BABS3071
Commercial Biotechnology
School of Biotechnology and Biomolecular Sciences
Faculty of Science

SESSION 1, 2017

Core course: 3052 Biotechnology program
Stage 3 Elective: 3970 Science program

Convener: Dr Wallace Bridge
BABS3071 2017 Course Outline

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A1. Information about BABS3091

<table>
<thead>
<tr>
<th>Year of delivery</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Code</strong></td>
<td>BABS3071</td>
</tr>
<tr>
<td><strong>Course name</strong></td>
<td>Commercial Biotechnology</td>
</tr>
<tr>
<td><strong>Academic unit</strong></td>
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</tr>
<tr>
<td><strong>Level of course</strong></td>
<td>Core 3rd year BSc (Biotech) 3053</td>
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<tr>
<td><strong>Units of Credit</strong></td>
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<td><strong>Prerequisites</strong></td>
<td>Enrolment in BSc</td>
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A2. Delivery details

<table>
<thead>
<tr>
<th>Hours per week</th>
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<tr>
<td><strong>Number of weeks</strong></td>
<td>12 weeks</td>
</tr>
<tr>
<td><strong>Commencement date</strong></td>
<td>Mon 6 March, 2017 (Week 2)</td>
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Summary of course structure (for details see 'Course Schedule')

<table>
<thead>
<tr>
<th>Component</th>
<th>HPW</th>
<th>Time</th>
<th>Day</th>
<th>Location</th>
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<td>Lecture</td>
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<td>Tue</td>
<td>CLB4</td>
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<tr>
<td>Tutorials</td>
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<td>11:00 – 13:00</td>
<td>Tue</td>
<td>CLB4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11:00 – 13:00</td>
<td>Mon</td>
<td>Mathews 106</td>
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<tr>
<td>Total</td>
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<td></td>
<td></td>
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</table>

B. Staff

<table>
<thead>
<tr>
<th>Name</th>
<th>Contact Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wallace Bridge: Course convener</td>
<td><a href="mailto:wj.bridge@unsw.edu.au">wj.bridge@unsw.edu.au</a>, 108 Samuels Bldg</td>
</tr>
</tbody>
</table>

**Please note:** that students are welcome to Email staff with queries, providing only short concise answers are required (e.g. Yes/No). For any detailed explanations of issues relating to the course and the assignments then please **DO NOT** send Emails but raise your concerns with staff during the allotted tutorial times.

**Email protocol**

Ensure the subject line commences with BABS3071 2017 and is followed by the topic of the message. See example, below. BABS3071 2017 Stock Market Game

**Do not use artistic licence with punctuation** e.g. BABS3071:2017, BABS3091_2017, etc, **are all wrong**.

Please sign each email with your full name and your student number.
C. **Course details**

| **Introduction** | Changing global patterns are resulting in the so called “knowledge based industries” becoming increasingly important drivers of economic growth. Countries which are successful in commercialising high technology industries are being rewarded with economic growth and are seeing significant improvement in their GDP per capita. For this reason, considerable global interest is being focussed on strategies that encourage the formation and growth of technology-based companies.  

Over the past few decades, information technology and communication (ITC) industries have seen rapid growth and have played a major role in knowledge based economies. More recently, major advances in the basic sciences underpinning biotechnology have resulted in the establishment of companies structured specifically to commercialise these new technologies. The contribution from these companies is now becoming a major factor in the economic growth of many nations. As an example, biopharmaceutical sales are now 10% of the total pharmaceutical market and are rapidly increasing.  

In this course, issues key to the commercialisation of biotechnology products will be addressed, and the structure of the growing biotechnology industry in Australia and overseas will be described. The major distinguishing feature that differentiates the biotechnology sector from the information industry is the importance of intellectual property (IP) and the need to protect new discoveries with patents. Most biopharmaceuticals require 10-15 years of R&D and clinical testing before they make it to the market and, as such, ownership of the IP must be firmly established to protect the inherent extensive financial and resource investment. A solid grounding in IP will be provided both in the formal lectures and in the course assignments.  

The biotechnology sector is characterised by a large number of start-up companies, and the way in which such companies are formed and grow will be discussed in the course and reinforced in the assignments. The lectures will also cover the need for business planning in start-ups from the perspective of raising capital, defining the company vision, and managing the growth of the business.  

