# Unit Outline

**ETEN1000 Electronics**  
**Semester 2, 2016**

<table>
<thead>
<tr>
<th><strong>Unit study package code:</strong></th>
<th>ETEN1000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mode of study:</strong></td>
<td>Internal</td>
</tr>
</tbody>
</table>

**Tuition pattern summary:**
- Note: For any specific variations to this tuition pattern and for precise information refer to the Learning Activities section.
- Lecture: 1 x 2 Hours Weekly
- Computer Laboratory: 1 x 2 Hours Fortnightly
- Tutorial: 1 x 1 Hours Weekly
- This unit does not have a fieldwork component.

**Credit Value:**  
25.0

<table>
<thead>
<tr>
<th><strong>Pre-requisite units:</strong></th>
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</table>
| 10926 (v.5) Mathematics 103  
| **OR**  
| 305639 (v.1) Mathematics 135  
| **OR**  
| MATH1004 (v.0) Mathematics 1 or any previous version  
| **OR**  
| MATH1007 (v.0) Pre and Introductory Calculus or any previous version |

| **Co-requisite units:** | Nil |
| **Anti-requisite units:** | Nil |

**Result type:**  
Grade/Mark

**Approved incidental fees:**  
Information about approved incidental fees can be obtained from our website. Visit fees.curtin.edu.au/incidental_fees.cfm for details.

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- **Title:** Dr  
- **Name:** Manora Caldera  
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- **Location:** Building: 314 - Room: 437

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**Administrative contact:**  
- **Name:** Michelle Cutinha  
- **Phone:** 08 9266 7428  
- **Email:** M.Cutinha@curtin.edu.au  
- **Location:** Building: 314 - Room: 312

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**Acknowledgement of Country**

We respectfully acknowledge the Indigenous Elders, custodians, their descendants and kin of this land past and present.

**Syllabus**

Introduction to electrical and magnetic phenomena, electrical circuits, circuit analysis, Kirchoff’s Voltage Law, Kirchoff’s Current Law, nodal and mesh analysis, equivalent circuits. Introduction to electronics: the operational amplifier, PN junction, transistor and applications. Introduction to PSPICE simulator.
Introduction

This unit will cover the basic principles of electrical and electronic circuits and operation of basic electronic components and their circuits. Topics covered include network theorems, diodes and diode circuits, transistors and transistor amplifiers and op-amps and op-amp applications. The laboratory will involve the testing of basic electronic circuits and design and implementation of a basic headphone amplifier. The unit should teach you to analyse and design fundamental electronic circuits with diodes, transistors and opamps.

Unit Learning Outcomes

All graduates of Curtin University achieve a set of nine graduate attributes during their course of study. These tell an employer that, through your studies, you have acquired discipline knowledge and a range of other skills and attributes which employers say would be useful in a professional setting. Each unit in your course addresses the graduate attributes through a clearly identified set of learning outcomes. They form a vital part in the process referred to as assurance of learning. The learning outcomes tell you what you are expected to know, understand or be able to do in order to be successful in this unit. Each assessment for this unit is carefully designed to test your achievement of one or more of the unit learning outcomes. On successfully completing all of the assessments you will have achieved all of these learning outcomes.

Your course has been designed so that on graduating we can say you will have achieved all of Curtin’s Graduate Attributes through the assurance of learning process in each unit.

<table>
<thead>
<tr>
<th>On successful completion of this unit students can:</th>
<th>Graduate Attributes addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Understanding of basics of electrical and magnetic phenomena</td>
<td>✉️</td>
</tr>
<tr>
<td>2 Analyse and solve basic electrical circuits</td>
<td>✉️ ✓️</td>
</tr>
<tr>
<td>3 Analyse basic operational amplifier circuits. Being able to understand the operation of basic electronic devices and their applications</td>
<td>✉️ ✓️</td>
</tr>
</tbody>
</table>

Curtin’s Graduate Attributes

- ✉️ Apply discipline knowledge
- ✉️ Thinking skills (use analytical skills to solve problems)
- ✉️ Information skills (confidence to investigate new ideas)
- ✓️ Communication skills
- ✓️ Technology skills
- ✓️ Learning how to learn (apply principles learnt to new situations) (confidence to tackle unfamiliar problems)
- 🎉 International perspective (value the perspectives of others)
- 🎉 Cultural understanding (value the perspectives of others)
- 🎉 Professional Skills (work independently and as a team) (plan own work)

