GENG1002: Introduction to Electrical & Electronic Engineering

Credit: 6 points Availability: Semester 1 and Semester 2
Old unit code: 600.102, ENGT1001

Outcomes: This unit encourages an appreciation of the multidisciplinary nature of electrical and electronic engineering and its application in a wide variety of industry sectors.

Students are able to (1) understand basic principles and design methods associated with simple circuits using techniques that they have learnt in lectures, tutorials and laboratories; (2) confidently use the Internet while studying the web-based Mallard teaching system; (3) work successfully in teams and appreciate the design and operational performance issues required when theoretical material is applied in a problem-solving approach in order to develop an autonomous electric vehicle; (4) communicate effectively with others in both written and spoken work; and (5) undertake further technical and professional courses particularly in the area of electrical and electronic engineering.

Content: This unit includes the following:
(1) introduction to electric circuits—current, voltage, power, voltage and current sources, Kirchhoff’s current law and voltage law, solving simple resistive circuits;
(2) nodal analysis, superposition, source transformations, Thevenin and Norton theorems, maximum power transfer;
(3) magnetism, electromechanics, dc motors; transducers
(4) diodes and circuits;
(5) operational amplifiers and instrumentation—applications in home automation, process control and music;
(6) digital logic;
(7) inductance and capacitance; and
(8) AC circuits—phasors, sinusoidal steady state analysis and types of power.

Unit Rules:
Advisable prior study: TEE Calculus or equivalent, TEE Applicable Mathematics or equivalent and TEE Physics
Contact hours—60 (lectures: 36 hrs; tutorials: 12 hrs; labs: 12 hrs)

Unit Web Page: http://student.ee.uwa.edu.au/units/geng1002
Schedule: The intended schedule for this unit is shown in the table below (subject to change)

<table>
<thead>
<tr>
<th>Week</th>
<th>Week Start</th>
<th>Topic/Chapter in Lecture Notes</th>
<th>Tutorial</th>
<th>Lab</th>
</tr>
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<tbody>
<tr>
<td>9</td>
<td>23/2/09</td>
<td>Introduction to circuits – Chapter 1</td>
<td>No</td>
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</tr>
<tr>
<td>10</td>
<td>2/3/09</td>
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<td>11</td>
<td>9/3/09</td>
<td>Nodal Analysis – Chapter 2</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>12</td>
<td>16/3/09</td>
<td>Analysis Techniques – Chapter 3</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>13</td>
<td>23/3/09</td>
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<td>No</td>
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<tr>
<td>14</td>
<td>30/3/09</td>
<td>Diodes – Chapter 8</td>
<td>Yes</td>
<td>Lab 1</td>
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<tr>
<td></td>
<td>1/4/09</td>
<td>PROSH – No Lecture, Reschedule tute..</td>
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<tr>
<td>16</td>
<td>13/4/09</td>
<td>BREAK</td>
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<td>17</td>
<td>20/4/09</td>
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<td>Yes</td>
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<tr>
<td>18</td>
<td>27/4/09</td>
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<td>Lab 2</td>
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<td></td>
<td>28/4/09</td>
<td>Operational Amps – Chapter 9</td>
<td>Yes</td>
<td></td>
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<tr>
<td>19</td>
<td>4/5/09</td>
<td>Digital Systems – Chapter 10</td>
<td>Yes</td>
<td>Lab 3</td>
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<tr>
<td>20</td>
<td>11/5/09</td>
<td>Digital Systems – Chapter 10</td>
<td>Yes</td>
<td>Lab 3</td>
</tr>
<tr>
<td>21</td>
<td>18/5/09</td>
<td>L, C – Chapter 5</td>
<td>Yes</td>
<td>Lab 4</td>
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<tr>
<td>22</td>
<td>25/5/09</td>
<td>AC Circuits – Chapter 6</td>
<td>Yes</td>
<td>Lab 4</td>
</tr>
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</table>

Contact Hours

Lectures:
- Tuesday 11.00-11.45pm Octagon
- Wednesday 10.00-10.45pm Social Sciences Lecture Theatre
- Thursday 11.00-11.45pm Social Sciences Lecture Theatre

Lectopia recordings of this unit will be available.

Tutorials –
You must attend one tutorial session per week. You need to sign up for tutorials via OLCR. Note that attendance will be taken at all tutorial sessions, and tutorial participation will constitute 5% of your final assessment. If your tutorial falls on a designated UWA holiday (ANZAC Day) or event (eg PROSH) then YOU must reschedule and attend another session during that week.

