ELEC396

Electrical Machines

S2 Day 2019

School of Engineering

Contents

General Information

Unit convenor and teaching staff
Lecturer
Jahangir Hossain
jahangir.hossain@mq.edu.au
Contact via 02 9850 2229
44WR-Room 109
Thursday 12.00 AM-2.00 PM

Amir Safari
amir.safari@mq.edu.au

Tutor
Seyedfoad Taghizadeh
seyedfoad.taghizadeh@mq.edu.au
Contact via 0405550714
44WR-level 1 Desk 21
Thursday 1.00 PM-2.00 PM

Credit points
3

Prerequisites
39cp at 100 level or above including ENGG150 and ELEC270

Corequisites

Co-badged status

Unit description
This unit develops fundamental knowledge and skills in the area of electrical machines (motors, generators) and their applications in modern electrical systems, such as electric vehicles and renewable energy systems. This unit will equip students with the knowledge and skills necessary for designing, analysing, controlling and selecting appropriate machines for various applications, and to operate them in a safe, efficient and economical manner.

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:

Describe and explain operational characteristics of typical electrical machines for a range of real industrial processes

Analyse electrical machines and identify the appropriate machines for a particular real world application

Identify, formulate and provide solutions to complex problems with intellectual independence for finding the performance of electrical machine systems

Design and implement appropriate control and protection measures for both DC and AC machines for a range of context

Identify and manage workplace health and safety issues

General Assessment Information

Conditions required to pass the unit**: e. g.: Grading and passing requirement for unit**

In order to pass this unit a student must obtain a mark of 50 or more for the unit (i.e. obtain a passing grade P/ CR/ D/ HD). For further details about grading, please refer below in the policies and procedures section.

Late submissions and Resubmissions

Late submissions will attract a penalty of 10/100, 10% marks per day. Extenuating circumstances will be considered upon lodgment of a formal notice of disruption of studies.

Resubmissions of work are not allowed.

Assessment Tasks

Name	Weighting	Hurdle	Due
Tutorial	20%	No	At the end of tutorial session
Quiz	10%	No	During lecture time
Laboratory	30%	No	At the end of lab session
Final exam (closed book)	40%	No	During central exam period

Tutorial

Due: **At the end of tutorial session**
Weighting: **20%**

There are ten tutorial sessions throughout the semester. **There is no tutorial session in week**

1. Each tutorial will have several problem solving questions. Few questions will be solved interactively by the lecturer in the scheduled tutorial class. In each session, students will be asked to solve a question individually related to ones they have practiced on that session .Students will submit the solution to the lecturer at the end of the class. The problems will be designed to enhance students' understanding of the topics covered in lectures and provide them with an opportunity to apply the knowledge they have learned from lectures to solving practical problems. In the tutorial class they will: (i) analyse three-phase electrical circuits (ii) identify, formulate and provide solutions to complex problems related to three-phase transformers, DC and AC electrical machines.

Criteria & Marking: (i) calculation accuracy; (ii) communications of assumptions; (iii) methodology and (iv) completeness. Detail of the marking criteria will also be notified on iLearn.

On successful completion you will be able to:

- Analyse electrical machines and identify the appropriate machines for a particular real world application
- Identify, formulate and provide solutions to complex problems with intellectual independence for finding the performance of electrical machine systems

Quiz

Due: **During lecture time**
Weighting: **10%**

During 'lecture' times in the classroom each week, students will be asked a series of questions which will reflect work in class (calculations, review of taught material, etc.) or reading assignments between classes.

Some questions (around 10 per week) will carry marks: 1 for a correct answer and 0 for an incorrect answer. These marks will be accumulated each week. Some questions are anonymous and will be indicated as such at the time; these questions carry no marks.

On successful completion you will be able to:

- Describe and explain operational characteristics of typical electrical machines for a range of real industrial processes

Laboratory

Due: **At the end of lab session**
Weighting: **30%**

There are ten laboratory sessions throughout the session. **There is no laboratory session in week 1**. The laboratories are strongly recommends; attendance, participation, and completion of

all the laboratory activities are required in order to satisfactorily complete the course. You are required to record all the laboratory results (and printouts), answer all questions and submit it at the end of each session. Completion of a laboratory activity is determined by having the laboratory tutor sign off the student log book, nominally at the end of the laboratory class.

On successful completion you will be able to:

- Analyse electrical machines and identify the appropriate machines for a particular real world application
- Design and implement appropriate control and protection measures for both DC and AC machines for a range of context
- Identify and manage workplace health and safety issues

Final exam (closed book)

Due: **During central exam period**
Weighting: **40%**

Final Exam will cover all of the course content. This will be a closed book exam, and involve short answers and problem solving.

On successful completion you will be able to:

- Describe and explain operational characteristics of typical electrical machines for a range of real industrial processes
- Analyse electrical machines and identify the appropriate machines for a particular real world application
- Identify, formulate and provide solutions to complex problems with intellectual independence for finding the performance of electrical machine systems
- Design and implement appropriate control and protection measures for both DC and AC machines for a range of context

Delivery and Resources

Lecture materials, Tutorial Questions, Laboratory Instruction Manuals, and Tutorial Solutions will be uploaded to iLearn.

Lectures will be recorded on Echo Recordings.

Laboratories will use different DC and AC machines, transformers, meters and loads.

Recommended readings are ELEC396 lecture notes and the following reference books:

Testbook: A. E. Fitzgerald, C. Kingsley, Jr., and S. D. Umans, Electric Machinery, 9th edition, 2014. McGrawHill, ISBN:978-0073380469 Recommended book: Stephen J. Chapman, Electric

Machinery Fundamentals, 5th Edition, McGraw Hill Int., 2012, ISBN-978-0-07-352954-7

Unit Schedule

For details, please refer to the Unit Schedule on the ELEC396 iLearn webpage.

Learning and Teaching Activities

Unit Schedule

Weekly learning and teaching topics and activities are outlined in the Unit Schedule, together with relevant sections of the text and references.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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

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

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

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- Identify, formulate and provide solutions to complex problems with intellectual independence for finding the performance of electrical machine systems

- Design and implement appropriate control and protection measures for both DC and AC machines for a range of context

Assessment tasks

- Laboratory
- Final exam (closed book)

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcome

- Identify and manage workplace health and safety issues

Assessment task

- Laboratory

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Describe and explain operational characteristics of typical electrical machines for a range of real industrial processes
- Analyse electrical machines and identify the appropriate machines for a particular real world application

Assessment tasks

- Quiz
- Final exam (closed book)

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcome

- Analyse electrical machines and identify the appropriate machines for a particular real world application

Assessment tasks

- Tutorial
- Final exam (closed book)

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcome

- Identify, formulate and provide solutions to complex problems with intellectual independence for finding the performance of electrical machine systems

Assessment tasks

- Tutorial
- Final exam (closed book)

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Describe and explain operational characteristics of typical electrical machines for a range of real industrial processes
- Design and implement appropriate control and protection measures for both DC and AC machines for a range of context

Assessment tasks

- Laboratory
- Final exam (closed book)

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcome

- Identify and manage workplace health and safety issues

Assessment task

- Laboratory

Changes from Previous Offering

This is a new unit and offering first time in S2 2018.