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2014/2015, Semester 2, Week 1

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Created: 18-Apr-2002, Updated: 05-Nov-2014

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Module Code	LSM1302/GEK1527
Module Title	Genes & Society AY 14-15 (sem 2)
Semester	Semester 2, 2014/2015
Modular Credits	LSM1302 (4) / GEK1527 (4)
Faculty	Science (Biological Sciences)
Timetable	Timetable
Module Facilitators	Click to view who is teaching the module.
Weblinks	
Tags	--

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Aims & Objectives[Top](#)

The aim of the module is to introduce students to the modern concepts in biology and to enable them to evaluate independently the potential benefits and risks of the biotechnological revolution and its implications for society. It focuses on how genes and our understanding of it had impacted, are and will be impacting, our lives as individuals and our society at large. While the module covers broad themes of genetics and biotechnology including related ethical issues and implications, it also provides sufficient grounding of fundamental concepts to ensure students of diverse background can appreciate the significance of past, present and future developments of genetic knowledge on societies.

Prerequisites[Top](#)

Preclusion: BL1361. Not for students taking Life Sciences major/minor, FST, Pharmacy and Bioengineering major.

Please refer to CORs

<http://nus.edu.sg/cors/index.html>

Teaching Modes[Top](#)

Lectures, independent study and CAL-based.

Schedule[Top](#)**TIMETABLE FOR SEMESTER II, 2014/2015****LSM1302/GEK1527 - GENES AND SOCIETY****Lecture Group: SL1 & SL2****Module Coordinator: Dr Lam Siew Hong**Email: dbslsh@nus.edu.sg

Tel: 6516-7379

GROUP SL1**LECTURES:** MONDAYS & THURSDAYS**TIME:** 1400-1600hrs**VENUE:** UT-AUD1**GROUP SL2****LECTURES:** TUESDAYS & FRIDAYS**TIME:** 1400-1600hrs**VENUE:** UT-AUD2

WK	MTH	LECTURES (SL1)		LECTURES (SL2)	
		MONDAYS	THURSDAYS	TUESDAYS	FRIDAYS
1.	Jan	12 L1	15 L2	13 L1	16 L2
2.		19 L3	22 L4	20 L3	23 L4
3.		26 L5	29 L6	27 L5	30 L6
4.	Feb	2 L7	5 L8	3 L7	6 L8
5.		9 L9	12 L10	10 L9	13 L10
6.		16 L11	19 Public Holiday	17 L11	20 Public Holiday
Recess week: Sat 21 Feb – Sun 1 Mar 2015 (1 week)					
7.	Mar	2 L12	5 L13	3 L12	6 L13
8.		9 eLearning Week	12 eLearning Week	10 eLearning Week	13 eLearning Week
9.		16 L14	19 L15	17 L14	20 L15
10.		23 L16	26 L17	24 L16	27 L17
11.	Mar/Apr	30 L18	2 No Class	31 L18	3 Public Holiday
12.	Apr	6 L19	9 L20	7 L19	10 L20
13.		13 L21	16 L22	14 L21	17 L22
READING PERIOD : Sat 18 Apr to Fri 24 Apr 2015 (1 week)					
EXAMINATION : Mon, 4 May 2015, 9.00 a.m.					
VACATION : Sun 10 May 2015 to Sun 2 Aug 2015 (12 weeks)					

Syllabus[Top](#)**(1) Introduction (Lectures 1-5; Introduction to Biotechnology, Chapters 1, 2)**

- The century of biotechnology
- Landmark findings of modern biology
- The nature of the genetic material and flow of genetic information
- Differences between organisms in how the genetic material operates

(2) Tools in Genetic Engineering (Lectures 6-8; Introduction to Biotechnology, Chapters 3, 8)

- Cloning & gene transfer
- Southern hybridization & PCR
- DNA fingerprinting
- DNA sequencing, genome research, and proteomics
- Biocomputing and bioinformatics

(3) The genetic engineering of microorganisms, plants, animals and humans, and applications to society (Lectures 9-12; Introduction to Biotechnology, Chapters 4-11)

- Medical
- Environmental
- Agricultural
- Pharmaceutical
- Military
- Legal and forensic

(4) Moral and ethical concerns (Lecture 13; Introduction to Biotechnology, Chapters 12-13)

- The ethics of genetic engineering
- The ethics of genetic predictions and animal cloning
- Intellectual property rights and patenting

Assessment

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Nature of CA and final assessment:

The final grade will be based on an examination (60%) and CA (40%).

Final Examination: 60 multiple choice questions.

Continual Assessment: This will include several formats from participation of online quizzes/survey, short structured questions, essay writing, problems-related to reading assignments, problems-related to web-based learning, special-assigned problems, etc. While the CA will involve some of these formats, it is however not limited to those listed here. The module coordinator and lecturers involved will decide on the type, format and weightage of the assessments.

Specific instructions and deadlines for each tasks and assignments will be given in advance during the lectures.

The module will involve web-based learning, online participation/interaction and some form of assessments will require broadband internet access, and students are advised to make their own arrangement for the necessary internet access. The Department of Biological Sciences will provide selected time-slots in the teaching lab (Refer to IVLE home page) to facilitate students' learning, however, due to the limited/restricted time-slot, students will likely require their own internet access.

