

## ECOLOGY & DIVERSITY OF MARINE MICROORGANISMS - Course schedule December 1- 20, 2003

Date	Activities		
	Lectures and Evening Sessions will take place in the Ignacio Molina lecture room at the Dichato Marine Station, unless stated otherwise in the program. Laboratory Work and Microscopy will take place in the Dichato Oceanography Laboratories. Student housing is available for all course participants in the guest house at the Dichato campus. The Minisymposium on December 12, will be held at the Auditorio Alejandro Lipschütz at the main campus of the Universidad de Concepción in Concepción		
<b>Week 1</b> December 1-6	<b>Morning</b>	<b>Afternoon</b>	<b>Evening</b>
Monday December 1	Instructors meeting: Dichato lecture room 10.00 <b>Students arrive</b> (Verónica Molina) <b>Welcome and introduction</b> to the housing and Laboratory facilities (Osvaldo Ulloa) 11.30 Presentation of <b>Course Program</b>	14.00 Introductory Lecture 1: <b>Diversity among microbes</b> : what we know, what we don't yet know (Kurt Hanselmann)  17.00 Welcome by Head of the Oceanography Department (Ciro Oyarzun) and UNESCO chair (Silvio Pantoja), University of Concepción	19.00 – 21.00 <b>Student presentations, Part 1</b> (Lecture Room)
Tuesday December 2	08.30 Lecture 2: <b>Chemical basis for life and life processes</b> (Kurt Hanselmann)  10.30 Lecture 3: <b>An ecosystem approach to microbial diversity</b> (Kurt Hanselmann)	14.00 Begin lab work. <b>Presentation of lab equipment and lab exercises</b> (Osvaldo Ulloa, lab instructors)	19.00 – 21.00 <b>Student presentations, Part 2</b>
Wednesday December 3	08.30 Lecture 4: <b>Habitats for oxic and anoxic phototrophs</b> (Kurt Hanselmann)  10.30 Lecture 5: <b>Metabolic coupling in microbial mats and biofilms</b> (Kurt Hanselmann)	14.00 Lab work in groups: <b>Sample storage, microscopy, sample processing</b> (DNA extraction, PCR, Gel electrophoresis (Osvaldo Ulloa, and lab instructors)	19.00 – 21.00 <b>Student presentations, Part 3</b>  Defining <b>Individual Projects</b> and order media components from Concepción
Thursday December 4	08.30 Lecture 6: <b>Designing diets</b> : New, established and unusual methods for growing microorganisms (Kurt Hanselmann)  10.30 Lecture 7: <b>Application of bacterial biofilms for industrial effluent treatment</b> (Homero Urrutia)	14.00 <b>Individual project work</b>  Define and chose <b>exam paper</b> (library and literature searches) 16.00 Preparation of equipment for sampling cruise (Verónica Molina)	19.00 Lecture 8: <b>Thioploca</b> (Victor Gallardo)
Friday December 5	<b>Field trip day in groups</b> 08.00 <b>Group 1</b> : Kay Kay departs from Dichato peer and will stop for sampling (water column and box core) at station 7 (36 m) in Concepción Bay. Partial sample preparation on board the ship.  08.00 <b>Group 2</b> : Field trip to the tidal swamp in Coliumo Bay	13.00 <b>Group 1</b> : Kay Kay departs from Dichato peer and will stop for sampling (water column and box core) at station 7 (36 m) and station 14 (66 m) on the shelf off Concepción Bay. Partial sample preparation on board the ship.  13.00 <b>Group 2</b> : Field trip to the tidal swamp in Coliumo Bay	Lab: Work-up samples for <b>individual projects</b> : Filtration of water samples, fixation for flow cytometry, squeezing of sediment cores, cleaning Thioploca and /or Beggiatoa from macrofauna. Assay labile interstitial water components (H <sub>2</sub> S) and fix others for assaying them later
Saturday December 6	Work on samples: Assay interstitial water components and carry out other chemical analyses. Preparations for DNA extraction, PCR, gel electrophoresis, microscopy, staining, enrichments		Discussion: achievements of week 1

