Effective communication is a skill that can be acquired. All that is needed is desire and a guide. Professional engineers always work as part of a team and so they need to be able to communicate effectively with a variety of other people: managers, co-workers and customers.

There are many engineers or engineering students who have excellent technical skills but have a hard time communicating their ideas or do not work well with others. Communication skills are just as important as technical knowledge for success with a project.

We spend most of our working day communicating. Our communication is divided into writing, reading, speaking and listening. The principles of good communication are how to listen and present your ideas. The simplest communication skill is no more than how to go about ‘selling your ideas’ and professional engineers need to sell their ideas for success.

As your knowledge of the technical part of engineering develops, you will need to communicate more and more technically diverse material to wider and wider audiences. Your ability to communicate will determine how successful you are in your career as an engineer.

Communication reflects your own distinct personality. Hence, this guide cannot be the final word on communication skills. It is written as a beginning, designed to make you confident with basic suggestions so that you will be able to enhance your communication skills on your own.

I would like to thank the staff of The Learning Centre, and especially Pam Mort who acted as editor, for the production of this guide. I also thank Iain Skinner who co-ordinated the work in the School.

Dr E. Ambikairajah

Director of Academic Studies

School of Electrical Engineering and Telecommunications

February 2001

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Design and layout by Tracey-Lee Downey (The Learning Centre).
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More than half of an engineer’s ‘work’ involves writing and speaking to others—both engineer and non-engineer. These sections explain how to structure and present your communication.

You need to present information in ways that satisfy markers. Later, these conventions will also be required in your professional work.

Some more advice to help you review your approach to study.
Writing, whether it be for a report an essay or a talk, is a process that involves a number of steps. While the steps are presented here in a set order, you will often find yourself carrying out more than one step at a time and even repeating steps as you prepare your assignment. The steps are presented in separate stages here for clarity. These usually consist of:

**Analysing the Task (see page 26)**

This should be done before any other part of the assignment process. Otherwise, useless information may be gathered, thus wasting your valuable time. You will also analyse the task many times while completing your assignment to keep you focused and ensure that you produce a relevant document.

**Taking Notes (see page 29)**

Early on you will find that you take more notes than you actually need. As your own ideas and research develop about the topic, your notetaking will become more precise and relevant to the task.
This is a bit of a ‘Black Box’ as scientists are still researching how our minds work. However, there are some useful strategies that experienced writers and speakers use to help clarify their understanding and form their opinions about a topic.

Preparing Your Report (page 6) or Talk (page 20)

Prepare the body sections first and the introductory (abstract and introduction) and concluding sections last. Don’t forget the reference list and contents pages (if a written report). Organise the body to tell a logical story about the topic. While you may have learnt about your topic in a random sequence as you located information from the library and had to decide what was relevant or not, your task is to explain the topic clearly and concisely so that someone else can understand it immediately.

Visuals (page 14 & 22), Formatting (page 10), Style, and Editing (page 41)

Conventions and standards are important presentation tools. They set the tone and feel of a text and project an image of who you are as a writer and communicator.
A report documents an investigation of a design, a problem or a topic of interest. A report is usually written so that information can be easily extracted. Depending upon its length and purpose, a technical report will include a number of sections. The more common sections are listed below. Essential sections common to all reports are marked with an asterisk.

Title Page*

Presents routine information and hints at the contents of the report through an informative title. Design your title page to be simple yet functional and appropriate for the audience and the task. Some of the more common elements found on the title page include:

- Institution/ Organisation’s name (e.g.. The University of New South Wales)
- Course name and code
- Title of the report—a concise description of the topic
- Author (student’s name and number)
- Name to whom the report is submitted (e.g. your lecturer)
- Date of submission
- Signed statement of originality (it is important to declare ownership of the report in case there are future questions).

All the assignments you submit will require a school cover sheet. In many cases this will function as your title page.

Abstract*

Provides an overview of the most important aspects of the report. Ideally it should be less than one page, varying between 50 and 250 words though for most reports, the former is more common. A longer and more detailed abstract is called an Executive Summary.

The abstract should clearly and briefly state the following:

- what was investigated (topic)
- why it was investigated (issues or questions)
- how it was investigated (the method is usually only explained in experimental reports)
- major conclusions from the findings
- major recommendations (to suggest change or that further action is required)
Abstract
Digital television is a new technology that provides more flexible and effective transmission compared with analog television. It provides improved picture and sound quality, including the elimination of ghosting and other transmission errors. Although digital television became available in major Australian capital cities in January 2001, digital television sets are currently not available in the market. A digital set-top box decoder connected to an analog television in the best option for upgrading to digital television. Integrated digital television receivers which are distinguished by a wide screen, high level audio capability and high resolution displays are expected to be available in late 2001. Although digital transmission is expected to eventually replace analog transmission for all broadcast delivery, the price and availability of digital television reception equipment will determine the rate at which this technology is adopted.

Figure 1. Sample Abstract for a General Report on The Introduction of Digital Television Technology

Acknowledgement

Usually included in a thesis or a similar large report, but not usually included in an undergraduate report. Thank the people and organisations who helped and supported you in providing resources and/or information. For example, your lecturer/supervisor, individuals or organisations or other students and staff who gave important information or advice. If your report contains information that is unpublished, you should state who gave you permission to include the information. This is important when you are involved in an industry partnership and the ownership or intellectual property of information needs to be documented. A few sentences or a short paragraph is usually all that is required.

Contents Page

Indicates the structure of the report and assists the reader to locate specific information of particular interest in a report. Include heading, subheading and page numbers.
1. Introduction
This report details the design and evaluation of a monitoring system that enables remote communication to facilitate home health care. Home monitoring is increasingly being seen as an effective way of providing ongoing care for the management of a chronic disease. The hypothesis is that monitoring in the home will aid in the control of infections and improve compliance with the therapy, enhancing the quality of life and reducing costs for the patient and the health care provider. A literature review is given in Section 2, design considerations have been examined in Section 3, system specifications have been listed in Section 4, evaluated results are presented in Section 5 and the conclusions are in Section 6.

Figure 3. A Sample Introduction

Introduction*

The first section in the main body of a report. Earlier sections are preparatory only.

The introduction is very important as it sets the context for the report. It contains the background to the report (usually an explanation of the topic, why the report was produced and the aims of the report) and an outline of how the report is organised. It does not contain any findings or recommendations. Length can range from one paragraph in a short report to several pages in a large report. See Figure 3 on page 8 of the guide for a sample introduction.

Body of the Report*

The structure of the main body of a report will vary depending on the purpose. Ultimately the final content and its order will depend on your original task and what you want to convey to the reader. More importantly, the body of the report should support your conclusions. A comparison of the differences in structure of three reporting scenarios follows and are examples only.

General Report

Purpose: To provide a balanced account on a topic or on an area of knowledge. The report is a record of the investigation and its outcomes. The study will involve gathering information from different sources, analysing this information and making a conclusion.

The main body of this type of report might contain a summary of the topic, an analysis of current issues or areas of particular interest, and a discussion of future directions or possible solutions.

When planning and writing a general report, you will decide what section headings to use. The headings would describe for the reader the topic of the section and in some cases the purpose of the section.

Experimental Report

Purpose: To describe the experimental work in sufficient detail so the experiment can be reviewed and, if necessary, repeated and/or modified. It is also important to draw conclusions from the data and to place these conclusions in the context of other related work. Typical sections in the body might include:
• Theory and/or current knowledge on the subject (This provides the context for your research)
• Objectives of the experiment or test (Questions you are investigating)
• Procedure/Method (What you did and why)
• Results (What you found)
• Analysis and Discussion (Why these results? What do the results mean?)

Short experimental reports are called laboratory reports. Complex experimental reports (for example a thesis) may involve a number of procedures/methods sections. Usually after each separate procedure/method, the findings and discussion are presented.

**Work Experience Report**

*Purpose:* An account of activities, events and/or observations.

Typical sections in the body *might* include:

• Site description—what the organisation does/produces, layout, staff organisation etc.
• Description of your work/activities/processes/systems/plant & equipment
• Description of other work/activities observed
• General comments on building, layout, technical facilities, amenities
• Industrial relations
• Any other issues that drew your attention

**Conclusions* & Recommendations**

Every report should include some concluding statements on the subject of the report. Your conclusions should be justified or supported by the body of the report. Try to organise from most important to least important. Your concluding statements would principally relate to the impact of the study, analysis, new design, or solution. That is, what this report has achieved. No new information is introduced in the conclusion.

