ELEC9716 Electrical Safety

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   The course will be held in room EE224

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2.9.12 Cabling and terminations
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2.9.14 Maintenance requirements
2.9.15 Cost comparisons

3. Staff Contact Details

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Email</th>
<th>Availability; times and location</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Convener</td>
<td>Colin Grantham</td>
<td><a href="mailto:c.grantham@unsw.edu.au">c.grantham@unsw.edu.au</a></td>
<td>Tutorials &amp; EE109</td>
<td>9386 4894</td>
</tr>
<tr>
<td>Lecturer/tutor</td>
<td>Colin Grantham</td>
<td></td>
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</table>

4. Course details

**Credit Points:**
The course is a 6 Unit credit course.

**Summary of the Course**
Electrical accidents to personnel and electrically initiated fires cause a considerable loss to industry and the community every year, ranging from death and permanent debilitating injury to property damage amounting to many millions of dollars. The causes of such accidents and fires range from carelessness and/or ignorance, through to unforeseen maloperation of equipment or appliances.

The continual growth of the chemical and petro-chemical engineering industries in recent years implies a corresponding increase in the number of industrial complexes involving hazards from flammable gases, vapours and mists which can produce explosive mixtures with air. At the same time the amount of electrical equipment required on such sites is increasing, so that appropriate steps must be taken to provide the protection against the possibility of gas ignition.

Explosions can cause huge loss of life and plant such as in the cases of the Alpha-Piper oil rig and Flixborough disasters in the UK. In addition to the large disasters which create international news, there are numerous smaller explosions and fires such as those in small paint spraying areas, dry-cleaning premises and the like which can also cause serious injury and/or substantial loss. In many cases the hazards occur in areas frequented by the public, for example petrol service stations. In all of these situations electricity is used.

The importance of this expanding area of technology has been emphasized by a number of IEE international conferences over the years. Despite the increasing importance of electrical safety in hazardous atmospheres it was reported at one of these conferences that there is still a shortage of professional engineers with appreciable knowledge of the subject and that some of the fundamentals of hazardous atmosphere electrical safety had never even been heard of by many factory works engineers.
A comprehensive set of printed notes, some case studies, including videos, will be provided to supplement the individual lecture presentations.

**Aims of the Course**
The course aims to provide students with an understanding of the hazards to people and equipment that are present in the electrical environment of a power supply utility, commercial or domestic installation, together with the design principles and working procedures that are implemented to minimise the risk of electrical accidents and fires. The legal processes that can arise as a result of electrical accidents and fires are also discussed.

The course also aims to provide students with a thorough understanding of explosion hazards and the various methods of overcoming these hazards.

**Student learning outcomes**
Students will gain skills in identifying the presence of electrical hazards, implementing measures to minimise risk and develop skills in investigative techniques for determining the cause of electrical accidents, fires and explosions.

**Graduate Attributes**
A formal set of notes are available for this course. The notes are expansive and detailed and you may take these lecture notes into the end of session test. Sections of these notes may be highlighted, but no additional written material may be added to the notes which are taken into the end of session test. The subject material is very descriptive and a significant proportion of the assessment (including the two assignments) is of a descriptive nature. If your written English is very poor you should consider very carefully before committing yourself to this course.

5. **Rationale for the inclusion of content and teaching approach**

In the past the Electric Energy Group within the School of EE&T carried out a survey to establish what employers would like the School to offer in terms of continuing graduate education. Electrical Safety came top of the list. As a consequence Colin Grantham, together with others, has developed and help present Electrical Safety short courses on numerous occasions throughout Australia and South East Asia over the past 20 years. The present course is largely based on these short courses. Colin Grantham also worked in the mining industry and for the British Approvals Service for Electrical Equipment in Flammable Atmospheres (BASEEFA) and has carried out several hundred consultancies associated with Electrical Safety. This vast experience is taken into the classroom and the theory provided in the course notes is extensively supplemented with numerous practical case studies.

6. **Teaching strategies**

The classroom teaching is based on providing an overview of each of the topic areas listed in Section 2 above. The topic areas from the course notes will be extensively supplemented with numerous practical case study examples and video recordings.

