



# MOLS8002

## Bioethics and Biotechnology

Session 2, In person-scheduled-weekday, North Ryde 2023

*School of Natural Sciences*

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Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

## General Information

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By appointment

Credit points  
10

Prerequisites  
Admission to GradDipBiotech or GradCertLabAQMgt or GradDipLabAQMgt or MBiotech or MBioBus or MLabAQMgt or MRadiopharmSc or MSc or MScInnovationChemBiomolecularSc or MPH or HSYP801 or HSYP8100 or HSYP802 or HSYP8101

Corequisites

Co-badged status

### Unit description

This unit introduces students to ethical issues raised by current developments in biotechnology, especially in the sphere of genetic technology. Topics include the ethics of genetic technology in human medicine and reproduction, including genetic screening/testing; human embryo research; genetic therapies (somatic and germ-cell); genetic enhancement; and cloning; and the impact of biotechnology on other aspects of human, animal and environmental well-being. Students develop a firm grounding in the ethical principles, theories and frameworks with which to analyse a variety of biotechnological applications, in addition to the requirements of scientific and academic conduct and the carrying out of responsible research.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

## Learning Outcomes

On successful completion of this unit, you will be able to:

**ULO1:** Explain the major ethical issues posed by specific biotechnological advances.

**ULO2:** Explain the central ethical concepts, principles and theories that arise in debates concerning the applications of biotechnological developments.

**ULO3:** Analyse and critically evaluate relevant case studies and scientific contexts, as well as theories and arguments in the relevant literatures.

**ULO4:** Apply the skills and concepts involved in ethical reasoning and argumentation to past, current and future controversies in biotechnological and other sciences.

**ULO5:** Construct clear and rigorous arguments in support of your own ethical positions and values.

**ULO6:** Apply enhanced skills in clarity of thought, clarity of oral and written expression, and written argumentation.

## General Assessment Information

### Detailed assessment information and rubrics

Detailed information about each of the assessments, including rubrics and submission instructions will be available in the Assessment block in iLearn. Please make sure you read the assessment information carefully. Assessment forums for each assessment will be available on the unit iLearn – if you have an assessment question please check the assessment information and the relevant assessment forum to see if your question has already been answered. If not, please post your question on the assessment forum where it will be answered within 1-2 days (weekdays). Please do not email teaching staff unless you have tried all the above sources and

cannot find an answer to your question.

### Essay Option One or Essay Option Two – What does this mean?

In this unit students must choose ONE of two possible dates to submit their essay. You do not need to advise the teaching team or the unit convenor: you simply choose whether to submit half way through the unit, or at the end of the unit. Essay questions for the first essay option will relate to the first half of the unit; essay questions for the second essay option will relate only to the second half of the unit. Students may only submit ONE essay; no re-tries are permitted. Essay questions will be released four weeks prior to each due date. Please NOTE the following when selecting your essay submission date:

- Students selecting Essay Option Two will NOT have received their essay mark or feedback prior to the final examination in this unit.
- Students are not at a disadvantage if they submit their essay for Essay Option One, in spite of having completed only half the unit at that time. Essay questions require knowledge only of the topics covered in the first half of the unit, and student essay results are not generally better at the end of semester.
- Please consider the fact that you may have several assessments due in other units at the end of semester'
- Please consider the fact that you will need to study for an Examination in this unit at the end of semester, which will require you to answer questions from topics covered across the whole unit.

### Special Consideration

Requests for extensions must be submitted via a Special Consideration request, which is available in the <http://ask.mq.edu.au> portal. Your request should be submitted **no later than five days after the due date** and will need to be accompanied by appropriate supporting documentation. Please see the Special Consideration policy in the list of policies at the end of this document for further details. Read the policy closely as your request may be turned down if you have not followed procedure, or if you have not submitted a request in a timely manner.

### Late Submission Penalty

Unless a Special Consideration request has been submitted and approved, **a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted**, up until the 7th day (including weekends). After the 7th day, a mark of '0' (zero) will be awarded even if the assessment is submitted. Submission time for all written assessments is set at 11.55pm. A 1-hour grace period is provided to students who experience a technical issue. This late penalty will apply to written reports and recordings only. Late submission of time sensitive tasks (such as tests/exams, performance assessments/presentations, scheduled practical assessments/labs) will be addressed by the unit convenor in a Special consideration application.

