UNIVERSITI TUNKU ABDUL RAHMAN
FACULTY OF INFORMATION & COMMUNICATION
TECHNOLOGY (PERAK CAMPUS)

FINAL YEAR PROJECT (FYP)
INFORMATION BOOKLET

Prepared by FYP Committee

*Ver. 10 Jan 2012
*Note: Please always refer to the most updated version
Table of Contents

1 INTRODUCTION.................................................................................................................. 4

1.1 Selection of Project Area and Project Proposal ...................................................... 5
1.2 General Classification of Final Year Project ......................................................... 6
1.3 Academic Research Projects.................................................................................. 6
1.4 Application Development Projects ...................................................................... 6
1.5 Combining Project Categories ............................................................................. 7

2 PROJECT MILESTONE AND PROCEDURES................................................................. 8

2.1 Pre-Project Schedule ............................................................................................... 8
2.1 Project I Schedule .................................................................................................... 8
2.2 Project II Schedule .................................................................................................. 10

3 PITFALLS AND PROBLEMS......................................................................................... 12

4 PROJECT REPORT CONTENTS AND ARRANGEMENT.............................................. 13

4.1 Report Contents and Arrangement Guidelines for Project I .................................. 14
4.2 Report Contents and Arrangement Guidelines for Project II ................................ 20
4.3 Poster Content and Arrangement Guidelines for Project I and Project II ........... 21

5 PROJECT REPORT FORMAT.............................................................................................. 22

5.1 Report Format for Project I ..................................................................................... 23
5.2 Report Format for Project II .................................................................................. 25
5.3 Other Points to Note on Writing Report ................................................................ 27

6 VIVA: ORAL PRESENTATION AND PRODUCT DEMONSTRATION............. 29

7 FYP GUIDELINES FOR SUPERVISOR AND MODERATORS ...................... 29
APPENDICES

Appendix A: Final Year Project Posting Form .................................................. 32
Appendix B: Final Year Project Registration Form .............................................. 34
Appendix C: Final Year Project Biweekly Report ............................................... 36
Appendix D: Report Front Cover ........................................................................ 39
Appendix E: Sample of Report Arrangement ...................................................... 41
Appendix F: IEEE References ............................................................................ 55
Appendix G: APA References .............................................................................. 68
Important Notice to All Students

Plagiarism is a serious offence. Copy and paste for the report content is prohibited.

You must sign the report submission declaration to confirm that your FYP report has been done by your own efforts without any plagiarism.
1 Introduction

Every student undertaking the degree is required to complete a project under the supervision of an FICT (Perak) academic staff or an external supervisor from the industry. In the case whereby an external supervisor is appointed, an FICT (Perak) staff shall be appointed as a co-supervisor for the student. The project should provide students with the opportunity to bring together the academic knowledge and skills acquired from the range of modules already studied. In general the whole project can be divided into two parts, namely Project I and Project II, which are to be completed by the students in the first and second semesters in Year 3. The objectives and learning outcomes of the two modules are listed as follows.

The objectives of Project I:
[1] To introduce a general approach to start on a project of interest, the need for proper documentation and reporting, and professional presentation of plans and proposals.
[2] To present and discuss various tools and skills that may be utilised for the formulation and development of a project.

The learning outcomes of Project I:
After completing this unit, students will be able to:
[1] Identify a topical or problem area of interest for an ICT final year project (FYP).
[2] Define the scope and objectives of the FYP.
[3] Develop a project plan for the FYP.
[4] Write formal documentations, such as proposal, literature search summary, work log, and report, required for the FYP.
[5] Determine suitable research methods and tools for problem analysis and project development.
[6] Demonstrate formal presentation skills for a proposal and technical work.

The objectives of Project II:
[1] To encourage students to demonstrate their technical skills, and put in practice their experience and knowledge.
[2] To provide an opportunity for students to highlight and realise in projects, their grasp of interdisciplinary knowledge, including business domain knowledge.
[3] To provide an opportunity for students to further their research, in their discipline and that of the industry, and report their findings appropriately.
[4] To provide an avenue for students to document and showcase their project work, e.g. to potential employers.

The learning outcomes of Project II:
After completing this unit, students will be able to:
[1] Review and re-evaluate the project scope, objectives, and project plan proposed in Project I.
[2] Compile and perform literature and technical review for the project.
[3] Formulate project requirements into specifications or models.
[4] Analyse the specifications or models and select suitable tools or methods for project development.
[5] Develop a system or theorem based on the stated specifications or models.
[6] Evaluate the system or prove the theorem.
[8] Present or demonstrate the project results.

Although students are required to take the project modules in their Year 3, they are encouraged to explore the areas of interest, identify the project supervisors and define a project topic if possible, as early as in the second semester of Year 2. The detailed planning of the project is described in the following sections.

Generally, all projects will involve elements of preliminary investigation, project design, realization of design and evaluation.

1.1 Selection of Project Area and Project Proposal
A starting point to tackle the final year project is the identification and selection of an area of interest by the student. A session will be held whereby relevant lecturers are invited to give a short talk to the students of Year 2 Semester 2. This will expose students to the areas available and the people involved. To know better an area of work, students can later seek out potential project supervisors for further discussion. Also, students can look into the internet for more information on the areas of interest. After agreeing with the supervisor on the area of study (and perhaps with a tentative title), students can then make use of the holidays for background reading for their final year project endeavour.

A list of suitable project topics or areas offered by the lecturers will be made known to eligible students through the faculty website, and/or other means. This is done during Year 2 Semester 2. Students are also encouraged to suggest their own projects or projects in collaboration with firms in the industry (where appropriate). To do so, students must prepare a draft proposal and discuss with the relevant lecturer to ensure that the proposal is of a suitable level and standard.

The project selection and student-supervisor allocation process will be finalized during the first two weeks of Year 3 Semester 1. Students are required to register their project title with the approval of an academic staff as the supervisor. Students may wish to modify their preferred projects to be re-cast to their preferred project scope. They can do so subject to the agreement of the relevant supervisor. Also, students need to attend weekly (2 hours) classes for Project 1. Students need to meet their individual supervisors on regular basis, at least, once per fortnight.

By the end of Year 3 Semester 1, students will hand in their final year project proposal for evaluation by the supervisor.
1.2 General Classification of Final Year Project
The following is a guide and framework for setting up and running your project. There are two broad categories:

- Academic research projects;
- Application development projects.

These categories are merely a guide to help you design your project. While most projects will fit neatly into one of these 2 types, others will have characteristics of several project categories. It is important for students to recognise what project category that their project might fit into so as to enable them to address the relevant learning outcomes and requirements in which will help defining a clear and concise project objectives.

1.3 Academic Research Projects

Academic research projects are undertaken to investigate a research question. An academic research project must contain a research contribution from the student, for example, the development of a model or the design of an algorithm towards analysing/solving a problem. A research projects might include more data gathering, the gathering of this data in itself will not constitute an acceptable level of research effort by the student. Rather some rigorous analysis of the data and/or the development of some deliverable based on the data will be required.

The deliverable should have the potential for further research used by a third party, for example the supervisor, an external body or other stakeholders in the project. Furthermore, academic research projects must be designed so that it is clear what factors affect the validity and generalisability of the results.

In developing Academic Research projects, your proposal should state:

- The research question to be addressed;
- Any research initiative or project that your project is a part of;
- The research methods and tools to be used;
- How you will judge the validity and generality of your results;
- In what ways the project may contribute to related research activities.

1.4 Application Development Projects

These types of projects involve design and construction of a prototype for an application that can be in the form of hardware or software or a mixed hardware/software. The design and construction must be non-trivial. The development should follow an established hardware/software engineering method. In exceptional cases, we will permit projects that
involve analysis and design without a construction. Our intention is that the design can be implemented by a third party in the future. Alternatively, a formal theory may be built and its soundness and application demonstrated. In developing Application Development projects and producing the project proposal you should state:

- The purpose of the hardware/software;
- In what way the project is novel;
- What theory (if any) underpins the project;
- Applicable hardware/software engineering methods;
- What tools will be used, so far as decided;
- Methods envisaged for testing and evaluating the hardware/software;
- How the complexity of the work merits it being a final year project.