Find out more about Curtin’s Graduate attributes at the Office of Teaching & Learning website: ctl.curtin.edu.au

Learning Activities

After passing this unit students should be able to:
- Explain the relevance of Electrical and Electronic circuits.
- Explain fundamental concepts in the analysis of electrical systems; e.g. voltage, current, power etc.
- Analyse simple electric circuits using the corresponding laws and theorems.
- Use laboratory instruments and software/hardware tools to analyse and monitor small electrical and electronic circuits.
- Analyse and design fundamental electronic circuits with diodes, transistors and opamps.
### Assessment

#### Assessment schedule

<table>
<thead>
<tr>
<th>Task</th>
<th>Value %</th>
<th>Date Due</th>
<th>Unit Learning Outcome(s) Assessed</th>
</tr>
</thead>
</table>
| Short tests        | 25 percent | Week: TBA  
                      | Day: Thursday  
                      | Time: During the tutorial time | 1,2,3 |
| Laboratory report  | 25 percent | Week: TBA  
                      | Day: TBA  
                      | Time: During the Laboratory time | 1,2,3 |
| Exam               | 50 percent | Week: Examination week 1-2  
                      | Day: 14 November to 25 November  
                      | Time: Any time | 1,2,3 |

#### Detailed information on assessment tasks

1. There will be three short tests throughout the semester conducted during the tutorial times (5% each).
   
   Announcement regarding these tests will be posted in blackboard and during the lecture one week prior to the test.

   A “Take home” test worth 10% to be undertaken. Individual submission is required (read the section on plagiarism in this document).

   See course calendar for due dates.

2. Prelabs are to be prepared prior to each laboratory session and these will be marked during the laboratory session. This will be worth 25% of each lab mark

   Reports are to be individually prepared and written even though labs are conducted in groups. Each lab report will be worth 75% of the lab mark

   Lab report of the previous lab conducted is to be submitted at the start of next Lab in two weeks time. Total of the five Lab reports will be worth 15% of overall mark

   A report on the mini lab project that includes all details, design steps and results of the work you have undertaken. You MUST INCLUDE A REFLECTION. This involves consciously thinking/reporting about and analysing what one has done (or is doing) in the design. This will be worth 10% of overall mark

3. Exam is as per centrally scheduled timetable. This is to be a 2 hour exam

   This examination will cover ALL material from lectures, tutorials and lab sessions. This will worth 50% of overall mark

#### Pass requirements

An overall grade of 50% is required to pass this unit. Failure to submit ALL assessments may result in a fail grade

#### Fair assessment through moderation

Moderation describes a quality assurance process to ensure that assessments are appropriate to the learning outcomes, and that student work is evaluated consistently by assessors. Minimum standards for the moderation of assessment are described in the Assessment and Student Progression Manual, available from policies.curtin.edu.au/policies/teachingandlearning.cfm
Late assessment policy
This ensures that the requirements for submission of assignments and other work to be assessed are fair, transparent, equitable, and that penalties are consistently applied.

1. All assessments students are required to submit will have a due date and time specified on this Unit Outline.
2. Students will be penalised by a deduction of ten percent per calendar day for a late assessment submission (eg a mark equivalent to 10% of the total allocated for the assessment will be deducted from the marked value for every day that the assessment is late). This means that an assessment worth 20 marks will have two marks deducted per calendar day late. Hence if it was handed in three calendar days late and given a mark of 16/20, the student would receive 10/20. An assessment more than seven calendar days overdue will not be marked and will receive a mark of 0.

Assessment extension
A student unable to complete an assessment task by/on the original published date/time (eg examinations, tests) or due date/time (eg assignments) must apply for an assessment extension using the Assessment Extension form (available from the Forms page at students.curtin.edu.au/administration/) as prescribed by the Academic Registrar. It is the responsibility of the student to demonstrate and provide evidence for exceptional circumstances beyond the student’s control that prevent them from completing/submitting the assessment task.

