

LIFS3140
General Genetics
Fall Semester 2021

Lectures: Wednesday and Friday 13:30-14:50
Venue: LT-J
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]	Tutor
	T1	Tue 12:00-12:50	Rm 1409 [60]	Shaoli HASSAN
	T2	Tue 9:00-9:50	Rm 6591 [60]	Lea L. LIN
	T3	Tue 11:00-11:50	Rm 2302 [60]	Hyebin UHM
	T4	Mon 17:00-17:50	Rm 1511 [40]	Hank H. CAO
	T5	Tue 16:30-17:20	LSK Rm 1027 [40]	Samuel W.Y. WONG

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

Course description:

This course with lecture and tutorials aims to introduce students to the fundamental principles and mechanisms of heredity and variation. Topics will include the basic principle 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 pro- 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

<u>Lecture</u>	<u>Tutorial</u>	<u>Topic (Instructor)</u>	<u>Chapter</u>
Sep 1		Course introduction, Monohybrid intercross (EH)	2, 3
Sep 3		Pedigree analysis (EH)	2, 3
	<i>Sep 6/7</i>	<i>On Sep 1 & 3 lectures (EH)</i>	
Sep 8		Sex-linked inheritance (EH)	2, 3
Sep 10		Population genetics (EH)	22
	<i>Sep 13/14</i>	<i>On Sep 8 lecture (EH)</i>	
Sep 15		Population genetics (EH)	22
Sep 17		Dihybrid intercross (EH)	2, 3
	<i>Sep 20/21</i>	<i>On Sep 10 & 15 lectures (EH)</i>	
Sep 22		“no lecture”	
Sep 24		Genetic linkage (EH)	5
	<i>Sep 27/28</i>	<i>On Sep 17 lecture (EH)</i>	
Sep 29		Genetic linkage (EH)	5
Oct 1		“no lecture”	
	<i>Oct 4/5</i>	<i>On Sep 24 & 29 lectures (EH)</i>	
Oct 6		Gene mapping in model organisms (EH)	5
Oct 8		Gene mapping using large pedigrees (EH)	--
	<i>Oct 11/12</i>	<i>On Oct 6 & 8 lectures (EH)</i>	
Oct 13		Gene mapping using small pedigrees (EH)	--
Oct 15		Gene mapping using population data (EH)	--
	<i>Oct 18/19</i>	<i>On Oct 13 & 15 lectures (EH)</i>	
Oct 20		Extension of Mendelian genetics (EH)	4
Oct 22		Extension of Mendelian genetics (EH)	4
	<i>Oct 25/26</i>	<i>On Oct 20 & 22 lectures (EH)</i>	
Oct 27		Quantitative genetics (EH)	21
Oct 29		Forward genetics and recombinant DNA technology (DL)	16
	<i>Nov 1/2</i>	<i>On Oct 27 lecture (EH)</i>	
Nov 3		Forward genetics and recombinant DNA technology (DL)	16
Nov 5		Application of recombinant DNA technology and reverse genetics (DL)	17
Nov 6 (Sat) 14:00-17:00 Mid-Term Exam [on EH lectures, 60% assessment]			
	<i>Nov 8/9</i>	<i>On Oct 29, Nov 3 & 5 lectures (DL)</i>	
Nov 10		Genomics: genetics from a whole-genome perspective (DL)	18
Nov 12		Genomics: genetics from a whole-genome perspective (DL)	18
	<i>Nov 15/16</i>	<i>On Nov 10 & 12 lectures (DL)</i>	
Nov 17		Genomics: genetics from a whole-genome perspective (DL)	18
Nov 19		Epigenetics and practical definition of genes (DL)	15
	<i>Nov 22/23</i>	<i>On Nov 17 & 19 lectures (DL)</i>	
Nov 24		Epigenetics and practical definition of genes (DL)	15
Nov 26		Epigenomics (DL)	--
	<i>Nov 29/30</i>	<i>On Nov 24 & 26 lectures (DL)</i>	
Dec 7-18 (TBD) Final Exam [on DL lectures, 40% assessment]			