ENEE13021 *Power System Analysis and Design*
Term 2 - 2024

Profile information current as at 29/07/2024 03:31 pm

General Information

Overview
On the satisfactory completion of this unit, you will be able to work both individually and in a team to model, analyse and investigate design and operation options for electrical power networks to meet community service requirements. You will be able to analyse the steady-state performance of power systems, perform both symmetrical and unsymmetrical fault calculations, and conduct stability analysis of power systems. You will be using the industry standard power system simulation software to simulate different scenarios in the power network. As such, you will articulate the process of updating and maintaining power network assets to meet most safety, reliability, and quality requirements for both the present and future.

Details
Career Level: *Undergraduate*
Unit Level: *Level 3*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites
ENEE12015 Electrical Power Engineering.
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 - 2024

- Bundaberg
- Cairns
- Gladstone
- Mackay
- Online
- 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).

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. **Online Quiz(zes)**
Weighting: 30%
2. **Written Assessment**
Weighting: 30%
3. **Online Test**
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 SUTE

Feedback
Content is relevant to the studies.

Recommendation
This good practice should be continued.

Feedback from SUTE

Feedback
Response time for student queries must be improved.

Recommendation
Timely responses to student queries should be maintained.

Feedback from SUTE

Feedback
Quality of the learning materials needs to be improved.

Recommendation
Quality of the learning materials should be improved.

Feedback from SUTE

Feedback
Students have questioned the relevance of the assessment tasks to their learning.

Recommendation
Assessment tasks should be reviewed and improved.

Feedback from SUTE

Feedback
Students have questioned the useful knowledge/skill gained from the unit

Recommendation
During the lectures how the taught content is used in industry should be explained

Unit Learning Outcomes

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

1. Calculate fault currents of power systems across various scenarios to select suitable protection schemes
2. Solve power flow problems for power system planning and operation studies
3. Analyze the balanced and unbalanced operation of power systems utilising suitable software packages
4. Investigate power angle stability for both single and multi-machine power systems
5. Work both collaboratively and autonomously to analyse and solve problems
6. Communicate effectively using power systems terminology, symbols and diagrams to present design documents, solutions, and calculations.

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:

Intermediate 1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 1I 2I 3I 4I) 1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 1I 2I 3I 4I) 2.3 Application of systematic engineering synthesis and design processes. (LO: 3I 6I) 3.3 Creative, innovative and pro-active demeanour. (LO: 3I)

Advanced 1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences that underpin the engineering discipline. (LO: 1A 2I 3I 4A) 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 1A 2A 3A 4A 5A 6I) 2.1 Application of established engineering methods to complex engineering problem solving. (LO: 1I 2A 3A 4I 5A) 2.2 Fluent application of engineering techniques, tools and resources. (LO: 1I 2A 3A 4I) 3.2 Effective oral and written communication in professional and lay domains. (LO: 5I 6A) 3.4 Professional use and management of information. (LO: 1I 2I 3A 4I 5I) 3.6 Effective team membership and team leadership. (LO: 3A 5A 6A)

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

Refer to the Engineering Undergraduate Course Moodle site for further information on the Engineers Australia's Stage 1 Competency Standard for Professional Engineers and course level mapping informationhttps://moodle.cqu.edu.au/course/view.php?id=1511

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
1 - Online Quiz(zes) - 30%						•
2 - Written Assessment - 30%	•	•	•		•	•
3 - Online Test - 40%	•	•	•	•		

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
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						

Textbooks and Resources

Textbooks

ENEE13021

Prescribed

Power System Analysis and Design
Edition: 6th edn (2016)
Authors: J. Duncan Glover, Thomas Overbye, and Mulukutla Sarma
CENGAGE Learning
Boston , MA , USA
ISBN: 9781305636187
Binding: Paperback

View textbooks at the CQUniversity Bookshop

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Access to a document scanner and a pdf converter
- Computer with Windows OS, headphones & microphone
- The free version of PowerWorld Simulator - downloadable from the internet

Referencing Style

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

Teaching Contacts

Jamshid Aghaei Unit Coordinator
j.aghaei@cqu.edu.au

Schedule

Week 1 - 08 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to power systems analysis	Chapters1 & 2 of Glover, Sarma, and Overbye	

Week 2 - 15 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Power System Modelling	Chapters 3 & 4 of Glover, Sarma, and Overbye	

Week 3 - 22 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Modelling of Power System Networks	Chapter 5 of Glover, Sarma, and Overbye	

Week 4 - 29 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic

Introduction to Load Flow Analysis	Chapter 6 of Glover, Sarma, and Overbye	The online Quiz will be opened on Monday this week.

