LIFS3140
General Genetics
Fall Semester 2016

Lectures: Every Tuesday and Thursday 10:30-11:50
Venue: LT-D
Instructors: Dr. Eugene S.C. HUNG (EH) (course coordinator)
Prof. King L. CHOW (KC)
Prof. Danny C.Y. LEUNG (DL)
Prof. Hannah H. XUE (HX)

Tutorials: Every Monday 17:00-17:50

Sections	**Venues**	**Tutors**
T1	Room 2126A	Miss Cynthia CHEN
T2	Room 2127A	Mr. Marco CHEUNG
T3	Room 2127C	Mr Johnny SUNG
T4	Room 2612A	Miss Shuting WU
T5	Room 2612B	Mr. Joey YANG

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

Lecture (Date)	***Tutorial (Date)***	**Topic (Instructor)**	**Chapter**
1 (Sep 1)		Law of segregation (EH)	2, 3
	1 (Sep 5)	*For Lecture 1 (EH)*	
2 (Sep 6)		Sex linkage (EH)	2, 3
3 (Sep 8)		Law of independent assortment (EH)	2, 3
	2 (Sep 12)	*For Lectures 2 & 3 (EH)*	
4 (Sep 13)		Genetic linkage (EH)	5
5 (Sep 15)		Gene mapping in model eukaryotes (EH)	5
	3 (Sep 19)	*For Lectures 4 & 5 (EH)*	
6 (Sep 20)		Gene mapping in humans: large families (EH)	5
7 (Sep 22)		Gene mapping in humans: small families & populations (EH)	5
	4 (Sep 26)	*For Lectures 6 & 7 (EH)*	
8 (Sep 27)		Chromosome aberrations (EH)	13
9 (Sep 29)		Chromosome aberrations (EH)	13
	5 (Oct 3)	*For Lectures 8 & 9 (EH)*	
10 (Oct 4)		Homologous recombination & transposition (EH)	13, 12
11 (Oct 6)		Gene structure: gene regulation in eukaryotes, and integration with genetics with molecular genetics (KC)	7, 8, 9, 10

Mid-Term Exam [on Lectures 1-10 (EH)]: Oct 8, Saturday, 10:00-12:00, LT-A or LT-B

12 (Oct 11)		Extension of Mendelian genetics: more genetic interactions and regulatory actions; probability and modification of Mendelian ratios (KC)	3, 4, 19
13 (Oct 13)		Genetic regulation and mapping of pathways in biological process (KC)	10, 11, 19
	6 (Oct 17)	*For Lectures 11 to 13 (KC)*	
14 (Oct 18)		Non-threshold traits and continuous phenotypes: their multifactorial property (KC)	21
15 (Oct 20)		Quantitative genetics: analytical tools and application (KC)	21
	7 (Oct 24)	*For Lectures 14 & 15 (KC)*	
-- (Oct 25)		--	
16 (Oct 27)		Forward genetics and recombinant DNA technology (DL)	16
	8 (Oct 31)	*For Lecture 16 (DL)*	
17 (Nov 1)		Forward genetics and recombinant DNA technology (DL)	16
18 (Nov 3)		Application of recombinant DNA technology and reverse genetics (DL)	17
	9 (Nov 7)	*For Lectures 17 & 18 (DL)*	
19 (Nov 8)		Developmental genetics (DL)	20
20 (Nov 10)		Epigenetics and practical definition of genes (DL)	15
	10 (Nov 14)	*For Lectures 19 & 20 (DL)*	
-- (Nov 15)		--	
21 (Nov 17)		Genomics: genetics from a whole-genome perspective (HX)	18
	11 (Nov 21)	*For Lecture 21 (HX)*	
22 (Nov 22)		Genomics: genetics from a whole-genome perspective (HX)	18
23 (Nov 24)		Population genetics and evolution (HX)	22
	12 (Nov 28)	*For Lectures 22 & 23 (HX)*	
24 (Nov 29)		Population genetics and evolution (HX)	22
25 (Dec 1)		Review (HX)	--

Final Exam [on Lectures 11-26 (KC, DL & HX)]: To be scheduled

Assessment Tasks (Weightings): **Mid-Term Exam (40 %)**
Final Exam (60 %)