The recommendations consider whether all the original objectives (stated in the introduction)

---

**Figure 4. Sample Conclusions to a General Report on Digital Television Technology**

Digital television delivers higher definition pictures, better sound quality, and eliminates transmission errors experienced by analog transmission. It is also possible to transmit multiple programs within the same bandwidth, provide more effective closed captions, electronic program guides and multiple language soundtracks. Current analog televisions can receive digital transmission with a set top box decoder, but are unable to improve definition and sound quality.
were achieved. If not, what alternative action might be considered. If all the objectives were achieved, what further questions may or should be resolved in the future?

**References***

A reference list details all the sources of information referred to in the report. It is most important and must be complete to comply with the statement of originality. The information you need to reference may be data, quotations and illustrations from other reports, textbooks and technical papers etc. The references are usually sorted alphabetically by author and year of publication. Some reference lists use a number system. There are specific conventions and punctuation that must be followed in drawing up the reference list. See page 40 of this guide.

**Appendices**

The main body of the report should only contain information that is directly relevant to the discussion. This usually requires the summarising and selecting of specific information from all the data you have gathered.

Appendices provide additional or supporting information that, while not crucial to an understanding of the main facts and recommendations, may be of further interest to the expert reader. This additional information should be placed at the end of the report. Direct the reader to the appendix as you would to a figure or table, e.g.; “See Appendix A for additional …”. Appendices include tables of raw data, a detailed description of equipment, large or detailed drawings, or a copy of a questionnaire or interview. Normally these are listed as Appendix A, Appendix B, Appendix C, and so forth.
Good layout and consistent formatting make a report easy to read, pleasing to the eye and demonstrate pride in your work.

**Layout and Formatting**

Handwritten work is acceptable and must be legible and neatly set out. Your thesis and professional work must be typed. Table 1 and Table 2 give format settings for typed reports.

**Table 1: Recommended format settings for simple reports**

<table>
<thead>
<tr>
<th>Font – body of report</th>
<th>Times New Roman, Bookman (use 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Headings</td>
<td>Arial (sans serif font)</td>
</tr>
<tr>
<td>Font size</td>
<td>12 point</td>
</tr>
<tr>
<td>Paragraph spacing</td>
<td>6 pt</td>
</tr>
<tr>
<td>Line spacing</td>
<td>1.5</td>
</tr>
<tr>
<td>Left Margin</td>
<td>25 mm</td>
</tr>
<tr>
<td>Right margin</td>
<td>25 mm</td>
</tr>
<tr>
<td>Top margin</td>
<td>25 mm</td>
</tr>
<tr>
<td>Bottom margin</td>
<td>25 mm</td>
</tr>
</tbody>
</table>

Bold and italic typefaces are used to emphasise particular words or phrases. Do not overuse these features. **Bold** is usually used to emphasise one or two words. **Italics** is slightly less striking to the eye, so is used to emphasise phrases or entire sentences.

**Underlining** is seldom used. However, underlining is effective to emphasise part of a word, for example *un*representative.

Certain words can also be emphasised by the use of CAPITALS but should be rarely used. A common use is where the reader might otherwise misread the meaning of a sentence such as “Water from outlets in this laboratory is not potable and **MUST NOT** be consumed.”

Font sizes and styles are outlined in Table 2.

**Section/Chapter Numbering System**

The numbering of section/chapter headings and subheadings is normal in a report. The
Introduction is generally numbered 1 with the Conclusions section having the last number. Sometimes the references section is also included in the numbering system. Third level headings are the generally accepted limit (e.g. 8.4.3 Errors in data acquisition). Too many subheadings and levels can become confusing and cumbersome.

Table 2: Sample Font Styles

<table>
<thead>
<tr>
<th>Font Style</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title Heading</strong></td>
<td>18 pt Arial bold font, small caps, start new page, align left</td>
</tr>
<tr>
<td><strong>1. Heading Level 1</strong></td>
<td>14 pt Arial bold font, all caps, align left, 18 pt line space before</td>
</tr>
<tr>
<td><strong>1.1. Heading Level 2</strong></td>
<td>12 pt Times italic bold font, align left, 12 pt line space before</td>
</tr>
<tr>
<td>Paragraphs</td>
<td>12 pt Times font, justify left and right margins, sentence case</td>
</tr>
<tr>
<td>Table/Figure Caption</td>
<td>10 pt Times font</td>
</tr>
<tr>
<td>Header</td>
<td>10 pt Times italic font, thin underline</td>
</tr>
<tr>
<td>Footer</td>
<td>10 pt Times italic font, thin underline</td>
</tr>
<tr>
<td>References</td>
<td>12 pt Times font, align left, indent second &amp; consecutive entry lines</td>
</tr>
</tbody>
</table>

Page Numbering

All pages in a report should be numbered except for the title page. The preliminary pages such as Abstract, Contents and Acknowledgements are numbered using Roman numerals (i, ii, iii etc.).

The main body of the report, i.e. from the Introduction section onwards, uses Arabic numerals (1, 2, 3 etc.) for page numbering. There are several locations where page numbers can be placed but the convention in reports is at the bottom of the page.

Page Headers & Footers

A saying particularly relevant here is often the simplest approach is the best option (or, KISS – Keep It Simple, Stupid). Except for page numbers, minimal use should be made of headers and footers.

In textbooks, the header contains the name of the book or the chapter heading whilst in a report it might be the abbreviated report title. In an industry report, the footer usually contains information for document control, such as: file name, version number, date created etc.

Overly elaborate headers and footers can distract the reader, not adding any value to the communication process. So if you wish to use them, ask yourself for each particular piece of information how this aids the communication process and is it really necessary? In a thesis,
Numbers & Measurement

All units of measurement should be stated in metric form following industry convention and are abbreviated according to the International System of Units (SI), for example:

- electrical field strength is normally reported in volts per metre, e.g. 3 V/m
- wire gauge is usually reported in millimetres, e.g. 5 mm
- baud rate is reported in kilobits per second, e.g. 30 kbps

Numerals and their units, and equations should not run over a line. The number and unit or entire equation should appear on the same line. A non-breaking space placed between the value and unit will automatically ensure that this occurs. [In MS-Word, a non-breaking space is inserted by typing Ctrl-Shift spacebar]

Pay particular attention to the number of significant figures in a value such that it reflects the accuracy of that value. If necessary use appropriate scientific notation (e.g. \(10^n\)) or scaling of units (e.g. M, k, m etc.). A common trap for the inexperienced report writer is to transpose calculated values from a spreadsheet directly into a report, forgetting about significant figures. For example, an engineer might use a spreadsheet to calculate the current flowing through a resistor. Whilst the calculated value in the spreadsheet might be shown as say 0.0013467A, the actual value in the report should be written as say 1.35 \(\times 10^{-3}\)A or better still 1.35 mA. Also be careful with the use of capitals in units as for example 10 MW is not the same as 10 mW. There are conventions with respect to using numerals, these are summarised in Table 3.

Table 3: Conventions for using numerals

<table>
<thead>
<tr>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spell out all figures if they are placed at the start of a sentence</td>
<td>Twenty five data samples were taken</td>
</tr>
<tr>
<td>Use figures for all units of measurement and all which involve abbreviations</td>
<td>4 mA  2W (ohm)</td>
</tr>
<tr>
<td>Spell out numbers from one to ten when used without a unit and use figures for numbers 11 and above without a unit</td>
<td>The 2nd and 20th samples</td>
</tr>
<tr>
<td>No commas or spaces for figures under 10 000</td>
<td>1000   5870   9999</td>
</tr>
<tr>
<td>Numbers 10 000 and above have a space</td>
<td>11 000  120 000  1 228 356 units</td>
</tr>
</tbody>
</table>

Formulae

Equations are generally placed near the centre of a page, with consecutive equations vertically aligned about the equals (=) sign, for example:
\[ y = mx + b \]  
\[ X = \lambda(h + f) \]  

Equations should be numbered consecutively as they appear in the text, with a number in brackets near the right hand margin. This number is used for identification in the body of the report.

**Figures and Tables**

Figures include diagrams, graphs, sketches, photographs and maps. Figures help in understanding the concepts being discussed in the report. Graphs are particularly useful in demonstrating the existence of a relationship between two or more variables. Tables consist of data presented in columns and rows. They are useful when the exact value of the numbers is important to the discussion.