A complex and often controversial field such as biotechnology raises a number of ethical, regulatory and consumer issues. Environmental, consumer and commercial concerns regarding the use of genetically modified organisms (GMOs) in agriculture will be discussed as will the various legislative frameworks controlling the manufacture (GMP) and use of biotech products. The course will also cover the design and management of human clinical trials, which are central to the development of any new therapeutic agent.  

Most lectures in the course will be delivered by experts from industry; they are a highlight of the course. Please come along and be on time to get the most out of our guest presentations. |
| **Course aims and learning outcomes** | BABS3071 aims to provide a fundamental understanding of the biotechnology industry. Biotechnology is an applied science and, as such, involves the conversion of scientific knowledge and discovery into commercial products. Bioscience |
graduates require a solid foundation in fundamental science and a good understanding of the commercial and business issues relating to the biotechnology industry to justifiably call themselves biotechnologists. Without any understanding of business imperatives, it is difficult for any applied scientist to appropriately focus their research efforts to deliver outcomes that have reasonable commercial potential.

By the end of this course, your learning outcomes will include an understanding of:

- The history and structure of the Australian and international biotechnology and related industries
- The importance of intellectual property in the biotechnology industry
- The role of clinical trials for testing efficacy and safety of pharmaceuticals
- Manufacturing processes and practices for biopharmaceuticals
- The environmental and legislative issues relating to genetically modified organisms, especially plants
- How biotechnology companies structure themselves to be sound businesses.

The course will also provide you with opportunities to develop important capacities, such as:

- skills in research, enquiry and analytical thinking
- enhanced information literacy
- an insight into some of the ethical and social issues of biotechnology

The course assignments will reinforce and build on the lecture material. Each student will select an ASX-listed biotechnology company that is developing products in an area of interest (e.g. gene therapy, transgenics, nanotech, etc.). They will first evaluate a selected patent family from that company, and critically review it in terms the technology it protects, competitive landscape and strategic value for the company before evaluating the company as a whole. Students will also increase their knowledge of the biotechnology industry by competing in a Virtual Stock Exchange game, where they individually trade only in biotech stocks. They must evaluate stock price trends, company announcements and a series of intrinsic and extrinsic factors to explain the rise and fall of biotech stock prices.

### University Handbook entry

This course is an introduction to the commercialisation of biotechnology. It covers important aspects of biotechnology that are critical in the industry. This includes funding for biotechnology R&D (corporate and government), intellectual property (IP), commercialisation strategies and regulatory issues. Expert speakers who work in the biotechnology industry present most of the lectures. Assignments include a stock market game and detailed case studies on Australian biotechnology companies, including those that are developing new drugs, diagnostics and devices.

### D. Lecture topics

(Note: in week 3, a detailed lecture/tutorial schedule will be provided as a supplement to this course outline)

- Commercialisation and innovation processes.
- Australian and International biotech industries
- Intellectual property (IP):
Types of IP, International IP law and treaties, Invention vs Discovery, Patentability of biotech inventions.

Identifying inventive subject matter, Research management and laboratory practice.

IP Valuation and commercialisation of IP. License agreements

- Human clinical trials and ethical issues in biotech
- Manufacturing and regulation approval for biotech products – GMP, GLP, ICH
- Commercializing stem cell technology
- Genetically modified plants.
  - The risk to the environment: a scientific perspective
  - Government regulations, consumer perception and their impact on commercializing GMOs

E. Tutorial topics

- Overview of course and assignments
- How to invest in the stock market
- The Australian stock market
- Finding and evaluating business information
- Reading Annual Reports
- Financial statements what do they tell you
- Politics and science
- Commercialising IP at UNSW
- Health and Safety implications for research
- Government reporting: regulation and administration
- What to expect in the exam. Example questions and discussion.

F. Assessment Tasks

- Assignment 1 is an individual effort. Assignment 2 and the presentation are three member team efforts.
- All assignment reports are to be single spaced and in 12 point Calibri font and a minimum of 2.5 cm margins is required.
- Additional pages can be used for the title page (include team name, team members – first and last names and student numbers), references and any appendices. **Assignments that are longer than this will be automatically penalised 10% of final mark.**
- All work in the assignments is expected to be the students’ own analysis of available information. The entire body of the text will need to be completely referenced at the end of the report. Do not copy and paste information directly from any website and include it without appropriate referencing in your report. **This is plagiarism** and is very easily detected by your assessors. Any plagiarism detected will be acted upon.
- If you are unclear about what is required in any of the assignments, please ask during the tutorial sessions.