1.5 Combining Project Categories

For students’ projects that do not fit neatly with one of the two project categories, the union of the respective lists of details must be clearly stated in the proposal.
2 Project Milestone and Procedures

2.1 Pre-Project Schedule

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Date</th>
<th>Action Required (AR) by Supervisor/Moderator/Student</th>
</tr>
</thead>
</table>
| Posting of project titles and supervisors | Year 2 Semester 2 | **Supervisor AR:** Supervisor to fill the Final Year Project Posting form. The projects will be reviewed by FYP committee to ensure its uniqueness and contribution.  
**FYP Committee AR:** To consolidate and post the Final Year Project Posting from the Supervisors for students reference. |
| Selection of project area.              | Year 2 Semester 2 | **Student AR:** Students to look for potential supervisors and simultaneously do background reading.  
**Supervisor AR:** Supervisors to hold discussion sessions with students. |
| Face to face meeting.                   | Year 2 Semester 2 | **Student AR:** After the student has selected an area for his/her final year project, the student is required to meet with the supervisor at least once per week/biweekly as determined by the supervisor. |

2.2 Project I Schedule

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Date</th>
<th>Action Required (AR) by Supervisor/Moderator/Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting to discuss the process of the Final Year Project</td>
<td>Year 3 Semester 1</td>
<td>2 hours discussion for 14 weeks</td>
</tr>
<tr>
<td>Project Undertaking form</td>
<td>Week 3</td>
<td><strong>Student AR:</strong> Students to sign the Final Year Project Undertaking form to undertake the proposed project title under the supervision of the chosen supervisor. Pass the signed form to supervisor.</td>
</tr>
<tr>
<td>Task</td>
<td>Frequency</td>
<td>AR</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>----</td>
</tr>
<tr>
<td><strong>Supervisor AR:</strong></td>
<td></td>
<td>Supervisor to sign the Final Year Project Registration form to accept the supervision of the named student with the proposed project title, and key in the project info on spreadsheet provided.</td>
</tr>
<tr>
<td><strong>FYP Committee AR:</strong></td>
<td></td>
<td>Consolidate all registration forms and assign supervisor to students who have not got a project yet.</td>
</tr>
<tr>
<td>Bi-Weekly Log</td>
<td>Bi-weekly</td>
<td><strong>Student AR:</strong></td>
</tr>
<tr>
<td>Submit TWO (2) Preliminary Proposal Report (to Supervisor)</td>
<td>Week 8</td>
<td><strong>Student AR:</strong></td>
</tr>
<tr>
<td>Submit TWO (2) comb-bound Project Proposal (to Supervisor)</td>
<td>Week 12</td>
<td><strong>Student AR:</strong></td>
</tr>
</tbody>
</table>
Moderator has to read the submitted report.

| Oral presentation | Week 13,14 | Student:  
Student has to present their Project Proposal  
Supervisor AR:  
Supervisors to make the necessary arrangement with their students and moderators to evaluate the oral presentation according to the Report Proposal Marking Scheme.  
Moderator AR:  
Moderator has to attend and assess the oral presentation. |
| Submission of result | Week 14 | Supervisor AR:  
Supervisors to submit the evaluation result to FGO.  
FGO:  
FGO has to collect the results. |

Note: Please refer to the related appendices for the forms

**Figure 2-F1**: Final Year Project milestones.

### 2.3 Project II Schedule

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Date</th>
<th>Action Required (AR) by Supervisor/Moderator/Student/Faculty Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting with supervisor</td>
<td>Year 3 Semester 2</td>
<td></td>
</tr>
</tbody>
</table>
| Bi-Weekly Log                     | Bi-weekly          | **Student AR:**  
Students to submit a biweekly log to report the progress of the student’s project work.  
**Supervisor AR:**  
Supervisors to verify and sign on the biweekly log and keep them for the record. |
| Submit draft reports to the supervisor. | Week 6 to week 10. | **Supervisor AR:**  
Supervisors to advice and make correction to the draft and returns it back to the student. |
| **Submit TWO (2) corrected comb-bound full report copies to the supervisor. (Marked by Supervisor only)** | **Week 12.** | **Supervisor AR:**  
Supervisors to pass a comb-bound copy to their moderator for review. Supervisors to mark report according to the Full Report Marking Scheme. Supervisors to make minor corrections on the report, if any. |
| --- | --- | --- |
| **Oral Presentation and Product Demonstration. (Assessed by Supervisor and Moderator)** | **Week 12 and Week 13.** | **Supervisor and Moderator AR:**  
Supervisors to liaise with their respective moderators to arrange the venue, time, tools, equipment, marking sheet etc for the viva. Supervisor and Moderator to assess and evaluate the student's project work. Supervisor and moderator to finish evaluating/marking the student's final year project work. Moderator to mark and pass the hardcopy of the mark to supervisor (Moderator has to examine the oral presentation and report using the same marking scheme).  
Supervisor to staple the mark sheets and pass to the FYP committee. Any disagreement (more than 10%) on the marks allocation can be brought forth to the FYPC for further discussion.  
The Supervisor to pass the comb-bound report to the student for final **minor correction** before collecting it back from the student.  
The Supervisor and Moderator keep their respective comb-bound copies for their own future use.  
**All marks must remain confidential and not to be disclosed.**  
**Student AR:**  
Student to do the final **minor correction** on the report before sending it for comb bound.  
Students to return the comb-bound report to the Supervisor. |
| Submit ONE (1) set of softcopy to FGO. | Week 15 | **Student AR:**
Students to submit one (1) set of softcopy to the FGO. The softcopies should contain the following (if any):
- The complete executable program
- The source codes
- The full report in Microsoft Word

**FGO:**
To collect and keep the softcopies.

| Submission of Results | Week 15 | **Supervisor:**
Supervisors to submit the evaluation result to FGO.

**FGO:**
FGO has to collect the results.

---

**Figure 2-F2:** Final Year Project milestones.

---

### 3 Pitfalls and Problems
The final year project will be a demanding but exciting learning experience. However, it is not without problems which, if not identified and addressed, could seriously affect the final result and ultimately reduce your grade. In this section we mention some of these problems and how to avoid them.

a. The “Overachiever” Problem. A common problem is selecting a topic that is far too ambitious for the allotted time. Remember that you have only 12-13 weeks to finish the coding, debugging, and testing. Be careful not to select a topic that is unrealistically large. This can lead to frustration as well as errors caused by “cutting corners” and hurrying through the implementation. Discuss with your advisor the scale of what you are planning. If he or she thinks it may be too large, consider implementing the project in stages, each complete in itself. When stage I is working move on to stage II. If you do not finish stage II, however, you will still have a functioning system.

b. The “Do It Tomorrow” Problem. Thirteen weeks sounds like a long time, but it goes by quickly. You need an implementation schedule that allocates reasonable amounts of work throughout the entire semester. Then you must stick to that schedule. Don’t be tempted to postpone work on the project because week 13 seems so far off. All that happens is that during the final few weeks you rush madly to get something working, and software implemented in a rush rarely works correctly!

c. The “Sleeping Member” Problem. In the ideal world, all team members have equal ability, equal interest in the problem, and work equally hard. In the real world that may not happen. You may have one (or more) team members who do not carry their share of the workload, not because of a lack of ability, but rather lack of interest or motivation. This is a serious problem because, although part of your grade is based on each individual’s effort, another part is based on successfully finishing the project. A non-contributing team member can slow down or prevent completion of the work. If you have a teammate who is not doing his or her share of the work, talk to them and stress the importance of everyone doing their job. If this does not solve the problem then talk to your supervisor. Don’t let the failure of others prevent you from completing the work and receiving a good grade.

d. The “Poop Out At The End” Problem. You have worked hard for 13 weeks to complete this project. You have spent many late nights and chased down hundreds of bugs, but it is now working, so are you done? Absolutely not! The project grade is not based only on the programs you develop but also on your written reports and oral presentations. Remember that even though you may be ‘burned out’ from implementation, there is still work to be done. Don’t produce a poorly written paper or give a poorly organized presentation. That will negate much of your good work. Put in the time needed to prepare both a well written, high-quality final report and a well organized, polished presentation. A good job on these last steps will insure that you receive a grade that fairly represents the work you have done.

4 Project Report Contents and Arrangement
Students should not copy large sections of books and/or reports. The change in writing style can be easily detected. Students will be penalised for copying. Whenever values of short passages have been quoted, the full reference should be given. Students will be penalised for not referencing previous work.

4.1 Report Contents and Arrangement Guidelines for Project I

The essential components of the content of the final year project proposal should include the items listed in Figure 4-F1. They should also be arranged in the top-down order listed. The proposal should not exceed 30 pages.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Arrangement of the Proposal</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Title Page</td>
<td>1 page. Refer to Appendix E.</td>
</tr>
</tbody>
</table>
| 2        | Abstract                    | Maximum 2 pages. Refer to Appendix E. It should describe the format / outline of the proposal. Abstracts are formal summaries of your completed work:  
  - Abstracts, like all summaries, cover the main points of a piece of writing that includes the field of study, problem definition, methodology adopted, research process, conclusion and planning of the project work, etc.  
  - Unlike executive summaries written for non-specialist audiences, abstracts use the same level of technical language and expertise found in the article itself.  
  - Unlike general summaries which can be adapted in many ways to meet various readers' and writers' needs.  
  Abstracts typically serve the following goals:  
  - Help readers decide if they should read an entire article.  
  - Help readers to see your key findings and achievement of your project.  
  - Help readers understand your project by acting as a pre-reading outline of key points.  
  - Help readers to review technical work without becoming bogged down in details. |
<p>| 3        | Table of Contents           | Refer to Appendix E. It should list all the chapters and their corresponding sections and subsections found in the report. |
| 4        | List of Tables              | Refer to Appendix E. It should list all the tables and their corresponding page numbers found the report. |
| 5        | List of Figures             | Refer to Appendix E. It should list all the figures and their corresponding page numbers found the report. |
| 6        | List of Symbols             | Refer to Appendix E. It should list all the symbols found in the report and their corresponding meaning. |</p>
<table>
<thead>
<tr>
<th></th>
<th>List of Abbreviations</th>
<th>Refer to Appendix E. It should list all the abbreviations found in the report and their corresponding meaning.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Sectioning</td>
<td>Number of pages should be between 20 to 30 pages. Students should familiarize themselves with report writing skills such as division of work and report sectioning. Each chapter should begin on a new page. Within a chapter, use as many sections and subsections as possible and where appropriate. Subsection is limited to 3 levels only.</td>
</tr>
</tbody>
</table>

**Chapter 1: Introduction**

- Motivation and Problem Statement (1 to 2 paragraphs)
  - It should be short and concise, emphasizes on overview of problems and the motivation of the whole project. At the very minimum, students should present a summary of the problem and the problem domain of the project.
  - You need to justify the existence of your project. Problem statement - state the existing problem to be solved. Motivation - why want to solve it, why the project is needed? Writing up on problem statement and motivation: you need to solve some problems. You need to improve something. You need to develop something that previously have not existed or carry out enhancement work. Example: You want to develop a Mandarin voice recognition software, because the software does not exist. Or, you improve on the existing Mandarin voice recognition software because the existing often misinterprets some words.
  - Common mistake: students normally confuse problem statement (or motivation) with technical difficulties.