Figures and tables should, as far as possible, be self-contained in terms of highlighting a particular point for the reader’s attention. However, they are not meant to be a medium of communication separate from the body of the report. Each figure and graph in a report has to be referred to in the body of the report. If this cannot be done then it should not be included in the report. All figures and tables must be numbered in the order they are mentioned in the report (Table 1, Table 2, Figure 1, Figure 2 etc.). Many word processors allow the table and figure number to be automatically cross-referenced in the body of the report.

Each table and figure should have a very simple, descriptive caption. Any symbols or abbreviations used in the figure or table must be explained in the report. Units of measurement should be placed in the column or row headings. Explanatory footnotes may be added to tables, usually in a smaller size font directly under the table.

Avoid using the expression “the figure above” or “the figure below”, as locations may change. Place the figure or table in close proximity to and preferably after where it is referred to in the body of the report. An example of a simple layout for a table is shown in Table 4.

As a general rule, labels are usually centred on a page where:

- the label for a table appears above the table; and
- the label for a figure appears below the figure.

**Table 4: Resistivity and Temperature Coefficient of Different Materials at 20°C**

<table>
<thead>
<tr>
<th>Material</th>
<th>Resistivity (Ω·m)</th>
<th>Temperature Coefficient (per degree C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>1.59 X 10⁻⁸</td>
<td>6.1 X 10⁻³</td>
</tr>
<tr>
<td>Copper</td>
<td>1.68 X 10⁻⁸</td>
<td>6.8 X 10⁻³</td>
</tr>
<tr>
<td>Aluminium</td>
<td>2.65 X 10⁻⁸</td>
<td>0.429 X 10⁻³</td>
</tr>
</tbody>
</table>
Table 4 illustrates the following points

- The data in the table are clearly set out with column and row headings showing appropriate units placed within brackets.

- The table is centred on the page and is not crowded by surrounding text.

- The caption is succinct and conveys the meaning of the information. Captions are usually a descriptive or informative statement to help focus the reader's attention on a particular issue.

If you are using another writer’s table or figure, do not include the caption, number or formatting from the sourced reference material as it will be incompatible with your report numbering system and format. You must also reference any figure or table if copied or adapted from another source. **Otherwise it can be considered plagiarism and a breach of copyright.** In the case of:

- tables—the reference is placed under the table using the expression “Source: Smith (1994), p. 58.”

- figures—the reference is placed under the figure using the expression “after Jones (1996), p. 42.”

Both are generally typed in 9-point italics font.

The quality of an illustration is very important. If the image is poor and difficult for the reader to clearly see the point being made, then except in special cases, it should not be included in the report as it will detract from the quality of the report. Use of colour is another trap for inexperienced report writers. Colour is a formatting option but should be used carefully otherwise the effect on the reader is numbed. Colours will not be reproduced in conventional black and white photocopying. Therefore they should not be relied on to distinguish important features of an illustration or graph.
Memos are an organisation’s method for internal communication. They:

- inform of decisions, actions or changes
- request decisions, actions or changes
- provide information which may have been requested or which may be considered of interest

Memos may be distributed through internal mail, fax, email or placed on a notice board. They can be a simplified letter or a brief report depending on their purpose. They should emphasise the important underlying ideas or messages.

**Presentation/ Layout**

Headings are used to show:

- whom the memo is going to
- whom the memo is from
- the date it was sent
- the subject or title
- any file or reference numbers

Memos are usually typed or neatly written on printed forms.

Language is informal (you can use I, we, you, etc.) but not too casual, and while you can be direct, remember to be courteous as well.

Content is meant to be clear, concise, concrete and convincing.

Do not include an inside address, formal greeting/salutations or a complimentary close, such as “yours faithfully”. These are standard features for external correspondence, or more formal internal correspondence.
TO: Students in The School of Electrical Engineering and Telecommunications
FROM: The Learning Centre
DATE: 15. 01. 02
SUBJECT: Email Netiquette

Email is the official form of correspondence between UNSW and students. We recommend you regularly check your email account so that important information is not missed.

FOLLOWING ARE THE DOS AND DON'TS OF EMAIL NETIQUETTE.

• Read your email regularly & reply to e-mail promptly, if only to say ‘message received—I will get back to you’.

• Be brief, clear, concise, courteous & deliver content.

• Large documents are best sent as attachments. However, only send attachments when absolutely necessary. Many people don’t like receiving them. Attachments can carry viruses or just clutter up a hard disc.

• Do not type in UPPERCASE—it suggests shouting. Use it only for emphasis.

• Be very careful in attempting irony, humour etc. in a message; it might not come over as you intended & can be taken as insulting.

• When replying to an email you have received, make sure others know what you are talking about. Refer to the original message and the subject.

  * when you do quote something mentioned in a previous email, do so briefly & to the point. Nobody wants to see the entire message again! By net convention, quoted lines are preceded by a ‘>’.

• Do not send anything libellous etc. Libel laws do cover email.

• Be careful about sending confidential information via email. It can easily be intercepted or forwarded without your permission.

• Use mailing lists carefully. Don’t send things to people who aren’t interested. “Junk” mail is a nuisance!

• Try not to send multiple copies of the same message. Be sure to check your To: & Cc: fields. Nobody wants the same message 10 times over.

• Always include your name and contact details—your ‘signature’.

• Know your rights and responsibilities. Visit the University’s pages on procedures and guidelines for email communication and computer use at:

  <http://www.infonet.unsw.edu.au/poldoc/indcompu.htm>
Minutes of Meetings

Minutes are produced to record and communicate decisions made by groups of people in face to face meetings. Minutes are a summary of decisions made in a meeting. They also include the names of person/s responsible for agreed action/s.

Layout/ Presentation

Just as your laboratory measurements are not recorded in pencil, so your minutes must be in ink and include:

1. when and where the meeting took place
2. who was present and absent
3. the reason for the meeting
4. what was discussed, decided and who is responsible for agreed action
5. references to source material if appropriate
6. the date of next meeting
7. when the meeting closed
8. at formal meetings, signatures of all present may be required to indicate accuracy and agreement to the minutes.

Running Meetings

- Remember to circulate an agenda before the meeting which lists items that the meeting will cover. This can be decided at the end of the previous meeting or before the meeting begins.
- Try rotating the duties of chair and minute taker so every member of the group gains experience and contributes.
- During the meeting, the chairperson announces the items on the agenda, assists the group in staying on track and makes sure everyone participates. For example, the chair would summarise the discussion if it has gone on too long or the group appears to be sidetracked. “So, what we have said so far is . . .”.
- When discussing an item make constructive comments on the idea rather than focusing on the person.
- When taking minutes, it can be helpful to check understanding and get agreement by reading to the group what you have written down.
Technical Meeting Minutes

Group Project on Development of Optical Devices Based on Multicore Fibres

Date: Friday 18 February 2000
Venue: Room G7, 9.30 am
School of Electrical Engineering and Telecommunications UNSW

Present: Paul Chen (Chair), Brett Gilford, Jack Lowe, Dianne Thomson, Jill Allen, Sean Howes, Tan Wu, Phil Ashcroft (Secretary), Gerry Ascher, Will Brown
Apologies: Matt Smith, Simone Rowe

Meeting Purpose
- Discuss progress of project prototype
- Allocate work on packaging and tuning.

Experimental Results of Prototype

JA showed a fully functional prototype packaged TCF Demultiplexer. Discussion followed regarding costs involved in manufacturing the device. It was generally thought that main costs would be assembly and packaging. This would depend on producing long lengths of stable TCF. Future availability of low index cladding tubes may well make the rod-in-tube method attractive for the direct manufacture of precision TCF performs.

JA presented the results of the TCF-Bicell measurements. For a UV tuned sample isolation of 20dB and 18dB was obtained in cell 1 and 2 respectively. (NB all references to dBs will refer to optical dBs). This represents about a 4dB degradation from the TCF only measurements, probably due to the 2nd mode power.

Measurements of the bend tuned sample were not easy to do using the monochromator. However using high frequency modulation of the lasers made bend tuning trivial. Thus it would be feasible to do bend tuning in the primary package together with the alignment of the TCF to the bi-cell. The fibre used had well matched wavelengths but not particularly good isolation. Isolation of 18.5dB and 13dB was obtained in cell 1 and 2 respectively.

