

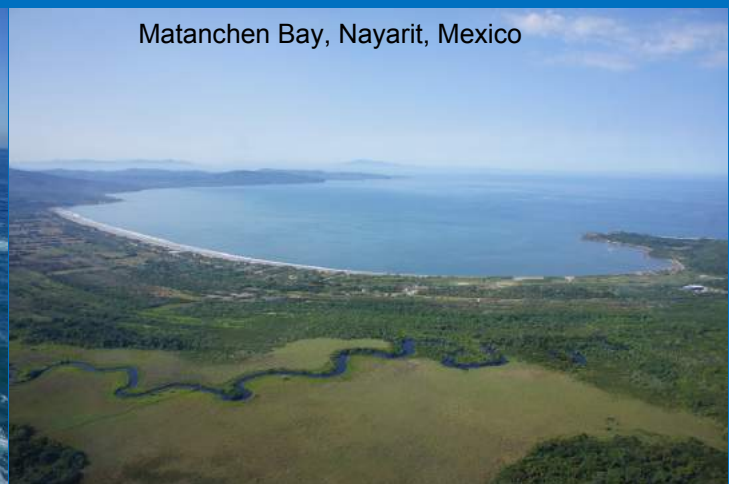
Summer School

Integrating Ecosystems in Coastal Engineering Practice (INECEP)

September 18 –29, 2017 Puerto Morelos, Mexico



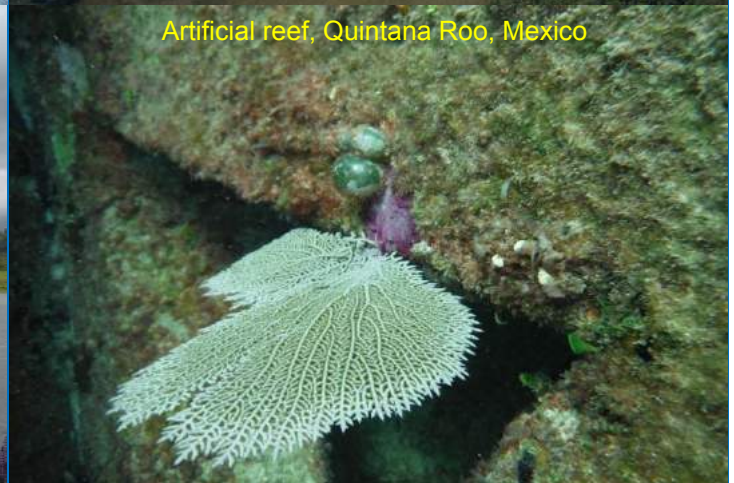
Joatinga Coast, Rio de Janeiro, Brazil



Matanchen Bay, Nayarit, Mexico



Coyhaique lake, Chile



Artificial reef, Quintana Roo, Mexico

Funded by



Summer School on

Integrating Ecosystems in Coastal Engineering Practice (INECEP)

Overview

Coastlines around the world are suffering significant damage from rising population density, increasing urban development, more infrastructure for diverse sectors and on-going ecosystem degradation. Engineers are increasingly called upon to provide structures that give protection against wave attack, coastal flood and erosion. These have generally been designed as hard structures, with little or no consideration of their impacts on ecosystems or possible adaptation to climate and global changes. However, natural solutions to replace or to be incorporated into conventional protection schemes have begun to emerge. But too often the more conventional structures are still adopted as there is a lack of knowledge, methodical frameworks, models, analysis tools and practical guidance for the implementation of more ecologically based schemes. As a response to recent natural disasters (coastal flood/erosion), research and development in ecosystem-based approaches have advanced greatly concerning the interactions between protection structures and coastal ecosystems, evaluation, modelling and mapping of coastal ecosystem services, methodological frameworks and tools for eco-engineering.

Objectives

On successful completion of the Summer School, the attendees will have acquired knowledge on methodologies, modelling and analysis tools and the most appropriate frameworks available, enabling them to move from conventional coastal protection to nature-based and hybrid coastal protection solutions. More specifically, each participant will be equipped with essential state-of-the art knowledge concerning:

- (i) Coastal ecosystems, their functioning and interaction with traditional man-made infrastructure, including their evaluation
- (ii) Modelling concepts/approaches to quantify the degradation and renovation of ecosystems by and after natural disturbances
- (iii) The most promising methods/strategies/tools to integrate eco-system engineering solutions for coastal protection at different scales (local to regional).