- Project Scope (1-2 paragraph)
  - Describe what you are going to deliver at the end of the project. (e.g. a piece of software, a piece of hardware, an improvement plan of a system, a development framework, a research survey, a model of a system, or simulation result, etc). Give a general overview of your solution of the problem.
Example: This project develops a model on the social behavior of Internet with various simulation results on some scenarios. This project involves a new algorithm design to speed up the grid computing.

- **Project Objectives (1-4 paragraph)**
  - Describe the purpose and aims of the project which give more detailed information than the project scope.
  - For example: The project aims to improve at least 10% in processing performance over the current Sun Solaris grid computing engine with our new algorithm.
  - The following questions are applicable:
    - What in general will this project try to achieve?
    - What will this project focus on?
    - What IS NOT covered by this project?
  - Common mistakes:
    - Stating learning objectives instead of project objectives. For example, learning programming languages, tools etc.
    - Treating project timelines as project objectives.

- **Impact, significance and contribution (1-2 paragraph)**
  - Describe how the project is going to benefit the readers or anybody.
  - Describe the reasons for solving the problems mentioned in the problem statement.
  - Why are the problem and solution of your project interesting? Why is your project worth your readers’ time to read it?
  - Make your readers feel that your project is important or “desirable”.
  - This is where you need to “sell” or “promote” your project.
For example: By having this educational software, the student will visualize better on how the processor works.

For example: This survey has to be carried because it will form the basis to anticipate and project the market trend ahead of time.

- Background information (> 3 paragraphs)
  - A brief section giving background information may be necessary, especially if your work spans two or more traditional fields.
  
  - Give a descriptive view on the field (or sub-field) of the project and historical development prior to the project.
  
  - Give your readers who may not have any experience with some of the material needed to follow your project.
  
  - It may be a good practice to give some definition of some key terms, or impart some key technical knowledge to the readers at this point.
  
  - The ultimate question: What my readers, especially those who are not the same field as I do, need to know before they continue to read the rest of the document?

Chapter 2

- Literature Review
  - Highlight what is the current practice or prior arts towards the problem. It can be structured or non-structured (for unexplored areas)
  
  - If there are prior arts, students should refer or cite them and include the referenced art in the references section.

- Fact Finding
  - Scientific method to do fact finding and analysis - reviewing existing manuals and procedures, preparing questionnaires, observations, research
and conducting personal interviews.

- Accomplished by techniques such as data element analysis; input-output analysis, including flow diagrams; recurring data analysis; and report use analysis.

- Data Collection
  - Collect relevant data and documents to justify the problems and need for solutions

- Critical Remarks of previous works
  - Describe the strength and weakness of any previous work that are similar to your project
  - Compare them with your proposed solutions.

Chapter 3

- Methodology and tools
  - Methodologies and General Work Procedures (1-2 paragraphs + figures)
    - A brief statement of the methodology for the realization of the project. It could define the general approach to how the project and its output(s) will be realized.

- Implementation Issues and Challenges (1-2 paragraphs)
  - Difficult issues and challenges in the implementation.
  - Novel aspects of this project (if any)
  - This is the point that you describe your technical difficulties to implement your solutions.

- Timeline (1 paragraph)
  - Estimated timeline for deliverables and milestones
  - Graphical - Gantt chart format
  - Planning for current semester and next semester.

- Requirement Specifications
  - User requirements
  - System Performance Definition
  - Design and Verification Plan
### Chapter 4
- Conclusion (1 paragraph)
  - Summarize the project including the problem, motivation, and proposed solutions

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Bibliography</td>
</tr>
</tbody>
</table>
| 10 | Appendices | The appendices are supplementary materials which because of their length would break up the main flow of the report. The following is a guideline on the arrangement of appendices and what may be included as part of the appendices. 

Appendix A (or more)
- Specifications, data sheets and drawings of equipment or components used.
- Data used for analysis.
- Survey sheets.
- Charts and data tables.
- Lengthy mathematical derivations.
- etc

**Figure 4-F1:** Essential components for the final year project proposal and their arrangement.
4.2 Report Contents and Arrangement Guidelines for Project II

The essential components of the content of the final year project report should include the items listed in Figure 4-F2. They should also be arranged in the top-down order listed. The report should comprise between 20,000 – 40,000 words.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Arrangement of the Report</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Front Cover</td>
<td>Content same as the Title Page. Refer to Appendix D. The board used for binding should have sufficient rigidity to support the weight of the work when standing on the shelf. Note the format (font type, size, capitalization and the sentences arrangement) must be strictly adhere to. No changes are allowed. It is the responsibility of the students to remind the photocopy vendors to adhere to the format stated when binding. Any discrepancy will result in the rejection of the students' soft-bound report and thereafter students will have to re-bind at their expense.</td>
</tr>
<tr>
<td>2</td>
<td>Report Status Declaration Form</td>
<td>1 page. Refer to Appendix E.</td>
</tr>
<tr>
<td>3</td>
<td>Title Page</td>
<td>1 page. Refer to Appendix E.</td>
</tr>
<tr>
<td>4</td>
<td>Declaration of Originality</td>
<td>1 page. Refer to Appendix E.</td>
</tr>
<tr>
<td>5</td>
<td>Acknowledgements</td>
<td>1 page. Refer to Appendix E.</td>
</tr>
<tr>
<td>6</td>
<td>Abstract</td>
<td>Maximum 1 page. Refer to Appendix E. It should states the field of study, problem definition, methodology and techniques adopted, research process, results obtained and conclusion of the project work.</td>
</tr>
<tr>
<td>7</td>
<td>Table of Contents</td>
<td>Refer to Appendix E. It should list all the chapters and their corresponding sections and subsections found in the report.</td>
</tr>
<tr>
<td>8</td>
<td>List of Figures</td>
<td>Refer to Appendix E. It should list all the figures and their corresponding page numbers found the report.</td>
</tr>
<tr>
<td>9</td>
<td>List of Tables</td>
<td>Refer to Appendix E. It should list all the tables and their corresponding page numbers found the report.</td>
</tr>
<tr>
<td>10</td>
<td>List of Symbols</td>
<td>Refer to Appendix E. It should list all the symbols found in the report and their corresponding meaning.</td>
</tr>
<tr>
<td>11</td>
<td>List of Abbreviations</td>
<td>Refer to Appendix E. It should list all the abbreviations found in the report and their corresponding meaning.</td>
</tr>
<tr>
<td>12</td>
<td>Chapters</td>
<td>Each chapter should begin on a new page. Within a chapter, use as many sections and subsections as possible and where appropriate. The following is a general guideline on the arrangement of chapters and what to be included as part of each</td>
</tr>
<tr>
<td>Chapter</td>
<td>Content</td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Chapter 1</td>
<td>- Introduction&lt;br&gt;  - Problem statement.&lt;br&gt;  - Background and motivation.&lt;br&gt;  - Objectives.</td>
<td></td>
</tr>
<tr>
<td>Chapter 2</td>
<td>- Facts finding.&lt;br&gt;  - Literature research and review of previous work.&lt;br&gt;  - Data collection.</td>
<td></td>
</tr>
<tr>
<td>Chapter 3, 4 (or more)</td>
<td>- Methodology and tools&lt;br&gt;  - Requirement&lt;br&gt;  - Specification: Analysis, Design and Verification Plan&lt;br&gt;  - Implementation and Testing.</td>
<td></td>
</tr>
<tr>
<td>Chapter 5</td>
<td>- Project Review, Discussions and Conclusions: what has been achieved, relate to Objectives, problems encountered, personal insight into the total research experience&lt;br&gt;  - Future Work: indicate improvements / further developments that can be made.</td>
<td></td>
</tr>
</tbody>
</table>

13 Bibliography  Refer to Appendix E. It should list all the reference materials used for the project.

14 Appendices  The appendices are supplementary materials which because of their length would break up the main flow of the report. The following is a guideline on the arrangement of appendices and what may be included as part of the appendices.

Appendix A (or more)<br>  - Specifications, data sheets and drawings of equipment or components used.<br>  - Data used for analysis.<br>  - Survey sheets.<br>  - Charts and data tables.<br>  - Lengthy mathematical derivations.<br>  - etc

**Figure 4-F2:** Essential components for the final year project report and their arrangement.
4.3 **Poster Content and Arrangement Guidelines for Project I and Project II**

The essential components of the content of the poster report should include the items listed in Figure 4-F3.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Poster Presentation</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Size</td>
<td>A1,</td>
</tr>
<tr>
<td>2</td>
<td>Font</td>
<td>Your poster should be easily read from a distance of 4 ft. Use contrasting fonts for the title, text and figure legends.</td>
</tr>
</tbody>
</table>
| 3        | Required Elements   | - You may use photos, figures, and table  
- Determine a logical sequence for the material you will be presenting.  
- Organize that material into sections, e.g., Introduction, Methods, Results, Discussion, and Conclusions.  
- Arrange the material into columns. |
| 4        | File Type           | Softcopy, save the softcopy in any of the following image format: JPEG / TIFF / BMP / EPS. |

**Figure 4-F2:** Essential components for poster.
5 Project Report Format

5.1 Report Format for Project I

The report should be written using the third person and in the past tense. For example, do not use "I" or "you" in the report.

