



Course Syllabus: Genomics - B 204

Division	Biological and Environmental Sciences & Engineering Division
Course Number	B 204
Course Title	Genomics
Academic Semester	Fall
Academic Year	2018/2019
Semester Start Date	08/26/2018
Semester End Date	12/11/2018
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.s a	+966128082893	4220, 3, Ibn Sina (bldg. 3)	9:00 am to 5:00 pm.
Simon Georg Krattinger	SIMON.KRATTINGER@KAU ST.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 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.
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	<p>Recommended Books (for reference only):</p> <ul style="list-style-type: none"> -“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. -“Principles of Computational Cell Biology: From Protein Complexes to Cellular Networks” Volkhard Helms, Wiley-VCH, 2008. -“Analysis of Biological Networks” Björn H. Junker and, Falk Schreiber, Wiley Interscience, 2008. 												
Method of evaluation	<p>70.00% - Final exam 30.00% - Midterm exam</p>												
Nature of the assignments	<p>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. <i>There are no make-up exams for this class.</i></p> <p>-Exams: Will include all topics covered in the course.</p> <p>-Grading Scheme:</p> <ul style="list-style-type: none"> ■ <ul style="list-style-type: none"> › Mid-term Exam: 30% ■ <ul style="list-style-type: none"> › Final Exam: 70% <p><u>Final course grades will be assigned according to the chart below:</u></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">A 86 % -90 %</td> <td style="width: 33%;">A- 82 % -86 %</td> <td style="width: 33%;"></td> </tr> <tr> <td>B+ 78 % -82 %</td> <td>B 74 % -78 %</td> <td>B- 70 % -74 %</td> </tr> <tr> <td>C+ 66 % -70 %</td> <td>C 62 % -66 %</td> <td>C- 58 % -62 %</td> </tr> <tr> <td>D 45 % -58 %</td> <td>F below 45%</td> <td></td> </tr> </table>	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%	
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	<p>Attendance Policy: Attendance to class is mandatory. Unexcused absences can result in dismissal (failure) of the course. It is the responsibility of the student to inform the instructor in case of absences.</p>												
Additional Information													

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Sun 08/26/2018 Wed 08/29/2018	Lecture 1: Introduction to Genomics (Simon Krattinger) Lecture 2: Genome sequencing (Simon Krattinger)
2	Sun 09/02/2018 Wed 09/05/2018	Lecture 3: Genome assembly (Simon Krattinger) Lecture 4: Genome annotation (Simon Krattinger)
3	Sun 09/09/2018 Wed 09/12/2018	Lecture 5: Genome Projects (Simon Krattinger) Lecture 6: Biodatabases (Manuel Aranda)
4	Sun 09/16/2018 Wed 09/19/2018	Lecture 7: Transcriptomics / Proteomics (Simon Krattinger) Lecture 8: Comparative Genomics I (Takashi Gojobori)
5	Sun 09/23/2018 Wed 09/26/2018	Lecture 9: Comparative Genomics II (Takashi Gojobori) Lecture 10: Ecological Genomics I (Manuel Aranda)
6	Sun 09/30/2018 Wed 10/03/2018	Lecture 11: Ecological Genomics II (Manuel Aranda) Mid Term Exam
7	Sun 10/07/2018 Wed 10/10/2018	Lecture 12: Population Genomics I (Takashi Gojobori) Lecture 13: Population Genomics II (Takashi Gojobori) -
8	Sun 10/14/2018 Wed 10/17/2018	Lecture 14: Population Genomics III (Takashi Gojobori) Lecture 15: Molecular Evolution I (Takashi Gojobori)
9	Sun 10/21/2018 Wed 10/24/2018	Lecture 16: Molecular Evolution II (Takashi Gojobori) Lecture 17: Molecular Evolution III (Takashi Gojobori)
10	Sun 10/28/2018 Wed 10/31/2018	Lecture 18: Molecular Evolution IV (Takashi Gojobori) Lecture 19: Introduction to Bioinformatics
11	Sun 11/04/2018 Wed 11/07/2018	Lecture 20: Functional Genetics / Genomics I (Manuel Aranda) Lecture 21: Functional Genetics / Genomics II (Manuel Aranda)
12	Sun 11/11/2018 Wed 11/14/2018	Lecture 22: Functional Genetics / Genomics III (Manuel Aranda) Lecture 23: Systems Biology (Simon Krattinger)
13	Sun 11/18/2018 Wed 11/21/2018	Lecture 24: Agricultural Genomics I (Simon Krattinger) Lecture 25: Agricultural Genomics II (Simon Krattinger)
14	Sun 11/25/2018 Wed 11/28/2018	Lecture 26: Repetition Final Exam
15	Sun 12/02/2018 Wed 12/05/2018	No lecture
16	Sun 12/09/2018	No lecture
17		No lecture
18		

Note

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