Tutorials start in Week 2 of semester (listed as Week 10)
- Monday 11:00 11:45 Math LR1
- Monday 13:00 13:45 Math Blakers
- Tuesday 9:00 9:45 GPB2:LT
- Tuesday 14:00 14:45 Math:LR1
- Wednesday 12:00 12:45 Math:LR1
- Thursday 12:00 12:45 ENCM:ELT2
- Thursday 14:00 14:45 Math Blakers
- Thursday 15:00 15:45 GPB2:LT
If you are unable to attend your designated tutorial session then you must contact Mr Haque to arrange attendance at another tutorial for that week. If you miss a tutorial session for a particular week, due to illness or other extenuating circumstances, then you should see Dr Jenny Hopwood (Faculty Associate Dean –Extn 3061 for an appointment). Please note that applications for consideration, deferral of tests or exams or extensions of time for assignments on medical, personal or other grounds must be lodged with the faculty office no later than three working days after the due date for the assessment in question. This rule will apply to all students, except in exceptional circumstances ( 'exceptional' does mean 'exceptional', not 'just didn't have time to get around to it'!).

Tutors will be going over past examination questions and other material in class and this information will ONLY be available in tutorials.

**Mallard Sessions** – OLCR (Lab 1) – no need to enroll, not compulsory

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Group</th>
<th>Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>10:00</td>
<td></td>
<td>Wk 10</td>
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<tr>
<td>Tuesday</td>
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<tr>
<td>Wednesday</td>
<td>15:00</td>
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<td>Wk 10</td>
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<tr>
<td>Thursday</td>
<td>10:00</td>
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<td>Wk 10</td>
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<tr>
<td>Friday</td>
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<tr>
<td>Friday</td>
<td>14:00</td>
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<td>Wk 10</td>
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</tbody>
</table>

**Laboratories** (assessed, compulsory) – OLCR (Lab 2) – When you sign up for your laboratory on the OLCR system you should note that the laboratory sessions are scheduled as follows:

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Group</th>
<th>Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>10:00</td>
<td>12:45</td>
<td>Group 1</td>
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<tr>
<td>Monday</td>
<td>15:00</td>
<td>17:45</td>
<td>Group 3</td>
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<tr>
<td>Tuesday</td>
<td>15:00</td>
<td>17:45</td>
<td>Group 5</td>
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<tr>
<td>Wednesday</td>
<td>15:00</td>
<td>17:45</td>
<td>Group 7</td>
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<tr>
<td>Thursday</td>
<td>15:00</td>
<td>17:45</td>
<td>Group 9</td>
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<tr>
<td>Friday</td>
<td>10:00</td>
<td>12:45</td>
<td>Group 11</td>
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<tr>
<td>Friday</td>
<td>14:00</td>
<td>16:45</td>
<td>Group 13</td>
</tr>
<tr>
<td>Monday</td>
<td>10:00</td>
<td>12:45</td>
<td>Group 2</td>
</tr>
<tr>
<td>Monday</td>
<td>15:00</td>
<td>17:45</td>
<td>Group 4</td>
</tr>
<tr>
<td>Tuesday</td>
<td>15:00</td>
<td>17:45</td>
<td>Group 6</td>
</tr>
<tr>
<td>Wednesday</td>
<td>15:00</td>
<td>17:45</td>
<td>Group 8</td>
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<tr>
<td>Thursday</td>
<td>15:00</td>
<td>17:45</td>
<td>Group 10</td>
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<tr>
<td>Friday</td>
<td>10:00</td>
<td>12:45</td>
<td>Group 12</td>
</tr>
<tr>
<td>Friday</td>
<td>14:00</td>
<td>16:45</td>
<td>Group 14</td>
</tr>
</tbody>
</table>

If you are unable to attend your designated laboratory session due to extenuating circumstances then you must contact Mr Haque to arrange attendance at another session. You should see Dr Jenny Hopwood (Faculty Associate Dean –Extn 3061 for an appointment) so that she may write an official letter verifying your circumstances. Please note that applications for consideration, deferral of tests or exams or extensions of time for assignments on medical, personal or other grounds must be lodged with the faculty office no later than three working days after the due date for the assessment in question. This rule will apply to all students, except in exceptional circumstances ( 'exceptional' does mean 'exceptional', not 'just didn't have time to get around to it'!).
time to get around to it').

