



THE UNIVERSITY OF
NEW SOUTH WALES

SCHOOL OF MATERIALS SCIENCE AND ENGINEERING

NANO3003

Nanotechnology 3

Course Outline

Session 2, 2009

Course staff

A/Prof. Sammy Chan (Course Co-ordinator) SC	School of Materials Science and Engineering E8 Rm 215 Sli.Chan@unsw.edu.au
Prof. Justin Gooding (JG)	School of Chemistry, Office Dalton 132 justin.gooding@unsw.edu.au
Prof. Alex Hamilton (AH)	School of Physics. alex.hamilton@unsw.edu.au
Other guest lecturers	See the section "Course Timetable"
Tutors	See the section "Project"

Course Timetable

This is a tentative class schedule, please note that while the time is fixed the contents and lecturers for Friday classes may change.

Week start Date	Week	Wednesday 9-11am: Law 163	Lecturer	Friday 9-10 am: Webster 250	Lecturer
27-Jul	2	Lecture - introduction Library Usage of Databases esp. Patents (Lib class in G14, MSE building)	SC/Adrian McMinn	Applications of Nanomaterials I	SC
3-Aug	3	Meet tutors: Project Group Wk 1A	Tutors	Applications of Nanomaterials II	SC
10-Aug	4	Meet tutors: Project Group Wk 2A	Tutors	Guest Lecture	TBA
17-Aug	5	Meet tutors: Project Group Wk 3A	Tutors	Commercialisation and Venture Capital	Dr. Lee Styger
24-Aug	6	Meet tutors: Project Group Wk 4A	Tutors	Intellectual Property	Mr. Dan Berger, Davies Collison Cave
31-Aug	7	Poster A & report A finalisation	Tutors	Guest Lecture	Dr. Nagarajan Valanoor
14-Sep	8	Meet tutors: Project Group Wk 1B	Tutors	Biodevices Example I	JG
21-Sep	9	Meet tutors: Project Group Wk 2B	Tutors	Biodevices Example II	JG
28-Sep	10	Meet tutors: Project Group Wk 3B	Tutors	Guest Lecture	A/Prof. Naresh Kumar
5-Oct	11	Meet tutors: Project Group Wk 4B	Tutors	Nanoelectronics 1	AH
12-Oct	12	Poster B & report B finalisation	Tutors	Nanoelectronics 2	AH
19-Oct	13	Poster Presentations	All	No lecture	-

Course outline

The learning and teaching philosophy underpinning the course (based on UNSW Learning Guidelines)

NANO3003 is a 3UC course for 3rd Year Nanotechnology students. There are no pre-requisites. This course deals with commercialisation of technology, with particular reference to nanotechnology. Specific issues dealt with include approaches to fabrication, engineering or bioengineering aspects, putting the whole device together, commercialization aspects, protection of intellectual property and the raising venture capital.

Teaching Methods

Lectures = 1 *hr/week* Tutorials = 0.5 -1 *hr/week* Group work= 1-1.5 *hrs/week*.

Projects:

- **Students form 3 - 4 groups, and do two projects on a product and a real company. Each project will be supervised by a different tutor.**
- **The first project will be on a particular device, sensor or material, as defined by the tutors. And the students will be asked to investigate the development of this device, sensor or material in the world. A comparison on companies producing the technology and/or products is made.**
- **For the 2nd project (Project B), students will choose their own company to study, after discussion with the tutor and approved by the tutor. The company has to be a new one that has not been studied in the past by NANO 3003 students.**
- **For each project, students must prepare a written report and an A-1 poster.**

Project Tutors

Tutor 1 A/Prof. Naresh Kumar Tel. 9385 4698 E-mail n.kumar@unsw.edu.au

Tutor 2 Dr. John Stride Tel: 9385 4672 E-mail: j.stride@unsw.edu.au

Tutor 3 Dr. Nagarajan Valanoor Tel: 93854263 E-mail: nagarajan@unsw.edu.au

Tutor 4 TBA (Please contact Prof. Hamilton for details)

Project outlines for the first project

A description of the device, material or technology studied. The background of the device/material/technology (the basic theory, importance, applications etc).

Identify companies that work on this device/material/technology, and a comparison on their IPs, publications etc.

Market analysis of the device/material/technology and market shares of the companies studied.

Future trend of the device/material/technology Possible improvement or substitute of the device/material/technology

Project outlines for the second project:

Identify company and summarize key IP

- a. Who are the researchers?
- b. What publications do they have?
- c. What patents do the researchers and the company hold? What is the critical IP? What is the technology/science – how does it work?

Market analysis

- d. What is the product?
- e. What is the market?
- f. Any details of funding / licensing?

