جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Course Syllabus: Genomics - B 204

Division	Biological and Environmental Sciences & Engineering Division
Course Number	B 204
Course Title	Genomics
Academic Semester	Fall
Academic Year	2019/2020
Semester Start Date	08/25/2019
Semester End Date	12/10/2019
Class Schedule (Days & Time)	04:00 PM - 05:30 PM | Sun Wed

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Manuel Ignacio Aranda Lastra	manuel.aranda@kaust.edu.sa	+966128082979		9:00 am to 5:00 pm.
Takashi Gojobori	takashi.gojobori@kaust.edu.sa	+966128082893	4220, 3, Ibn Sina (bldg. 3)	9:00 am to 5:00 pm.
Simon Georg Krattinger	SIMON.KRATTINGER@KAUST.EDU.SA		3275, 2, Ibn Al-Haytham (bldg. 2)	9:00 am to 5:00 pm.

Teaching Assistant(s)

Name	Email
None	None

Course Information

Comprehensive Course Description	Principles and technologies for generating genomic information for ecological, biomedical, biotechnological, and agricultural applications. Technologies will be introduced progressively, from DNA to RNA to protein. The integration of biology, chemistry, engineering, and computational sciences will be stressed. Topics include: Technology for high-throughput sequencing, methods for assembling and annotating genomes, characterizing functional genes, gene expression, comparative genomics, population genomics and proteomic technologies.
Course Description from Program Guide	Principles and technologies for generating genomic information for ecological, biomedical and biotechnological applications. Technologies will be introduced progressively, from DNA to RNA to protein to whole cell systems. The integration of biology, chemistry, engineering, and computational sciences will be stressed. Topics include: Technology for the High-throughput Sequencing, Methods for annotating genomes, characterizing functional genes, Gene Expression, Comparative Genomics, Population Genomics, Proteomic Technologies and Systems Biology.
Goals and Objectives	The goals and objectives is that the students understand principles and technologies for generating genomic information for ecological, biomedical, agricultural and biotechnological applications at the end of the present course. Moreover, the students are expected to obtain the knowledge of how organismic diversity and evolution can be understood through comparative approaches of genomic information. In particular, the students learn how to make ecological and evolutionary interpretation of phenotypic features from analyses of genomic information.
Required Knowledge	Basic knowledge of molecular biology and genetics is required. Very basic mathematics and statistics are preferably helpful if the students have.

Reference Texts	**Recommended Books (for reference only):** -**"Introduction to Genomics"** Arthur M. Lesk, Oxford University Press, third edition 2017. -**"Principles of Genome Analysis and Genomics (Third Edition)"** Sandy B. Primrose and Richard Twyman, Blackwell Publishing, 2008.
Method of evaluation	**50.00**% - Exam 2 **50.00**% - Exam 1
Nature of the assignments	**Exams:** A total of two exams will be given: 1) The mid-term exam **(date to be determinate).** 2) The final exam **during the final exam period.** ***There are no make-up exams for this class.*** -**Exams:** Will include all topics covered in the course. **Final course grades will be assigned according to the chart below:** A 86 % -90 % A- 82 % -86 % B+ 78 % -82 % B 74 % -78 % B- 70 % -74 % C+ 66 % -70 % C 62 % -66 % C- 58 % -62 % D 45 % -58 % F below 45%
Course Policies	**Attendance Policy:** Attendance to class is mandatory. Unexcused absences can result in dismissial (failure) of the course. It is the responsibility of the student to inform the instructor in case of abscences.
Additional Information	

Tentative Course Schedule *(Time, topic/emphasis & resources)*		
Week	**Lectures**	**Topic**
1	Sun 08/25/2019 Wed 08/28/2019	***Lecture 1: Introduction to Genomics (Simon Krattinger)*** ***Lecture 2: Genome sequencing (Simon Krattinger)***
2	Sun 09/01/2019 Wed 09/04/2019	***Lecture 3: Genome assembly (Simon Krattinger)*** ***Lecture 4: Genome annotation (Simon Krattinger)***
3	Sun 09/08/2019 Wed 09/11/2019	***Lecture 5: Genome Architecture (Simon Krattinger)*** ***Lecture 6: Transcriptomics (Manuel Aranda)***
4	Sun 09/15/2019 Wed 09/18/2019	***Lecture 7: Proteomics (Manuel Aranda)*** ***Lecture 8: Comparative Genomics I (Takashi Gojobori)***
5	Sun 09/22/2019 Wed 09/25/2019	***University Holiday*** ***Lecture 9: Comparative Genomics II (Takashi Gojobori)***
6	Sun 09/29/2019 Wed 10/02/2019	***Lecture 10: Biodatabases (Manuel Aranda)*** ***Lecture 11: Ecological Genomics I (Manuel Aranda)***
7	Sun 10/06/2019 Wed 10/09/2019	***Lecture 12: Ecological Genomics II (Manuel Aranda)*** ***Mid-term exam***
8	Sun 10/13/2019 Wed 10/16/2019	***Lecture 13: Population Genomics I (Takashi Gojobori)*** ***Lecture 14: Population Genomics II (Takashi Gojobori)***
9	Sun 10/20/2019 Wed 10/23/2019	***Lecture 15: Population Genomics III (Takashi Gojobori)*** ***Lecture 16: Molecular Evolution I (Takashi Gojobori)***
10	Sun 10/27/2019 Wed 10/30/2019	***Mid-semester break*** ***Lecture 17: Molecular Evolution II (Takashi Gojobori)***
11	Sun 11/03/2019 Wed 11/06/2019	***Lecture 18: Molecular Evolution III (Takashi Gojobori)*** ***Lecture 19: Molecular Evolution IV (Takashi Gojobori)***
12	Sun 11/10/2019 Wed 11/13/2019	***Lecture 20: Introduction to Bioinformatics (Takashi Gojobori)*** ***Lecture 21: Functional Genetics / Genomics I (Manuel Aranda)***
13	Sun 11/17/2019 Wed 11/20/2019	***Lecture 22: Functional Genetics / Genomics II (Manuel Aranda)*** ***Lecture 23: Functional Genetics / Genomics III (Manuel Aranda)***
14	Sun 11/24/2019 Wed 11/27/2019	***Lecture 24: Agricultural Genomics I (Simon Krattinger)*** ***Lecture 25: Agricultural Genomics II (Simon Krattinger)***
15	Sun 12/01/2019 Wed 12/04/2019	***Lecture 26: Agricultural Genomics III (Simon Krattinger)*** ***Lecture 27: Repetition***
16	Sun 12/08/2019	***Final Exam***

Note

The instructor reserves the right to make changes to this syllabus as necessary.