cross Cultural Competence							•
8 - Ethical practice							•
9 - Social Innovation							
10 - 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	9	10
1 - Written Assessment - 20%	•	•	•	•						
2 - Online Quiz(zes) - 20%	•	•	•	•						
3 - Practical and Written Assessment - 20%	•	•	•	•	•	•		•		
4 - Examination - 40%	•	•	•	•						

Textbooks and Resources

Textbooks

ENEX12001

Prescribed

Electrical machines, drives and power systems
6th edn - new international edition (2014)
Authors: Wildi, T
Pearson Education
Upper Saddle River , NJ , USA
Binding: Hardcover

View textbooks at the CQUniversity Bookshop

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

Referencing Style

All submissions for this unit must use the referencing style: Harvard (author-date)
For further information, see the Assessment Tasks.

Teaching Contacts

Kianoush Emami Unit Coordinator
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Schedule

Week 1 - 10 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Electrical Power Systems	Chapter 7	

Week 2 - 17 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Electrical Power Measurement and Three Phase Circuits	Chapter 7 and 8	

Week 3 - 24 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Transformers – Ideal to Practical	Chapter 9 and 10	

Week 4 - 31 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Per-Unit system Methodology	Chapter 10	

Week 5 - 07 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Special and Three Phase Transformers	Chapter 11 and 12	

Vacation Week - 14 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 21 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Electrical Machines, Their Applications	Chapter 1, Chapter 2 and Chapter 3	Part 1 of the Quiz 1 opens Tuesday this week 22nd August and closes on Friday this week 25th August at 23:45 PM AEST

Week 7 - 28 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
DC Machines	Chapter 4 and Chapter 5	Residential school of this unit will be held from 28 AUG - 30 AUG 2017 in Building 28/2.10 in Rockhampton.

Week 8 - 04 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Induction (AC) Machines	Chapter 13, Chapter 14 and Chapter 18	

Week 9 - 11 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Synchronous (AC) Machines	Chapter 16, Chapter 17	**Written Assessment** Due: Week 9 Friday (15 Sept 2017) 11:45 pm AEST

Week 10 - 18 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Fundamentals in Protection and Control of Electrical Machines Fundemantals Elements of Power Electronics	Chapter 20, Chapter 21	

Week 11 - 25 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Electronic Control of DC and AC Motors	Chapter 22, Chapter 23	**Practical and Written Assessment** Due: Week 11 Monday (25 Sept 2017) 11:45 pm AEST

Week 12 - 02 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic
Unconventional and Special Machines	Chapter 19	Part 2 of the Quiz opens Tuesday this week 3rd October and closes on Friday this week 6th October at 23:45 PM AEST

Review/Exam Week - 09 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 16 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic

Term Specific Information

There is a minimum mark of **50%** for the labs and the final exam to pass the unit.
Laboratory schedules for Mackay campus will be announced on the unit website. Residential school of this unit for distance students will be held from 28 AUG - 30 AUG 2017 in Building 28/2.10 in Rockhampton.

Assessment Tasks

1 Written Assessment

Assessment Type
Written Assessment

Task Description
This will include 8 problems from the content covered in weeks 1-9. Problems will be similar to the tutorial problems. The assignment will be uploaded to Unit Moodle site in the beginning if the term. This assessment item covers Learning Outcomes 1, 2, 3, 4, 6, 7

Assessment Due Date
Week 9 Friday (15 Sept 2017) 11:45 pm AEST
Submit to the link provided in unit Moodle site as a PDF/WORD file

Return Date to Students
Week 11 Friday (29 Sept 2017)
Feedback will be provided within 2 weeks

Weighting
20%

Assessment Criteria
The assignments will be graded using the following criteria:
· Correct Answers and methods;
· Correct format;
· All working must be shown clearly;
· Assignments must be neat, tidy and legible;
· Attempt all questions.
15% - defining the problems properly, correct diagrams etc.
35% - applying correct models formulae
40% - correct steps
10% - correct answers

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Submit to the link provided in unit Moodle site as a PDF/WORD file