Week 5 - 05 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
Load Flow Algorithms	Chapter 6 of Glover, Sarma, and Overbye	**Online Quiz: Power System Modeling (Weeks 1-3)** Due: Week 5 Monday (5 Aug 2024) 10:00 pm AEST

Vacation Week - 12 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 19 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
Load Flow Studies, Modelling and Voltage Control	Chapter 6 of Glover, Sarma, and Overbye	

Week 7 - 26 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
Symmetrical Components	Chapter 8 of Glover, Sarma, and Overbye	

Week 8 - 02 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Fault Analysis (1)	Chapter 8 of Glover, Sarma, and Overbye	

Week 9 - 09 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Fault Analysis (2)	Chapter 9 of Glover, Sarma, and Overbye	

Week 10 - 16 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Transient Stability	Chapter 11 of Glover, Sarma, and Overbye	**PROJECT** Due: Week 10 Monday (16 Sept 2024) 11:59 pm AEST

Week 11 - 23 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Multi-machine systems, small-signal stability	Chapters 11 of Glover, Sarma, and Overbye	

Week 12 - 30 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Stability controls, modelling of renewables	Chapters 11 and 12 of Glover, Sarma, and Overbye	

Review Week - 07 Oct 2024

Module/Topic	Chapter	Events and Submissions/Topic
- Review of the whole unit - Q&A		

Exam Week - 14 Oct 2024

Module/Topic	Chapter	Events and Submissions/Topic
		End of Term Online Test is scheduled Week 14 (EXAM WEEK)

Assessment Tasks

1 Online Quiz: Power System Modeling (Weeks 1-3)

Assessment Type
Online Quiz(zes)

Task Description
Overview
This compulsory assessment has 10-20 multiple-choice problems where students are expected to choose correct answers. The questions cover the unit contents from Week 1 to Week 3.
Content Coverage:
The quiz encompasses 10-20 multiple-choice questions to ensure a comprehensive assessment of the topics discussed in weeks 1 to 3. Key areas include:
- Introduction to Power Systems (Chapters1 & 2 of Power System Analysis and Design (5th Edition) written by Glover, Sarma, and Overbye)
- Introduction to Power System Modelling (Chapters 3 & 4 of Power System Analysis and Design (5th Edition) written by Glover, Sarma, and Overbye)
- Modelling of Power System Networks (Chapter 5 of Power System Analysis and Design (5th Edition) written by Glover, Sarma, and Overbye)
Preparation
To optimise quiz performance, it is recommended that students thoroughly review the lecture recordings and notes from Weeks 1 to 3. These materials offer crucial insights and detailed explanations necessary for answering quiz questions accurately. Additionally, the quiz may include content derived from Chapters 1 to 5 of the main textbook of the unit, i.e., Power System Analysis and Design (5th Edition) written by Glover, Sarma, and Overbye.
Quiz Format:

- Question Type: Multiple-choice questions
- Number of Questions: 10-20 random questions
- Number of Attempts: Two attempts allowed
- Duration: 40-60 minutes per attempt

Feedback
Students will receive automated feedback upon completion of the quiz. This feedback is intended to provide immediate insights into areas of strength and those requiring further review.
Timing and Submission
Completion Deadline: Students must complete the quiz by the specified deadline to ensure their scores are recorded.
Late Submissions: Late submissions will not be accepted, and students are encouraged to manage their time effectively to avoid last-minute issues.
Grading
Scoring: Each question carries equal weight. The final grade will be based on the highest score achieved across the two attempts.
Grade Recording: The highest score from the two attempts will be automatically recorded in the grade book.

Number of Quizzes
1

Frequency of Quizzes
Other

Assessment Due Date
Week 5 Monday (5 Aug 2024) 10:00 pm AEST
The exam takes 2 hours.

Return Date to Students

Weighting
30%

Minimum mark or grade
Students must score 50% of the allocated marks!