- Font
  - Times New Roman, 12 points, 1.5 line spacing.
  - Applies to ALL, including figure caption, table caption, chapter headings and subheadings.
  - Exceptions:
    - Header, Footer, Footnote, Words in Figure/Table, font size should be within 10 to 11 points.
    - Colour: black.
    - Citing references in text: number the cross-references 1, 2, 3, and so on, font size 12.

- Language
  - British English

- Printing
  - Single side.

- Paper
  - A4 size, 80g paper.

- Header
  - Align left: chapter number and title.

- Footer
  - Align right: page number.
  - The following is to be aligned left:
    - BIS (Hons) Information Systems Engineering
    - Faculty of Information and Communication Technology (Perak Campus), UTAR.

- Page Number
  - Align right at the Footer.
  - Title, Abstract, Table of Contents and Listing – pages are numbered using small Roman numeric (i, ii, iii, etc). Note even though the Title Page is numbered i, the number is not to be printed on the page.
  - Chapters and Bibliography – pages are numbered 1, 2, 3, etc.
  - Appendices – pages are numbered A-1, A-2, etc for Appendix A, B-1, B-2, etc for Appendix B and etc.
• Margins
  – Left (1.5 inches, except the front cover 1.2 inches)
  – Right (1 inch)
  - Header/Footer (0.5/0.4 inch)
  – Top/Bottom (2 inches)

• Title Page (refer to Appendix E)
  - Do not include UTAR logo.
  - The font used is Times New Roman 12.
  - Note the format (font type, size, capitalization and the sentences arrangement) of the Title Page in Appendix E must be strictly adhere to. Change the word “REPORT” to “PROPOSAL”.

• Table of Contents (refer to Appendix E)

• Tables/Figures (refer to Appendix E)
  – Should include table (figure) caption immediately below the table (figure).
  – Number the tables and figures sequentially, with respect to the chapter or section of a chapter. To be consistent, use either one format, not both.
  - For example, Table 2-2 is the second table of chapter 2.
  - For example, Table 4-2-6 is the sixth table of section 2 of chapter 4

• Citation
  – Use IEEE or American Psychological Association (APA) standard citation (please refer to Appendix I & J).

• Bibliography
  – Use IEEE or American Psychological Association (APA) standard citation (please refer to Appendix I & J).

• Binding
  – Must be comb-bound.
  – One (1) blank sheet of paper should be put before the first type page and another blank paper should be attached before the back cover.

• Softcopy
  – TWO (2) softcopy of reports should be submitted in CD/DVD which containing the following:
    • The FYP or dissertation/thesis is required to be saved in PDF format only and save in 1(one) PDF file, no separate files for different sections of FYP and dissertation/thesis are allowed. The file size must not be more than 100MB.
    • Attachments to the FYP or dissertation/thesis such as complete executable program programming, set-up/installation guide and source code of program source codes (or systems and data files, art works, etc) in various file formats must be compressed and zipped into ONE (1) zipped file. The file size of the zipped file must not be more than 200MB.
– The CD/DVD should be submitted in a CD/DVD casing with appropriate labeling. The CD/DVD should be attached at the back of the dissertation report.
– The “Session” should refer to the session of the FYP1
  e.g. FYP1 registered during session May 2011 – “Session: May 2011”

\[Labelling \text{ for } CD/DVD:\]

\begin{center}
\begin{tabular}{|c|}
\hline
Name: \\
ID: \\
Project Title: \\
Supervisor: \\
Degree Program: \\
Faculty: \\
Session: \\
\hline
\end{tabular}
\end{center}

5.2 Report Format for Project II

The report should be written using the third person and in the past tense. For example, do not use "I" or "you" in the report.

- Font
  - Times New Roman, 12 points, 1.5 line spacing.
  - Applies to ALL, including figure caption, table caption, chapter headings and subheadings.
  - Exceptions:
    - Header, Footer, Footnote, Words in Figure/Table, font size should be within 10 to 11 points.
    - Colour: black.
    - Citing references in text: number the cross-references 1, 2, 3, and so on, font size 12.

- Language
  - British English

- Printing
  - Single side.

- Paper
  - A4 size, 80g paper.

- Header
  - Align left: chapter number and title.
• Footer
  - Align right: page number.
  - The following is to be aligned left:
    BIS (Hons) Information Systems Engineering
    Faculty of Information and Communication Technology (Perak Campus), UTAR

• Page Number
  - Align right at the Footer.
  - Title, Declaration of Originality, Acknowledgements, Abstract, Table of Contents and Listing – pages are numbered using small Roman numeric (i, ii, iii, etc). Note even though the Title Page is numbered i, the number is not to be printed on the page.
  - Chapters and Bibliography – pages are numbered 1, 2, 3, etc.
  - Appendices – pages are numbered A-1, A-2, etc for Appendix A, B-1, B-2, etc for Appendix B and etc.

• Margins
  - Left (1.5 inches) except the Front Cover (1.2 inches)
  - Right (1 inch)
  - Header/Footer (0.5/0.4 inch)
  - Top/Bottom (2 inches)

• Front Cover (refer to Appendix D)
  - Content same as the Title Page.
  - Do not include UTAR logo.
  - The font used is Times New Roman 12.
  - Note the format (font type, size, capitalization and the sentences arrangement) must be strictly adhere to. No changes are allowed.

• Table of Contents (refer to Appendix E)
• Tables/Figures (refer to Appendix E)
  - Should include table (figure) caption immediately below the table (figure).
  - Number the tables and figures sequentially, with respect to the chapter or section of a chapter. To be consistent, use either one format, not both.
  - For example, Table 2-2 is the second table of chapter 2.
  - For example, Table 4-2-6 is the sixth table of section 2 of chapter 4

• Citation
  – Use IEEE or American Psychological Association (APA) standard citation (please refer to Appendix I & J).

• Bibliography
  – Use IEEE or American Psychological Association (APA) standard citation (please refer to Appendix I & J).
• **Binding**
  – The title page should be put immediately after the front cover followed by the blank sheet. Another blank sheet should be attached before the back cover.

• **Softcopy**
  – **TWO (2) softcopy** of reports should be submitted in CD/DVD which containing the following:
    • The FYP or dissertation/thesis is required to be saved in PDF format only and save in 1(one) PDF file, no separate files for different sections of FYP and dissertation/thesis are allowed. The file size must not be more than **100MB**.
    • Attachments to the FYP or dissertation/thesis such as complete executable program programming, set-up/installation guide and source code of program source codes (or systems and data files, art works, etc) in various file formats must be compressed and zipped into **ONE (1) zipped file**. The file size of the zipped file must not be more than **200MB**.
    • **The file naming format should be Course Code + Year of Submission + Student ID+ Copy No** (eg. **BA-2010-1007640-1**)
      – The CD/DVD should be submitted in a CD/DVD casing/pocket with appropriate labeling. The CD/DVD should be attached at the back of the dissertation report.
      – The “Session” should refer to the session of the FYP2
        e.g. FYP2 registered during session January 2012 – “Session: January 2012”

**Labelling for CD/DVD:**

- Name:
- ID:
- Project Title:
- Supervisor:
- Degree Program:
- Faculty:
- Session:

5.3 Other Points to Note on Writing Report

1. A thesis should be written according to the intended group of reader. It should be in a logic form with strong explanation to convince the reader on the conclusion of the thesis. It should be written in good language and easy to understand. Any technical language or daily language should be avoided. As far as possible all statements must be supported by numbers and data.

2. The writer should be able to defend all statements by referring to a reliable research or the research findings.
3. Symbols or nomenclature used should be defined. Standard symbols or acronym normally accepted in engineering field can be used. International System Unit (S.I) should be used. If you use other units, SI equivalent unit should be in bracket.

4. Equations and formulae should be typed and in Italic. Avoid using more the necessary lines by giving alternatives, for example:

\[(y/x) = ax + b\] preferred compared to:

\[y/x = ax + b\]

5. Diagram can include graphs and figures. It can be numbered together or separately with photograph. Diagrams should be easy to understand. Every diagram should be numbered using the Arabic number at the bottom (if possible different for each chapter) and should be given an informative title.

6. Pictures should be pasted on the page, numbered and titled.
   i. Every diagram should have relevant title and should be numbered.
   ii. Coordinate units (abscissa) should be written clearly in the graph.
   iii. All the data points and lines should be clear - generally it should not be more than 2 or 3 curves in every diagram
   iv. Types of different data points must be shown in a legend.
   v. Every diagram should be referred and elaborated in the text.
   vi. The gridlines should be in appropriate intervals.
6 Viva: Oral Presentation and Product Demonstration
This exercise is intended to assess the students’ ability to deliver a technical presentation as a result of their project investigation. The Oral Presentation is attended and assessed by the Supervisor and Moderator.

The presentation should describe the aim of the project, an outline of the presentation, the results obtained and the extent to which the goals of the project are met. The time allocated for the presentation session is 15 to 20 minutes and an additional 10 minutes for the ‘Question and Answer’ session.

The product demonstration session can be arranged to be the subsequent session to the oral presentation session for effective assessment. Otherwise, the demonstration may be arranged separately. The time allocated for the demonstration session is not more than 30 minutes.
7 FYP Guidelines for Supervisor and Moderators

Guidelines for Supervisor

The Project Student conducts their work under the direction of the Project Supervisor. The Supervisor can be a qualified internal academic faculty staff or someone qualified external to the faculty. In the case of external supervisor, an internal supervisor will be attached to the project to act as the moderator.

The Supervisor’s role is to stimulate discussion and indicate the various avenues of approach and resources available. Although the Supervisor may serve as a guide and mentor for the project, it is emphasized that the ultimate responsibility for the project lies with the students.