### Academic Integrity

Academic honesty is taken very seriously, and a range of methods, including but not restricted to

the use of Turnitin, are used to detect plagiarism. Misrepresenting someone else's work as your own may be grounds for referral to the Faculty Disciplinary Committee. If you have questions about how to properly cite work or how to credit sources, please ask the convenor for help and see also the Academic Integrity Policy <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/academic-integrity>

**Note: All assignments in this unit are individual assignments. Collusion (unauthorised collaboration on individual assignments) is a breach of the Academic Integrity Policy. If in doubt, contact a member of teaching staff.**

A helpful resource if you would like to know more about referencing and avoiding plagiarism is Macquarie's Academic Integrity Module, available here: <https://students.mq.edu.au/support/study/skills-development>. You will need to complete this Module before accessing the unit content, if you have not already done so. More information is available in iLearn.

### What about ChatGPT?

Information about this unit's policy on the use of AI will be made available in the Assessment block in iLearn. Please check that information and contact the convenor if you have any questions.

### Academic Writing and Study Support

Macquarie University offers a number of services to help with academic writing, referencing and study skills. For details, see: <https://students.mq.edu.au/support/study/skills/assignments>

**For information about policies related to Assessment, see *Policies and Procedures* section below.**

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Online timed examination</a>	25%	No	University Examinations Period
<a href="#">10 weekly quizzes</a>	20%	No	11.55pm on Sunday of each week (Weeks 3-12 only)
<a href="#">Discussion Participation and Engagement</a>	15%	No	In weekly SGTAs
<a href="#">Essay Self-assessment</a>	10%	No	Same as your essay submission date
<a href="#">iLearn Intro and film reflection</a>	5%	No	11.55pm Sunday 6 August
<a href="#">Essay</a>	25%	No	EITHER 11.55pm Sunday 17 Sept OR 11.55pm Sunday 5 Nov

## Online timed examination

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 25 hours

Due: **University Examinations Period**

Weighting: **25%**

Students complete an online timed exam (1.5 hours) during University Examination period.

On successful completion you will be able to:

- Explain the major ethical issues posed by specific biotechnological advances.
- Explain the central ethical concepts, principles and theories that arise in debates concerning the applications of biotechnological developments.
- Apply the skills and concepts involved in ethical reasoning and argumentation to past, current and future controversies in biotechnological and other sciences.
- Construct clear and rigorous arguments in support of your own ethical positions and values.
- Apply enhanced skills in clarity of thought, clarity of oral and written expression, and written argumentation.

## 10 weekly quizzes

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **11.55pm on Sunday of each week (Weeks 3-12 only)**

Weighting: **20%**

Students complete 10 short online quizzes, worth 2% each. Quizzes must be completed by the end of the teaching week.

On successful completion you will be able to:

- Explain the major ethical issues posed by specific biotechnological advances.
- Explain the central ethical concepts, principles and theories that arise in debates concerning the applications of biotechnological developments.
- Analyse and critically evaluate relevant case studies and scientific contexts, as well as theories and arguments in the relevant literatures.
- Apply enhanced skills in clarity of thought, clarity of oral and written expression, and written argumentation.

## Discussion Participation and Engagement

Assessment Type <sup>1</sup>: Practice-based task

Indicative Time on Task <sup>2</sup>: 10 hours

Due: **In weekly SGTAs**

Weighting: **15%**

Students engage in planned discussion exercises in SGTAs, demonstrating that they have read the required readings and making active and constructive contributions to discussions.

On successful completion you will be able to:

- Explain the major ethical issues posed by specific biotechnological advances.
- Explain the central ethical concepts, principles and theories that arise in debates concerning the applications of biotechnological developments.
- Analyse and critically evaluate relevant case studies and scientific contexts, as well as theories and arguments in the relevant literatures.
- Apply the skills and concepts involved in ethical reasoning and argumentation to past, current and future controversies in biotechnological and other sciences.
- Construct clear and rigorous arguments in support of your own ethical positions and values.
- Apply enhanced skills in clarity of thought, clarity of oral and written expression, and written argumentation.

## Essay Self-assessment

Assessment Type <sup>1</sup>: Reflective Writing

Indicative Time on Task <sup>2</sup>: 5.0 hours

Due: **Same as your essay submission date**

Weighting: **10%**

Students complete a self-assessment of their essay, using the essay rubric and criteria and qualitative assessment of the essay strengths, weaknesses and challenges.

On successful completion you will be able to:

- Apply the skills and concepts involved in ethical reasoning and argumentation to past, current and future controversies in biotechnological and other sciences.
- Apply enhanced skills in clarity of thought, clarity of oral and written expression, and written argumentation.

