Information Literacy Program

ENGN1211
Search Smarter Session

Tutorial to Support Your Research Assignment 2018
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What can you expect to walk away with after today?

Your individual assignment has been set to meet the following learning outcomes for the course:

- Demonstrate research into engineering concepts, technology and contexts
- Communicate engineering concepts and solutions effectively using different media to professional and other audiences.
- Demonstrate self-reflection and evaluation of ideas.

This session is designed to help you with research at a university level, by the end of this session, participants will be able to:

- Analyse a topic to find the best keywords
- Search appropriate resources
- Use advanced searching options for search engines
- Evaluate internet material

Project Options

This research assignment will allow you to investigate an area of engineering from the list below that interests you.

- Soft plastic recycling
- Bionic ear (cochlear implant)
- Wi-Fi
- Computer vision in mapping (satellite imagery for mapping
- RFID (paywave)
- Nanotech in construction - paint, insulation, solar
- Solar aeroplane - Smart wearables (t-shirts, shoes etc.)
- 3D Printer - Rocket that can land on an asteroid
- Photovoltaic cells
- Small scale Biodigester (some resources are provided on Wattle)
- Robotic skeletons
Getting Started: Topic Analysis

Before you search, you need to think about the background information you need.

- Identify keywords that can be used as search terms
- List synonyms, alternate spellings and related terms that may help you refine your search

Think of alternate keywords for your key concepts. For example, if you’re researching bionic ear include alternate keywords such as “cochlear” and “implant”

Questions to develop specific keywords or concepts:

- How was the technology developed?
- What terms do people use when talking about the technology?
- Who are the (anticipated) customers or users?
- What are the possible futures for your technology?

Take some time to think about the appropriate keywords for your assignment and how you’d like to approach your search.

My possible keywords include:
Background material

Background material can also help you identify specific angles on your topic that you might wish to explore. Types of background materials include encyclopaedias and textbooks. Here are a few background resources that might help explore your topic.

- Dictionary of Chemical Engineering
- Wiley Encyclopedia of Computer Science and Engineering
- Encyclopaedia of RF and microwave engineering

Subject guides

Search Strategy Basics

Spelling variations
Use of the ‘wildcard’ symbol—commonly represented by a question mark (?)—will search for multiple spellings. For example:

- Behavio?r will search both behaviour, behavior.
- Organi?tion will search both organisation, organization.

Truncating your search terms
Adding a truncation symbol—commonly an asterisk (*)—after the root of a word will find variations of that word. Truncating words returns variant spellings and endings, and can save you from having to do multiple searches.

- Pollut* will return the words pollution, pollutant, and pollutants, etc.
- Toxi* will return the words toxic, toxin, toxins, toxicity, and toxicology, etc.
- Nanotech* will return the words nanotech, nanotechnology and nanotechnologies, etc.

Combining your search terms using Boolean operators
Boolean operators let you combine keywords and phrases to retrieve specific search results. They are inserted between your keywords and phrases, and as a general rule should always appear in UPPER CASE.

Use **AND** to narrow or focus your search and retrieve records containing only the specified words. For example:

- energy AND solar
- plastic AND recycle* AND soft

Use **OR** to broaden your search and retrieve records containing any of the words specified. For example:

- “bionic ear” OR “cochlear implant”

If you use the **OR** operator when searching for acronyms and abbreviations, remember to include the actual term spelt in full as well. For example:

- RFID OR “Radio frequency identification”

Use **NOT** (which sometimes also appears as **AND NOT**) to narrow your search results and return records that do not contain a specified term. For example:

- rocket AND asteroid NOT (moon OR lunar)

Use **parentheses** ( ) to group words and phrases together when combining the OR operator with an AND operator in the same search. For example:

- (nanotech* AND ((Building OR construction)) AND (paint* OR insulat* OR solar)
Finding books in the Library catalogue

You may need to find books about general engineering concepts to assist you with your project. Go to the Library website (http://anulib.anu.edu.au). The Catalogue search is in the middle of the page.

If you’re unsure of the specific title of a book, or you just wish to browse titles on a particular topic, do a **Keyword** search.

You will then see your results. Click on the title to get more detail.
You will then see more information about the book including a link to View online for online resources.

You will then see more information about the book including a link to View online for online resources.