<b>Week 2</b> December 8-13	<b>Morning</b>	<b>Afternoon</b>	<b>Evening</b>
Monday December 8	08.30 Lecture 9: <b>Applications of flow cytometry to water column microbial communities</b> (Osvaldo Ulloa)  10.30 Lecture 10: <b>Phylogenetics: Evolution of microbial diversity</b> (Kurt Hanselmann)	14.00 Lab work: <b>Individual projects</b> Flow cytometry, DNA extraction, PCR, Gel electrophoresis, Microscopy, Staining, Enrichments	19.00 Group 1 <b>Individual project</b> work Group 2 <b>Computer lab</b> : Bio-geochemical thermodynamics (Kurt Hanselmann) Group 3 <b>Individual project</b> work
Tuesday December 9	08.30 Lecture 11: <b>Securing biological inventions through horizontal gene transfer</b> (Kurt Hanselmann)  10.00 Lectures 12 & 13: <b>Genetic markers for the study of the diversity of micro-algae 1</b> (Patricia Gómez)	14.00 Lab work with Patricia Gómez	19.00 Group 1 <b>Computer lab</b> : Bio-geochemical thermodynamics (Kurt Hanselmann) Group 2 <b>Individual project</b> work Group 3 <b>Individual project</b> work
Wednesday December 10	08.30 Lecture 14: <b>Phenotypic characterization of metabolic diversity</b> (Kurt Hanselmann)  10.00 <b>Lab work</b> with Patricia Gómez	14.00 Lab work with Patricia Gómez	19.00 Group 1 <b>Individual project</b> work Group 2 <b>Individual project</b> work Group 3 <b>Computer lab</b> : Bio-geochemical thermodynamics (Kurt Hanselmann)
Thursday December 11	08.30 Lecture 15: <b>Strategies to adapt to changing habitat conditions</b> (Kurt Hanselmann)  10.30 Lecture 16: <b>Xenobiotics: bioremediation and survival under starvation</b> (Miguel Martínez)	14.00 Lab work in rotations 1. <b>Practical flow cytometry</b> (Osvaldo Ulloa) 2. <b>Enrichments</b> (Kurt Hanselmann) 3. <b>Molecular Identification</b> (Veronica Molina) 4. <b>Growing anaerobic biofilms</b> (Homero Urrutia)	19.00 Preparations for <b>Minisymposium</b>
Friday December 12	08.00 Bus leaves Dichato for Concepción 10.00 - 18.00 <b>Minisymposium</b> in Concepción: <b>Current Aspects of Environmental Microbiology</b> (special program) Sandwiches for lunch and drinks at the symposium site 18.30 Bus leaves for Dichato 19.30 Reception with Symposium speakers and guests in Dichato 22.30 Bus leaves for Concepción with guests		
Saturday December 13	08.30 Lecture 17: <b>Vertebrate defence mechanisms against bacteria</b> (Carlos Smith) 09.30 Lecture 18: <b>Fighting pathogenic bacteria in aquaculture</b> : Case studies (Carlos Smith) <b>Discussion group</b> 11.00 <b>Bio-toxic molecules in aquatic ecosystems</b> : Are they produced for communication or for warfare? (Mónica Vásquez)	<b>Discussion group</b>  12.00 <b>New developments in microbial community analysis</b> (Bernardo Gonzáles)	Discussion: achievements of week 2

<b>Week 3</b> December 15-20	<b>Morning</b>	<b>Afternoon</b>	<b>Evening</b>
Monday December 15	08.30 Lecture 19: <b>Ecosystem determinants which are selective for phenotypic traits</b> (Kurt Hanselmann)  10.30 Lecture 20: <b>Microbial involvement in carbon cycling and buffering</b> (Kurt Hanselmann)	14.00 <b>Evaluation of results of anaerobic biofilm experiments</b> (Homero Urrutia)  <b>Individual project work</b>	19.00 <b>Microbiology exercises:</b> Apply what you know: Solving microbiological problems (Kurt Hanselmann)  21.00 Turn in chosen <b>exam paper</b>
Tuesday December 16	08.30 Lecture 21: <b>Microbially mediated coupling of iron and phosphate cycling</b> (Kurt Hanselmann)  10.00 Lecture 22: <b>Community complexity in geochemically regulated habitats</b> (Kurt Hanselmann)	14.00 <b>Individual project work</b> 15.00 Lecture 23: <b>Antibiotic resistance – Localization of genetic cassetts inserted into gram-negative bacterial integrons</b> (Gerardo González)	19.00 Lab: over night PCR for Antibiotic resistance detection (Gerardo González)
Wednesday December 17	08.30 Lecture 24: <b>Responses of microorganisms to famine: Living in oligotrophic habitats</b> (Kurt Hanselmann)  10.00 Gel electrophoresis and analysis of experimental results (Gerardo González)	<b>Preparations for exam and for paper presentation</b>	<b>Preparations for exam and for paper presentation</b>
Thursday December 18	10.00 <b>Course exam:</b> Student exam and paper presentations, part 1. Staff & course participants, 30 minutes per student	14.00 <b>Course exam</b> cont.: Student exam and paper presentations, part 2	No evening activities scheduled
Friday December 19	09.00 <b>Course research results:</b> Summary of project work and integration of results into project posters	16.00 <b>Course graduation at Dichato:</b> Course participants, Faculty and invited Guests Course Certificates	18.30 <b>Reception and Fare well party</b>
Saturday December 20	Course evaluation, ideas for future courses, turn in final versions of course project contribution for poster Pack equipment for transport back to main campus and clean Dichato labs and housing		End of Course, departure