Generic Research Skills

Week 5 group meeting – Tuesday 22nd August 2006

Background/Rationale

As your academic studies progress, you are increasingly required to acquire valuable research skills to match your technical knowledge. Two key attributes that we strive to impart on University of Adelaide graduates are: 1. the ability to locate, analyse, evaluate and synthesise information from a wide variety of sources in a planned and timely manner, and 2. a commitment to continuous learning and the capacity to maintain intellectual curiosity throughout life (full document is available at: http://www.adelaide.edu.au/dvca/students/Uni%20Graduate%20Attributes.pdf). These attributes are in accord with the research-intensive nature of this University.

In the course Photonics for Communications, the research component is a significant part of the course. The pace of technological advancement is rapid in engineering, and it is important that you acquire strong research skills in order to prepare for your career ahead. As part of your research, you will be required to read and interpret various sources of information, critically evaluate and synthesize them into a coherent story, and effectively communicate ideas and findings in the form of a written report. All of these requirements assume at least a basic level of skill in accessing and critically analysing discipline-appropriate literature.

The short task that you are asked to undertake has two aims. Firstly, it will give you some practice in recognising, extracting and logically organising key points from literature available on a topic. Secondly, the exercise will help you to identify a suitable project topic. The supervisor will be able to provide an adequate level of feedback for your work as well as guidance on the developing your project topic..

Broad Topic Areas

- Silicon Photonics
- Optical Communications
- Nonlinear Optics
- Photonics for Biomedical Imaging
- Optical Data Storage

You are required to first commence your reading in *one* of these broad areas, and subsequently narrow down your topic to greater specificity as you progress.

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Valuable Resources

Barr-Smith Library (books)

Journals, in particular:

1. IEEE (online library: http://ieeexplore.ieee.org/Xplore/dynhome.jsp)
2. SPIE (online library: http://www.spiedl.org/);

Task Instructions:

Select **two** articles on photonics and complete tasks 1 and 2.

1. *Integrate the information presented in the two articles to write your own dot-point notes on the worksheet attached*. To do this:
   - Identify 3-4 key ideas from the articles
   - Identify 6-10 potentially interesting/useful references from the articles
   - Use these key ideas to formulate headings
   - Make bullet-point notes and list them under these headings.
   - After each point, indicate its source, i.e. whether the idea came from article 1, article 2, or both (this means you will need to have full bibliographic information of the sources at the end of your notes)
   - Provide a title that embodies the content of your notes.

2. Which of the two articles do you consider to be the better source? On what characteristics/features of the article have you based your choice? / How have you arrived at your choice?

Submit your written response by **Friday, 1 September**. An example rubric for assessment of this exercise is attached with this document. The "indicators" column clearly shows what is **expected** of you as researchers; the level you achieve depends on the quality of your work.

If you need help to acquire articles, or have general enquiries, feel free to contact me.

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Brian Ng

22 August, 2006

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Student Name: ……. ID number: ……..

Title: ……

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Assessment Criteria for Generic Research Skills Exercise

Student Name: _____ Student ID: _____

Marker: _____

Indicators ***The student with research skill …***	**Level 1** *Students research at the level of a* ***closed enquiry*** *and require a* ***high degree of structure/ guidance***	**Level 2** *Students research at the level of a* ***closed enquiry*** *and require a* ***some structure and guidance***
A. Students embark on inquiry *and so determine a need for knowledge/ understanding*	❑ Identifies some peripheral or duplicated ideas as key	❑ Identifies KEY ideas
B. Students find/generate *needed information/data using appropriate methodology*	❑ Points/notes generated partially relate to the headings under which they are listed ❑ Notes produced are sourced predominantly from 1 text only	❑ Points/notes generated elaborate on the key ideas to which they are linked ❑ Notes produced draw on ideas from both texts
C. Students critically evaluate *information/data and the process to find/generate this information/data*	❑ Identifies indicators of source credibility and reliability but does not fully apply them in evaluating data or process	❑ Identifies several relevant indicators of source credibility and reliability and provides appropriate rationale for usage/inclusion of information
D. Students organise *information collected/ generated*	❑ Has attempted a note-taking framework, but information is organised predominantly as a list of undifferentiated bullet points	❑ Uses a hierarchical note-taking framework that organises related information under the appropriate key headings.
E. *Students* ***synthesise*** *and* ***analyse*** *and* ***apply*** *new knowledge*	❑ Produces point form notes (information not directly copied or sentence format) but notes separated according to source	❑ Combines and integrates ideas/data from different sources to generate notes
F. *Students* ***communicate*** *knowledge and the process used to generate it, with an awareness of ethical, social and cultural issues*	❑ Title is present ❑ Partial and/or incorrect acknowledgement of sources of information	❑ Title relates clearly to the key ideas presented in the notes ❑ Full and correct acknowledgement of sources of all noted information

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