Topics

- Recent advances in research on natural/hybrid solutions for coastal protection, showing to what extent they can be transferred into engineering practice
- Impacts of traditional engineering solutions and coastal squeeze on ecosystems.
- Attributes/functioning/services of coastal ecosystems focusing on coral reefs, mangroves and coastal freshwater wetlands, salt marsh, sea grass and coastal dunes.
- Criteria on the use of ecosystem engineering species for coastal protection against floods/erosion and optimization in terms of their functionality/ecology and aesthetic aspects.
- Concepts/methods for the evaluation of ecosystem services with a focus on coastal protection services
- Coastal protection effects (e.g. wave attenuation, flood depths/velocity, erosion rates/shoreline changes) and their modelling to quantify the effectiveness of ecosystem-based coastal defence options.
- Modelling concepts and approaches to quantify the degradation/renovation of ecosystems by/after natural disturbances (e.g. an episodic extreme event vs. series of successive moderate events), including better characterization of the cases where renovation instead of degradation is likely to occur,
- Risk-based approaches within a consistent multi- and trans-disciplinary framework such as DPSIR
- Case studies for integrating ecosystems in coastal protection at different temporal/spatial scales and lessons learned (examples of good and bad practice).
- Future steps to overcome (i) gaps in current knowledge and modelling weaknesses, (ii) lack of practical guidance and consistent methodologies, (iii) weaknesses in current monitoring techniques/strategies, (iv) inconsistencies in current regulations, policies and strategies for the integration of ecosystems in coastal protection.

Lectures, field work & excursions

The Summer School consists of an introductory session, two major sessions (lectures / exercises / discussions in class), field work / excursions to selected coastal sites and a final session with case studies/ lessons learned.

The participants will also have the opportunity to discuss/present case studies from their own country with the aim of identifying, together with the lecturers and the other attendees, the most appropriate solutions in group discussions.

SCHEDULE

Date	Time	Events
Monday 18/9/2017	All day	Arrival of participants with “Ice Breaker” in the late afternoon
Tuesday 19/9/2017	9:00 – 17:00	Introductory Session (i) Integrating ecosystems in coastal protection against flood/erosion: Recent advances and challenges (ii) Coastal eco-engineering: problems and challenges in Mexico (iii) Coastal eco-engineering: problems and challenges in Latin America (iv) Discussion and feedback from participants
Wednesday 20/9/2017	9:00-18:00	PART 1: Theoretical background, concepts and structuring framework Ecosystems: Ecological functioning and coastal protection efficiency (i) Mangrove forests (ii) Coral reefs (iii) Salt marshes and freshwater coastal wetlands (iv) Sea grasses (v) Coastal dunes (vi) Presentations of case studies by attendees
Thursday 21/9/2017	9:00-18:00	Ecosystem services with a focus on coastal protection (i) Concepts/methods/models for quantifying/valuing ecosystem services within a consistent valuation framework (ii) Measuring efficiency of coastal protection ecosystems against waves, floods and erosion: Parameters/modelling framework (iii) Resilience/adaptive capacity of selected coastal ecosystems (vii) Introduction to ecological modelling (iv) Presentations of case studies by attendees (v) Preparatory course for field work (1): data acquisition, equipment setup and data treatment and analysis
Friday 22/9/2017	9:00-18:00	Ecosystem approach, integrated framework and monitoring (i) Ecosystem approach to coastal protection and management (ii) DPSIR with nested SPR: Strengths/limitations/refinements as a structuring framework for ecosystem-based coastal protection (iii) Integrated monitoring: framework, methods and techniques (iv) Presentations of case studies by attendees (v) Preparatory course for field work (2): data acquisition, equipment setup and data treatment and analysis
Saturday 23/9/2017	8:00 -19:00	Field work: Monitoring and visits to selected sites
Sunday 24/9/2017	Whole day	FREE