Assessment Criteria
No Assessment Criteria

Referencing Style

- Harvard (author-date)

Submission
Online

Learning Outcomes Assessed

- Communicate effectively using power systems terminology, symbols and diagrams to present design documents, solutions, and calculations.

2 PROJECT

Assessment Type
Written Assessment

Task Description
Overview
The second assessment item in this unit is a comprehensive written assessment designed to address the majority of the unit's learning outcomes. This assessment will contribute 30% towards your final mark. Students will work in teams of up to three members to complete a power system modelling and simulation exercise using the PowerWorld Simulator. The exercise will encompass power system modelling, load flow analysis, and fault calculations, covering the content from weeks 1 to 9.
Content Coverage

- Overview of power system components and operations.
- Basic principles and definitions.
- Mathematical modelling of generators, transformers, and loads.
  Understanding and application of the per-unit system.
- Formation and analysis of impedance and admittance matrices (Z-bus and Y-bus).
- Network representation and single-line diagrams.
- Load flow studies using iterative methods.
- Short-circuit and fault analysis, including the calculation of fault currents and post-fault voltages.

Preparation
To prepare for this assessment, students are expected to:

- Organise into teams of no more than three members. Ensure diverse skill sets within the team to cover various aspects of the project.
- Install the free edition of PowerWorld Simulator using the instructions provided on Moodle.
- Watch the available video tutorials to achieve basic competency in using the software.
- Revisit lecture notes, textbook chapters, and tutorial exercises from weeks 1 to 9.
- Practice load flow and fault analysis problems using PowerWorld Simulator.
- Collect necessary data for the assigned power system model. This may include system parameters, load data, and network configurations.

Assessment Format
The assessment consists of a written report and a simulation file, both to be submitted via Moodle. The report should include the following sections:
1. Introduction: Brief overview of the power system being analysed; Objectives of the simulation exercise;
2. Methodology: Description of the modelling approach; Detailed explanation of load flow analysis and fault calculation methods used; Steps followed in PowerWorld Simulator to set up the model and run simulations.
3. Results: Presentation of load flow analysis results, including bus voltages, line flows, and losses. Fault (symmetrical and unsymmetrical) analysis results, detailing fault currents and post-fault system conditions. Visual aids such as diagrams, graphs, and tables to illustrate findings.
4. Discussion: Interpretation of the results;
5. Conclusion: Summary of key findings; Reflection on the learning outcomes achieved through the exercise.
6. Appendices: Include any supplementary material such as raw data, additional calculations, and screenshots from PowerWorld Simulator.
7. Contribution statement: The role and contribution of each student should be clarified at the end of the report.

Feedback:
This assessment aims to develop and evaluate your competency in power system analysis through practical application, teamwork, and effective communication of technical findings. Accordingly, the feedback will be provided in the following formats:

- Detailed comments on each section of the report, highlighting strengths and areas for improvement.
- Specific feedback on content understanding, application of modelling techniques, the accuracy and clarity of the simulations and calculations, and quality of the report presentation.

- Each team will receive collective feedback, while individual contributions will be acknowledged and assessed.
- Opportunity for a follow-up meeting with the unit coordinator to discuss the feedback in detail.

Assessment Due Date
Week 10 Monday (16 Sept 2024) 11:59 pm AEST
Submit the report as a PDF file to the link in the Assessment tile of the unit website in Moodle together with relevant simulation files.

Return Date to Students
Week 12 Monday (30 Sept 2024)
Feedback will be given through unit website in Moodle.

Weighting
30%

Minimum mark or grade
Students must score 50% of the allocated marks!

Assessment Criteria
The written assessment for the power system modelling and simulation exercise will be evaluated based on the following criteria:

1. Understanding and Application of Power System Concepts (20%)

- Demonstrates a comprehensive understanding of power system components, modelling techniques, and analysis methods.
- Correct application of theoretical knowledge to the simulation exercise.
- Accurate use of relevant formulas and principles in load flow and fault calculations.

2. Simulation Accuracy and Setup (25%)

- Correct setup and configuration of the power system model in PowerWorld Simulator.
- Properly executed load flow analysis with accurate results.
- Accurate fault analysis, including the calculation of fault currents and post-fault voltages.
- Inclusion of all necessary parameters and data for the simulations.

