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	2018/2019
Semester Start Date	01/27/2019
Semester End Date	05/23/2019
Class Schedule (Days & Time)	08:00 AM - 04:00 PM | Sun Mon Tue Wed Thu

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
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	3218, 2, Ibn Al-Haytham (bldg. 2)	Appointments to be made on request by email.

Teaching Assistant(s)

Name	Email
Abbrar Labban	abbrar.labban@kaust.edu.sa

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

-Spatio-temporal variability (e.g. mesoscale processes, seasonal cycles, etc.)

-Phytoplankton photosynthesis and primary production

-Prokaryotes (bacteria and archaea) biomass and heterotrophic production

-Eukaryotic microbes

-Viruses

-Microbial diversity and evolution

-Microbial food webs

-Role of microbes in biogeochemical cycles

-Global 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, 3d ed. (Editors: J. M. Gasol and D.L. Kirchman, John Wiley & Sons, 2018) [editions 1 and 2 also recommended]
Method of evaluation	**30.00**% - Scientific review article presentation **50.00**% - Course Project(s) **20.00**% - Active participation
Nature of the assignments	Course Project: The assignment 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 articles 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 02/17/2019 Mon 02/18/2019 Tue 02/19/2019 Wed 02/20/2019 Thu 02/21/2019	Phytoplankton and primary production. Prof. Susana Agustí.
2	Sun 02/24/2019 Mon 02/25/2019 Tue 02/26/2019 Wed 02/27/2019 Thu 02/28/2019	Heterotrophic microbes. Prof. Xosé Anxelu G. Morán.
3	Sun 03/03/2019 Mon 03/04/2019 Tue 03/05/2019 Wed 03/06/2019 Thu 03/07/2019	Extra lectures, field work and start of lab experiments. Prof. Susana Agustí and Xosé Anxelu G. Morán.
4	Sun 03/10/2019 Mon 03/11/2019 Tue 03/12/2019 Wed 03/13/2019 Thu 03/14/2019	Lab experiments analysis and final oral presentations. Both instructors.

Note

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