Best High frequency results were from a UV tuned sample and gave isolation of 15dB and 17.5dB in cell 1 and 2 respectively. This compares favourably with the optical values of 14.8dB and 17dB at the same wavelengths of 1307nm and 1545nm respectively.

Decision on Future Direction

Work has been allocated to writing the final report (see previous minutes details) Other work areas as follows:

Packaging of TCFs in hand (Action: DT)
Label for the package (Action: BG, JA)
Bend tuning of TCF and DCF (Action JA, TW, WB, PA)

Other Business: Next meeting - Friday 21 April 2000 9.30am
Oral Presentations

Oral Presentations are a way to communicate to an audience by speaking to them and by showing them. In an oral presentation how you say something is as important as what you say. While there are differences between speech and writing, many of the features, organisation and conventions of report writing are still expected in an oral presentation of a report. Much of the advice throughout this guide on preparing your written work applies also to the thinking, organising and style of your oral presentations.

Things to Remember

• There is a difference between written and spoken language. In an oral presentation you are speaking to your audience, not reading to them. You are also performing.

• To communicate clearly to your audience you must maintain eye contact, speak clearly, and use tone and volume to communicate your ideas.

• A good delivery requires regular relaxed breathing, standing in a balanced position, and using your whole body (face, hands, arms, shoulders, feet!) to communicate your confidence and energy.

• Use visual aids to explain technical details. DO NOT ‘read’ your visuals to the audience (see pages 20, 21 and 22 for specifications and advice on using visuals successfully).

• The audience should listen and respond with relevant questions or suggestions. Some presenters may invite questions during their talk, others may request you save questions until the end.

The Oral Presentation Process

1. Preparation

• Research your topic

• From your written report select the essential information and make into note cards.

• Check your timing (80 words=1 minute). Never go over time.

• Select audiovisual materials or real items to clarify and demonstrate your points.

2. Rehearsal

• Practise out loud—be aware of how you sound—confident, nervous, certain, uncertain?
• Practise using audiovisual equipment and other presentation aids that you will use.
• After evaluating your rehearsal, reorganise and rewrite the content as needed.
• Rehearse at least three times!

3. Performance
• Before you begin, check that the room and all equipment is working and properly arranged.
• Your performance begins as soon as your audience sees you, so walk and stand with confidence.
• Do not speak too quickly. Allow pauses and vary your intonation. Remember to breathe naturally.

4. Evaluation
• Ask yourself:
  • Did I achieve my objective? Why or why not?
  • Did the audience react as expected? Why or why not?
  • How can I improve my next presentation?

Any Presentation Has Four Major Sections

1. The Introduction
Tell your audience the topic, the main points or areas you will talk about and get them interested! It's like a road map for your audience. You tell them where you are going to take them and give them a reason for listening to you.

2. The Body
Present your ideas in a logical order, one idea building on another (see page 8 for example structures for organising the body).

3. The Conclusion
Restate your main points or key findings and conclude by tying it all together. State your opinion on the topic and provide recommendations on future directions if appropriate. It is your job to let the audience know that your talk is over.

4. The Discussion
Thank the audience and invite questions. Be prepared to support your conclusions or explain your work in more detail. It is a good idea to prepare possible questions before you give your talk (and practice your answers).
Visual aids are a powerful addition to an oral presentation. They can be used to explain a process or concept, to highlight important points and to present key findings and conclusions. Carefully plan and prepare your illustrations, but remember: you are not the oral aid to a visual presentation. Your spoken delivery of information is still most important.

**General Principles for Technical and Scientific Visual Aids**

- Visual materials should be concise, simple and relevant. They should support and add impact to your presentation.
- **ALL** visuals must be readable from the back of the room.
- Use colour to improve the impact of each message.
- Lettering and symbols should be consistent, clearly printed in bold colours and properly spaced.
- figures, axes on figures must be properly labelled
- units must be used consistently
- Graphics (figures, charts, diagrams, pictures etc.) should be large, clear, in focus and able to be seen and read by every audience member. Lines and symbols must be clear.
- Consistent format, layout and colour is important. This applies to individual and group presentations.

**Hints for Making Visual Aids**

These are general principles that apply to OHTs (overhead transparencies), Powerpoint slides, or boardwork.

**Do:**

- be clear. Each visual should convey a specific idea, point, or topic area.
- keep it simple and eliminate unnecessary information and clutter.
- use a large font (at least 24 points).
- use an easy-to-read font like Helvetica, Arial or Times. Make your message bold.
- use 1 message per visual (15-20 words or 1-2 graphics).
- check spelling and grammar.
Do Not:

- use small lettering, ornate fonts or untidy handwriting. You audience won’t be able to read it.
- cram too much information on one visual.
- include graphics purely for decoration.
- use background and text colours that are difficult to distinguish (e.g. light blue text on white background) or that clash (e.g. red background and dark green text). They will be hard to read.
- squeeze lines or cramp letters together. The text should be readable from the back of the room.

How to Use Visual Aids Well

- tell the audience what you are going to show them (“My next slide . . .”)
- tell the audience what you are showing them (“This is a diagram of ...” “The graph represents ...”). Don’t treat graphics or charts as self-explanatory.
- pause as you present the visual so the audience can read it
- tell the audience what the visual is saying (“As you can see . . .”) and point to relevant parts of the visual if this is helpful to the audience.

Presenting Equations

- A key of symbols must be included on the visual. Make sure all elements of the visual are readable from the back of the room.
- ‘orally’ defining symbols for the audience is better than reading a large number of symbols.

Rather than reading the visual aloud and saying:

“C is equal to εA divided by d”

Try saying:

“The capacitance depends on the dimensions of the conductors and the permittivity of the medium between them”
A poster is a visual display of a topic, project or investigation. A good poster combines text and graphics to communicate a clear message to the reader. A great poster is readable, legible, well organised, succinct, and can stand alone.

Principles to Consider

Attention

First impressions will come from the layout/design, colour of texts and graphics and the informative headings.

Brevity

It is very difficult to read while standing and our attention can waver after 5 minutes, so keep text to a minimum. We recommend between 250-400 words. Present short sections of text by creating short paragraphs and bullet points.

Coherence

The poster should make a logical unified statement. The visuals and text must complement each other. Visuals are not decoration, they provide content.

Direction

Do not have too many sections or images. Concise and clear headings are important. Organise poster elements from top to bottom and left to right as this reflects how most people read.

Evidence

The main points and claims made must be supported by valid evidence.

Tips for Making a Poster

• Allow at least a week (5 full days!) to prepare the poster.
• Do a number of sketches on spare paper to plan the overall layout. Prepare draft visuals and text.
• Print draft visuals and text and arrange as planned. Look for the gaps or weaknesses in the content and the claims. Check that visuals and text are readable from 1.5m.
• Aim to balance the amount of content across each section of the poster.
• Experiment with text and border colours. Check the colours don’t clash with the background paper and that the effect is restful to the eye. Limit your ‘pallet’ to 2-3 colours.

• Choose the best visual (graph, table, diagram) to present the content you wish to highlight.

• Look at past posters and notice what works and what does not.

**Essential Elements of a Poster**

• Title and subheadings should be short and memorable as these represent a “contents page”.

• Author/s and institution are usually included in the top left corner.

• Introduction - usually a short paragraph that gives the problem and the context of the problem. Usually placed in the top left corner or top middle section.

• Body - short descriptions of methods if appropriate, criteria or theory involved and key findings. Columns or framed boxes of text and visuals are presented in the sequence to be read.

• Conclusion – brief statements of what was achieved and/or recommended. Usually towards the bottom left corner.

• References – only include if referred to in the body of the poster. In these cases only small numbers are involved and these are usually placed in the bottom right corner.

**Typical Conventions & Formatting**

While requirements will vary, some typical specifications for posters include:

<table>
<thead>
<tr>
<th>Font Style</th>
<th>• Roman/Times or Bookman</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Must be readable from 1.5 m</td>
</tr>
<tr>
<td></td>
<td>• Choose one font and alter the size or bold features</td>
</tr>
<tr>
<td>Type Size</td>
<td>• Main heading 96—180</td>
</tr>
<tr>
<td></td>
<td>• Section headings 48—84</td>
</tr>
<tr>
<td></td>
<td>• Text and captions 14—18</td>
</tr>
<tr>
<td>Written Style</td>
<td>• Formal and direct</td>
</tr>
<tr>
<td></td>
<td>• Eliminate wordy beginnings to sentences</td>
</tr>
<tr>
<td>Presentation</td>
<td>• All elements must be aligned, clean and well secured</td>
</tr>
<tr>
<td>White space</td>
<td>• The visual pause between elements</td>
</tr>
<tr>
<td></td>
<td>• Do not squash texts and visuals together</td>
</tr>
</tbody>
</table>

**4th Year Poster**

A template and instructions for the 4th year thesis poster are available at:

Task Analysis

“What do I have to do?”