3. Methodology and Approach (20%)

- Clear and logical description of the modelling approach and simulation steps.
- Detailed explanation of load flow analysis and fault calculation methods used.
- Use of appropriate methods and best practices in setting up and running simulations in PowerWorld Simulator.

4. Results Presentation and Interpretation (20%)

- Clear presentation of simulation results, including bus voltages, line flows, losses, and fault conditions.
- Effective use of visual aids such as diagrams, graphs, and tables to illustrate findings.
- Accurate interpretation and analysis of the results.
- Identification and discussion of any discrepancies or unexpected outcomes.

5. Report Quality and Organisation (10%)

- Structured and well-organised report, following the required format (Introduction, Methodology, Results, Discussion, Conclusion, Appendices).
- Clarity and coherence in writing, with proper grammar and spelling.
- Proper labelling and referencing of figures, tables, and equations.
- Comprehensive and logical flow of content throughout the report.

6. Teamwork and Individual Contribution (5%)

- Effective collaboration and division of tasks among team members.
- Clear indication of individual contributions to the project.
- Demonstration of teamwork in achieving project goals and overcoming challenges.

Grading Rubric:

Criteria	Excellent (85-100%)	Good (70-84%)	Satisfactory (50-69%)	Needs Improvement (30-49%)	Unsatisfactory (0-29%)
Understanding and Application	Thorough understanding, accurate application	Good understanding, mostly accurate	Basic understanding, some inaccuracies	Limited understanding, several inaccuracies	Little to no understanding, mostly inaccurate
Simulation Accuracy and Setup	Perfect setup, highly accurate results	Good setup, mostly accurate results	Adequate setup, some inaccuracies	Poor setup, significant inaccuracies	Incorrect setup, highly inaccurate
Methodology and Approach	Clear, detailed, logical	Clear, fairly detailed	Basic, somewhat clear	Lacks detail, unclear	Poor methodology, very unclear
Results Presentation and Interpretation	Clear, well-illustrated, insightful	Clear, good illustrations, some insight	Basic presentation, adequate illustrations	Poor presentation, lacks illustrations	Incoherent presentation, no illustrations
Report Quality and Organisation	Well-structured, clear, error-free	Well-structured, minor errors	Adequate structure, some errors	Poor structure, several errors	Very poor structure, many errors
Teamwork and Contribution	Highly effective, well-coordinated	Effective, fairly coordinated	Adequate, some coordination issues	Poor coordination, unequal contribution	Very poor coordination, minimal contribution

Referencing Style

- Harvard (author-date)

Submission
Online Group

Submission Instructions
Submit the report as a PDF file to the link in the Assessment tile of the unit website in Moodle together with relevant simulation files.

Learning Outcomes Assessed

- Calculate fault currents of power systems across various scenarios to select suitable protection schemes
- Solve power flow problems for power system planning and operation studies
- Analyze the balanced and unbalanced operation of power systems utilising suitable software packages
- Work both collaboratively and autonomously to analyse and solve problems
- Communicate effectively using power systems terminology, symbols and diagrams to present design documents, solutions, and calculations.

3 End of Term Online Test

Assessment Type
Online Test

Task Description
Overview
The third assessment item for this unit is the End of Term Online Exam, which constitutes 40% of your final mark. This comprehensive exam will evaluate your understanding and application of the core concepts covered from weeks 4 to 12, focusing on load flow studies, fault analysis, and power system transient stability. The exam is divided into two parts: Part-1 consists of 10 True/False questions, and Part-2 comprises 3 to 4 numerical problems. This assessment aims to test both your theoretical knowledge and practical problem-solving skills. It encourages you to apply theoretical knowledge to practical scenarios, enhancing your problem-solving abilities and readiness for real-world power system challenges.
Content Coverage
The exam will cover the following key topics:
1. Weeks 4 to 6: Load Flow Studies
  - Power flow equations and their significance.
  - Methods of solving load flow problems, including the Gauss-Seidel, Newton-Raphson, and Fast Decoupled methods.
  - Analysis and interpretation of load flow results, including bus voltages, line flows, and system losses.
2. Weeks 7 to 9: Symmetrical Components and Fault Analysis
  - Types of faults in power systems (e.g., single line-to-ground, line-to-line, double line-to-ground, and three-phase faults).

- Calculation of fault currents using symmetrical components and per unit system.