**Instructional Staff**

*Unit Co-ordinator/Lecturer: Dr. J. Henry*
Room: E&E building Rm 1.67  
Telephone: 2537  
Email: jasmine@ee.uwa.edu.au  
Consultation Days: Tuesday, Wednesday, Thursday  
Please email for an appointment.

*Mallard/Tutorial/Lab Co-ordinator: Mr Serajul Haque*
Room: E&E building Rm 3.22/3.06  
Telephone: 1766/3592  
Email: serajul@ee.uwa.edu.au

For questions about Mallard, tutorials, laboratories and/or schedules please see

**Mr Serajul Haque**
Availability: 9:30-5:00 Mon-Fri.  
Consultations: 11am - 1:00 pm or by appointment

**Textbooks and Resources**

**Recommended Textbook:**
Giorgio Rizzoni, "*Principles and applications of electrical engineering*

Laboratory experiments, and lecture notes, will be obtainable for purchase from the Co-Op Bookshop or borrowed from the library Closed Reserve. Tutorial sheets will be given out in classes. Solutions to the end of Chapter questions (orange book) will be made available via the web).

**Background Reading**
S. E. Schwarz and W. G. Oldham "*Electrical Engineering: An Introduction*"  
J. R. Cogdell "*Foundations of Electric Circuits*"  
R. J. Smith and R. C. Dorf "*Circuits, Devices and Systems*"
## Unit Assessment

<table>
<thead>
<tr>
<th>Component</th>
<th>Throughout Semester</th>
<th>Attendance compulsory</th>
<th>5% + 5% = 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mallard + Tutorial Attendance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Class Tests</strong></td>
<td>Test 1: 2(^{nd}) APRIL 11am</td>
<td>Test 2: 13(^{th}) MAY 10am</td>
<td>10% each TOTAL: 20%</td>
</tr>
<tr>
<td><strong>Laboratory Component</strong></td>
<td>Throughout Semester</td>
<td>Attendance compulsory</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Examination</strong></td>
<td>End of Semester 1</td>
<td></td>
<td>60%</td>
</tr>
</tbody>
</table>

*Anyone who misses a test for legitimate reasons (as verified by the sub-Dean of the Faculty) will have that test assessment percentage added to their final exam assessment percentage (i.e. their final exam will be worth 70% if one test is missed, 80% if both tests are missed). There is no deferred or supplemental tests available.\*

- Please note that applications for consideration, deferral of tests or exams or extensions of time for assignments on medical, personal or other grounds must be lodged with the faculty office no later than three working days after the due date for the assessment in question. This rule will apply to all students, except in exceptional circumstances (‘exceptional’ does mean ‘exceptional’, not ‘just didn't have time to get around to it’!).
- All work submitted must be the individual student's own work.
- Attendance at tutorials will be recorded and participation is expected. Part of your final assessment (5%) will be based upon your attendance and participation at tutorials.
- Students MUST attend their scheduled laboratory sessions. **Non-attendance (except with a medical certificate) will result in a zero mark for ALL sessions.** If you miss a laboratory, it is your responsibility to contact Mr Haque to reschedule the session. There are NO EXEMPTIONS for laboratories ie if you are repeating this unit, you must complete the laboratory sessions also.
- Prelab exercises are to be completed PRIOR to lab attendance. Non-completion of this component will result in a 20% penalty of that lab mark.
- The penalty for late submission of Mallard homework problems will be 10% per calendar day.
- Guest lecturers are scheduled for during the semester and the content of these lectures IS EXAMINABLE.
- There is NO SUPPLEMENTARY assessment available.

### Generic Skills
Examination and tests:
- ability to apply knowledge of basic science and engineering fundamentals
- ability to undertake problem identification, formulation and solution
- to master subject matter and techniques of their chosen discipline at internationally-recognised levels and standards
- to think and reason logically and creatively
Tutorials and Mallard Assignments
- ability to undertake problem identification, formulation and solution
- to master subject matter and techniques of their chosen discipline at internationally-recognised levels and standards

Laboratories
- ability to apply knowledge of basic science and engineering fundamentals
- ability to function effectively as an individual and in multi-disciplinary and multicultural teams with the capacity to be a leader or manager as well as an effective team member
- to think and reason logically and creatively

Faculty and University Policies

Marks Adjustments/Supplementary Assessment:
The final total assessment will be scaled so that the average falls between 60% and 65%, as per the Faculty’s Scaling Policy. Please be warned that GENG1002 usually needs to be scaled DOWN.