Purchase of special components or equipment requires prior consent from the Supervisor, who acts as the ‘budget controller’ due to the limited funds available.

The Supervisor will evaluate the biweekly report, the project proposal, the full report, the oral presentation and product demonstration.

If the student could not manage to meet the supervisor in 4 consecutive weeks, the lecturer will have to contact the student to find out the current status of the student, and report the situation to the Final Year Project committee.

Guidelines for Moderators

Moderator is member of staff whose function is to ensure a uniform standard of assessment is applied to each project.

Moderation will take place at two stages:
- An assigned Moderator will evaluate the oral presentation and product demonstration. Refer to Appendix D to obtain the Moderation Form.
- Overall moderation is carried out during the Final Year Project Committee meeting.

Note
Supervisors are strongly encouraged to attend the Final Year Project Committee meeting for the purpose of moderation to provide input on behalf of their project students and other students so that a fair moderation can be achieved across the board.
Appendices
Appendix A: Final Year Project Posting Form
FINAL YEAR PROJECT POSTING FORM

Supervisor Name:
Room:
Department:
Faculty:

Area of Interest

Related work

Additional Information
Project Title:
Description:
Skills:
Appendix B:  Final Year Project Registration Form
FINAL YEAR PROJECT REGISTRATION FORM
(Project I / Project II)

I hereby affirm that the originality and authenticity of the Final Year Project to be undertaken will be upheld. The report and/or the system that I submit at the conclusion of the Final Year Project will be the result of my own investigations and effort.

I understand that cheating and plagiarism constitute a serious violation of the university regulations, which will not only result in a failing grade for the Final Year Project but subject me to further disciplinary actions.

Signature of Student:

_________________

Name:
Date:

Student Name :
Student ID :
Contact No :
Email Address:
Course :
Year of Study :

Area of Study :
Proposed Project Title :

Signature of Supervisor:

_________________

Name:
Date
Appendix C: Final Year Project Biweekly Report
## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

## 2. WORK TO BE DONE
3. PROBLEMS ENCOUNTERED

4. SELF EVALUATION OF THE PROGRESS

__________________________
Supervisor’s signature

__________________________
Student’s signature
Appendix D: Report Front Cover
ONLINE B2B AND B2C PURCHASING
BY
ANTHONY CHAN MING WAI
(REFER NEXT PAGE FOR MARGIN)

A REPORT
SUBMITTED TO
Universiti Tunku Abdul Rahman
in partial fulfillment of the requirements
for the degree of
BACHELOR OF COMPUTER SCIENCE (HONS)
Faculty of Information and Communication Technology
(Perak Campus)

MAY 2010
Appendix E: Sample of Report Arrangement
REPORT STATUS DECLARATION FORM

Title: ______________________________________________________

__________________________________________________________

Academic Session: _____________

I __________________________________________________________

(CAPITAL LETTER)

I declare that I allow this Final Year Project Report to be kept in
Universiti Tunku Abdul Rahman Library subject to the regulations as follows:
1. The dissertation is a property of the Library.
2. The Library is allowed to make copies of this dissertation for academic purposes.

Verified by,

____________________________________________

(Author’s signature) (Supervisor’s signature)

Address:

____________________________________________

____________________________________________

____________________________________________

Supervisor’s name

Date: ____________________

Date: ____________________
ONLINE B2B AND B2C PURCHASING

By

Anthony Chan Ming Wai

A REPORT
SUBMITTED TO
Universiti Tunku Abdul Rahman
in partial fulfillment of the requirements
for the degree of
BACHELOR OF INFORMATION TECHNOLOGY (HONS)
COMPUTER ENGINEERING
Faculty of Information and Communication Technology
(Perak Campus)

MAY 2010
DECLARATION OF ORIGINALITY

I declare that this report entitled “METHODOLOGY, CONCEPT AND DESIGN OF A 2-MICRON CMOS DIGITAL BASED TEACHING CHIP USING FULL-CUSTOM DESIGN STYLE” is my own work except as cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.

Signature : _______________________

Name : _______________________

Date : _______________________

44
ACKNOWLEDGEMENTS

I would like to express my sincere thanks and appreciation to my supervisors, Dr. B.M. Armstrong and Dr. G.A. Armstrong who has given me this bright opportunity to engage in an IC design project. It is my first step to establish a career in IC design field. A million thanks to you.

To a very special person in my life, Stephanie Yuen, for her patience, unconditional support and love, and for standing by my side during hard times. Finally, I must say thanks to my parents and my family for their love, support and continuous encouragement throughout the course.

When I asked for strength, God gave me more burdens to carry.
When I asked for love, God sent me people with problems.
When I asked for wisdom, God gave me more problems to solve.
I see that I did not get the things I asked for but I have been given all the things that I needed. Thank God.
This project is an IC design project for academic purpose. It will provide students with the methodology, concept and design of digital integrated circuit. This will be illustrated through the construction of a Teaching Chip. Since CMOS technology is well suited for digital circuits, it is therefore implemented in the project. From the design point of view, emphasis is laid on the IC design flow. A flow exists due to the fact that IC design business involves integrating four diverse major areas namely device operation, circuit analysis and design, circuit simulation and lastly, physical layout and re-simulation. Emphasis is also made on the importance of an EDA tool; how it is incorporated into the design flow and aids IC design jobs. The tool used in this project is the Tanner Tools. There are several styles to design integrated circuit and the one used here is the full-custom design style. In the area of device operation and circuit analysis/design, the circuit design job involves hand calculation for DC and transient design. These include designing the logic threshold voltage and propagation delay time of the circuit according to specification. Three common methods, Average-Current, Differential Equation and Digital Model are reviewed for their suitability in delay time hand calculation. Since hand calculation only presents an approximated circuit design, computer simulation is compulsory to verify the design. In the area of circuit simulation, SPICE MOSFET Level 2 model is used due to its suitability for teaching. Thus, at minimum, 2.0 micron CMOS is chosen. Beyond 2.0 micron, more complicated SPICE MOSFET model is required for simulation and is therefore avoided. Suitable CMOS processes are reviewed and consequently, MOSIS/Orbit 2.0 micron process is chosen. In the areas of physical layout and re-simulation, the designed circuit was laid out, design rule check was performed on the layout followed by layout extraction to obtain the equivalent SPICE netlist for re-simulation. The re-simulation includes the effect of parasitic capacitance and resistance, which are not included in the earlier circuit design. Re-simulation is necessary since parasitic affects the transient characteristics. Lastly, suitable digital circuits for teaching will be designed and packed onto the Teaching Chip. Examples include inverter, ring oscillator, NAND, NOR, static CMOS, etc.
The output material of the project would be SPICE programs, DC and transient simulation results, cell level, block level and chip level layouts.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>TITLE</th>
<th>i</th>
</tr>
</thead>
<tbody>
<tr>
<td>DECLARATION OF ORIGINALITY</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>iv</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>x</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xi</td>
</tr>
<tr>
<td>LIST OF SYMBOLS</td>
<td>xii</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>xiii</td>
</tr>
</tbody>
</table>

## CHAPTER 1 INTRODUCTION

1-1 Problem Statement and Motivation            1
1-2 Objectives                                  1
1-3 Project Scope and Direction                 2
1-4 Dissertation Summary                        2

## CHAPTER 2 LITERATURE REVIEW: IC DESIGN

### ENVIRONMENT

2-1 IC Design Flow                              7
2-2 Microprocessor Design Flow                  10
2-3 Memory IC Design Flow                       12
2-4 Digital CMOS IC Design Flow                 14
2-5 CAD Tools as Part of Flow                   16

## CHAPTER 3 LITERATURE REVIEW: LAYOUT DESIGN

3-1 Layout Design Types                         17
3-1-1 Cell Level Layout                         17
3-1-2 Block Level Layout                        17
3-1-2 Chip Level Layout                         18
3-2 Layout Design Flow - A General Rule         19
3-3 A Closer Look at the Layout Design Flow     20
CHAPTER 4 CMOS INVERTER

4-1 The CMOS Inverter

4-2 CMOS Inverter Design

4-3 CMOS Inverter DC Characteristics and Design

4-3-1 Device Transconductance Ratio ($\beta_n/\beta_p$) Calculation

4-3-2 Noise Margins $V_{NML}$ and $V_{NMH}$ Calculation

4-3-3 Transistor Sizing Calculation for DC Design

4-4 CMOS Inverter Transient Characteristics and Design

4-4-1 Output Parasitic Capacitance $C_{out}$ Calculation

4-4-2 Delay Time $t_P$ Calculation using Average-Current Method

4-4-3 Delay Time $t_P$ Calculation using Differential Equation Method

4-4-4 Delay Time $t_P$ Calculation using Digital MOSFET Model

4-5 Layout and Re-simulation with Parasitic

4-6 Construction of CMOS Inverter Design Flow

4-7 Use of Step-Input Waveform

4-8 Ring Oscillator

CHAPTER 5 CHIP LEVEL LAYOUT

5-1 General

5-2 Power Supply

5-2-1 Factors to be Considered for Power Lines
Layout
5-2-2 Power Estimation 88
5-2-3 Power Supply Routing 88
5-3 Pad Cells 90
5-3-1 Power Supply Pad Cells (V_{dd} and Gnd) 96
5-3-2 Generalized I/O Pad Cell 96
5-4 Chip Level Initial Floorplan 97