## iLearn Intro and film reflection

Assessment Type <sup>1</sup>: Practice-based task

Indicative Time on Task <sup>2</sup>: 5 hours

Due: **11.55pm Sunday 6 August**

Weighting: **5%**

Students introduce themselves on the iLearn Discussion Forum (Assessment 1) and post a short reflection on the film shown in Lecture 1.

On successful completion you will be able to:

- Explain the major ethical issues posed by specific biotechnological advances.
- Explain the central ethical concepts, principles and theories that arise in debates concerning the applications of biotechnological developments.
- Analyse and critically evaluate relevant case studies and scientific contexts, as well as theories and arguments in the relevant literatures.
- Apply the skills and concepts involved in ethical reasoning and argumentation to past, current and future controversies in biotechnological and other sciences.
- Apply enhanced skills in clarity of thought, clarity of oral and written expression, and written argumentation.

## Essay

Assessment Type <sup>1</sup>: Essay

Indicative Time on Task <sup>2</sup>: 25 hours

Due: **EITHER 11.55pm Sunday 17 Sept OR 11.55pm Sunday 5 Nov**

Weighting: **25%**

Students produce a piece of argumentative writing in response to assigned essay questions.

On successful completion you will be able to:

- Explain the major ethical issues posed by specific biotechnological advances.
- Explain the central ethical concepts, principles and theories that arise in debates concerning the applications of biotechnological developments.
- Analyse and critically evaluate relevant case studies and scientific contexts, as well as theories and arguments in the relevant literatures.
- Apply the skills and concepts involved in ethical reasoning and argumentation to past, current and future controversies in biotechnological and other sciences.
- Construct clear and rigorous arguments in support of your own ethical positions and



values.

- Apply enhanced skills in clarity of thought, clarity of oral and written expression, and written argumentation.

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<sup>1</sup> If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

<sup>2</sup> Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

## Delivery and Resources

**NOTE: It is expected that students will attend/listen to ALL LECTURES and will complete ALL ASSESSMENT COMPONENTS in this unit.** You do not need to have passed each assessment to pass the unit, but it is expected that all assessments are attempted. The final examination will cover all sections of the unit.

**General Submission Procedure:** Written assessments must be submitted via TurnItIn at the correct link provided on the Unit iLearn site. You may only make ONE submission for each assessment, and you will NOT be able to view your TurnItIn match similarity report for your assessment before you submit it. You must ensure that you use the correct link for your assessment, and that you upload the correct final version of your assessment. No re-submissions will be permitted.

### DELIVERY:

Lectures in this unit will be in-person (on-campus) with recordings available online via Echo360 and the unit iLearn site.

STGA (Small Group Learning Activities) will be either on campus or on zoom (where available).

**READING:** All required readings are available in Leganto on the unit iLearn site. Supplementary reading is required for Essays. Suggestions for Supplementary Reading will be provided in lectures and on iLearn.

## Unit Schedule

### SECTION I: (WEEKS 1–5) FRAMEWORKS FOR AN ETHICS OF BIOTECHNOLOGY

**WEEK 1 (beginning July 24): What is ethics? What is ethical reasoning? (A/Prof Lotz)**

*Required reading:*

Cohen, S.: 'What is Ethics?'

- **No SGTA (Small Group Teaching Activity) in Week 1**

**WEEK 2 (beginning July 31): How can ethical theories help us think about bioethics and biotechnology? (A/Prof Lotz)**

**Part I: Consequentialist and Autonomy-based ethics.**

*Required reading:*

Thomson, A.: 'Moral Principles and Moral Theories'.

Grace, D. and Cohen, S.: Chapter 1 pp.15-20, sections on 'Consequentialism' and 'Nonconsequentialism' in *Business Ethics: Problems and Cases*.

- **Online Discussion Exercise due: by 11.55pm Sunday 6 August.**

**WEEK 3 (beginning Aug 7): How can ethical theories help us think about bioethics and biotechnology? (A/Prof Lotz)**

**Part II: Rights-based, Virtue-based, and Care-based ethics.**

*Required reading:*

Rachels, J. Chapter 11, 'Feminism and the Ethics of Care', pp. 133-142.

Grace, D and Cohen, S.: Chapter 1 pp.21-24, section on 'Virtue Ethics' in *Business Ethics: Problems and Cases*.

**WEEK 4 (beginning Aug 14): Does biotech have lessons to learn from eugenic history? (A/Prof Lotz)**

*Required reading:*

Wikler, D. and Barondess, J. 'Bioethics and Anti-Bioethics in Light of Nazi Medicine: What Must We Remember?'

Buchanan, A. et al: Excerpt from 'Eugenics and Its Shadow'

*Optional additional reading:*

Buchanan, A. et al: Excerpt from 'Genes, Justice and Human Nature.'