The student will be expected to lodge the form and supporting documentation with the unit coordinator before the assessment date/time or due date/time. An application may be accepted up to five working days after the date or due date of the assessment task where the student is able to provide an acceptable explanation as to why he or she was not able to submit the application prior to the assessment date. An application for an assessment extension will not be accepted after the date of the Board of Examiners’ meeting.

Deferred assessments
If your results show that you have been granted a deferred assessment you should immediately check OASIS for details.
Deferred examinations/tests will be held from 15/02/2017 to 17/02/2017. Notification to students will be made after the Board of Examiners’ meeting via the Official Communications Channel (OCC) in OASIS.

Supplementary assessments
Supplementary assessments are not available in this unit.

Reasonable adjustments for students with disabilities/health circumstances likely to impact on studies
A Curtin Access Plan (CAP) is a document that outlines the type and level of support required by a student with a disability or health condition to have equitable access to their studies at Curtin. This support can include alternative exam or test arrangements, study materials in accessible formats, access to Curtin’s facilities and services or other support as discussed with an advisor from Disability Services (disability.curtin.edu.au). Documentation is required from your treating Health Professional to confirm your health circumstances.
If you think you may be eligible for a CAP, please contact Disability Services. If you already have a CAP please provide it to the Unit Coordinator at the beginning of each semester.

Referencing style
The referencing style for this unit is Chicago.
More information can be found on this style from the Library web site: http://libguides.library.curtin.edu.au/referencing.

Copyright
© Curtin University. The course material for this unit is provided to you for your own research and study only. It is subject to copyright. It is a copyright infringement to make this material available on third party websites.
Academic Integrity (including plagiarism and cheating)

Any conduct by a student that is dishonest or unfair in connection with any academic work is considered to be academic misconduct. Plagiarism and cheating are serious offences that will be investigated and may result in penalties such as reduced or zero grades, annulled units or even termination from the course.

Plagiarism occurs when work or property of another person is presented as one’s own, without appropriate acknowledgement or referencing. Submitting work which has been produced by someone else (e.g. allowing or contracting another person to do the work for which you claim authorship) is also plagiarism. Submitted work is subjected to a plagiarism detection process, which may include the use of text matching systems or interviews with students to determine authorship.

Cheating includes (but is not limited to) asking or paying someone to complete an assessment task for you or any use of unauthorised materials or assistance during an examination or test.

From Semester 1, 2016, all incoming coursework students are required to complete Curtin’s Academic Integrity Program (AIP). If a student does not pass the program by the end of their first study period of enrolment at Curtin, their marks will be withheld until they pass. More information about the AIP can be found at: https://academicintegrity.curtin.edu.au/students/AIP.cfm

Refer to the Academic Integrity tab in Blackboard or academicintegrity.curtin.edu.au for more information, including student guidelines for avoiding plagiarism.

Information and Communications Technology (ICT) Expectations

Curtin students are expected to have reliable internet access in order to connect to OASIS email and learning systems such as Blackboard and Library Services.

You may also require a computer or mobile device for preparing and submitting your work.

For general ICT assistance, in the first instance please contact OASIS Student Support:
oasisapps.curtin.edu.au/help/general/support.cfm

For specific assistance with any of the items listed below, please contact The Learning Centre:
life.curtin.edu.au/learning-support/learning_centre.htm

- Using Blackboard, the I Drive and Back-Up files
- Introduction to PowerPoint, Word and Excel
### Additional information

**Unit Assessment Outcomes and Competencies**

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Unit Learning Outcomes Assessed</th>
<th>EA Professional Competencies Assessed</th>
<th>Level of Thinking ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Tests</td>
<td>1, 2, 3</td>
<td>1.2. Conceptual understanding</td>
<td>Comprehension and Application</td>
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<td></td>
<td></td>
<td>1.3 Specialist knowledge</td>
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<td></td>
<td></td>
<td>2.1 Problem solving</td>
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<tr>
<td>Laboratory Report</td>
<td>1, 2, 3</td>
<td>2.2. Use of techniques</td>
<td>Analysis</td>
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<td></td>
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<td>3.2. Communication</td>
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<td>3.6. Team work</td>
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<tr>
<td>Exam</td>
<td>1, 2, 3</td>
<td>1.3. Specialist knowledge</td>
<td>Analysis and Synthesis</td>
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<td>1.5. Context</td>
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</tbody>
</table>

1. **KNOWLEDGE AND SKILL BASE**
   1.1. Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.
   1.2. Conceptual understanding of the, mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.
   1.3. In-depth understanding of specialist bodies of knowledge within the engineering discipline.
   1.4. Discernment of knowledge development and research directions within the engineering discipline.
   1.5. Knowledge of contextual factors impacting the engineering discipline.
   1.6. Understanding of the scope, principles, norms, accountabilities and bounds of contemporary engineering practice in the specific discipline.