LINKS (A) The Biotech Century

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DNA from the beginning (<http://www.dnafb.org/dnafb/>)

Learn.Genetics (<http://learn.genetics.utah.edu/>)

LINKS (B) Tools in genetic engineering[Top](#)

- (1) Basis of DNA fingerprinting, [<?http://www.dnadata source.net/fingerprint.htm](http://www.dnadata source.net/fingerprint.htm)
- (2) DNA testing (<http://www.scientific.org/tutorials/articles/riley/riley.html>) and associated problems (<http://www.scientific.org/DNAProblems/DNA-Problems.htm>) 2006
- (3) Human Genome Project Information, DOE/NIH, http://www.ornl.gov/TechResources/Human_Genome and <http://www.genome.gov/Pages/EducationKit/download.html>
- (4) Celera Genomics, <http://www.celera.com>.
- (5) DNA chips and Affymetrix at <http://www.affymetrix.com>
- (6) Carrying out a microarray (<http://www.bio.davidson.edu/courses/genomics/chip/chip.html>)

LINKS (C) Genetic engineering of bacteria & plants[Top](#)

- (1) Genentech -- the first biotech company, www.gene.com/gene/index.jsp
- (2) Borlaug, N. <http://www.plantphysiol.org/cgi/content/full/124/2/487?>
- (3) Campaign for Food Safety, <http://www.purefood.org/index.htm>
- (4) Designing seeds <http://www.beyonddiscovery.org/content/view/article.asp?a=167>
- (5) Genetic Engineering: The Future of Foods? (http://www.fda.gov/fdac/features/2003/603_food.html) FDA 2003
- (6) Pros and Cons of GMO http://www.ornl.gov/sci/techresources/Human_Genome/elsi/gmfood.shtml

LINKS (D) Genetic engineering of animals[Top](#)

- (1) Pharming, <http://www.pharming.com/>
- (2) Xenotransplantation, <http://xenotransplant.ineu.org/xenotrans/> June 2002

LINKS (E) The genetic engineering of humans[Top](#)

- (1) Gene therapy www.businessweek.com/datedtoc/a999/9928t.htm#BACOVSTO
- (2) DNA on the witness stand, http://www.accessexcellence.org/AB/WYW/lander/lander_1.html
- (3) Paternity testing in Bio-Synthesis Incorporated, <http://www.biosyn.com/>

LINKS (F) Animal and human cloning[Top](#)

- (1) A clone in sheep's clothing ([Scientific American March 1997](#))
- (2) The first human clone, <http://www.sciam.com> (January 2002)
- (3) The Perils of Cloning (2006) (<http://www.time.com/time/magazine/article/0,9171,1209937,00.html>)
- (4) Stem Cells "The Hope and the Hype" (2006) (<http://www.time.com/time/magazine/article/0,9171,1220538,00.html>)
- (5) Ethics in Science "The rise and fall of the cloning king" (2006) (<http://www.time.com/time/magazine/article/0,9171,1145236,00.html>)

LINKS (G) Gentic engineering - others
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Biological and Chemical Weapons, [Bioweapons](#) and [Evaluating the Threat](#) (Scientific American Dec 2001)

LINKS (H) Legal concerns
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- (1) **The golden helix: Inside biotech ventures.** 1995. A. Kornberg. p.236-245. University Science Books. HD9999 Bio.K.
- (2) **Reshaping Life - Key issues in genetic engineering.** 1989. G.J.V. Nossal & R.L. Coppel. Cambridge University Press, Cambridge. C.10 & 11. QH442NOs.
- (3) [Patenting life in Europe](#), Nature Biotechnology. 1998.

ACCESS TO CD ROMS
[Top](#)**CD ROMs**

There are 6 CD Roms made available to you. You are strongly recommended to use these materials to help in understanding the course (especially those marked *).

(i) *Investigating heredity, (ii) *DNA, (iii) *Genetic Engineering (iv) *From DNA to protein, (v) Mendel's principles of heredity (vi) Evolution

You have **two options** to access these:

(i) **using your own computer from home:** Please log in via **NUS VPN** if you access from home. You can download the NUS VPN software from this link <http://www.nus.edu.sg/comcen/dialup/>

The CD rom URL is <http://staff.science.nus.edu.sg/~gek1527/> Please use the username GEK1527 OR LSM1302. As for password, they are given in class - THESE WILL NOT BE GIVEN OUT ELECTRONICALLY! You can email Ms. Wong WP at dbswwp@nus.edu.sg if you encounter difficulties.

(ii) You may view the CD rom at our students' computer cluster at Biological Sciences teaching laboratory LS Lab 5. Please see available time slots below. No booking is required but do abide with the rules of the students' cluster.

Laboratories location	Monday	Tuesday	Wednesday	Thursday	Friday	Remarks
LS lab 5 at S2 level 4		1 - 2 pm 4 - 5 pm	10 - 12nn 2 - 4 pm	1 - 2 pm 4 - 5 pm		

[illegible]

Lecture Slides

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Weblinks, CD ROMs and other references as listed above.

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