Faculty of Engineering
School of Electrical Engineering & Telecommunications

ELEC 9716
Electrical Safety

SESSION 1, 2011
ELEC9716

Electrical Safety

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Course convener

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Course details

Credits (UOC)

Course ELEC 9716 is 6 UOC.

Contact hours

3 hours per week

Lectures

Civil Engineering 713 (K-H20-713): Tuesdays 6 PM – 9 PM.

Draft lecture plan

<table>
<thead>
<tr>
<th>Week No</th>
<th>Date</th>
<th>Summary of Lecture Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>08/03/11</td>
<td>General principals of electricity &amp; safety</td>
</tr>
<tr>
<td>3</td>
<td>15/03/11</td>
<td>Electricity &amp; Human body</td>
</tr>
<tr>
<td>4</td>
<td>22/03/11</td>
<td>Insulation &amp; Earthing</td>
</tr>
<tr>
<td>5</td>
<td>29/03/11</td>
<td>Electric &amp; magnetic fields</td>
</tr>
<tr>
<td>6</td>
<td>05/04/11</td>
<td>Electrical hazards – lightning &amp; fire</td>
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<tr>
<td>7</td>
<td>12/04/11</td>
<td>Electrical hazards – explosion</td>
</tr>
<tr>
<td>8</td>
<td>19/04/11</td>
<td>Mid-session test</td>
</tr>
<tr>
<td>9</td>
<td>03/05/11</td>
<td>Overhead, Underground &amp; Hidden electricity</td>
</tr>
<tr>
<td>10</td>
<td>10/05/11</td>
<td>Safety equipment - RCD &amp; PPE</td>
</tr>
<tr>
<td>11</td>
<td>17/05/11</td>
<td>Protection &amp; testing - Lockout / tagout</td>
</tr>
<tr>
<td>12</td>
<td>24/05/11</td>
<td>Electrical maintenance</td>
</tr>
<tr>
<td>13</td>
<td>31/05/11</td>
<td>Electrical safety &amp; law</td>
</tr>
</tbody>
</table>

Note: The lecture starts only from week 2 and not week 1.
Teaching strategies

The classroom teaching will be through power point presentations. All course notes will be supplied by the lecturer prior to lectures every week. The lectures will be extensively supplemented with numerous practical case study examples and video recordings.

Tutorials

Tutorials will be done during the lecture hours on certain topics. This will be announced in the blackboard and the material will be made available. It is also expected that students will attempt the tutorial questions outside of the formal tutorial periods.

Assessment

You are expected to attend all lectures, tutorials and midterm test, in order to maximize learning. It is a UNSW requirement that you attend at least 80% of your classes. In addition to the lecture notes, you should read relevant sections of the recommended text. Reading additional texts would further enhance your learning experience. Group learning is also encouraged.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Assessment</th>
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<tbody>
<tr>
<td>Assignment</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm test</td>
<td>20%</td>
</tr>
<tr>
<td>Final written exam</td>
<td>60%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

1) Assignment

- The assignment is based on an actual case study. You will be required to elaborate on a case study (either from your workplace or elsewhere) and 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.
- Approximately 10 pages
- Individual report
- Due 17 May 2011.
- Late submissions are not permitted. If assignment is not submitted the student has to lose 20% marks straight away.

2) Mid-session test

- There will be one mid-session test on 19 April 2011. Test duration: One hour; Venue: Lecture room.
- This will give a good practice for sitting the final exam.
- If a student is unable to attend for medical or other serious reasons (i.e., a death in the immediate family) the student must present medical certificates and/or other documentation to the lecturer within 2 weeks of the assessment task. If this is not done within the required time period then no consideration will be given. In case of missing the
test for one of the reasons above, the assessment will be carried over to the final exam; i.e., the final exam will become a higher % of the assessment. Or, in other words, the final exam will be assessed for 80% instead of 60%, for this student.

3) Final Exam

- The final exam will be a closed book exam for 3 hours. In principle, the examination may cover any aspect of the course that has been presented in lectures and tutorials.
- Any relevant material like safety codes and formulae will be supplied in the exam.
- Students are not allowed to bring any course material.

Course Information

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 mal operation 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.

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

- Ability to assess and provide solutions to a practical case study.
- Ability to write a formal engineering report with independent conclusions.
- The subject material is very descriptive and a significant proportion of the assessment (including the assignment) is of a descriptive nature. If your written English is very poor you should consider very carefully before committing yourself to this course.

Academic honesty and plagiarism

What is Plagiarism?

- Plagiarism is the presentation of the thoughts or work of another as one’s own*. Examples include:
  - direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person’s assignment without appropriate acknowledgement;
  - paraphrasing another person’s work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
  - piecing together sections of the work of others into a new whole;
  - presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and
  - claiming credit for a proportion of work contributed to a group assessment item that is greater than that actually contributed.

- For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.
- Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.
- Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.
- The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does not amount to plagiarism†.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via: [www.lc.unsw.edu.au/plagiarism](http://www.lc.unsw.edu.au/plagiarism)

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
• appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle.

† Adapted with kind permission from the University of Melbourne.

Resources for students

Course web site

• All announcements and course materials will be hosted on the UNSW Blackboard at: http://lms-blackboard.telt.unsw.edu.au
  You should be automatically enrolled in ELEC9716 on Blackboard.
  You will need your zPass to access this.
• All marks from assignment and midterm test can be found on Blackboard.
• A discussion forum is available in Blackboard where students can post their doubts and discussions. Any student can answer the questions by any other student. Only questions related to Electrical safety need to be posted.

Recommended texts


Equity and diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (93854734 or www.equity.unsw.edu.au/disabil.html).

Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made. Information on designing courses and course outlines that take into account the needs of students with disabilities can be found at: www.secretariat.unsw.edu.au/acboardcom/minutes/coe/disabilityguidelines.pdf