Print material will provide the Location and Call Number and Status. If the book you want is on loan, you can click the Request link to recall it.
Websites vs Journal Articles

**Question:** Why worry about finding journal articles? Everything you need is available for free on the Internet, right?

**Answer:** no 😞
A great deal of academic material is available by subscription only. You need to be able to locate and access this material. This includes peer reviewed material.

**Peer Review**

Peer reviewed journal articles are reviewed by academics in the same discipline chosen by the journal. It is an organised method for evaluating journal articles, certifies the correctness of procedures, and establishes the plausibility of results. Popular magazines may be interesting and informative, but tend to gloss over important details and provide overly simplistic explanations.

A peer-reviewed journal will normally include an “**instructions to authors**” section that outlines the editorial policy and peer review process. Other clues include:

- may include the word ‘journal’ in the title
- articles are substantial, written by an academic and include a list of references
- Scholarly journals generally aren’t as glossy and “pretty” as popular magazines.

Example of an “Author Guidelines” section from the *Advances in Structural Engineering.*
Using Databases to Find Journal Articles

Journals come in either electronic format or hard copy. To find journal articles on your topic, you need to use a database.

What is a database?
A database is an index to journal articles. It contains information about the article including author, title, source, year, and often an abstract. The database doesn’t contain the article itself, instead containing the information you need to find the article. Many databases have links to the full-text.

How can I access databases?
Databases are linked from the Library website. Click on the first letter of your database to get to the database you need.
Useful Databases for Engineering

Please remember that no database covers everything (not even Google!), so you may need to check more than one. All of the ones listed are accessible through the E-resources and databases link on the ANU Library Homepage.

Multidisciplinary Databases

**SuperSearch**: A multidisciplinary database; results are ranked by relevance. It is a very useful service for undergraduates looking to search a wide range of material through a single search box.

**Scopus**: A large multidisciplinary database with a strength in the sciences and a focus on scholarly and peer reviewed literature.

**Google Scholar**: Google’s version of a scholarly database.

Engineering specific e-resources

**ACM digital library (Association for Computing Machinery)**

This collection of full text articles and bibliographic records covers the fields of computing and information technology. It includes the complete collection of ACM's publications including journals, conference proceedings, magazines, newsletters, and multimedia titles. It is also integrated with the Guide to Computing Literature bibliography.

**IEEE Electronic Library**

This digital library is a resource for discovery and access to scientific and technical content published by the IEEE (Institute of Electrical and Electronics Engineers) and its publishing partners. It provides access to more than 3 million full text documents in electrical engineering, computer science, and electronics. It comprises over 160 journals; over 1,200 conference proceedings; more than 3,800 technical standards; over 1,000 eBooks, and over 300 educational courses. Approximately 25,000 new documents are added to IEEE Xplore each month.

**IET Digital Library**

The world's leading international scientific organisation and thought leader, the Institution of Engineering and Technology (IET), produces this global repository of science, engineering, and technology-focused content. It comprises more than 100,000 technical papers and around 5,000 book chapters from 1994 onwards. Approximately 450 new documents are added to the IET Digital Library each month.

**Standards Online Premium**

Standards Online Premium provides online access to the full text of all Australian standards, their international equivalents, withdrawn and superseded standards, document history and referenced standards. Covers subject areas in the technical and business areas.
**Scopus**

Why would I use it?

Scopus is a multi-disciplinary database, providing access to quality web sites in science and technology. It also has coverage of more than 22,000 peer reviewed journals in science, social sciences and humanities.

Select ‘S’ for Scopus from the alphabetical list under E-resources & databases on the ANU Library homepage [http://anulib.anu.edu.au/](http://anulib.anu.edu.au/)

Scroll down and click on the link for Scopus.

**Searching Scopus**

Enter your search, using Boolean operators (AND, OR, NOT), truncation (*), and phrase searching (“phrase”) as appropriate. For example:

**(smart wearable*) AND customer***
When you see your results, scroll down to see brief records of the citations your search has found, including the title of the article, the author(s), the journal in which the article appears and the date of publication.

You can also use the limits on the left-hand side of the results to limit your search results. The default results list is sorted by the most recent date. This can be changed, suggested sort listings are by relevance and by the number of times an article has been cited.

To view more information about an article, click on the title.
You can now see more information about the article, including the abstract and any citing or related documents.