**Assignment submission requirements**

Assignments 1 and 2 must be submitted as hardcopies (BSB Office) and soft copies (wj.bridge@unsw.edu.au) by 3:00 pm Friday of the due week.
Breakdown of student assessment

<table>
<thead>
<tr>
<th>Component</th>
<th>Page limit</th>
<th>% Final Mark</th>
<th>Due Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td></td>
<td>5</td>
<td>2-11</td>
</tr>
<tr>
<td>Stock market game (Assignment 1)</td>
<td>3</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Company review (Assignment 2)</td>
<td>4</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Final presentation</td>
<td>3 slides</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Exam</td>
<td></td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

**Participation**

Given the workshop nature of the course it is vital that students attend and participate in class. To this end, 5% of the final course mark will be awarded for 100% participation (completion of weekly tutorial homework tasks) and prorated for below 100%.

**Assignment 1: Stock Exchange game**

Assignment 1 will give an introduction to the biotechnology and US NASDAQ technology stock market. Students will gain insight into:

1. The overall range of listed biotechnology companies (products, size, history, etc.).
2. How the stock market works (by direct involvement in buying and selling on the Virtual Stock Exchange).
3. The thrill of profit and the despair of loss.....
4. Annual reports.
5. Business journals and Web databases (unbiased reports on expectations and announcements).
6. Professional investment services, analysts and stockbrokers.

Hopefully you should find this assignment challenging but enjoyable. The assignment will run through 10 weeks of the course with students expected to trade and develop portfolios on the NASDAQ.

The submitted report will be **3 pages in length**. It will contain a 2 page reflective essay to briefly describe your portfolio development and performance, and most importantly, **what you have learned**. You will also select one of your purchased stocks and give a 1 page discussion of the changes in that stock price over the last 6 months. A list of all of your trades, from the Virtual Stock Exchange, will form an appendix. You will be expected to make at least 2 trades per week in the game (weeks 2-11) as evidence of engagement with the competition. However, should you wish not to make two trades in any given week due to a belief that making the trades will potentially financially damage your portfolio, you will need to send Wallace a brief email explaining the rationale for your decision. Should you do this you will be considered to be active in the competition and will not be penalised. For any given week you must make your trades prior to midnight of the Friday. Any gaps in meeting the required trading activity will result in a pro rata penalty of up to 28% of the marks for the assignment.
Marks will NOT be based on the performance of your portfolio, but will be awarded according to what you have learned, the amount and type of trading you have done and the reasoning behind the decisions to purchase or sell a particular stock. However, just for fun there will be a prize ($50) for whoever meets the investment criteria throughout the competition and has the highest nett worth by competition close.

**Template for Assignment 1 report (marks distributed according to page allocation)**

Overview of investment/portfolio strategy and performance - ½ page  
Critique of resources used to make investment decisions – ½ page  
What you have learnt – ½ page  
What you would do differently next time or in real life – ½ page  

**Featured stock – 1 page**  
Brief description of company (history, size, products, business model) – ¼ page  
Why you bought it? – ¼ page  
Key influences that affected the price in the last 6 months – ½ page

The first tutorials will involve becoming familiar with NASDAQ listed biotechnology stocks and the free Internet services that are available for investment advice and information. We do not expect students to be financial whizzes from the start but will encourage you to dive in, using the information that you find. This is as much an exercise in using Web resources as it is in making (or losing) virtual money.

You will first need to register your personal details at the Virtual Stock Exchange (VSE) website (http://vse.marketwatch.com/Game/Homepage.aspx). Once you have done so, you can then join the Commercial Biotechnology private competition.

- **Game Name:** BABS3071-2017  
- **URL:** www.marketwatch.com/game/babs3071-2017  
- **Password:** BABS30712017  
- **Competition dates:** 27th February 2017 to 26th May 2017  
- **Starting value:** $100,000

Note: You will receive limited formal instruction in this course on the stock markets. This is a self-learning exercise and you will be expected to answer your own questions by exploring resources available on the Web, including those on the Virtual Stock Exchange.