Before you begin researching for a report, a talk, or writing a response to an exam question, you should clarify what the task requires. You must understand what you are being asked to do.

Key Words

Key words tell you the approach you should take when answering any question. There are three types of key words:

- **Task Words** tell you what you have to do: the action you need to perform
- **Topic Words** tell you what the topics are
- **Focus Words** limit and define the question further

Using Key Words

**Example:** Write a report in 1500 words. Describe the implications of microprocessors for the smart home.

**Task words**

*Write a report in 1500 words*

This sentence tells you what ‘genre’ is required. In this case a brief report is required, not an essay.

*Describe*

Another task word in the question. According to the glossary of words on the following page ‘describe’ means to ‘give a detailed or graphic account’ of something. You will need to include information that draws on a number of sources or readings.

**Topic Words**

*microprocessors, smart home*

Topic words set the content area so you can focus your research and reading.

**Focus Words**

*implications*
Focus words help you decide how to link and interpret the topics.

In this question you would not just write a descriptive report on microprocessors that are used in modern ‘smart’ homes. Instead you would focus on describing how microprocessors have made the smart home possible and what this means - the advantages and disadvantages for example.

**What if I do not have a question?**

If you are given a general topic to research you need to form your own focus. First consider the current trends, issues or debates on the topic (this may require some preliminary research). Then form a focus question that indicates how you will approach the topic. You should also discuss your question with your tutor.

**Other Instructions and Clues**

Carefully read additional instructions for your assignment or task. Read your entire course outline to check the following:

- word limit
- due date
- recommended readings and sources
- presentation conventions (eg referencing and page layout)
- criteria for marking

Clarify any questions with your tutor.

**Glossary of Task Words**

<table>
<thead>
<tr>
<th>Analyse</th>
<th>Show the essence of something, by breaking it down into its component parts and examining each part in detail.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess</td>
<td>Consider an idea, thing or claim in order to make a judgment.</td>
</tr>
<tr>
<td>Argue</td>
<td>Present the case for and/or against a particular proposition. Support the case with evidence presented in an ordered and logical way.</td>
</tr>
<tr>
<td>Compare &amp; Contrast</td>
<td>When either or both of these terms are applied, look for similarities and differences between propositions.</td>
</tr>
<tr>
<td>Criticise/ or Critically</td>
<td>When the term ‘critically’ is used in a question (e.g. ‘critically examine’), you are asked to ‘criticise’ something, you are being asked to give your judgment about the merit of theories, or opinions about the truth of facts, and to back up your judgment with evidence.</td>
</tr>
<tr>
<td><strong>Define</strong></td>
<td>Set down the precise meaning of a word or phrase. Show that the distinctions implied in the definition are necessary.</td>
</tr>
<tr>
<td><strong>Describe</strong></td>
<td>Give a detailed or graphic account.</td>
</tr>
<tr>
<td><strong>Discuss</strong></td>
<td>Investigate or examine by argument, give reasons for and against.</td>
</tr>
<tr>
<td><strong>Evaluate</strong></td>
<td>Make an appraisal of the worth of something, in the light of its apparent truth, include your personal opinion.</td>
</tr>
<tr>
<td><strong>Examine</strong></td>
<td>Present in depth and investigate the implications.</td>
</tr>
<tr>
<td><strong>Explain</strong></td>
<td>Make plain, interpret, and account for in detail.</td>
</tr>
<tr>
<td><strong>Interpret</strong></td>
<td>Bring out the meaning of, and make clear and explicit; usually also give your own judgement.</td>
</tr>
<tr>
<td><strong>Outline</strong></td>
<td>Give the main features or general principles of a subject, omitting minor details and emphasising structure and relationship.</td>
</tr>
<tr>
<td><strong>Review/ Identify</strong></td>
<td>Make a survey of, examining the subject critically.</td>
</tr>
<tr>
<td><strong>State</strong></td>
<td>Specify fully and clearly.</td>
</tr>
<tr>
<td><strong>Summarise</strong></td>
<td>Give a concise account of the chief points of substance of a matter, omitting details and examples.</td>
</tr>
</tbody>
</table>
**Note-Taking Skills**

*Effective note-taking from lectures, readings etc. is an essential skill for university study and professional practice. Good note-taking allows a permanent record for revision and a register of relevant points that you can integrate with your own writing and speaking. Good note-taking reduces the risk of plagiarism. It also helps you distinguish where your ideas came from and how you think about those ideas.*

Effective note-taking requires:

- recognising the main ideas
- identifying what information is relevant to your task
- having a system of note taking that works for you
- reducing the information to note and diagram format
- where possible, putting the information in your own words
- recording the source of the information

When taking notes for an assignment you need to plan your notebook or computer document to record the following information:

<table>
<thead>
<tr>
<th>Always record the bibliographic details or the course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author/s, year published, title, publisher and country published, volume and issue numbers. If a web site, include the date you visited, the site name and the URL.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Record information from the source accurately</th>
<th>Record your ideas (use different colour, uppercase, separate columns or rows)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exact words from the original “in direct quotation marks”</td>
<td>What is significant or interesting about this information?</td>
</tr>
<tr>
<td>Include page numbers</td>
<td>Why put it in the report/ essay?</td>
</tr>
<tr>
<td>You can also paraphrase or summarise the information in your own words</td>
<td>Where might I put this in the report/ essay?</td>
</tr>
</tbody>
</table>

Using colour, columns or rows can be helpful to distinguish your ideas from the sources you consult and can reduce the chances of plagiarising.
Lecture Survival Tips

Here are some strategies to increase listening comprehension and improve your note-taking.

Before the Lecture:

- Revise the previous lecture or tutorial. (Even 10 minutes makes a big difference!)
- Pre-read about the topic of the upcoming lecture.
- Check the pronunciation of any new words or discipline-specific language in the pre-readings.
- Rule up pages according to your note-taking system. This saves time in the lecture.

During the Lecture:

- Be on time and sit near the front.
- Have a system for recording information that works for you.
- Don’t be distracted from the information being given.
- Select what is relevant. You do not need to write down everything that is said.
- Distinguish between main points, elaboration, examples, repetition, ‘waffle’, restatements and new points by:
  - Listening for structural cues (signpost/transition words, introduction, body and summary stages)
  - Looking for non verbal cues (facial expression, hand and body signals)
  - Looking for visual cues (the content of any visual aids used e.g. OHTs, references to names and sources)
  - Listening for phonological cues (voice change in volume, speed, emotion). Generally with more important information the speaker will speak slower, louder and they will direct their attention to the audience.

After The Lecture:

- Revise lecture notes within 24 hours. Tidy up your handwriting and fill in any missing bits. Reviewing makes remembering concepts and information much easier.
- Write a short summary of the lecture (1 paragraph) in your own words to consolidate your understanding, and to improve your paraphrasing skills!
- Attach any handouts to your lecture notes.
Information should never be used indiscriminately. When looking at material there should be a continual evaluation process occurring. Evaluate information for its relevance, usefulness and quality.

Here are some questions to assist you in evaluating what information to record for a task.

**Selecting Information**

- Do I need more information to think further about the topic?
- How does this link or relate to my topic? (See task analysis)
- Do I have enough information to begin writing?
- Could I explain this in my own words? (to show that I understand the information?)

**To The Issue**

**Relevance**

- Is this essential for the audience to know? (Keep?)
- Is this nice or interesting for the audience to know? (Discard?)
- Is this too technical (shorten) or too simple (elaborate) for my reader?
- Be prepared to do this!
Usefulness

• Does this information help me focus my thoughts?
• Where could I put this in my report/essay/answer?
• Is this essential background information?
• Could this information help me locate additional information?
• Can I use this to present my central argument/decision?