Keywords may give you other options for searching.

Click on the Find it at ANU button to view the different options for accessing full text.
If no full-text is available, the Find it at ANU window gives different options for getting hold of the full text article.

These may include a search in the library catalogue for the journal; or a link to ArticleReach [see page 23 for further information].

Smart textiles for technical applications
Author: Gries, T.
Journal: Technische Textilien
ISSN: 0323-3243
Date: 2003
Volume: 45 Issue: 2

Search CrossRef for a DOI link to the full text.

Please try the following to find the full text item:
- Search the ANU Catalogue
- By Title
- By ISSN
- ANU Document Supply Service
- Order from ArticleReach
  Login with the barcode from your ANU card (E....F)
- Help for ANU staff and students
SuperSearch

Why would I use it?
SuperSearch provides a single search across the Library’s print and electronic collections, with direct links to full text articles. It is a Google-type search.

Searching SuperSearch
Go to the Library website and enter your search in the SuperSearch window.

nanotech* AND (Construction OR building) AND (paint* OR insulat* OR solar)

You will then see your initial results. Use the options on the left to refine your results, for example limiting to scholarly and peer-review and full-text only.
The Library

Click on **preview** to get more information about the resource.

**Photocatalytic nano-composite architectural lime mortars for degradation of urban pollutants under solar and visible (interior) light**

by Saedi M. Tobaldi, DM Rozman, N. More

CONSTRUCTION AND BUILDING MATERIALS, 10.02.2017, Volume 152

...As this mortar is intended to both combat atmospheric pollution, and create more durable/longer maintenance building facades.

Click on **Full Text Online** to get the article in full text.

**Construction and Building Materials**

Volume 152, 15 October 2017, Pages 206-213

Photocatalytic nano-composite architectural lime mortars for degradation of urban pollutants under solar and visible (interior) light

Manfred Saedi ¹, ³, ⁴, David M. Tobaldi ², Nada Rozman ³, Andrijana Sever Škapin ³, Joško A. Lubincha ⁵, Robert C. Pullar ⁶, ⁷, ²

Brought to you by: Australian National University Library

The Library

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Google Scholar

Google Scholar (scholar.google.com.au) allows you to bypass popular information and find scholarly information across a range of disciplines, provided by a wide range of academic institutions. Google Scholar searches and lists scholarly journal articles.

Basic Google Scholar search

Searching Google Scholar is very similar to general Google searching. The default search is a topic (keyword) search. To access Google Scholar go to Scholar (scholar.google.com.au) and enter your key terms.

Advanced Scholar search

Go to Scholar (scholar.google.com.au) and on the left hand menu and select Advanced Scholar Search.

The search terms are entered into the relevant fields in the Advanced Search form.
Access materials from Scholar

The ANU subscribes to a large number of online journals, which can be accessed in full-text via Google Scholar.

From the list of results you can click on the PDF option to view full text, or the Find it at ANU option to see what is available from the ANU.

If an article doesn’t have full text or a Find it at ANU click-through, you can still look it up in the catalogue to see if we hold it. Alternatively articles can be ordered via ArticleReach [see page 23 for further details].
Advanced Google search

Advanced Google search allows you to narrow down search results for complex searches by using the features of the Advanced Search. Key features that can be used include phrase searching, limiting by a particular file type and restricting to domains and domain names [see page 22 of this handbook for further detail on domain names].

For example: soft plastic recycle* site: edu.au filetype: pdf

The results are all from in Australian Educational Institution websites.

[PDF] Development of High Performance Sorting Process for Recycling of ... 

Development of High Performance Sorting Process for Recycling of Plastics. 122. Development of High ... primarily concerned with the recycling of rigid plastic milk bottles, detergent and soft drink bottles, which are ... develop intelligent high performance plastics recycling methods and techniques that will result not only in ...

[PDF] Reuse and recycling; model development and incentive .... - AGSM 
www.agsm.edu.au/academic/teaching/SS/SProfIt.../RECYCLING_INCENTIVES.pdf

Jun 26, 2000 - was to develop a framework, a social systems model, for understanding the way people might be ... contamination in plastics collected for recycling, but helps to change the value systems of people to ... sound resource utilisation (including “soft” tools such as life cycle analysis (ISO, 14040) and ...