**Assignment 2: Company Evaluation**

For assignment 2, teams of three students will study and report on various technology and business aspects of an allocated ASX listed Biotech Company. The 4 page report will discuss your chosen company in terms of history, products, IP position, and performance. You must reference your assignment extensively. The references should go at the end of the document (after the 4 pages) and be cited appropriately in the text. You can also include an additional title page and an appendix.

The sections to be addressed will be:
1.1 Executive Summary. Highlights of the report (Note: it is not a table of contents in text). ½ page
1.2 Establishment and founders. How and why was the company established? ¼ page
1.3 IP position of the company’s main products. 1 page
   • Patent family. Description of portfolio and the inventions being protected? Have the patents been granted? ¼ page
   • Market. What problem does the invention solve? i.e. What is the market opportunity and how large is it. ¼ page
   • Competitive advantage. How does it solve the problem better than current available solutions? i.e. what advances are being made with the IP? ¼ page
   • Product development. How are the patents being developed into products? What stages have been completed? ¼ page
1.4 Share and dividend performance (chart with comments on key events affecting price). 1 page
1.5 Business model. How does the company generate or intend to generate revenue? Who are the customers and why do (or will they) buy and how do you get your product to them (distribution)? ½ page
1.6 Regulatory approval (or other validation approvals) required. ¼ page
1.7 Recommendations. Your overall assessment of the strengths/weaknesses of the company’s activities. ¼ page

Final Presentation
During Week 12, each team will give a 5 minute oral presentation to the class on their companies. Note. All team members must partake in the presentation delivery. After each presentation there will be a 3 minute Q&A session, with each presenter having the opportunity to address at least one question from the audience regarding their presentation.

As the time allocated is short the presentation will need to focus on the:

1. Technology of the company
2. Market niches (description and $ value if available)
3. Size of the company (staff and value)
4. Key technology advantages or innovation
5. Expected future in the market place and any threats (from competing technologies/companies)
6. Expected investment potential (based on share price)

Presentations will be peer review graded by all teams and Wallace

At the end of each presentation, each team will negotiate, and agree on marks for presenting teams against the following criteria.

- the clarity of the presentation (was it understandable)
- analysis (was the analysis sufficient and credible)
- ability to respond to questions

Exam
The exam will be a combination of Multiple Choice, True/False and short answer questions. The details of the exam including exact structure, mark weighting and course content coverage will be discussed in the Week 12 tutorial. Examples of questions will also be presented and discussed.
**Before the course commences**

Read the course outline and have one question prepared regarding aspects of the course. Be prepared to ask this question during the first tutorial class.

Find on the internet one item of recent (Australian or international) news that is relevant to the Biotech sector and of interest to you. Email the link to Wallace (wj.bridge@unsw.edu.au) by 5 pm Thursday 2 March 2017 and please use the Subject line: BABS3071 2017 News.

This will contribute 50% of the week 2 (class 1) participation marks.

Select news items will discussed during the tutorials.

**G. Course materials and the Internet**

Lectures in this course will be recorded and made available via the Echo system. PDFs of lectures will be made available via Moodle after the lecture has been delivered. Tutorial materials, where possible, will also be available electronically.

**H. Continual course improvement**

Student feedback on BABS3071 is gathered yearly, using UNSW’s Course and Teaching Evaluation and Improvement (CATEI) Process. Student feedback is of enormous value, is taken seriously, and continual improvements are made to the course based in part on such feedback.

Changes for 2011, from comments in 2010 CATEI survey are:
- Length of student presentation increased from 5 to 6 minutes, more computer tutorials.

Changes for 2012, from comments in 2011 CATEI survey are:
- Class expanded to have two tutorial sessions with restrictions on numbers of attendees per session.

Changes for 2013, from comments in 2010/2011 CATEI are:
- More individual assessment tasks (and less group work)
- Adjustment of marks for assessment tasks and early bird quiz, to better reflect effort for each task.