**WEEK 5 (beginning Aug 21): How do we do ethical science and research? (Prof Lipworth)**

*Required reading:*

Emanuel, E *et al.* 'What Makes Clinical Research Ethical?' *Journal of the American Medical Association (AMA)*, Vol. 283, No. 2 May24/31: 2701-2711.

Glass, B. 'The Ethical Basis of Science.'

## SECTION II (WEEKS 6–10): BIOTECHNOLOGY IN HUMAN HEALTH AND REPRODUCTION

### WEEK 6 (beginning Aug 28): Human embryo research – Do human embryonic stem cells have moral status? What about synthetic embryos [SHEEFs]? (A/Prof Lotz)

*Required reading:*

Harris, J. 'Stem Cells, Sex and Procreation'

Pera, M. et al. 'What if stem cells turn into embryos in a dish?'

*Optional additional reading:*

Aach J. et al. 'Addressing the ethical issues raised by synthetic human entities with embryo like features'. *eLife* 2017;6: e20674. DOI: 10.7554/eLife.20674

### WEEK 7 (beginning Sept 4): Would anything be wrong with human cloning for procreative purposes? (A/Prof Lotz)

*Required reading:*

Brock, D. 'Cloning Human Beings: An Assessment of the Ethical Issues Pro and Con.'

*Optional additional reading:*

Holm, S. 'A Life in the Shadow: One Reason Why We Should Not Clone Human Beings.'

Kass, L. 'The Wisdom of Repugnance.'

### **MONDAY 11 SEPT – FRIDAY 22 SEPT (inclusive): MID SEMESTER BREAK**

- **ESSAY OPTION 1 DEADLINE: 11.55pm Sunday 17 September**

### WEEK 8 (beginning Sept 25): Genetic screening, testing and diagnosis – Is it always better to know? (Prof Lipworth)

*Required reading:*

Clarke, A. 'Genetic Screening and Counselling.'

Steinbock, B. 'Preimplantation Genetic Diagnosis and Embryo Selection.'

### WEEK 9 (beginning Oct 2): Should we edit the human genome for future generations? (Prof Lipworth)

- **No SGTA (Small Group Teaching Activity) in Week 9.**

*Required reading:*

Chadwick, R. 'Gene Therapy.'

Smolensky, S. 'CRISPR/Cas9 and Germline Modification: New Difficulties in Obtaining Informed Consent'

*Optional additional reading:*

Elias, S. and Annas, G.: 'Somatic and Germline Gene Therapy.'

Warren, MA. 'The Moral Status of the Gene.'

**WEEK 10 (beginning Oct 9): If genetic therapy is ok, what about genetic enhancement?(Prof Lipworth)**

*Required reading:*

Singer, P. 'Parental Choice and Human Improvement'.

Ter Meulen, R *et al*: 'Ethical Issues of Enhancement Technologies'.

*Optional additional reading:*

Resnik, D and Vorhaus, D. 'Genetic Modification and Genetic Determinism'.

**SECTION III (WEEKS 11-12): BIOTECHNOLOGY IN WIDER CONTEXT – COMMERCE AND FOOD**

**WEEK 11 (beginning Oct 16): Should human genes be privately ownable and commercially exploitable? (Prof Lipworth)**

*Required reading:*

Chadwick, R. and Hedgecoe, A. 'Commercial Exploitation of the Human Genome'

*Optional additional reading:*

Munzer, S. 'Property, Patents and Genetic Material'

**WEEK 12 (beginning Oct 23): Synthetic and food biotechnology: Solving environmental and food scarcity problems? (Prof Lipworth)**

*Required reading:*

Scott, D. 'The Technological Fix Criticisms and the Agricultural Biotechnology Debate'

Rogers, W. 'Ethical Issues in Synthetic Biology: A Commentary'

*Optional additional reading:*

Thompson, P. 'Ethical Issues in Food Biotechnology'

**Week 13: (beginning Oct 30):** Writing/Exam Preparation Week

- **No SGTA (Small Group Teaching Activity)** this week
- **ESSAY OPTION 2 DEADLINE: 11.55pm Sunday 5 November**

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](https://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

### The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

## Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

## Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

## Changes from Previous Offering

Changes to topics and readings. Removal of timed online test, replaced by 10 online quizzes.

## Changes since First Published

Date	Description
03/10/ 2023	"Tutor" replaced with teaching staff or teaching team. "Tutorials" replaced with SGTA (Small Group Teaching Activities)
23/07/ 2023	Assessment clarification.