CHAPTER 6 STATIC CMOS: CLASSICAL CMOS CIRCUIT DESIGN
6-1 Static CMOS 101
6-2 CMOS NAND Gate 103
  6-2-1 NAND3 DC Characteristics and Design 103
  6-2-2 NAND3 Transient Characteristics and Design 113
  6-2-3 NAND3 Layout and Re-simulation 116
6-3 CMOS NOR Gate 123
  6-3-1 NOR3 DC Design 123
  6-3-2 NOR3 Transient Design 129
  6-3-3 NOR3 Layout and Re-simulation 132
6-4 Comparison Between NAND3 and NOR3 143

CHAPTER 7 CONCLUSION AND DISCUSSION 148
7-1 What has been Achieved? 148
7-2 What has not been Achieved? 151
7-3 Future Direction 152

REFERENCE 153
APPENDIX A  THE TANNER TOOLS SYSTEM  A-1
A-1  Simulation Tools  A-1
A-2  Front End and Netlist Tools  A-1
A-3  Mask-Level Tools  A-2

APPENDIX B  MOSIS/ORBIT 2.0 MICRON PROCESS  B-1
B-1  General  B-1
B-2  Process Specifications  B-2
B-3  Modeling of MOSFET using SPICE  B-3
B-3-1  Basic MOSFET Model  B-4

APPENDIX C  TECHNOLOGY SPECIFICATION  C-1
C-1  SCNA Technology  C-1
C-2  Process Design Rules  C-3

APPENDIX D  TRANSISTOR LAYOUT DESIGN  D-1
D-1  Factors to be Consider for Transistor Layout  D-1

APPENDIX E  INTERCONNECTS LAYOUT DESIGN  E-1
E-1  Interconnect Layout Design  E-1
E-1  Factors to be Consider for Routed Signals  E-1
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure Number</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2-1-F1</td>
<td>IC design flow.</td>
<td>8</td>
</tr>
<tr>
<td>Figure 2-2-F1</td>
<td>Full-custom flow for a microprocessor.</td>
<td>10</td>
</tr>
<tr>
<td>Figure 2-3-F1</td>
<td>Memory IC design flow.</td>
<td>13</td>
</tr>
<tr>
<td>Figure 2-3-F2</td>
<td>Full-custom design flow.</td>
<td>14</td>
</tr>
<tr>
<td>Figure 3-2-F1</td>
<td>Layout design procedure.</td>
<td>19</td>
</tr>
<tr>
<td>Figure 3-3-F1</td>
<td>Layout floor planning procedure.</td>
<td>20</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table Number</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 4-1-T1</td>
<td>CMOS 2-Input NAND Timing Comparison.</td>
<td>71</td>
</tr>
<tr>
<td>Table 4-2-T1</td>
<td>CMOS 3-Input NAND Timing Comparison.</td>
<td>73</td>
</tr>
<tr>
<td>Table 4-3-T1</td>
<td>CMOS 3-Input NOR Timing Comparison.</td>
<td>75</td>
</tr>
</tbody>
</table>
## LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMOS</td>
<td>Complementary Metal Oxide Semiconductor</td>
</tr>
<tr>
<td>MOSFET</td>
<td>Metal Oxide Semiconductor Field Effect Transistor</td>
</tr>
<tr>
<td>IC</td>
<td>Integrated Circuit</td>
</tr>
<tr>
<td>DRC</td>
<td>Design Rule Checker</td>
</tr>
<tr>
<td>SCNA</td>
<td>Scalable CMOS N-Well Analog</td>
</tr>
<tr>
<td>ASIC</td>
<td>Application Specific Integrated Circuit</td>
</tr>
<tr>
<td>HDL</td>
<td>Hardware Description Language</td>
</tr>
</tbody>
</table>
Appendix F: IEEE Reference
Contents

- Citation Within The Text
  - Personal Communications

- Creating a reference list or bibliography
  - Print Documents
    - Books
    - Parts of Books
    - Journal Articles
  - Electronic Documents
    - E-Books
    - E-Journals
    - Internet Documents
  - Non-Book Formats
    - Podcasts
    - Other Formats
  - A reference list: what should it look like?
  - Abbreviations
  - Other sources of information

These guidelines follow the principles given in the Information for Authors: IEEE Transactions, Journals and Letters published by the Institute of Electrical and Electronics Engineers (IEEE) in 2003 and the Reference Guide: IEEE Style, University of Illinois at Urbana Champaign, College of Engineering, 1998. An additional source of information on the citation of electronic resources was Numeric Referencing, University of Wales, Swansea, 2004.

IEEE Style uses a notational method of referencing when referring to a source of information within the text of a document. In its simplest form, a citation is given consisting of a number enclosed by square brackets. The full details of the source are given in a numerical reference list at the end of the document.
Citation Within The Text

Indicating the relevant reference in the text
A number enclosed in square brackets, eg. [1] or [26], placed in the text of the essay, indicates the relevant reference. Citations are numbered in the order in which they appear in the text and each citation corresponds to a numbered reference containing publication information about the source cited in the reference list at the end of the publication, essay or assignment. Once a source has been cited, the same number is used in all subsequent references. No distinction is made between print and electronic references when citing within the text.

Each reference number should be enclosed in square brackets on the same line as the text, before any punctuation, with a space before the bracket.

Here are some examples of this kind of referencing:
"...end of the line for my research [13]."
"The theory was first put forward in 1987 [1]."
"Scholtz [2] has argued that......"
"Several recent studies [3, 4, 15, 16] have suggested that..."
"For example, see [7]."

It is not necessary to mention either the author(s) or the the date of the reference unless it is relevant to your text.
It is not necessary to say "in reference [26] ..." "In [26] ..." is sufficient.

Citing more than one reference at a time
When citing more than one source at a time, the preferred method is to list each reference number separately with a comma or dash between each reference:

Preferred
[1], [3], [5]

Although the following method is also acceptable:
Acceptable
[1, 3, 5]
[1-5]

Personal Communications
Personal communications include conversations, letters, interviews, e-mails and telephone conversations.
IEEE style states that you cite only published works, forthcoming published works, and unpublished materials available to scholars in a library, a depository, or an archive. For interviews or other "non-recoverable" information, no citation number is necessary. This does not mean that an attempt to identify the author is unnecessary, but that it needs to be done in the text itself.

"In a personal interview with Bill Gates, he suggested that he would soon rule the world."
"In a letter to the author, Professor Mueller detailed his experiences with using this data collection software."
Creating a reference list or bibliography

A numbered list of references must be provided at the end of the paper. The list should be arranged in the order of citation in the text of the assignment or essay, not in alphabetical order. List only one reference per reference number. Footnotes or other information that are not part of the referencing format should not be included in the reference list.

The following examples demonstrate the format for a variety of types of references. Included are some examples of citing electronic documents. Such items come in many forms, so only some examples have been listed here.

Print Documents

Books

Note: Every (important) word in the title of a book or conference must be capitalised. Only the first word of a subtitle should be capitalised. Capitalise the "v" in Volume for a book title. Punctuation goes inside the quotation marks.

Standard format

[#] A. A. Author/editor, Title: Subtitle (in italics), Edition (if not the first), Vol. (if a multivolume work). Place of publication: Publisher, Year, page number(s) (if appropriate).

Single author


Edited work


Later edition


More than one author


Three or more authors

Note: The names of all authors should be given in the references unless the number of authors is greater than six. If there are more than six authors, you may use et al. after the name of the first author.

**Series**


**Corporate author (ie: a company or organisation)**


**Conference (complete conference proceedings)**


**Government publication**


**Manual**


**Catalogue**


**Application notes**


**Note:** Titles of unpublished works are not italicised or capitalised. Capitalise only the first word of a paper or thesis.

**Technical report**


**Patent / Standard**


**Papers presented at conferences (unpublished)**

Thesis or dissertation


Parts of a Book

Note: These examples are for chapters or parts of edited works in which the chapters or parts have individual title and author/s, but are included in collections or textbooks edited by others. If the editors of a work are also the authors of all of the included chapters then it should be cited as a whole book using the examples given above (Books). Capitalise only the first word of a paper or book chapter.


Single chapter from an edited work


Conference or seminar paper (one paper from a published conference proceedings)


Article in an encyclopaedia, signed


Study Guides and Unit Readers

Note: You should not cite from Unit Readers, Study Guides, or lecture notes, but where possible you should go to the original source of the information. If you do need to cite articles from the Unit Reader, treat the Reader articles as if they were book or journal articles. In the reference list or bibliography use the bibliographical details as quoted in the Reader and refer to the page numbers from the Reader, not the original page numbers (unless you have independently consulted the original).

### Journal Articles

**Note:** Capitalise only the first word of an article title, except for proper nouns or acronyms. Every (important) word in the title of a journal must be capitalised. Do not capitalise the "v" in volume for a journal article.

You must either spell out the entire name of each journal that you reference or use accepted abbreviations. You must consistently do one or the other. Staff at the Reference Desk can suggest sources of accepted journal abbreviations.

You may spell out words such as volume or December, but you must either spell out all such occurrences or abbreviate all. You do not need to abbreviate March, April, May, June or July.

To indicate a page range use pp. 111-222. If you refer to only one page, use only p. 111.

**Standard format**

[#] A. A. Author of article. "Title of article," *Title of Journal*, vol. #, no. #, pp. page number/s, Month year.

### Journal articles


**OR**


### Electronic documents

**Note:** When you cite an electronic source try to describe it in the same way you would describe a similar printed publication. If possible, give sufficient information for your readers to retrieve the source themselves.