Learning Outcomes Assessed

- Model basic power system components and machines using simplified linear equivalent circuits
- Explain the relationship between power and energy; calculate power and energy in power networks and electrical machines
- Compare and explain features of DC and AC electrical machines with regard to their construction and operational characteristics
- Compare and explain features of drive systems, protection and control schemes for electric machines
- Create professional documentation of the solutions, designs and analysis processes using electrical terminology, diagrams and symbols that conform to Australian or International Standards
- Work individually and collaboratively in a team to produce high quality outputs

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy

2 Online Quiz(zes)

Assessment Type
Online Quiz(zes)

Task Description
The quiz has two parts, Part 1 of this assessment will include short numerical problems from content covered in weeks 1-5 (Power engineering). Part 2 of this assessment will include short numerical problems from content covered in weeks 6-11. Each part will have 10 short numerical questions. These will be MCQ type question, with students requiring uploading their workings for the lecturer to give feedback on mistakes they have made if they get any of them wrong. This assessment item covers Learning outcomes 1, 2, 3, 4, 6, 7.
Complete the online test by going into the links provided in Week 06 and Week 12. Please see the UNIT SCHEDULE for information on respective deadlines. Upload the scanned workings to the upload links provided in those respective weeks.

Number of Quizzes
2

Frequency of Quizzes
Other

Assessment Due Date

Complete the online test by going into the links provided in Week 05 and Week 11. Upload the scanned workings to the upload links provided in those respective weeks

Return Date to Students
Review/Exam Week Friday (13 Oct 2017)
Feedback will be provided within 2 weeks

Weighting
20%

Assessment Criteria
· Correct choice for a question will receive 1 mark

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Complete the online test by going into the links provided in Week 05 and Week 11. Upload the scanned workings to the upload links provided in those respective weeks

Learning Outcomes Assessed

- Model basic power system components and machines using simplified linear equivalent circuits
- Explain the relationship between power and energy; calculate power and energy in power networks and electrical machines
- Compare and explain features of DC and AC electrical machines with regard to their construction and operational characteristics
- Compare and explain features of drive systems, protection and control schemes for electric machines

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy

3 Practical and Written Assessment

Assessment Type
Practical and Written Assessment

Task Description
This assessment item relates to learning outcomes 1,2,3,4,5,6,7 of the unit as stated. Students will be formed into teams of generally 3 members for this assessment item.
Laboratory schedules will be announced on the unit website. See the unit schedule and unit website for more information.

Assessment Due Date
Week 11 Monday (25 Sept 2017) 11:45 pm AEST
Upload to the Link provided in unit Moodle site as a PDF/WORD file

Return Date to Students
Monday (9 Oct 2017)
Feedback will be available in 2 Weeks

Weighting
20%

Minimum mark or grade
50

Assessment Criteria
This assessment item relates to learning outcomes 1,2,3,4,5,6,7 of the unit as stated.
Assessment Criteria:
Correct procedure and steps towards collecting data from the experiments: 60%
Correct computations, answers and units: 20%
Proper use of reference 5%
Professional presentation and layout of the report: 15%

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Upload to the Link provided in unit Moodle site as a PDF/WORD file

Learning Outcomes Assessed

- Model basic power system components and machines using simplified linear equivalent circuits
- Explain the relationship between power and energy; calculate power and energy in power networks and electrical machines
- Compare and explain features of DC and AC electrical machines with regard to their construction and operational characteristics
- Compare and explain features of drive systems, protection and control schemes for electric machines
- Apply appropriate laboratory techniques and software tools to understand power systems and electrical machines
- Create professional documentation of the solutions, designs and analysis processes using electrical terminology, diagrams and symbols that conform to Australian or International Standards
- Work individually and collaboratively in a team to produce high quality outputs

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Information Technology Competence
- Ethical practice

Examination

Outline
Complete an invigilated examination.

Date
During the examination period at a CQUniversity examination centre.

Weighting
40%

Length
180 minutes

Minimum mark or grade
50

Exam Conditions
Open Book.

Materials
Calculator - all non-communicable calculators, including scientific, programmable and graphics calculators are authorised
Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).

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