

# Course Description

## 7046 - Power Quality and Fault Diagnosis

<b>Course Code:</b>	ELEC ENG 7046
<b>Course Title</b>	Power Quality and Fault Diagnosis
<b>Academic Year:</b>	2008
<b>Semester:</b>	1
<b>Units:</b>	3
<b>Lecturer:</b>	Dr. R. Zivanovic
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### **Aim**

The aim of this course is to address power quality issues and condition monitoring techniques used in industrial systems, and expose the students to the state of art in power quality in power systems and condition monitoring of motors.

### **Outcomes**

The course will cover various issues under two major sections: power quality and motor condition monitoring, which are highly topical and addressed in every section of the industrial world. The students will gain various skills in this course including sourcing the origin of an unknown disturbance in an electrical system and performing real time measurements using dedicated instrumentation and sensor technologies. In addition, the students will have a chance to investigate power quality and condition monitoring related case studies. Furthermore, the computer aided real time measurement and analysis techniques utilized in this course will expose the students to the state of art in power quality and condition monitoring of motors, which finds applications in numerous systems from energy generation to the transmission and utilization.

### **Assumed knowledge**

ELEC ENG 1006 Electrical Engineering I or ELEC ENG 1005 Electrical Systems AM, ELEC ENG 2008 Electronics II, or equivalent.

### **Delivery Methods**

20 lectures, 4 Tutorials (primarily computer aided)

### **Assessment:**

Quizzes and two major assignments.

2 Quizzes 33%

2 Assignments 33%

1 Research Project: 34%

## **COURSE OUTLINE : 4043 POWER QUALITY AND CONDITION MONITORING**

Definitions and Preliminary Studies  
Introduction to Power Quality  
Power Quality Disturbances  
Signature of Power Quality Problems  
Power Quality Disturbance Solutions  
Power Quality Research  
Condition Monitoring Overview  
Induction Machine Theory  
Induction Motor Construction and Faults  
Off-Line Testing Methods  
On-Line Condition Monitoring : Data Collection  
On-Line Condition Monitoring : Data Analysis

### **COURSE NOTES or TEXTBOOKS**

A comprehensive course notes will be provided, which will include a number of references.

### **Graduate Attributes**

- GA1** An advanced level of knowledge and understanding of the theory and practice of Electrical and Electronic, Computer Systems or IT&T Engineering and the fundamentals of science and mathematics that underpin these disciplines.
- GA2** A commitment to maintain an advanced level of knowledge throughout a lifetime of engineering practice and the skills to do so.
- GA3** The ability to apply knowledge in a systematic and creative fashion to the solution of practical problems.
- GA4** A commitment to the ethical practice of engineering and the ability to practice in a responsible manner that is sensitive to social, cultural, global, legal, professional and environmental issues.
- GA7** An ability to identify, formalise, model and analyse problems.
- GA8** The capacity to design, optimise, implement, test and evaluate solutions.
- GA9** An ability to plan, manage and implement solutions that balance considerations of economy, quality, timeliness and reliability as well as social, legal and environmental issues.
- GA11** Skills in the use of advanced technology, including an ability to build software to study and solve a range of problems.
- GA13** An ability to utilise a systems approach to design and operational performance.
- GA14** Understanding of the principles of sustainable design and development.

These programs also foster the graduate attributes of the University of Adelaide and the Institution of Engineers Australia. These should be read in conjunction with the list above.

### **Assessment of Graduate Attributes**

Attributes GA1, GA7, GA8, GA11 and GA13 will be assessed through the assignments and quizzes. The problem based assignments are designed particularly to develop and assess attributes GA3, GA4, GA7, GA8, GA9, GA11, GA13 and GA14. Completion of the assignments will also require students to undertake some independent learning and so will develop in students the realisation of the necessity to continually acquire new knowledge and understanding. Thus completion of the assignments will develop and assess attribute GA2.

wls:clg:14th February 2007