[PDF] scientific report: contaminated waste and recycling. - Federation ... 
https://federation.edu.au/__data/assets/pdf_file/0020/.../SCIENTIFIC-REPORT.pdf

developed. This study explored firstly the contamination issues through Ballarat and Victoria, what this means for the effectiveness of recycling operations and provided some direction as to how large intuitions may best .... can be seen. Small paper, absorbable paper (napkins, paper towel) and soft plastics are noteworthy.
Evaluating online information for academic research

Evaluation of the information you have found online that is not peer review material requires development of your critical eye. There are several criteria used to discern the quality of the academic materials you have located. In addition, peer reviewed material should be checked to look for bias of the journal overall.

**Authority and reputation of the source**
- Who provides the information?
- Are the author's title and institution/company displayed?
- Is there a link to the author's email address?
- Does the URL indicate what type of organisation the information is coming from? What, if anything does this tell you about the credibility of the information?
- If a trade publisher or organisation, is the source reputable, a recognised authority?

**Information integrity**
- Is the information current and up to date?
- Does the author give the source for the information?
- Is there evidence of bias in the information?
- Can the information be verified elsewhere?
- What is the purpose of the page? Is it simply a marketing tool?

**Exercise:** Go to the links below look at the sites listed. Are they credible?

http://quicklink.anu.edu.au/wx7z  
http://quicklink.anu.edu.au/3ng1  
http://quicklink.anu.edu.au/j4j3

You can use the questions in the tables on the following page to evaluate the information.

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the author or publisher list their credentials, qualifications or affiliations? If so, can they be verified?</td>
<td></td>
</tr>
<tr>
<td>Who provides the information? Is the author of the source clearly stated?</td>
<td></td>
</tr>
<tr>
<td>Does the author provide contact details (e.g., an email address) that you can use to ask follow-up questions about the information?</td>
<td></td>
</tr>
<tr>
<td>Might the content be ironic, satire, or parody?</td>
<td></td>
</tr>
<tr>
<td>Are there spelling or grammatical errors?</td>
<td></td>
</tr>
<tr>
<td>Is the design of the material professional looking and user friendly?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Authority</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is it a personal homepage (if a webpage)?</td>
<td></td>
</tr>
<tr>
<td>Has the author provided any evidence or other sources to back up their information? Does the resource include sources or references you can check?</td>
<td></td>
</tr>
<tr>
<td>Can the information be verified elsewhere?</td>
<td></td>
</tr>
<tr>
<td>Is there evidence the information has undergone some peer review process?</td>
<td></td>
</tr>
<tr>
<td>Is the information produced or published by a reputable organisation or association?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objectivity</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the purpose of the material? Is it simply a marketing tool? Is it pushing a particular ideological agenda?</td>
<td></td>
</tr>
<tr>
<td>Is there evidence of bias in the information?</td>
<td></td>
</tr>
<tr>
<td>How detailed is the information?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Currency</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the information current and up to date?</td>
<td></td>
</tr>
<tr>
<td>When was the document produced? When was it last updated?</td>
<td></td>
</tr>
<tr>
<td>If the webpage or document includes links, are they up to date?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is it original information, or information reproduced from another page?</td>
<td></td>
</tr>
<tr>
<td>Is some content limited to fee-paying customers?</td>
<td></td>
</tr>
<tr>
<td>Is the information cited correctly?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Targeted Audience</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the information aimed at researchers? At students? At the general public?</td>
<td></td>
</tr>
</tbody>
</table>
## Domain Names

Domain names (url address) are one of the quickest and most effective ways of identifying a Web page. Learning to read domain names will enable you to quickly identify a Web page’s country of origin (e.g. .au, .uk, .jp), and the entity (e.g. .edu, .gov, .org.) that has produced the page.

When you run a search using a search engine, often the full web address will be displayed along with the results. Before opening the web page, you can often check the web address and get an idea of the type of organisation or group who has published the site. This allows you to begin evaluating the quality of the information before you even open it.