Quality

• Is the source reputable and unbiased?
• Are the authors qualified or expert in the field?
• Is the information out of date? Is the age of the information an issue?
• Is this new information or is it restating what many have already said/published?
• Is this the best piece of information or do I have something better?
The Black Box Revealed

This next section shows one way of developing an understanding of your topic and forming opinions. In your library research, you will collect a number of articles and books about your topic.

First-take notes

A consistent and useful system of notetaking will help you sort out your thoughts as you read. Here are some sample notes from different articles related to the topic of “smart cars”. What do you notice about the kinds of information included in the notes? (see page 32)

---


This article is about the latest developments in Adaptive Cruise Control (ACC) for automobiles.

“Every minute at least one person dies in a car crash” p.40

“The ultimate solution ... is to keep cars from smashing into one another” p.40

The technology exists for sensors and processors that can respond instantly to the distance and movement of other vehicles. The car's speed and distance from other objects can be controlled, but at the moment it is very expensive and only installed in luxury cars.

---


This talks about some of the design implications for automobile engineers due to increased consumer demand for Internet connectivity in cars.

Most automakers agree consumer demand will drive the development of this technology.

Will be used to provide services like

- Internet access
- on demand emergency assistance
- navigation
- traffic reports
- banking and shopping

for rear seat passengers: Internet access, entertainment via DVD, CD-ROM etc

“Display systems may be a component, but ultimately speech is seen as a key to keeping a driver's eyes on the road and both hands on the wheel” p.94

Bretz argues that even though the use of mobile phones is banned in some countries like Portugal, the approval for use of hands free voice activated dialling in the U.S. will pave the way for other devices.

---

This topic relates to the smart car because the use of radar, lidar, microprocessors and expert systems are explained.

Jones' main claim - I agree as it would be a very smart car if it can do this.

Could provide useful services, but these could also be a distraction

Voice recognition and speech processing is the key

Only addresses physical distractions?

---
Second- Form an outline

The writer then prepares an outline of related topics to give an overview of ideas formed from the readings. The writer also needs to consider what point or position will be highlighted.

<table>
<thead>
<tr>
<th>The Smart car- features</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Facts: ACC- collision avoidance</td>
</tr>
<tr>
<td>• Web/Internet Access- comm, entertainment, help</td>
</tr>
<tr>
<td>• Customising software systems for engines</td>
</tr>
</tbody>
</table>

Manages activities or dangerous distractions?  
I think  ACC most important

Figure 1: Sample outline notes for draft paragraph

Third- write a draft paragraph

The writer looks over her/his notes again and begins writing a paragraph based on the above outline. Note how ideas from different texts are merged into a unified paragraph and sources are always included (This earns you more marks!). The writer also remembers to include an opinion about the information. Not all the notes were included in the paragraph as the writer must choose, depending on the point she/he wishes to make, which information to include to best support the argument.

<table>
<thead>
<tr>
<th>Possible Heading</th>
<th>Smart Car Technology</th>
<th>Tutor’s Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draft paragraph to introduce ‘Smart Car Features’</td>
<td>Technological developments are greatly improving the entertainment, communication and safety systems available in vehicles. These systems include: Internet access for entertainment, services, communication, navigation or emergency assistance (Bretz 2001), and on board sensors that allow adaptive cruise control (ACC) for collision avoidance (Jones 2001). Because these systems are at a microprocessor and software level, cars can also be customised in their engine systems specifications (Whitehorn-Umphres 2001). As fantastic and promising as these systems may appear some authors warn of the dangers of increasing visual and mental distractions that these systems will create for drivers (Bretz 2001, Curry 2001). Ultimately ACC systems that are designed to avoid crashes seem to be the best mechanism for overcoming the distractions that many new interfaces will pose for drivers. Therefore, it is essential that ACC is increasingly available along with other smart car features. This section will now explain the interfaces for in car internet access, customising of engine systems and adaptive cruise control...</td>
<td>Clear conclusions will gain the reader’s respect</td>
</tr>
<tr>
<td>Summarises the features and acknowledges sources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set the scene for your argument</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State your opinion/evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Link to next part of this section</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 2: Sample draft paragraph based on notes

This section has shown you a simple and logical way to document information and ideas, and to begin forming opinions about your topic. The above paragraph is not perfect and would not be the final version that goes in the report or talk—but it is a start. Remember that writing is a cyclical process with ongoing thinking, revision and editing required to produce a clear and logical text.
Much of the work you produce at university will involve the important ideas, writings and discoveries of experts in your field of study. The work of other writers will provide you with information, evidence and ideas for your assignments, but must be incorporated into your work accurately and according to academic conventions.

Lecturers expect more than copied (plagiarised) pages from books, websites or journals. They expect you to demonstrate an understanding of the major ideas/concepts in the discipline.

Summarising and paraphrasing require important thinking and writing skills which are crucial to success at university. Putting information into ‘your own words’ helps you develop and demonstrate your understanding and interpretation of a text, and is a powerful tool for reshaping information to suit the many writing tasks that will be required of you.

What are the differences? What are the similarities?

<table>
<thead>
<tr>
<th>Quotations:</th>
<th>Paraphrasing:</th>
<th>Summarising:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• match the source word for word</td>
<td>• does not match the source word for word</td>
<td>• does not match the source word for word</td>
</tr>
<tr>
<td>• are usually a brief segment of the text</td>
<td>• involves putting a passage from a source into your own words</td>
<td>• involves putting the main idea(s) into your own words, but including only the main point(s)</td>
</tr>
<tr>
<td>• appear between quotation marks</td>
<td>• changes the words or phrasing of a passage, but retains and fully communicates the original meaning</td>
<td>• presents a broad overview, so is usually much shorter than the original text</td>
</tr>
<tr>
<td>• must be attributed to the original source, i.e. you must reference!</td>
<td>• must be attributed to the original source!</td>
<td>• must be attributed to the original source!</td>
</tr>
</tbody>
</table>

If you do not attribute your quotation, summary or paraphrase to the original source, you are ‘plagiarising’. This means you present others’ ideas as your own. You can be failed for plagiarising or even suspended from the University. (See UNSW Student Guide).
Common Forms of Plagiarism

From Obvious to More Subtle

• Copying an essay from another student and submitting it as your own work.

• Copying a journal article, a web page or a section of a book and submitting it as your own work.

• Copying sentences, paragraphs or visuals from someone else (essay, article, book, website, lectures, etc.).

• Quoting from a source ‘word for word’, without using quotation marks or proper acknowledgment is plagiarism.

• Using significant ideas from another author without acknowledgement.

• Putting someone else’s ideas into your own words and not acknowledging the source of the ideas.

• Heavy reliance on the written expressions of someone else without proper acknowledgment.

• Lifting sentences or paragraphs from someone else, without using quotation marks, but with proper acknowledgment. Here the impression is that the idea or information comes from the source cited, but that the phrasing, the choice of words to express it, is your own contribution.

• Excessive reliance on other people’s material.

• Repeated use of long quotations. Too many direct quotations (even with quotation marks and with proper acknowledgment) result in your sources speaking for you, meaning your own contribution is minimal. Use your own words more and rely less on quotations.

For examples of these common forms of plagiarism, visit the following website:

http://www.lc.unsw.edu.au/onlib/plag.html
Referencing

Referencing is a system that allows you to acknowledge the sources of information you use in your writing. If you do not reference your sources you are plagiarising. You must provide a reference whenever you use someone else’s words, ideas, theories or data. You must also reference graphics or tables.

Harvard Style is accepted in all written work in The School of Electrical Engineering and Telecommunications. It is one of the simpler systems to learn—and once mastered gives skill and patience to learn other referencing styles. For professional work, follow the conventions according to the IEEE.

General Principles of the Harvard System

Within the Text: Include three pieces of information about a source within the text of your work:

- the name of the author or authors
- the year of publication
- the page number (if the information/idea can be located on a particular page)

In-Text Citations may be placed at the end of a sentence (before the concluding punctuation) in brackets:

The theory was first developed by Browne (Gibbs 1981).

Another way of including a reference in your text is to integrate the author’s surname into your sentence, followed by the year of publication, in parentheses:

Gibbs (1981) states that Browne was the first to develop the theory of...

The following extract is an example of a paragraph using the Harvard system. Note how the writer has placed the sources near the end of the summary or paraphrase because the ideas not the authors were important in this section of text.