If only the first page number is given, a plus sign indicates following pages, eg. 26+. If page numbers are not given, use paragraph or other section numbers if you need to be
specific.
An electronic source may not always contain clear author or publisher details. The access information will usually be just the URL of the source. As well as a publication/revision date (if there is one), the date of access is included since an electronic source may change between the time you cite it and the time it is accessed by a reader.

E-Books
Standard format

[#] A. Author. Title of E-book. Place: Publisher, Date of original publication.


Article in online encyclopaedia


E-Journals
Standard format

[#] A. Author, "Title of Article," Title of Journal, vol., no., p. page numbers, month year. [Format]. Available: Database Name (if appropriate), internet address. [Accessed date of access].

Journal article abstract accessed from online database


Note: Abstract citations are only included in a reference list if the abstract is substantial or if the full-text of the article could not be accessed.

Journal article from online full-text database

Note: When including the internet address of articles retrieved from searches in full-text databases, please use the Recommended URLs for Full-text Databases, which are the URLs for the main entrance to the service and are easier to reproduce.


May 23, 2005].

Journal article in a scholarly journal (published free of charge on the internet)

2004].

Journal article in electronic journal subscription


Newspaper article from online database


Newspaper article from the Internet

[7] C. Wilson-Clark, "Computers ranked as key literacy," The West Australian, para. 3, 
18, 2004].

Internet Documents

Standard format

[#] A. Author, "Document title," Webpage name, Source/production information, 
Date of internet publication. [Format]. Available: internet address. 
[Accessed: Date of access].

Professional Internet site

(DVB): Implementation guidelines for DVB terrestrial services; transmission 
aspects,” European Telecommunications Standards Institute, ETSI TR-101-190, 

Personal Internet site

12, 2004].
General Internet site


Internet document, no author given


Non-Book Formats

[4] A. A. Person, Responsibility (if appropriate), Title: Subtitle. [Format]. Special credits (if appropriate). Place of publication: Publisher, Year.

Podcasts


Other Formats

Microform


Computer game


Software


Video recording


A reference list: what should it look like?

The reference list should appear at the end of your paper. Begin the list on a new page. The title References should be either left justified or centered on the page. The entries
should appear as one numerical sequence in the order that the material is cited in the text of your assignment.

**Note:** The hanging indent for each reference makes the numerical sequence more obvious.


Abbreviations

Standard abbreviations may be used in your citations. A list of appropriate abbreviations can be found below:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ed./Eds.</td>
<td>editor/editors</td>
</tr>
<tr>
<td>ed.</td>
<td>edition</td>
</tr>
<tr>
<td>et al.</td>
<td>and others</td>
</tr>
<tr>
<td>no.</td>
<td>number</td>
</tr>
<tr>
<td>p./pp.</td>
<td>page/pages</td>
</tr>
<tr>
<td>para.</td>
<td>paragraph</td>
</tr>
<tr>
<td>pt.</td>
<td>part</td>
</tr>
<tr>
<td>rev.</td>
<td>revised</td>
</tr>
<tr>
<td>suppl.</td>
<td>supplement</td>
</tr>
<tr>
<td>Vol.</td>
<td>Volume (book)</td>
</tr>
<tr>
<td>vol.</td>
<td>volume (journal)</td>
</tr>
</tbody>
</table>

Other sources of information

Note: This list of examples is in no way exhaustive. Only the most often-used types of references are listed here. Refer to the following publications for more information on citing references:


Appendix G: APA Reference
How To Cite References - APA Style

When using EndNote bibliographic software, please use the following output style - APA 5th.

Contents

- Citation Within The Text
  - Print Documents
    - Quoting
    - Paraphrasing and Summarising
    - More Examples
  - Electronic Documents
  - Personal Communications

- Creating a bibliography or works cited list
  - Print Documents
    - Books
    - Parts of a Book
    - Journal Articles
  - Electronic Documents
    - E-Books
    - E-Journals
    - Internet Documents
  - Non-Book Formats
    - Podcasts
    - Other Formats
  - A Reference List: what should it look like?
  - Abbreviations
  - Other sources of information

Citation Within The Text

These guidelines follow the principles and examples given in the 5th edition of the Publication manual of the American Psychological Association (2001) and the recent companion publication, APAStyle.org (n.d.).
APA style uses the author-date method when referring to a source of information within the text of a document. In its simplest form, a short citation is given consisting of the name of the author (or authors) and the date of publication. The full details of the source are given in a reference list at the end of the document.

The short, references within the text are given wholly or partly in round brackets. Generally, use only the surname of the author followed by a comma and the year of publication. Include page, chapter or section numbers if you need to be specific. **No distinction is made between books, journal articles, web documents or other formats** except for electronic documents that do not provide page numbers. In this instance, use the paragraph number if available with the abbreviation para.

For example, a reference to a book appearing in the text as (Kline, 2000, pp. 26-27) would be found in the reference list in the following form:


A reference to a journal article appearing as (Foo & Kelso, 2001, p. 222) would be referenced:


A reference to an electronic document would be cited in the text in the same way as a print document. In this example, the web document by (Munro, 1999, para. 12) would be cited in the reference list as:


The reference should be placed at the end of the sentence wherever possible. Alternatively, the author's name may be included in the text, and just the date and additional information placed within the brackets.

---

**Citation within the text - Print Documents**

There are four common methods of referring to a source document in the text of an essay, thesis or assignment. These methods are:

**Quoting**

Quotations must be identical to the original, using a small section of the source. They must match the source document word for word and must be attributed to the original author. When directly quoting from another source, ensure that the relevant page number(s) are given.

If less than 40 words, quotations should be incorporated into the text of your essay or assignment and enclosed within quotation marks.

She stated, "The 'placebo effect' ... disappeared when behaviors were studied in this manner" (Miele, 1993, p. 276), but she did not clarify which behaviors were studied.

OR

Miele (1993) found that "the placebo effect', which had been verified in previous studies, disappeared when behaviors were studied in this manner" (p. 276).
If 40 or more words, then the quotation should be indented as a block of text and the quotation marks omitted.

Miele (1993) found the following:
The "placebo effect", which had been verified in previous studies, disappeared when behaviors were studied in this manner. Furthermore, the behaviours were never exhibited again, even when reel[sic] drugs were administered. Earlier studies (eg. Abdullah, 1984; Fox, 1979) were clearly premature in attributing the results to a placebo effect. (p. 276)

**Paraphrasing and Summarising**
Both paraphrasing and summarising involve putting information from source material into your own words. Page numbers should be included in the citation of paraphrased or summarised material, in order to assist in locating the relevant passages within the source material.

When paraphrasing, do not add your own opinion and do not use the original wording. The purpose of paraphrasing is that it flows better with your own writing. Paraphrased material is often shorter than the original passage, taking a larger section of the source and condensing it slightly. When paraphrasing, you must attribute the original source. You are encouraged to include page or paragraph numbers which relate to the portion of the text that you have used, enabling an interested reader to locate the relevant passage in your source material, especially in a long or complex text.

Summarising also involves putting the main idea(s) into your own words, including only the main point(s). Once again, it is necessary to attribute summarised ideas to the original source. Summaries are significantly shorter than the original and take a broad overview of the source material. You are encouraged to include page or chapter numbers when summarising.

The following is an example, from the *Publication Manual of the American Psychological Association*, of how to appropriately paraphrase and summarise to avoid plagiarism:

As stated in the fifth edition of the *Publication Manual of the American Psychological Association*, the ethical principles of scientific publication are designed to ensure the integrity of scientific knowledge and to protect the intellectual property rights of others. As the *Publication Manual* explains, authors are expected to correct the record if they discover errors in their publications; they are also expected to give credit to others for their prior work when it is quoted or paraphrased. (p. 349).

**Citing the whole of a document**
Sometimes it may be necessary to give a general reference to the whole of a source document. This method of referencing is used least often.

Sternberg (2006) explores the basics of cognitive psychology through its coverage of cognitive neuroscience, attention and consciousness, perception, memory, knowledge representation, language, problem solving and creativity, decision making and reasoning, cognitive development, and intelligence.

---

**Citation within the text - Print Documents - Some more examples**

**Two authors**
(Lawson & Green, 1997, pp. 34-35) ...OR
Lawson and Green (1997, pp. 34-35) were unable ...

When the authors names are incorporated into the text the "&" is replaced with "and". Always cite both names every time the reference occurs in the text.
Three or more authors
The first in text citation of a work with three or more authors gives the surnames of all the authors:
Wasserstein, Zappulla, Rosen, Gerstman and Rock (2004, p. 301) have found ...

In subsequent citations in the text, only the surname of the first listed author is used, followed by the expression "et al." which means "and others":
Wasserstein et al. (2004, p. 301) have found

If there are more than six authors, only the surname of the first author is used, followed by et al.
Littlewood et al. (1997) have found ... OR
(Littlewood et al., 1997) stated that ...

Please note that in the Reference List or Bibliography, the first six authors' names and initials are given, then after the sixth author's name and initial et al. is used to indicate that there are additional authors.

Volume numbers included

Authors with the same surname
The theory was propounded in 1970 (Larsen A.E., 2001) ... OR
M.K. Larsen (2003) is among those ...

Make a distinction between them by including the author's initials. If the author's surname is incorporated in the text place the initials before the surname; if it is a citation within brackets the initials follow the surname.

Multiple works by the same author in the same year
Bursch (2005a) described how the yak made transport possible in the high mountains of Inner Asia, as did the llama in the Andes of South America (Bursch, 2005b).

A distinction is made by adding lower case letters, a, b, c, etc. to the date. These letters are included in the full reference in the Reference List to distinguish between the two documents.

Corporate author
(CSIRO, 1999) ... OR
As predicted by the Centre of Independent Studies (1997) ...