For a statement regarding the Faculty's Scaling Policy see http://www.ecm.uwa.edu.au/for/students/assess

As required by Faculty Policy, no supplementary examinations will be available for this unit.

Warning on Plagiarism and Collusion:
The University Guidelines on Academic Misconduct, including plagiarism and collusion, will be followed (see http://www.ecm.uwa.edu.au/for/students/plagiarism).
In cases where the lecturer believes that inappropriate plagiarism or collusion has occurred in a submission by a student, those determined to be responsible for the inappropriate plagiarism or collusion will receive a mark of zero for that portion of assessment for which the submission was made. This does not preclude the implementation of any provisions of Faculty or University policies. While the results you obtain in the laboratories may be shared with a partner, the written report and results processing are to be INDIVIDUAL efforts.

Appeals:
Any appeal of a student’s academic assessment/s will be handled as indicated in the Faculty Examination and Appeals Policy (see http://www.ecm.uwa.edu.au/for/students/exams).

Charter of Student Rights:
Applies to this unit. (see http://www.secretariat.uwa.edu.au/home/policies/charter).

Occupational Safety and Health Policy
For a referral to the UWA Occupational Safety and Health Policy: http://www.safety.uwa.edu.au/students
Further Information

OLCR System

Thursday, 12 March 2009(5pm)   Student Changes Disabled.

You must indicate your preferences for laboratory sessions via the OLCR system

Please note that OLCR is a live system and you should not remove yourself from an allocation, but rather change/add yourself to an alternate laboratory session instead. If you remove yourself from a laboratory session, you will not succeed in reallocating yourself to the same session if it becomes full in the mean time.

As of Thursday 12th March 2009 the allocations will be final and changes can only be made (WITH A VERY GOOD REASON!) through Mr. Haque.

Please note that the first lab session is on Monday, March 30th 2009 and any issues regarding allocation to laboratory sessions MUST be resolved before Monday, March 23rd, 2009.

Lecture, Tutorial and Laboratory Notes

Lecture notes (orange book) can be purchased from the Co-Op bookshop

It is expected that students will read notes AHEAD of each lecture. Sections designated REVISION will not be covered during lectures. Exercises that are not covered in class should be completed in your own time. If you are having trouble with these then please see your lecturer or tutor.

Chapter Problems are in the lecture notes and should be attempted in your own time. Full solutions will be made available during the semester, around 2 weeks prior to a class test.

Tutorials: The tutorial sheets will only be available from your tutorial session. No worked solutions are available. Help for any problems can be obtained from your tutor.

Laboratory Notes: Notes and copies of the report pro-formas will be available in your first laboratory session.

Mallard Introductory Sessions:

• A session, introducing the on-line assessment system, Mallard, will be held in the second week of semester (Week 10) – this introduction will take about 10 minutes. Attendance is recommended but not compulsory. You may drop-by any time during the session times.

We will show you how to access and use Mallard.

Computer account activation: Your EE computer account must be activated well BEFORE you come to the Mallard sessions (at least a day before) – otherwise the server becomes overloaded and only low numbers of students can access Mallard at
any point in time. Instructions are attached and the website to go to is: https://www.ee.uwa.edu.au/users/