4. Recent Developments

An example of a recent development in control automation that deals with safety issues is the further integration of control systems into the operation of a car. This has included the utilisation of a “smart airbag” (Bretz 2000, p.91). It has sensory systems that detect the size and weight of the seat’s occupant and adjust the air-bag system accordingly (Bretz 2000). Adaptive Cruise Control (ACC) has been developed in recent Jaguar and some Volvo models. ACC uses microwave radar technology and through the installed sensors is able to maintain a constant distance from the vehicle in front by measuring distance and relative speed (Caplan 2000). A similar system can be used to sense if there is movement in a driver’s blind spot. Sensors send a signal that can be relayed to the driver as a flash or a beep if the indicator is activated while a vehicle is in the driver’s blind spot (Caplan 2000).
These examples demonstrate the sequence and punctuation conventions for in-text citations

<table>
<thead>
<tr>
<th>A direct quotation</th>
<th>Write the text word for word and place double quotation marks at the beginning and end of the quote. The name(s) of the author(s), the date and the page number must be included.</th>
<th>&quot;Australia is a settler society&quot; (Hudson &amp; Bolton 1997, p. 9).</th>
</tr>
</thead>
<tbody>
<tr>
<td>To reference the overall content</td>
<td>You do not need to include page numbers because it is the entire work you are referring to.</td>
<td>Larsen and Greene (1989) studied the effects of pollution in three major cities...</td>
</tr>
<tr>
<td>More than one work</td>
<td>(Entwistle 1977; Haddon 1969)</td>
<td>or: Entwistle (1977) and Haddon (1969) both demonstrated that...</td>
</tr>
<tr>
<td>More than one author</td>
<td>(Sontag &amp; Paglia 1987)</td>
<td></td>
</tr>
<tr>
<td>More than two authors</td>
<td>Use the surname of the first author and <em>et al.</em> (= and others).</td>
<td>Brown et al. (1987) argued that . . .</td>
</tr>
<tr>
<td>More than one work by the same author</td>
<td></td>
<td>(Smith 1981, 1984, 1985)</td>
</tr>
<tr>
<td>A page in a website</td>
<td>In-text citations usually require page numbers, but Internet documents rarely contain them. Use the author name and date created or last updated:</td>
<td>(Winston 1999) or: (United Nations 1999)</td>
</tr>
<tr>
<td>A website with no author</td>
<td>If there is no author (ie a person or an organisation), cite the website/ page title and date: However, if no author can be identified, then you should doubt the quality of the reference.</td>
<td>(Land for sale on moon 2007)</td>
</tr>
<tr>
<td>To cite online images/ diagrams used as figures</td>
<td>In-text citations should follow figure captions. Use the author name and date created or last updated:</td>
<td>Figure 1: Artificial Neural Network (National Science Foundation 2001)</td>
</tr>
</tbody>
</table>
List of References

This is a list of all the books, journal articles, web sites, industry and government publications etc., that you have referred to in your report, essay or oral presentation. Consistency and accuracy in setting out this list is paramount. Readers may also use your list of references to locate sources of particular interest for their own further reading.

Include the following information in a list of references

<table>
<thead>
<tr>
<th>Books</th>
<th>Journal Articles</th>
<th>Non-print Sources</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Author surname and initial</td>
<td>• Author surname and initial</td>
<td>• Author (usually an organisation)</td>
<td></td>
</tr>
<tr>
<td>• Year of publication</td>
<td>• Year of publication</td>
<td>• Year of publication</td>
<td></td>
</tr>
<tr>
<td>• Book title</td>
<td>• Article heading</td>
<td>• Title</td>
<td></td>
</tr>
<tr>
<td>• Publisher</td>
<td>• Journal title</td>
<td>• Standard/ patent number eg. AS3000</td>
<td></td>
</tr>
<tr>
<td>• City where published</td>
<td>• Volume and issue numbers</td>
<td>• Publisher</td>
<td></td>
</tr>
<tr>
<td>If an edited book, then also collect the titles and authors of individual chapters that you take notes from.</td>
<td>• First and last page of the article</td>
<td>• City where published</td>
<td></td>
</tr>
</tbody>
</table>

- Begin your list on a new page.
- Label the list - References
- Sort alphabetically by author’s surname (or title if no author).
- If there is more than one author or editor, mention each author/editor in the list of references.
• Follow the sequence and punctuation in the example reference list provided.
• If the information exceeds one line of text, then the following lines would have a hanging indent.

References


Skinner, IM 1991, Modal Conversion by Gratings in Optical Fibres: The Theory and its Application to All-optical Switching (U), CRC Report 91-002, Communications Research Centre, Department of Communications Canada.

Example Reference List

In the above examples can you locate:
• A book by one author?
• An edited book?
• A book with more than one author?
• A journal article?
• An industry/work-based report?
• An online journal?

How Do I…?

It is impossible to include every possible example you may encounter in your research. Try to apply the principles demonstrated and if you still have questions seek further assistance from a style manual (page 50) or get help from your tutor or The Learning Centre.
Editing your written work so it is free of errors and is in a consistent style is essential to producing a professional piece of work. Poorly edited work will certainly lose marks! This section describes common features of technical and academic writing.

Once you have decided on your tone and style, use it consistently in your writing. This also applies to your tone and style for your oral presentations. If you are preparing a group report, your group should agree on a common format and style. This will ensure that the whole text has a consistent look and sound, and help prove that you have worked as a team.

**Aim to inform**

Scientific or technical writing differs from literary writing in a number of ways. Primarily, the aim of technical writing is to inform rather than to entertain. A simple and concise style is recommended.

An example of a literary sentence might read as:

“The wind was blowing fiercely and the air outside was becoming chilled.”

A scientific/technical sentence would probably read as:

“The wind velocity was 45 kph which reduced the air temperature to 15°C.”

Since the primary aim of the report writer is to inform, emotive language should be avoided. You should try to transmit information as objectively as possible.

**Be concise**

Avoid too many long sentences. Sentences with four or more clauses (or parts) can be confusing to read. Your text will often read better if you consider making two shorter sentences rather than one long sentence. If you need to include some qualification or an example, however, then a long sentence might be more appropriate.

An example of a long sentence may read as:

“After consulting three manufacturers: Dibble and Co., Sooky Ltd., and Bungle Pty Ltd., we have found two types of temperature sensor devices for the air flow meter and both are simple in design but have inherent drawbacks.”

More concise sentences might be:

“Three manufacturers were consulted: Dibble and Co., Sooky Ltd., and Bungle Pty Ltd. Two temperature sensor devices were found for the air flow meter. Though the design is simple each has inherent drawbacks.”
Use words and expressions economically. If you can use one word instead of two or three, then choose the one word. Often the single word is more precise and more suited to a written context. For example use the word “avoid” in preference to “get around.” Similarly, avoid long paragraphs. A simple but effective rule is that each paragraph should address one theme. The theme should be introduced in the opening sentence, developed in the body of the paragraph with a concluding remark made in the final sentence.

Be correct

You are responsible for checking your spelling, punctuation and grammar (particularly tenses!) not the computer! Do not depend on a spell checker.

I have a spelling checker
It came with my PC;
It plainly marks four my revue
Mistakes I cannot sea.
I've run this poem threw it,
I'm sure your pleased too no,
Its letter perfect in it's weigh,
My checker tolled me sew.
(Source unknown)

Sometimes you can see errors more easily if you do not proof read your writing until a day or two after printing the draft. This is called ‘the bottom-draw treatment’. Reading aloud can be helpful for ‘hearing’ errors that your eyes may miss.

What’s wrong with this sentence?

The Learning Centre at UNSW (located at G23 on the Upper campus) has many resources on punctuation, grammar and spelling that you can be used to improve your written expression.

Do not discriminate

Nondiscriminatory language must be used when talking generally about people. Nondiscriminatory language helps you avoid stereotyping, patronising and demeaning people on the basis of their gender, status or race. This issue will be even more important in the workplace when you graduate.

Table 5. Non-discriminatory language

<table>
<thead>
<tr>
<th>Instead of …</th>
<th>Use in preference…</th>
</tr>
</thead>
<tbody>
<tr>
<td>workman</td>
<td>operator/employee</td>
</tr>
<tr>
<td>(to) man</td>
<td>staff/operate/use/work/direct</td>
</tr>
<tr>
<td>man hours</td>
<td>operating hours/working hours</td>
</tr>
<tr>
<td>man power</td>
<td>staff/workforce/personnel</td>
</tr>
</tbody>
</table>
Be specific

Specify what you are writing about. Be careful how you use words such as ‘it’, ‘this’, ‘thing’, ‘way’, ‘someone’.