These are works without a personal author. Corporate authors may be associations, agencies like government departments, corporations or organisations. Names of organisations should be given in full the first time they are cited within the text. In subsequent citations, these names may be abbreviated in the text if the abbreviation is meaningful or well known.

More than one work cited
(Larsen, 1991; Haddon, 1999) ... OR
Larsen (1991) and Haddon (1999) demonstrated that ... OR

No author
This was apparently not the case in seventeenth-century England (On Travelling to London, 1683) ... OR
On Travelling to London (1683) reveals that this was not true.
When a work has no author or the author is anonymous, cite in the text the first few words of the reference list entry (usually the title) and the year. Use italics for the title.

No date of publication
Carruthers (n.d.) has suggested ... OR
(Carruthers, n.d.)

Newspapers
(Canberra Times, 24 Jan. 1997, p. B6) ... OR
The Weekend Australian (24-25 Jan. 1997, p. 19) reported ...

If the author of the article is named, cite in the normal way with the author and date. If there is no author given cite the newspaper title in italics. Include the specific date as well as year and page or section numbers if appropriate.

Citation within the text - Electronic documents
Documents published in electronic formats are cited in the same way as print documents. If the electronic document has an author and date of publication, cite these in the text. The full description of the document (including its electronic source data) will be given in the reference list or bibliography at the end of your essay or assignment.

If page numbers are not given use paragraph or other section numbers if you need to be specific.

If there is no author or date follow the guidelines above for print resources.

In the unlikely case that the document has no author, date or obvious title then the Internet address may be cited in the text.

Whole Internet site
Kidspsych (http://www.kidspsych.org) is a wonderful interactive Internet site for children.

To direct readers to an entire internet site (but not a specific document on the site), it is sufficient to give the address of the site in the text. Make sure the internet address you provide is current and links to the site. Remember that internet addresses may change.

No page numbers
(Derrida, 1994, section 2, para. 7)

Use a paragraph number if no page numbers are present.

No author, date or title
It has been stated that the problem cannot be solved (http://www.xyz.com).

Please keep in mind that citing information from an Internet page with so few credentials may not be suitable in an academic publication.

Citation within the text - Personal communications
Personal communications include letters, memos, personal interviews, telephone conversations, emails, messages from discussion lists and electronic bulletin boards. Citations for this type of material are not included in the reference list because they do not contain recoverable data. Cite personal communications in the text only. Adding "personal communication" to the citation within the text is a useful indicator of the kind of information under discussion.
Give the initials as well as the surname of the communicator and provide as exact a date as possible.

M. Day (personal communication, July 30, 2000) finds the film meets several criteria ... OR Professor Lutes in an email to the author gave details of his clinical experience with this treatment (T. K. Lutes, personal communication, April 18, 2001).

Creating a bibliography or works cited list

All documents cited in your assignment are listed in a single alphabetical list at the end of the assignment. The list is arranged by the author's surname, or title if no author is given. Only the author's initials are included regardless of the presentation of the author's name in the source document. The given name may be cited in full if it is needed to correctly identify the author, for example, where different authors have the same surname and initials.

Capitalisation practice also should be consistent. Titles and subtitles of journal articles, book parts and book titles are given minimal capitalisation. Only the first letter of the first word of the title (and subtitle, if given) and those words that normally have an initial capital are capitalised. Journal titles are given maximal capitalisation. All words other than prepositions, conjunctions, and definite and indefinite articles (a, an, the) are capitalised. Journal and book titles are italicised or if handwritten underlined.

Print Documents

Books

Standard format for citation

| Author, A. A., & Author, B. B. (Eds.). (Year). Title of work: Subtitle (edition.). (Volume(s)). Place of publication: Publisher. |

Single author

Two authors

Three or more authors

Edited work

Later edition

No author
No date of publication

Two or more books by the same author published in the same year

Multivolume work

Translation

Thesis or dissertation

Conference (complete conference proceedings with editors)

Organisation

Government publication

Government departments


Please Note: Documents authored by government departments are cited following the jurisdiction they report to. Precede the department name with Australia., Western Australia., etc.

Parts of a book
These examples are for chapters or parts of edited works in which the chapters or parts have individual title and author/s, but are included in collections or textbooks edited by others. If the editors of a work are also the authors of all of the included chapters then it should be cited as a whole book using the examples given above (Books). Only the first letter of the first word of the title of the chapter or part is capitalised.
Standard format for citation

Article/Chapter in a book

Article in an encyclopaedia, no author

Conference or seminar paper

Study Guides and Unit Readers
Note: If an article is reproduced in a Unit reader with full original pagination and bibliographic details, you may cite it as you would the original material. However, you should not cite from Unit Readers, Study Guides, or lecture notes if the original material is not reproduced in full with full bibliographic details, you should go to the original source of the information. If you do need to cite articles from a Unit Reader without the original pagination, treat the Reader articles as if they were book or journal articles. In your citations refer to the page numbers from the Reader, not the original page numbers.


Journal Articles
Arrange information about the source in the order given in the example below. Only the first word of the article title is capitalized. If, and only if, each issue of a journal begins on page 1, give the issue number in parentheses immediately after the volume number. Precede page numbers for newspapers only with p. or pp.

Standard format for citation


Journal article

Newspaper article

Magazine article with no author
Electronic documents

References to electronic publications begin with the same information that would be provided for a printed source. Additional information must be provided (depending on the type of electronic publication) to correctly identify that you accessed the document in an electronic format.

An electronic publication could be a World Wide Web site, an email, a journal article published on the Web, or a journal article retrieved from one of the full text databases available from the Library homepage. Some documents are published in both paper and electronic formats. Please cite according to the format you accessed.

Be aware that pagination may not be specified for many online publications. The number of the starting page can be included in your citation if it is given, and/or the number of pages in the document. For example: p. 7+ or (5 pp.).

The elements listed below may be a useful guide to what you need to record when citing an electronic document:

- name of author(s) if given
- year or date of publication (or date site was created or updated)
- title of document
- title of web site or database
- pages, sections or paragraphs (if given)
- date you accessed the site
- web address (if appropriate)

E-Books

Use the descriptive elements listed in the example below to cite e-books retrieved from the library catalogue.

|---|

Article from an Electronic Encyclopaedia


E-Journals

Journal article from full text database
Full text databases include ProQuest, EAI, and Wiley Interscience to name a few. Please remember that the journals in full text databases may be accessed with hot-links from the library web catalogue or from the Electronic Course Materials service. Once linked to the journal, check the screen to see if it is from a database. Journals in full text databases are usually not free on the internet but are purchased on subscription by the library. For this reason the Database name is cited rather than the web address.

Use the elements listed in the example below to cite journal articles retrieved from the library's full text databases.

Standard format for citation

<table>
<thead>
<tr>
<th>Article Author, A. A., &amp; Article Author, B. B. (Year). Title of article. Title of Journal, volume number(issue number), inclusive page or paragraph numbers. Retrieved month day, year, from Database name.</th>
</tr>
</thead>
</table>

Newspaper article from fulltext database


Journal article from the World Wide Web

Unlike journal articles from full text databases these are often freely available on the web. Some publishers offer recent issues for free and earlier issues for a subscription fee.

Standard format for citation

<table>
<thead>
<tr>
<th>Article Author, A. A., &amp; Article Author, B. B. (Year). Title of article [Version if appropriate]. Title of Journal, volume number(issue number), inclusive page or paragraph numbers. Retrieved month day, year, from Web address.</th>
</tr>
</thead>
</table>

Newspaper article from World Wide Web

Internet Documents

Cite documents published on the web according to the specific guidelines for the type of document. Books, plays, government reports and company annual reports are examples of documents that may be published on the web.

Please note: If no author or editor is given and the document is not a part, article or chapter, citation is by title, and format will precede the year of publication.

Standard format for citation

<table>
<thead>
<tr>
<th>Author, A. A. (Year). Title: Subtitle (Edition). Publisher. Retrieved month day, year, from Source or supplier information: Web address</th>
</tr>
</thead>
</table>

Whole Internet site


Electronic document, no author


Article in online encyclopaedia, no author


Government publication (Australian Bureau of Statistics bulletin)


AusStats is an example of a full text database that makes statistical data freely available on the Internet.

Government publication (Government department)


Non-Book Formats

Standard format for citation

<table>
<thead>
<tr>
<th>Artist, A. A. (Credit), &amp; Artist, B. B. (Credit). (Year of copyright, Date of recording). Title: Subtitle [format]. Place of recording: Publisher. (Year of recording if different from year of copyright).</th>
</tr>
</thead>
</table>

Please note: format normally follows the title or part title.

Podcasts


**Other Formats**

**DVD**

**Radio Programme**

**Television Programme**

**Video recording**

**Sound recording**

**Microform**

---

**A Reference List: what should it look like?**

Please note the hanging indent for each reference makes the alphabetical sequence more obvious.


Abbreviations
Standard abbreviations may be used in your citations. A list of appropriate abbreviations can be found in Publication manual of the American Psychological Association, 5th ed., pp. 216-217. Some of the more often used examples are listed here:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>chap.</td>
<td>chapter</td>
</tr>
<tr>
<td>ed.</td>
<td>edition</td>
</tr>
<tr>
<td>Ed.(Eds.)</td>
<td>Editor(s)</td>
</tr>
<tr>
<td>et al.</td>
<td>and others (from Latin et alii, et</td>
</tr>
</tbody>
</table>
### Other sources of information


**LINK LEVEL 3 R 808.02 AME 2001**


[Click here to go to website]
- End -