Date	Time	Events
Monday 25/9/2017	9:00-18:00	<p>PART 2: Ecosystem-based coastal protection: Modelling/implementation/monitoring/management Ecological impact of traditional hard/soft engineering solutions</p> <ul style="list-style-type: none"> (i) Impact of hard structures and ecological mitigation measures (ii) Impact of coastal squeeze and ecosystem remediation (iii) Impact of beach/dune nourishment and ecological improvements (iv) Presentations of case studies by attendees (v) Data analysis by fieldwork groups (1)
Tuesday 26/9/2017	9:00-18:00	<p>Natural/hybrid solutions for coastal protection</p> <ul style="list-style-type: none"> (i) Overview of ecological models and other modelling tools (ii) Introduction to ++InVEST model suite (iii) Modelling/analysing/optimizing performance of natural/hybrid solutions (iv) Design guidance for hybrid solutions against waves, floods and erosion (v) Presentations of case studies by attendees
Wednesday 27/9/2017	9:00-18:00	<p>Monitoring of protection performance of natural/hybrid solutions</p> <ul style="list-style-type: none"> (i) Monitoring requirements, approaches and techniques, (ii) Data analysis from the field work (iii) Presentations of case studies by attendees (vi) Data analysis by fieldwork groups (2)
Thursday 28/9/2017	9:00-18:00	<p>Management and legal issues</p> <ul style="list-style-type: none"> (i) Eco-based management framework and institutional/legal issues related to coastal protection (ii) Presentations of case studies by attendees
Friday 29/9/2017	9:00-18:00	<p>Part 3: Cases studies/lessons learned and closure</p> <p>Cases studies</p> <ul style="list-style-type: none"> (i) Three case studies, selected and presented by lecturers with respective focus on coastal dunes, beaches, coral reefs, mangroves and saltmarshes (ii) Presentations of case studies by attendees <p>Closing lecture and discussion</p> <ul style="list-style-type: none"> (i) Summary and conclusions of the course, including final discussions (ii) Evaluation of the course and suggestions for future collaboration <p>Farewell dinner and attendance certificates</p>
Saturday 30/9/2017		Departure



Lecturers and Course Material:

For each of the main topics, leading scientists/practitioners, including lecturers from DAAD-EXCEED partner universities, will be invited to provide lectures and exercises.

A brief summary of each lecture/exercise, expected learning outcomes and a list of supporting course material (lecture notes, related publications) will be sent to all participants before the seminar.

At the end of the seminar a memory stick will be given to each participant including a copy of the lectures/exercises, the supporting course material, photographs taken during the field work and the visits to coastal sites.

Target Audience:

The expected attendees are preferably advanced Master students and PhD-students, as well as young engineers, biologists, oceanographers, managers and geologists. Priority will be given to those attendees with experience in coastal ecosystems, who are interested in acquiring knowledge and competence in natural and hybrid solutions for coastal protection by combining coastal ecosystems with traditional engineering solutions. Each applicant will be asked to submit his or her own case study as an integral part of their application.

Number of participants:

The number of participants is limited to 30. Candidates from DAAD-EXCEED partner universities in Latin-America will be given first priority. There are full scholarships for participants from developing countries.

Application:

Online until **January 27, 2017**

http://www.exceed-swinton.org/7422_la-summer-school-in-puerto-morelos-mexico-sep-18-30-2017

– Selection and Notification will be sent to applicants until March 15, 2017

Internet: <http://www.exceed-swinton.org/>

Email: exceed@tu-braunschweig.de

Contact:

Prof. Dr. Rodolfo Silva Casarín

Instituto de Ingeniería
Grupo de Ingeniería de Costas y Puertos
Universidad Nacional Autónoma de México
Ciudad Universitaria
D.F., México
E-mail: RSilvaC@iingen.unam.mx
Phone: +52 55 56233668

Prof. Dr.-Ing. Hocine Oumeraci

Leichtweiß-institut für Wasserbau
TU Braunschweig
Beethovenstraße 51a
D-38106 Braunschweig, Germany
Email: h.oumeraci@tu-bs.de
Phone.: +49 531 391-3930

Venue:

Universidad Nacional Autónoma de México
Puerto Morelos, Quintana Roo, Mexico

Organization TU Braunschweig:

Prof. Dr. Andreas Haarstrick
Scientific Coordinator
Excellence Center for Development Cooperation
Sustainable Water Management
Beethovenstraße 51a
D-38106 Braunschweig, Germany
Email: a.haarstrick@tu-bs.de
Tel.: +49 531 391-3935

Co-organizers:

Dr. Malva Mancuso
Dr. Edgar Mendoza Baldwin
Dr. Pedro Pereira

Funded by