**Mallard:** web-based assignment system. [https://mallard.ee.uwa.edu.au/](https://mallard.ee.uwa.edu.au/)

- Mallard is a system on which you will be doing regular class assignments which will constitute 5% of your final unit assessment. You will be told in lectures and via email when the assignments are available and when they are due. You usually have about a week to do an assignment which consists of around 5 questions.
- The assignment is assessed immediately, so you know which questions you have answered correctly and those which you have wrong.
- You may repeat the questions you have wrong to improve your score! But you need to remember that the numbers used in the problems change each time you attempt the assignment.
- You may attempt the Mallard assignment up to 7 times before you are penalised by 5%.
- You do not have to do the whole assignment at once, you can do a couple of questions, submit the answers and then log in again to attempt the other questions, if you wish. Mallard only records the highest score for a question that you have received. So say your first attempt at a question gives you 80% and then your second attempt gives you 50% for it, Mallard will record the 80%. Note that in order to improve your mark you must reload and submit a new assignment. For example, if you get a question wrong and you wish to attempt it again, you MAY for PRACTICE press the “back button” on your browser, so that you load the same assignment, ie the same numbers. This will allow you to re-try a question without penalty (ie it is not counted as one of your attempts) until you get it correct - this will help you in finding the right technique for solving the problem. Once you have figured that out, then you can load in a “new assignment” apply the technique you know gives you the right answer with the new Mallard numbers. If you do not reload a new assignment then your score will remain unchanged: ie it will not improve.
- You must receive a minimum of 60% for an assignment before Mallard will show you, or give you, a score for the assignment. If you are having trouble with a question, ask your tutor for help!
- You can access Mallard from your home computer and computers around campus (eg college, library etc).
- Do not leave assignments to the last minute. If the server crashes an hour before the assignment is due, and you have not submitted your assignment then it will be deemed late and penalised accordingly!
Study Tips for GENG1002

1) Practice, Practice, Practice!!

This unit is predominantly about problem solving, there is very little to “rote learn” or memorise. In class, we will go over concepts of circuit analysis and then we shall put them into practice by solving circuits. Your responsibility is to practice problems on your own and to seek help if required. There are problems at the end of each chapter in the “Yellow book” – use these to practice. There are numerical answers for these chapter problems included. Full solutions to these problems will be made available during semester (usually just before a test)

Don’t wait for the full solutions to come out before trying these problems – looking at the solutions and understanding how an answer is derived IS NOT the same as doing the problem for yourself from scratch.

2) Time management.

Don’t memorise the notes – this is a waste of time.

DO the problems.

Don’t spend too long on a PARTICULAR problem – spend 15 minutes MAXIMUM, if you can’t get it, ask your tutor (or lecturer).

Form a STUDY GROUP – not only will you meet people this way 😊 you will find the unit a lot easier to cope with. Studying ALONE can be good sometimes, but try out studying in a group. It can often save you time.

3) Don’t let this unit (or any other!) overwhelm you. Keep up!

Come to lectures and tutes – skipping these will cost you more time than not coming. You have a chance to ask questions in lectures and tutes which you can’t do as easily if you are catching up using Lectopia.

Use Lectopia to go over parts of the lecture again especially if you find lectures are too fast for you.

Come and see me if you have any issues hindering your learning experience – if I can’t help you, I will be able to send you to the right person who can.
Important Notes Regarding Laboratories  
GENG1002 -- Semester 1 – 2009

Laboratory Organisation

Total of 4 laboratories to be completed (about one every two weeks)

◆ Laboratories will be done in teams of two students each.
◆ Students MUST attend their scheduled laboratory sessions. **Non-attendance (except with a medical certificate) will result in a zero mark for ALL sessions.** If you miss a laboratory, it is your responsibility to contact Mr Haque to reschedule the session. There are NO EXEMPTIONS for laboratories ie if you are repeating this unit, you must complete the laboratory sessions also.
◆ Students will not be allowed to finish experiments outside of their allocated sessions, thus experiments must be completed within the allocated session time.
◆

Laboratory Safety

**General safety laboratory rules which will be strictly enforced**

◆ No student will be allowed entrance to the laboratory without adequate footwear. Covered, low -heeled shoes must be worn during the laboratory.
◆ Long hair must be tied back
◆ No loose clothing to be worn.
◆ No food or drink is permitted in the laboratory.

Laboratory Report Guidelines

◆ Students will fill out a pro-forma laboratory worksheet provided in the laboratory and this will be handed in to the lab demonstrator at the end of each laboratory session.
◆ All pre-labs are to be handed in at the beginning of the lab session to a lab demonstrators, who will mark them off. The prelab will then be returned to you for attaching to your proforma and which you will hand in at the end of the laboratory session. Incomplete pre-lab exercises will result in a 20% penalty.
◆ Marked lab reports will be handed back to students at the next session; this mark is the basis for each lab session assessment.
◆ Students must put their name, student number, bench letter, group letter and day and time of their lab session and partner’s name on the pro-forma sheet
◆ All work must be entered in ink (graphs exempted, circuit diagrams must be in ink).
◆ Mistakes must be simply crossed out, “whiteout” is not allowed. A penalty of 2 points applies for obliterating mistakes or for using “whiteout”.

_____________________________________________________
Laboratory Coordinator: Mr Serajul Haque
serajul@ee.uwa.edu.au