7. **Assessment**

The assessment for the course will be as follows:
### Assessment

<table>
<thead>
<tr>
<th>Assessment task</th>
<th>Length</th>
<th>Weight</th>
<th>Learning outcomes assessed</th>
<th>Graduate attributes assessed</th>
<th>Due date</th>
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<tbody>
<tr>
<td>Assignment 1</td>
<td>Approximately 10-20 pages</td>
<td>20%</td>
<td>Ability to research a topic area, to learn, to demonstrate what you have learnt and to write a good formal report.</td>
<td>Ability to research a topic area and to write a good formal engineering report with independent conclusions.</td>
<td>15th April</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>Approximately 10 pages</td>
<td>20%</td>
<td>Ability to assess and learn from a practical case study.</td>
<td>Ability to assess and provide solutions to a practical case study and to write a formal engineering report with independent conclusions.</td>
<td>13th May</td>
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### Submission of Assessment Tasks

**Assignment 1**: You will be required to write a report on any area of “Electrical Safety” of your choice. The report will need to be written like any good substantial engineering report with all sources of information clearly identified and with specific conclusions. The marking of the report will be based on the report’s content, clarity, source of reference material, conclusions and to a large extent what the student has demonstrated that he/she has learned in carrying out the assignment.

**Assignment 2**: This assignment is based on an actual case study. You will be required to write a report giving your main reasons for the cause of the accident and who you think was to blame for the accident (i.e. employee or employer). You will also be required to provide suggestions of how you believe this type of accident could be best avoided in the future.
**End of session test:** This will be based on the course notes, tutorial examples and the case studies covered in lectures. The course notes can be taken into the examination, but as stated above these notes are expansive and detailed and you will need to have a degree of understanding of the notes to summarize them to provide the answers to specific questions. You will be required to make your own notes (or have a good memory) related to each of the case studies and videos provided to supplement the lecture notes throughout the course.

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**8. Academic honesty and plagiarism**

Plagiarism is the use of other people’s work without proper acknowledgement. It includes the copying of assignment tasks from other students. Further information about plagiarism can be found via http://www.lc.unsw.edu.au/plagiarism.

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**9. Course schedule**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Date</th>
<th>Location</th>
<th>Lecture Content</th>
<th>Tutorial/Lab Content</th>
<th>Suggested Readings</th>
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<tbody>
<tr>
<td>Effects of electric shock.</td>
<td>4/3/2010</td>
<td>EE224</td>
<td>See section 2 above.</td>
<td>-</td>
<td>Section 2.1</td>
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<tr>
<td>Protection against electric shock.</td>
<td>11/3/2010</td>
<td>EE224</td>
<td>See section 2 above.</td>
<td>Tutorial Sheet No. 1.</td>
<td>Section 2.1</td>
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<tr>
<td>Lightning hazards.</td>
<td>18/3/2010</td>
<td>EE224</td>
<td>See section 2 above.</td>
<td>Tutorial Sheet No. 1.</td>
<td>Section 2.2</td>
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<td>Earthing</td>
<td>25/3/2010</td>
<td>EE224</td>
<td>See section 2 above.</td>
<td>Tutorial Sheet No. 2.</td>
<td>Section 2.3</td>
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<td>RCDs</td>
<td>1/4/2010</td>
<td>EE224</td>
<td>See section 2 above.</td>
<td>Tutorial Sheet No. 2.</td>
<td>Section 2.4</td>
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<tr>
<td>Electric and magnetic fields.</td>
<td>15/4/2010</td>
<td>EE224</td>
<td>See section 2 above.</td>
<td>Tutorial Sheet No. 3.</td>
<td>Section 2.5</td>
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<tr>
<td>Electrosurgical hazards.</td>
<td>22/4/2010</td>
<td>EE224</td>
<td>See section 2 above.</td>
<td>Tutorial Sheet No. 3.</td>
<td>Section 2.6</td>
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<tr>
<td>Electrical safety and the</td>
<td>29/4/2010</td>
<td>EE224</td>
<td>See section 2 above.</td>
<td>Tutorial Sheet No. 3.</td>
<td>Section 2.7</td>
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### 10. Expected Resources for students

A full set of printed notes are available on the Library MyCourse Website at the following address:

[http://lrd.library.unsw.edu.au/F/?func=find-b&find_code=CNO&local_base=NSW30CAT&request=ELEC9716](http://lrd.library.unsw.edu.au/F/?func=find-b&find_code=CNO&local_base=NSW30CAT&request=ELEC9716)

The following book is useful for reference purposes to supplement the printed notes.

J. Maxwell Adams, “ELECTRICAL SAFETY a guide to the causes and prevention of electrical hazards”, The Institution of Electrical Engineers.

### 11. Course evaluation and development

This is a well developed course which has been modified over the years based on student and short course participant evaluations. Normal student survey evaluation will be carried out by the School of EE&T if deemed necessary by the Director of Academic Studies.

### 12. Other information to be included

It is expected that students will read the printed notes before lectures. It is also expected that students will attempt the tutorial questions outside of the formal tutorial periods. Finally it is expected that students will...
make their own notes relative to the practical case studies and videos which will be used throughout the lecture periods to supplement the formal lecture notes.