3. Weeks 10 to 12: Transient Stability
   - Concepts of transient stability and its importance in power systems.
   - Methods for analysing transient stability, including the equal area criterion.
   - Multi-machine systems, small-signal stability.

Preparation

To effectively prepare for the exam, students should:

- Thoroughly review all relevant lecture notes and corresponding chapters in "Power System Analysis and Design (5th Edition)" by Glover, Sarma, and Overbye.
  Focus on understanding key concepts and methodologies discussed during the lectures.
- Solve practice problems from the textbook and previous assignments, focusing on load flow studies, fault analysis, and transient stability.
  Watch tutorial videos on Moodle.
- Attend any review sessions or office hours offered by the unit coordinator for additional support.

Assessment Format

The exam consists of two parts:

1. Part-1: True/False Questions (10 questions) (20 %)
   - Each question will assess your understanding of fundamental concepts.
   - You will be required to indicate whether each statement is true or false.
   - This section tests your quick recall and basic comprehension of the topics.
2. Part-2: Numerical Problems (3 to 4 problems) (80 %)
   - These problems will require detailed calculations and logical steps to arrive at the correct solutions.
   - Problems may involve at least one question on each topic, including load flow analysis, fault current calculations, and transient stability.
   - You will need to show all work clearly, including intermediate steps, formulas used, and final answers.
   - Ensure accuracy in numerical calculations and proper use of units.

Feedback

Feedback on your performance will be provided in the following ways:

- Detailed scores for each part of the exam will be available on the university's Moodle platform.
  Breakdown of scores for each question in Part-1 and each numerical problem in Part-2.
- An overview of common mistakes and areas for improvement will be posted on the course page.
- An answer sheet of the exam will be provided to aid understanding.
- Optional follow-up sessions may be scheduled upon written request (via email) from each student to review the exam and address any questions or concerns.

Assessment Due Date

Return Date to Students

Weighting

40%

Minimum mark or grade

Students must score 50% of the allocated marks!

Assessment Criteria

Part-1: True/False Questions	**20%**
Part-2: Numerical Problems	**80%**
- Load Flow Studies	20%
- Symmetrical fault analysis	20%
- Unsymmetrical fault analysis	20%
- Transient Stability	20%

Each question in the second part will be evaluated based on the following criteria:
1. Accuracy of Numerical Solutions (40%):

- Correctness of the final numerical answers for each problem.
- Precision in calculations, including the correct use of units and significant figures.

2. Logical Steps and Calculations (30%)

- Clarity and correctness of the logical steps leading to the final answer.
- Proper use of mathematical formulas and principles specific to power systems analysis.
- Step-by-step demonstration of the problem-solving process, ensuring no logical gaps.

3. Understanding of Concepts (20%)

- Demonstration of a thorough understanding of power system concepts.
- Application of theoretical knowledge to practical problems.
- Ability to explain the reasoning behind each step of the calculation.

4. Presentation and Organisation (10%)

- Neatness and organisation of the presented work.
- Proper labelling of diagrams, equations, and tables.
- Clarity in the presentation of answers, ensuring they are easy to follow.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Please consider the following instructions: (1) The quiz will be conducted on Moodle. (2) Ensure you have access to the Moodle and are familiar with its use. (3) Log in using your university credentials before the start time of the quiz. (4) The quiz will be available from 16:00-18:00 on 26.07.2024. (5) Ensure you complete the quiz within this time frame. Late submissions will not be accepted. (6) Make sure you have a stable internet connection before starting the quiz. (7) Scan your work out answers and upload frequently to avoid data loss in case of connectivity issues. (8) Answers could be typed or handwritten and calculations must be shown in detail. You may need to scan or photograph handwritten steps if calculations cannot be typed. Ensure the images are clear and legible. Combine all parts of your answers into a single PDF file for submission. Tools such as Microsoft Word or Google Docs can be used to compile your answers, which can then be saved as a PDF. (9) Name your submission file as follows: LastName_FirstName_StudentID_EoTExam.pdf (Example: Doe_John_12345678_EoTExam.pdf)

Learning Outcomes Assessed

- Calculate fault currents of power systems across various scenarios to select suitable protection schemes
- Solve power flow problems for power system planning and operation studies
- Analyze the balanced and unbalanced operation of power systems utilising suitable software packages
- Investigate power angle stability for both single and multi-machine power systems

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