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

Course Syllabus: Marine Microbial Ecology - MarS 329

Division	Biological and Environmental Sciences & Engineering Division
Course Number	MarS 329
Course Title	Marine Microbial Ecology
Academic Semester	Spring
Academic Year	2017/2018
Semester Start Date	01/28/2018
Semester End Date	05/24/2018
Class Schedule (Days & Time)	08:00 AM - 04:00 PM | Sun Mon Tue Wed Thu

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Burton Harold Jones	burt.jones@kaust.edu.sa	+966128082512		Appointments to be made on request by email.
Xose Anxelu G. Moran	Xelu.Moran@kaust.edu.sa	+966128082455	2218, 2, Ibn Al-Haytham (bldg. 2)	Appointments to be made on request by email.
Susana Requena Agusti	susana.agusti@kaust.edu.sa	+966128082848	3274, 2, Ibn Al-Haytham (bldg. 2)	Appointments to be made on request by email.

Teaching Assistant(s)

Name	Email

Course Information

Comprehensive Course Description

The course will integrate key aspects of the oceanography, biology and ecology of microorganisms through lectures, literature reviews and field and lab work. Our current understanding of microbial diversity, physiology and interactions with the environment will be combined with hands-on work involving sample collection in Red Sea coastal ecosystems, biomass determinations and short-term experiments on responses to environmental drivers. The experimental component will be fundamental for the entire duration of the course.

The addressed topics will include:

-Vertical structure and physico-chemical gradients in the ocean

-Mesoscale oceanographic processes (seasonal cycles, eddies, upwelling)

-Phytoplankton photosynthesis and primary production

-Bacteria / archaea and heterotrophic prokaryotes production

-Eukaryotic microbes

-Viruses

-Microbial diversity and evolution

-Microbial food webs

-Role of microbes in biogeochemical cycles

-Climate change, physico-chemical and biological effects.

Course Description from Program Guide	Advanced Marine Microbial Ecology: This course covers recent developments in the field of marine microbial ecology and will give an overview on structure and function of microbial communities in the oceans including discussions on novel methods, results and hypotheses. Among the topics covered are: Photoheterotrophic bacteria, Marine Bacteria and the Carbon Cycle, UV radiation effects on Microbes and Microbial Processes, Uptake and Regeneration of Inorganic Nutrients by Marine Heterotrophic Bacteria, Bacterivory: Interactions between Bacteria and their Grazers, Symbiosis and Mixotrophy Among Pelagic Microorganisms, Marine Viruses and their ecological impact, Global Ocean Survey of Marine Metagenomics, Single 8 cell activity in marine bacterioplankton. As a PhD level course, assessment of students and participation expectations will be commensurate with the level of student experience.
Goals and Objectives	Planktonic unicellular organisms are fundamental players of marine food webs mediating all fluxes of matter and energy in the oceans. The course will build up from the underlying oceanographic physico-chemical properties and processes affecting microbial life to a thorough review of microbial ecology, from viruses to phytoplankton, and the role of these microorganisms in global biogeochemical cycles. The aim of this course is to provide the students with a working theoretical and practical understanding of marine microbial ecology. The final objective is that the students learn about the interactions between microorganisms and ocean processes and become able to conduct research on their current and future role in a rapidly changing planet.
Required Knowledge	Undergraduate and master courses in ecology, microbiology or marine science (MarS 221 is a prerequisite for MS students enrolled in Marine Science program). Students from programs other than Marine Science must have instructor permission to register for this course.
Reference Texts	Marine Microbiology: Ecology and Applications (C. Munn, Garland Science, 2011) Microbial Ecology of the Oceans, 2nd ed. (Editor: D.L. Kirchman, John Wiley & Sons, 2008) [3rd edition due 2018]
Method of evaluation	**50.00**% - Course Project(s) **30.00**% - Scientific review article presentation **20.00**% - Attendance and Participation
Nature of the assignments	Course project: The assignments will consist in an individual short report (<10 pages) on the experiments conducted during the course as well as an oral presentation (15 min) followed by open discussion with the instructors. Scientific review article presentation: The students will make presentations of assigned papers.
Course Policies	Attendance is mandatory to all lectures. Participation is a significant component of the grade. As a block course, students are expected to be available at any time and on short notice during the block period. Any anticipated absence should be cleared with the instructor by written (email) notification as early as possible. Students with approved absences are responsible for catching up on the materials from their classmates.
Additional Information	It is strongly preferred that communications are via email. For urgent issues, the instructors may be reached by phone (number will be provided to the class).

Tentative Course Schedule *(Time, topic/emphasis & resources)*		
Week	**Lectures**	**Topic**
1	Sun 01/28/2018 Mon 01/29/2018 Tue 01/30/2018 Wed 01/31/2018 Thu 02/01/2018	Oceanographic processes. Prof. Burton H. Jones.
2	Sun 02/04/2018 Mon 02/05/2018 Tue 02/06/2018 Wed 02/07/2018 Thu 02/08/2018	Phytoplankton and primary production. Prof. Susana Agustí.
3	Sun 02/11/2018 Mon 02/12/2018 Tue 02/13/2018 Wed 02/14/2018 Thu 02/15/2018	Heterotrophic microbes. Prof. Xosé Anxelu G. Morán.
4	Sun 02/18/2018 Mon 02/19/2018 Tue 02/20/2018 Wed 02/21/2018 Thu 02/22/2018	Field work, lab experiments and final oral presentations. All instructors.
5		- (Not applicable since it will be a block course of 4 weeks)
6		-
7		-
8		-
9		-
10		-
11		-
12		-
13		-
14		-
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17		
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Note

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