Changes for 2014
- New course coordinator
- All assessments are now individual efforts with no assessable teamwork. Students are encouraged to collaborate and help each other in research teams.
- Grade contribution increased for assignments (2013 Exam 45%, 2014 Exam 30%).
- New templates for assignment structure

Changes for 2015
- Return to paper CATAI

Changes for 2016
- Exam changed from essay (4 out of 5 choices) to multiple choice, True/False, short answer format
- Removal of mid-session test (content to be incorporated into tutorials). Exam now 40%.
- Return to on-line CATAI
- Assignments (2-3) changed from individual to teams of two.

Changes for 2017, based on 2016 CATAI feedback
- The two team assignments have been consolidated into a single assignment
- Team sizes have been increased from 2 to 3
- Increase in lecture/tutorial content covering financial statements and stock markets.
I. Special consideration and further assessment - Session 1 2017

Students who believe that their performance, either during the session or in the end of session exams, may have been affected by illness or other circumstances may apply for special consideration. Applications can be made for compulsory class absences such as (laboratories and tutorials), in-session assessments tasks, and final examinations. **Students must make a formal application for Special Consideration** for the course/s affected as soon as practicable after the problem occurs and **within three working days of the assessment to which it refers**. Students should consult the A-Z section of the “Student Guide 2016”, particularly the section on “Special Consideration”, for further information about general rules covering examinations, assessment, special consideration and other related matters. This is information is published free in your UNSW Student Diary and is also available on the web at: [my.unsw.edu.au/student/atoz/SpecialConsideration.html](http://my.unsw.edu.au/student/atoz/SpecialConsideration.html).

**HOW TO APPLY FOR SPECIAL CONSIDERATION**

Applications must be made via Online Services in myUNSW. **You must obtain and attach Third Party documentation before submitting the application. Failure to do so will result in the application being rejected.** Log into myUNSW and go to My Student Profile tab > My Student Services channel > Online Services > Special Consideration. After applying online, students must also verify supporting their documentation by submitting to UNSW Student Central:

- Originals or certified copies of your supporting documentation (Student Central can certify your original documents), and/or
- A completed Professional Authority form (pdf - download here).

The supporting documentation must be submitted to Student Central for verification **within three working days** of the assessment or the period covered by the supporting documentation. Applications which are not verified will be rejected.

Students will be contacted via the online special consideration system as to the outcome of their application. Students will be notified via their official university email once an outcome has been recorded.

**SUPPLEMENTARY EXAMINATIONS:**

The University does not give deferred examinations. However, further assessment exams may be given to those students who were absent from the final exams through illness or misadventure. Special Consideration applications for final examinations and in-session tests will only be considered after the final examination period when lists of students sitting supplementary exams/tests for each course are determined at School Assessment Review Group Meetings. Students will be notified via the online special consideration system as to the outcome of their application. **It is the responsibility of all students to regularly consult their official student email accounts and myUNSW in order to ascertain whether or not they have been granted further assessment.**

<table>
<thead>
<tr>
<th>For Semester 1 2017, BABS Supplementary Exams will be scheduled on:</th>
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</thead>
<tbody>
<tr>
<td>► BABS-coded courses, 11 July 2017</td>
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Further assessment exams will be offered on this day ONLY and failure to sit for the appropriate exam may result in an overall failure for the course. Further assessment will NOT be offered on any alternative dates.
J. UNSW Academic Honesty and Plagiarism

The University regards plagiarism as a form of academic misconduct, and has very strict rules regarding plagiarism. For UNSW policies, penalties, and information to help you avoid plagiarism see: http://www.lc.unsw.edu.au/plagiarism/index.html.

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.
Feedback statement
We appreciate student feedback because we are always looking for ways to improve your learning experience in this course. Below is a summary of the feedback from the previous student cohort in this course and our response to how we improved this year’s course delivery.

Last year’s students told us that:

1. They would like more formal content covering interpretation of financial statements in company annual reports
2. More instruction on how to invest in the stock market
3. A relax on the weekly trades for Assignment 1
4. A reduction in the number of assignments and an increase in team members
5. An increase in the spread of due dates for major assessment tasks

We have responded to this feedback by:

- Including more formal finance and stock market content into the tutorials
- Reducing the required number of trades to 2 per week (from 4 in 2016) and giving an option to provide a financial reason as to why you would prefer not to trade in a given week.
- Consolidated assignments 2 (3 page) and 3 (4 page) into a single assignment (4 pages) and have increased team members from 2 to 3.
- Assessment deadlines are now spread over Week 10, 12 and 13.