"Day (1983) suggested a new way to make a clear TiO\textsubscript{2} solution."

The word ‘way’ is vague and should be replaced with ‘method’, ‘procedure’, or ‘technique’.

Do not use contractions of verbs and pronouns as these are ‘spoken forms’ (doesn’t, can’t, it’s, they’re). The formal writing you will do at university and in the workplace requires the full form (does not, can not, it is, they are).

Lists of information

Reports use lists for clarity and emphasis within the text. They are a means to succinctly summarise information. Do not overuse lists or the report will become fragmented and difficult to read. There are several ways to form a list in a report.

1. Individual sentences

The opening sentence ends with a colon and each subsequent line ends with a semicolon:

Signals that humans can perceive include:

- speech signals;
- image or video signals; and
- audio signals.

2. An inventory

Start each item on the list with lower case letters (unless abbreviations) and do not punctuate until the end:

3.1 Equipment Required

The following equipment will be required to program the MBTP RI:

- C MUX SubRack
- supplied with - 48V DC
• NEHC ATA Card (Flash card)
• PC with Flash writer
• NEHC
• NEHC Debug cable.

There should be a logical order to the sequence of items in the list. This could be moving from general to specific, most important to least important, largest to smallest component, and so on. A numbered list is useful if a sequence or series of steps applies to the order of points in the list.

**Abbreviations and acronyms**

Abbreviations and acronyms are commonly used in Electrical Engineering and Telecommunications. Abbreviations are pronounced as letters, e.g. UNSW, whereas acronyms are pronounced as words, e.g. BIBO, pronounced as ‘beebow’.

The first time you use an abbreviation, you must spell out the full term followed by the abbreviation or acronym in parentheses. Subsequent use of the term is then made by its abbreviation or acronym. Do not use punctuation with abbreviations.

> “The University of New South Wales (UNSW) is situated on Anzac Parade, Kensington. The best way to travel to UNSW is by public transport.”

**Punctuation**

Understanding when and how to use punctuation helps you express ideas clearly.

**Table 6. Punctuation Conventions**

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Function</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full stop</td>
<td>•</td>
<td>To mark the end of a sentence.</td>
<td>Batteries can be used together with solar cells.</td>
</tr>
<tr>
<td>Colon</td>
<td>•</td>
<td>To introduce a list.</td>
<td>Worksite inductions are important for three reasons:</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td></td>
<td>• in an emergency …;</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td></td>
<td>• a fire would…; and</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td></td>
<td>• newly ‘inducted’ workers…</td>
</tr>
</tbody>
</table>
Comma

Separates information into readable units. Such uses include:

- after introductory phrases
- around relative clauses giving extra information
- between separate items listed in a sentence.

As early as the middle 19th century, track gauge, wheel-set diversions, vehicle loading gauge, and traction and buffing gear were so standardised that freight trains could cross smoothly from one rail network to another.

Apostrophe

Used to indicate ownership (whose) with nouns.

The engineer’s hat can be found...

ABC Ltd’s safety officer has...

Quotation marks

Indicates that the words enclosed in the quotations are from another source and are quoted exactly as in the original source.

Brake and Bates (1999) believe that the three-phase motor “may have no distinct optimal operating level” (p. 73).

Hyphen

Joins two words to create a single idea. Used when the spelling of two joined words would be awkward or obscure the meaning. Use only when necessary.

common-mode voltage
high-speed network
low-pass filter

The Learning Centre can help students develop their writing or speaking skills. Visit our website:

http://www.lc.unsw.edu.au
Time Management

Is This You?

“I need more time! I don’t have time to find time! Where does my time go? How can I use my time better?” Develop a plan . . . it may be a weekly, monthly or session plan. Try the following strategies.

STEP 1. TIME AUDIT

How do you spend your 168 hours per week?

STEP 2. PRIORITISE

√ Must do
√ Should do
√ Prefer to do

- Begin assignments early
- Maintain relationships and friends
- Plan time for weekly reading & exercises
- Finish tasks on time

STEP 3. ALLOCATE

Be realistic about how much time high priority tasks will need

Short Term
- Plan on a weekly basis
- List weekly & daily tasks
- Note when to start assignments

Long Term
- Use wall planners
- Leave free time for emergencies
- List all tasks due and plan when to start them
Pick up a free yearly wall planner from The Learning Centre, Level 2, The Library

A Learning Centre Weekly Planner is also available at:
http://www.lc.unsw.edu.au/student.html

STEP 4. USE YOUR PLANS
Follow them, but be flexible

- Break big tasks into smaller manageable parts
- Don’t neglect yourself, your friends or family
- When necessary, swap times/activities
- If in doubt, compromise—is the activity really worth the time or the effort?

STEP 5. REVIEW
Achievements & good habits
unworkable goals & poor strategies

- Reward yourself for tasks completed and sanity maintained
- Think of how you could do better next session
Like to Know More?

Resources on Campus

The Learning Centre, G23 Upper Campus *(The carpark behind the Mathews Building!)*

The Learning Centre and has a wide range of text and multimedia resources that students can use. Resources on speaking and writing at university, study skills and general English communication skills are available in the centre. During session free workshops on academic skills are run for UNSW students. Students can also make appointments for individual assistance.

International Student Centre (East Wing, Ground Floor, Red Centre)

International students can obtain advice about studying and living in Australia.

General Education Courses

These courses count towards your degree, may impress employers and provide an opportunity for you to develop your communication skills. For example; GENT0201 ‘Communication Skills’, GENLO220 ‘Effective Communication’, GENT0604 ‘Critical Thinking and Practical Reasoning’.

Institute of Languages UNSW ([http://www.lang.unsw.edu.au](http://www.lang.unsw.edu.au))

Courses in English language are available full time, part time, as a summer intensive and online. Classes are small and levels depend on your proficiency. Fees are charged.

Further Reading (Not in bibliographical order!)


An excellent dictionary for non-native speakers of English. Includes grammar notes, thesaurus notes and real examples of the word in use.

*IEEE Information for Authors.*

Most IEEE Journals have notes for authors and the IEEE produces pamphlets for members as well.


This book gives comprehensive advice and numerous examples of nearly every aspect of preparing a written document.


One of many excellent books on writing as a professional engineer.


An anthology of articles from the IEEE journals that give practical advice on every aspect of professional communication.
Websites

Electrical and Telecommunications Engineering
School of Electrical Engineering, The University of New South Wales
http://www.ee.unsw.edu.au

University Study Skills
The Learning Centre, The University of New South Wales
http://www.lc.unsw.edu.au

Unilearning
http://www.unilearning.net.au

R. Felder’s Handouts for Engineering Students

Maths and Physics Homepage

Referencing Electronic Sources

The Library at The University of New South Wales
http://info.library.unsw.edu.au/

English Language

ESL Café
http://www.eslcafe.com

Writing Exercises for Engineers and Scientists
http://www.writing.engr.psu.edu/exercises/

Common Errors in English
http://www.wsu.edu/~brians/errors/index.html

Further Study

ESCC (Eastern Suburbs Community College) offers English language courses for everyday or academic communication. Classes are held weekly, usually in the evening (7—9 pm) and run for eight or ten weeks. Fees are charged.

http://www.escc.nsw.edu.au/cgi-bin/WebObjects/East.woa
Have You . . ?

Checklist 1: Doing an Assignment

1. I have noted the due date on my planner/in my diary
2. I have begun early enough to get it done on time.
3. I have read the instructions and know what to do.
4. I have clarified my questions about the assignment with my tutor.
5. I have located the necessary information.
6. I have completed a draft answer/assignment.
7. My assignment is set out neatly.
8. My answers and information are organised logically.
9. I have followed the School’s requirements
10. I have checked my answers, and they are relevant to the instructions.

Checklist 2: Before You Hand It In!

1. I have answered the question/s.
2. I have referenced all sources of information.
3. All pages are secured according to lecturer’s requirements (e.g. just stapled or in folder).
4. I have attached a completed & signed cover page.
5. My assignment is presented professionally.

About Your Answers:

Yes       Well done—you are on the right track
No        Make a time in your diary/planner to do this
Not sure  Read instructions and guidelines, ask questions and get advice.