LIFS3140
General Genetics
Fall Semester 2023

Lectures: Monday and Wednesday 9:00-10:20
Venue: LT-A
Instructors: Dr. Eugene HUNG (EH) (course coordinator), bohsc@ust.hk, Rm 5451
Prof. Danny LEUNG (DL), dcyleung@ust.hk, Rm 5519

Tutorials:	**Section**	**Date & Time**	**Venue [Quota]**	**Tutors**
	T1	Fri 9:30-10:20	Rm 4502 [60]	Ying Hei KAN
	T2	Fri 12:30-13:20	Rm 1409 [60]	Angus Y. ZHOU
	T3	Fri 15:00-15:50	CYT-G009B [70]	Ray L.W. TSUI
	T4	Fri 14:00-14:50	Rm 4504 [54]	Weixuan SONG
	T5	Fri 10:30-11:20	Rm 4504 [54]	Jacqueline T.M. AW

Reference: *Genetic Analysis: An Integrated Approach* (2nd Edition), M.F. Sanders & J.L. Bowman, Pearson, 2016.

Course description:
This course with lectures and tutorials aims to introduce students to the fundamental principles and mechanisms of heredity and variation. Topics will include the basic principles of heredity, its chromosomal basis, molecular mechanisms of mutation, recombination, cytogenetics, somatic cell genetics, organelle genetics, viral genetics, bacterial and fungal genetics, cancer genetics, developmental genetics, quantitative and population genetics, genomics and bioinformatics, etc. The use of prokaryotic and eukaryotic organism models for genetic analysis will be emphasised. Students taking this course are expected to acquire both qualitative and quantitative skills needed for genetic prediction. They are expected to utilize these genetic principles to explain genetic phenomena in nature, to solve simple genetic problems encountered in plant breeding program, animal husbandry, molecular diagnosis and medical applications.

Course Objectives:
On successful completion of this course, students are expected to be able to
1. apply the principles of transmission genetics to explain hereditary traits observed in natural or experimental situations and to design studies on the hereditary properties of notable traits;
2. explain the principles of biological phenomenon in genetic, cellular and molecular terms;
3. apply mathematical (quantitative) and biological (molecular) tools to evaluate complex biological phenomenon susceptible to the influence of abiotic factors;
4. evaluate the impact of advances in genetic studies on real-life phenomena and issues;
5. critically appraise genetic organization in the representative living species and evaluate its systematic characterization and possible application in the field of genetic studies.

Prerequisite: LIFS2040 Cell Biology *or* LIFS2210 Biochemistry I

Date	**Topic (Instructor)**	**Chapter**
Sep 1 (Fri)	Course introduction	
Sep 4 (Mon) Lecture 1	Law of segregation (EH)	2, 3
Sep 6 (Wed) Lecture 2	Pedigree analysis (EH)	2, 3
Sep 8 (Fri) Tutorial 1	Law of segregation & pedigree analysis (EH)	2, 3
Sep 11 (Mon) Lecture 3	Sex-linked inheritance (EH)	2, 3
Sep 13 (Wed) Lecture 4	Law of independent assortment (EH)	2, 3
Sep 15 (Fri) Tutorial 2	Sex-linked inheritance & Law of independent assortment (EH)	2, 3
Sep 18 (Mon) Lecture 5	Extension of Mendelian genetics (EH)	4
Sep 20 (Wed) Lecture 6	Extension of Mendelian genetics (EH)	4
Sep 22 (Fri) Tutorial 3	Extension of Mendelian genetics (EH)	4
Sep 25 (Mon) Lecture 7	Population genetics (EH)	22
Sep 27 (Wed) Lecture 8	Population genetics (EH)	22
Sep 29 (Fri) Tutorial 4	Population genetics (EH)	22
Oct 2 (Mon) No session (Public Holiday)		
Oct 4 (Wed) Lecture 9	Population genetics (EH)	22
Oct 6 (Fri) Tutorial 5	Population genetics (EH)	22
Oct 9 (Mon) Lecture 10	Quantitative genetics (EH)	21
Oct 11 (Wed) Lecture 11	Quantitative genetics (EH)	21
Oct 13 (Fri) Tutorial 6	Quantitative genetics (EH)	21
Oct 16 (Mon) Lecture 12	Genetic linkage (EH)	5
Oct 18 (Wed) Lecture 13	Gene mapping in model organisms (EH)	5
Oct 20 (Fri) Tutorial 7	Gene mapping in model organisms (EH)	5
Oct 23 (Mon) No session (Public Holiday)		
Oct 25 (Wed) Lecture 14	Gene mapping in humans (EH)	--
Oct 27 (Fri) Tutorial 8	Gene mapping in humans (EH)	--
Oct 28 (Sat) 14:00-17:00	**Mid-term exam (on topics delivered until Oct 13, 50% of course assessment)**	
Oct 30 (Mon) Lecture 15	Application of recombinant DNA technology and reverse genetics (DL)	17
Nov 1 (Wed) Lecture 16	Application of recombinant DNA technology and reverse genetics (DL)	17
Nov 3 (Fri) Tutorial 9	Application of recombinant DNA technology and reverse genetics (DL)	17
Nov 6 (Mon) Lecture 17	Forward genetics and recombinant DNA technology (DL)	16
Nov 8 (Wed) Lecture 18	Forward genetics and recombinant DNA technology (DL)	16
Nov 10 (Fri) Tutorial 10	Forward genetics and recombinant DNA technology (DL)	16
Nov 13 (Mon) Lecture 19	Genomics: genetics from a whole-genome perspective (DL)	18
Nov 15 (Wed) Lecture 20	Genomics: genetics from a whole-genome perspective (DL)	18
Nov 17 (Fri) Tutorial 11	Genomics: genetics from a whole-genome perspective (DL)	18
Nov 20 (Mon) Lecture 21	Epigenetics and practical definition of genes (DL)	15
Nov 22 (Wed) Lecture 22	Epigenetics and practical definition of genes (DL)	15
Nov 24 (Fri) Tutorial 12	Epigenetics and practical definition of genes (DL)	15
Nov 27 (Mon) Lecture 23	Epigenomics (DL)	--
Nov 29 (Wed) Lecture 24	Epigenomics (DL)	--
Dec 7-19	**Final exam (on topics not tested in mid-term exam, 50% of course assessment)**	