2. **ENGINEERING APPLICATION ABILITY**
   2.1. Application of established engineering methods to complex engineering problem solving.
   2.2. Fluent application of engineering techniques, tools and resources.
   2.3. Application of systematic engineering synthesis and design processes.
   2.4. Application of systematic approaches to the conduct and management of engineering projects.

3. **PROFESSIONAL AND PERSONAL ATTRIBUTES**
   3.1. Ethical conduct and professional accountability
   3.2. Effective oral and written communication in professional and lay domains.
   3.3. Creative, innovative and pro-active demeanour.
   3.4. Professional use and management of information.
   3.5. Orderly management of self, and professional conduct.
   3.6. Effective team membership and team leadership.

**Levels of thinking ²**

1. **Remembering**—observation and recall of information; knowledge of dates, events, places, materials, objects; knowledge of major processes; mastery of subject matter.
2. **Comprehending**—understand information, grasp meaning; translate knowledge into new contexts; compare and contrast; order, group, infer causes, predict consequences.
3. **Applying**—use information; use methods, concepts, theories in new situations; solve problems using required skills or knowledge; use equipment, tools.
4. **Analysing**—discern patterns; organise parts; recognise hidden meanings; identify components, simplify complex information; metacognition.
5. **Evaluating**—compare and discriminate between ideas; think critically, make judgments about worth (based on stated premises); assess the value of theories, make choices based on reasoned argument; verify or question the value of evidence.
6. **Creating**—combining ideas to develop an original idea or product, engage in creative thinking.

**Enrolment**

It is your responsibility to ensure that your enrolment is correct - you can check your enrolment through the eStudent option on OASIS, where you can also print an Enrolment Advice.
Student Rights and Responsibilities

It is the responsibility of every student to be aware of all relevant legislation, policies and procedures relating to their rights and responsibilities as a student. These include:

- the Student Charter
- the University's Guiding Ethical Principles
- the University's policy and statements on plagiarism and academic integrity
- copyright principles and responsibilities
- the University's policies on appropriate use of software and computer facilities

Information on all these things is available through the University's "Student Rights and Responsibilities" website at: students.curtin.edu.au/rights.

Student Equity

There are a number of factors that might disadvantage some students from participating in their studies or assessments to the best of their ability, under standard conditions. These factors may include a disability or medical condition (e.g. mental illness, chronic illness, physical or sensory disability, learning disability), significant family responsibilities, pregnancy, religious practices, living in a remote location or another reason. If you believe you may be unfairly disadvantaged on these or other grounds please contact Student Equity at eesj@curtin.edu.au or go to http://eesj.curtin.edu.au/student_equity/index.cfm for more information.

You can also contact Counselling and Disability services: http://www.disability.curtin.edu.au or the Multi-faith services: http://life.curtin.edu.au/health-and-wellbeing/about_multifaith_services.htm for further information.

It is important to note that the staff of the university may not be able to meet your needs if they are not informed of your individual circumstances so please get in touch with the appropriate service if you require assistance. For general wellbeing concerns or advice please contact Curtin's Student Wellbeing Advisory Service at: http://life.curtin.edu.au/health-and-wellbeing/student_wellbeing_service.htm

Recent unit changes

Students are encouraged to provide unit feedback through eVALUate, Curtin's online student feedback system. For more information about eVALUate, please refer to evaluate.curtin.edu.au/info/.

To view previous student feedback about this unit, search for the Unit Summary Report at https://evaluate.curtin.edu.au/student/unit_search.cfm. See https://evaluate.curtin.edu.au/info/dates.cfm to find out when you can eVALUate this unit.

