

LIFS3140
General Genetics
Fall Semester 2018

Lectures: Monday 16:30-17:50 and Friday 12:00-13:20
Venue: LT-C
Instructors: Dr. Eugene S.C. HUNG (EH) (course coordinator)
Prof. King L. CHOW (KC)
Prof. Danny C.Y. LEUNG (DL)

Tutorials:	Section	Date & Time	Venue	Tutor
	T1	Thu 12:00-12:50	Room 6602	Miss Sabrina TAM
	T2	Thu 14:00-14:50	Room 4502	Miss Jacqueline AW
	T3	Thu 18:00-18:50	LT-H	Mr. Matthew PANG
	T4	Thu 17:00-17:50	Room 5506	Miss Stephanie DUAN
	T5	Thu 10:30-11:20	Room 5560	Mr. Jason JIANG

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 3		Course introduction, Monohybrid intercross (EH)	2, 3
	<i>Sep 6</i>	<i>On Sep 3 lecture (EH)</i>	
Sep 7		Pedigree analysis (EH)	2, 3
Sep 10		Sex-linked inheritance (EH)	2, 3
	<i>Sep 13</i>	<i>On Sep 7 & 10 lectures (EH)</i>	
Sep 14		Dihybrid intercross (EH)	2, 3
Sep 17		Genetic linkage (EH)	5
	<i>Sep 20</i>	<i>On Sep 14 & 17 lectures (EH)</i>	
Sep 21		Gene mapping in model organisms (EH)	5
Sep 24		Gene mapping using large pedigrees (EH)	5
	<i>Sep 27</i>	<i>On Sep 21 lecture (EH)</i>	
Sep 28		Gene mapping using small pedigrees (EH)	--
Oct 1		[National Day – No Class]	
	<i>Oct 4</i>	<i>On Sep 24 & 28 lectures (EH)</i>	
Oct 5		Gene mapping using population data (EH)	--
Oct 8		Chromosome aberrations (EH)	13
	<i>Oct 11</i>	<i>On Oct 5 & 8 lectures (EH)</i>	
Oct 12		Gene structure: gene regulation in eukaryotes, and integration with genetics with molecular genetics (KC)	7, 8, 9, 10
Oct 15		Extension of Mendelian genetics: more genetic interactions and regulatory actions; probability and modification of Mendelian ratios (KC)	3, 4, 19
	<i>Oct 18</i>	<i>On Oct 12 & 15 lectures (KC)</i>	
Oct 19		Genetic regulation and mapping of pathways in biological process (KC)	10, 11, 19
Oct 20 (Sat) 10:00-12:00		Mid-Term Exam [on Sep-3 to Oct-8 lectures (EH), 40% assessment]	
Oct 22 16:30-19:30 (3 hours)		Non-threshold traits and continuous phenotypes: their multifactorial property (KC)	21
	<i>Oct 25</i>	Quantitative genetics: analytical tools and application (KC) <i>On Oct 19 & 22 lectures (KC)</i>	
Oct 26		[No Class]	
Oct 29		Forward genetics and recombinant DNA technology (DL)	16
	<i>Nov 1</i>	<i>On Oct 29 lecture (DL)</i>	
Nov 2		Forward genetics and recombinant DNA technology (DL)	16
Nov 5		[No Class]	
	<i>Nov 8</i>	<i>On Nov 2 lecture (DL)</i>	
Nov 9		Application of recombinant DNA technology and reverse	17
Nov 12		Genomics: genetics from a whole-genome perspective (DL)	18
	<i>Nov 15</i>	<i>On Nov 9 & 12 lectures (DL)</i>	
Nov 16		Genomics: genetics from a whole-genome perspective (DL)	18
Nov 19		Population genetics and evolution (DL)	22
	<i>Nov 22</i>	<i>On Nov 16 & 19 lectures (DL)</i>	
Nov 23		Population genetics and evolution (DL)	22
Nov 26		Epigenetics and practical definition of genes (DL)	15
	<i>Nov 29</i>	<i>On Nov 23 & 26 lectures (DL)</i>	
Nov 30		Epigenetics and practical definition of genes (DL)	15
Dec 8-20 (to be determined)		Final Exam [on Oct-12 to Nov-30 lectures (KC & DL), 60% assessment]	