Competition:

Who are the competitors, and what IP do they have?

What distinguishes the chosen company?

- g. Similar research papers
- h. Other researchers in the field
- i. Other relevant patents

Reports: Report of up to 20 and 25 pages for projects A and B, respectively, are presented. This should cover areas such as:

- An introduction to the device/material/technology or company
- The underpinning science and product
- A critical evaluation of the IP and the global market,
- Conclusions
- Full references

Poster presentations: Students must prepare a large format (A1) poster summarising the project.

- Posters should summarize the information in the project report clearly and concisely
- Posters are presented at a meeting in week 12, attended by all 1st, 2nd, and 3rd year Nano students. Students are quizzed about their posters, just as they would be at a conference.

Assessment Methods:

Assessment is based on group work on the 5-week projects, undertaken in a group environment. Groups are typically 4-5 students, and meet with a tutor once a week. The projects are case studies of device/material/technology in nanotechnology and ‘live’ nanotechnology related companies, with an in-depth investigation of the science and technology behind the technology, company and the commercial approach taken by the company.

The work is presented in a poster presentation in Week 13 of Session, as well as with two written reports. The posters and reports are assessed by a panel of academics drawn from members of each school in the Nano program.

Weighting of the assessment components is 25% for each of the two reports, and 25% for each of the poster presentations.

Course information

Units of credit	3
Parallel teaching involved in this course	Yes
How the course relates to other course offerings and overall program(s) in the discipline	Nanotechnology is a relatively new subject which brings many inventions and discoveries to the society. The course is a third year course which based on the knowledge acquired in the earlier fundamental NANO 1001 and NANO2002 courses. It provides an update on the recent advances on nanotechnology. It also gives an introduction to intellectual property, patents, “novelty” and “inventiveness”.
Course aims	This course deals with commercialisation of technology, with particular reference to nanotechnology. Specific issues dealt with include approaches to fabrication, engineering or bioengineering aspects, putting the whole device together, commercialization aspects, protection of intellectual property and the raising venture capital.
Graduate attributes which will be gained through the course	<ul style="list-style-type: none">• Team and collaborative working skills• Planning, negotiation skills, delegation and reporting within a technical context• Researching information sources, discriminating source quality and acknowledgement• Scientific presentation• Application of high level mathematical modeling and problem solving skills.• Ability to understand and apply complex conceptual, technical and mathematical information across broad areas of a mathematically-based discipline.
Expected learning outcomes	At the end of the course you should: (a) Have gained an understanding of the basic concepts of intellectual property. (b) Have an understanding of how financial capital is raised to bring a product to market. (c) Be familiar with different approaches taken to bringing nanotechnology products to market. (d) Know where to obtain information about the financial and scientific background to a high-tech company. (e) Analyse the science behind a high technology

	company in relation to existing scientific literature, and present this information to a general scientific audience.
Teaching strategies	<ul style="list-style-type: none"> • Theory and concepts will be addressed in lectures. • Students will learn through two group projects which provide real examples on how the hi-tech companies are formed, their IPs, Marketing and the commercial approach adopted by these companies

Recommended Text: No specific text is recommended

Continual course improvement

- We welcome feedback at all times on presentation of course materials and any other course-related matters, and will be happy to discuss any issues raised in the lectures.
- You will be asked to provide evaluative feedback through the UNSW's Course and Teaching Evaluation and Improvement (CATEI) Process in Week 11 or 12.
- Feedback from prior assessments will be discussed in lecture 1.
- Students are encouraged to address any problems regarding teaching of this course at the annual staff-student meeting.
- Randomly students are asked to answer some short questionnaires for feedbacks on the course.

Academic honesty and plagiarism

What is Plagiarism?

Plagiarism is the presentation of the thoughts or work of another as one's own.* Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person's assignment without appropriate acknowledgement;
- paraphrasing another person's work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does *not* amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

www.lc.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle

† Adapted with kind permission from the University of Melbourne.

Administrative Matters

- All assessment tasks submitted after the deadline will receive a penalty of 10% of the maximum grade for every day late, or part thereof.
- Students unable to attend compulsory elements of the course, submit reports on time on health grounds should make a request for special consideration by submitting the form available from the Student Desk in the Chancellery. Medical certificates or other appropriate documents must be included. Students should also advise the lecturer.

- Students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734 or www.equity.unsw.edu.au/disabil.html). Early notification is essential to enable any necessary adjustments to be made. Information on designing courses and course outlines that take into account the needs of students with disabilities can be found at: www.secretariat.unsw.edu.au/acboardcom/minutes/coe/disabilityguidelines.pdf