Recent changes to this unit include:

None
<table>
<thead>
<tr>
<th>Week</th>
<th>Begin Date</th>
<th>Lecture</th>
<th>Laboratory/Tutorial</th>
<th>Assessment Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>25 July</td>
<td>Orientation Week</td>
<td></td>
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</tr>
<tr>
<td>Teaching Week 1</td>
<td>1 August</td>
<td>DC Analysis 1</td>
<td>L1 – Equipment Familiarisation</td>
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<td>Tutorial 1 – Component Identification</td>
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<tr>
<td>Teaching Week 2</td>
<td>8 August</td>
<td>DC Analysis 2</td>
<td>L1 – Equipment Familiarisation</td>
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<td>Tutorial 2 – Ohm’s Law</td>
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<tr>
<td>Teaching Week 3</td>
<td>15 August</td>
<td>DC Analysis 3</td>
<td>L2 – Basic Electrical Circuits</td>
<td>Lab 1 report due</td>
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<td>Tutorial 3 - Network Theorems</td>
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<tr>
<td>Teaching Week 4</td>
<td>22 August</td>
<td>Semiconductors and Diodes</td>
<td>L2 – Basic Electrical Circuits</td>
<td>Lab 1 report due</td>
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<td>Tutorial 4 - Mesh and Nodal Analysis</td>
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<tr>
<td>Tuition Free Week</td>
<td>29 August</td>
<td>Tuition Free Week</td>
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<tr>
<td>Teaching Week 5</td>
<td>5 September</td>
<td>Rectifier Circuits</td>
<td>L3 – Diodes and Rectification</td>
<td>Test 1 (Electrical Circuits)</td>
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<td>Test 1 (Electrical Circuits)</td>
<td>Lab 2 report due</td>
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<tr>
<td>Teaching Week 6</td>
<td>12 September</td>
<td>Operational Amplifiers 1</td>
<td>L3 – Diodes and Rectification</td>
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<td>Tutorial 5 – Diodes and Rectification</td>
<td>Lab 2 report due</td>
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<tr>
<td>Teaching Week 7</td>
<td>19 September</td>
<td>Operational Amplifiers 2</td>
<td>L4 – operational amplifier Circuits</td>
<td>Test 2 (Diodes and Rectification)</td>
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<td>Test 2 (Diodes and Rectification)</td>
<td>Lab 3 report due</td>
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<td>Take Home Test is released</td>
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<tr>
<td>Tuition Free Week</td>
<td>26 September</td>
<td>Tuition Free Week</td>
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<tr>
<td>Teaching Week 8</td>
<td>3 October</td>
<td>Revision on DC Analysis, Diodes and Rectification, Opamps</td>
<td>L4 – operational amplifier Circuits</td>
<td>Lab 3 report due</td>
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<td>Tutorial 6 – Operational Amplifiers</td>
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<tr>
<td>Teaching Week 9</td>
<td>10 October</td>
<td>Bipolar Junction Transistors 1</td>
<td>L5-Bipolar Junction Transistors</td>
<td>Test 3 (Operational Amplifiers)</td>
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<td>Test 3 (Operational Amplifiers)</td>
<td>Lab 4 report due</td>
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<tr>
<td>Teaching Week 10</td>
<td>17 October</td>
<td>Bipolar Junction Transistors 2</td>
<td>L5-Bipolar Junction Transistors</td>
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<td></td>
<td>Tutorial 7 – Bipolar Junction Transistors</td>
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</tr>
<tr>
<td>Teaching Week 11</td>
<td>24 October</td>
<td>Safety and Review</td>
<td>Mini Project - Amplifier Design to Drive a Speaker</td>
<td>Lab 5 report due – All students</td>
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<tr>
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<td></td>
<td>Tutorial 8 - Revision</td>
<td>Take Home Test is due</td>
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<tr>
<td>Teaching Week 12</td>
<td>31 October</td>
<td>Revision</td>
<td>Mini Project - Amplifier Design to Drive a Speaker</td>
<td>Mini Project Report due – All Students</td>
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<td>Tutorial 9 - Revision</td>
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<tr>
<td>Study Week</td>
<td>7 November</td>
<td>Study Week</td>
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<tr>
<td>Examinations</td>
<td>14 November</td>
<td>Examinations</td>
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<tr>
<td>Examinations</td>
<td>21 November</td>
<td>Examinations</td>
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