<table>
<thead>
<tr>
<th>Domain</th>
<th>What does it mean?</th>
<th>An example</th>
</tr>
</thead>
<tbody>
<tr>
<td>edu</td>
<td>An educational institution, e.g.: a university, colleges or high schools. (Primary schools also use .edu)</td>
<td>yale.edu – Yale University, USA harvard.edu – Harvard University, USA uni-stuttgart.de – University of Stuttgart, Germany (Germany doesn’t use the edu domain)</td>
</tr>
<tr>
<td>edu.au</td>
<td>Australian educational institution</td>
<td>anu.edu.au – ANU cit.act.edu.au – Canberra Institute of Technology unsw.edu.au – University of New South Wales in Sydney</td>
</tr>
<tr>
<td>ac.uk</td>
<td>The .ac refers to “academic” and is used by United Kingdom, Indian and Japanese universities</td>
<td>ox.ac.uk – University of Oxford, England ed.ac.uk – University of Edinburgh, Scotland du.ac.in – University of Delhi u-tokyo.ac.jp – University of Tokyo</td>
</tr>
<tr>
<td>gov (or go)</td>
<td>Government departments</td>
<td>defence.gov.au – Department of Defence, Australia dfat.gov.au – Department of Foreign Affairs and Trade, Australia deplu.go.id – Department of Foreign Affairs, Republic of Indonesia</td>
</tr>
<tr>
<td>org</td>
<td>An organisation, usually non-profit and community groups</td>
<td>alia.org.au – Australian Library and Information Association satsonline.org – South African Theological Seminary</td>
</tr>
<tr>
<td>asn</td>
<td>An association</td>
<td>apesma.asn.au – Association of Professional Engineers, Scientists and Managers, Australia</td>
</tr>
<tr>
<td>com</td>
<td>Commercial or company</td>
<td>ebay.com.au – an online auction site webshots.com – lovely photographs!</td>
</tr>
<tr>
<td>co.uk</td>
<td>United Kingdom commercial</td>
<td>news.bbc.co.uk – British Broadcasting Commission bookshop.co.uk – WH Smith Internet Bookshop</td>
</tr>
<tr>
<td>net</td>
<td>A networked organisation</td>
<td>abc.net.au – Australian Broadcasting Corporation blackdog.net – a fun, children’s game site</td>
</tr>
</tbody>
</table>
ANU Library’s ArticleReach

ArticleReach is a journal article supply service available free of charge to ANU staff and students. It is able to supply pdf copies of journal articles normally within a 2 day period. More information about ArticleReach is available at http://quicklink.anu.edu.au/sqq9.

Off-campus access

Databases and electronic journals and books can be accessed from off-campus via Virtual. Go to http://virtual.anu.edu.au and log in using your student ID and password.

For Further Assistance

If you need additional help with any of the material covered in the Library lectures or tutorial sessions on Internet resources or finding key journal resources for your project, please feel free to contact:

ANU Library Information Desk science.library@anu.edu.au (ph: 6125 3517)
Other resources

Training notes
To access the Information Literacy Program’s training notes, visit the Research & learn webpage (http://anulib.anu.edu.au/research-learn) and select the skill area followed by the relevant course. You can register for a workshop and find other information.

Research & learn how-to guides
Explore and learn with the ANU Library’s how to guides (ql.anu.edu.au/howto). Topics covered are:

- Citations & abstracts
- Data Management
- EndNote
- Finding books and more
- Finding journal articles and more
- Finding theses
- Increasing your research impact
- NVivo
- Topic analysis
- Using Google scholar

Subject guides
Find subject-specific guides (ql.anu.edu.au/subjectguides) and resources on broad range of disciplines. Such as:

- History, indigenous studies, linguistics and philosophy
- Criminal, human rights and tax law
- Biochemistry and molecular biology, neurosciences and psychology
- Asia Pacific, Southeast Asia and East Asian studies
- Engineering
- Astronomy and astrophysics, earth sciences, mathematical sciences and natural hazards

Online learning
Online learning is available through ANU Pulse (ql.anu.edu.au/pulse), which can be accessed from both on and off campus by all ANU staff and students.

IT skills development modules available in ANU Pulse
Microsoft Office (Access, Excel, OneNote, PowerPoint, Project, Visio, Word)
Microsoft Office (Mac)
Adobe suite (Illustrator, Photoshop)
Other IT (Concepts of IT, FrontPage, Internet Explorer, Type IT, Windows)

Training calendar
Select Events » near the bottom of the Library homepage to access our events calendar with upcoming training opportunities displayed day by day (http://ql.anu.edu.au/cal).