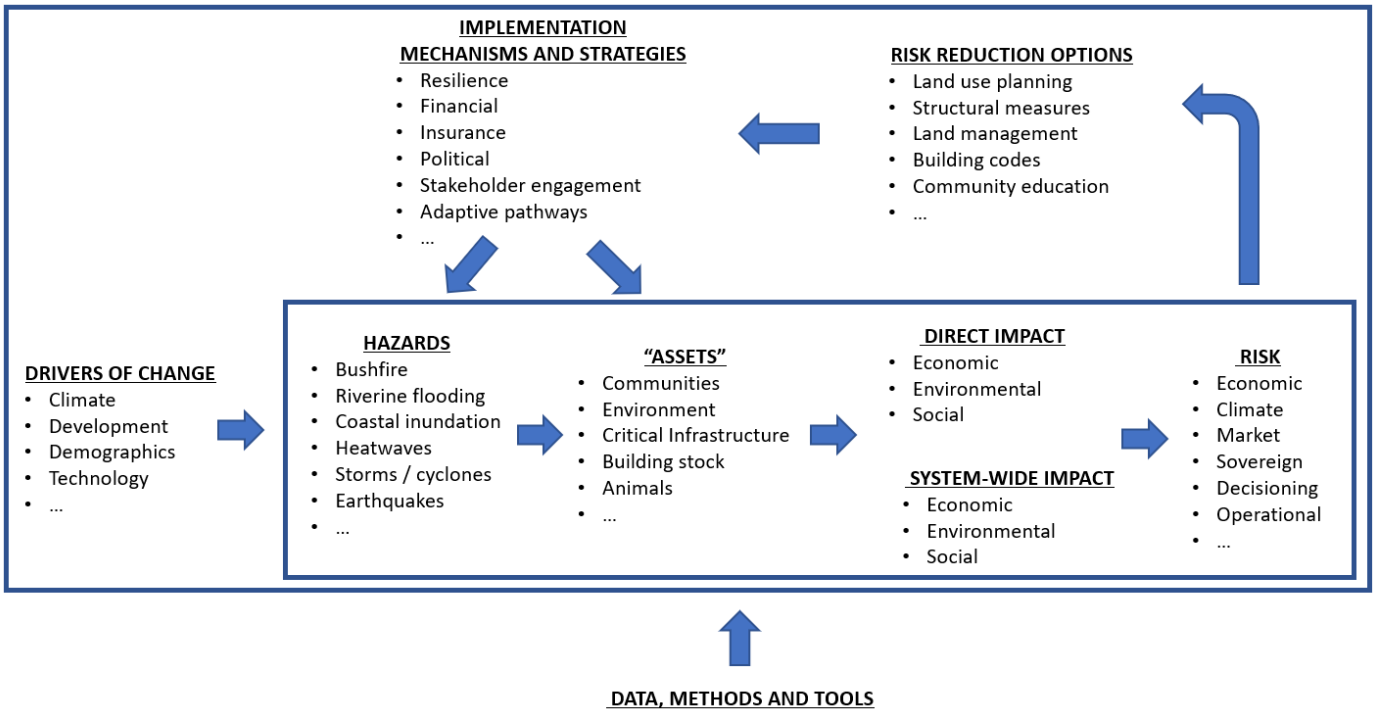
CEME 4005 & 7045

INTEGRATED NATURAL HAZARD RISK MANAGEMENT

Course Overview

This course provides participants with the opportunity to explore: different approaches to quantifying natural hazard risks; how these risks could change into the future in response to population and climate change; how these risks can be reduced using a range of strategies, including structural measures, land management, land use planning and changes to building codes, and; which approaches and mechanisms are effective for increasing the chances of implementing adaptive risk management plans. This is done in the context of risks associated with bushfires, heatwaves, earthquakes, cyclones, riverine flooding and sea level rise. Participants also have the opportunity to apply the above concepts to a project of their choice, enabling them to explore topics such as how risks could evolve over time under different plausible future scenarios, what the most effective risk reduction strategies might be, how to best manage risks from multiple hazards, what strategies are most effective for increasing community resilience, how to present hazard risk information to best engage communities in natural hazard risk reduction activities, how to present hazard risk information to communities most effectively, or other relevant topics of their choice.



WHAT WILL I LEARN IN THIS COURSE?

At the completion of this course, students will be able to:

1. Understand the mechanisms underlying a range of natural hazards (e.g. bushfire, riverine flooding, coastal inundation, heatwaves, cyclones and storms, and earthquakes) and produce hazard risk maps in GIS
2. Understand, quantify, critically assess and discuss the spatial variability in the likelihood of different natural hazards
3. Understand, quantify, critically assess and discuss the spatial variability in the exposure and vulnerability of different types of "assets" (e.g. buildings, critical infrastructure, people, environment)
4. Understand, quantify, critically assess and discuss the spatial variability of system-wide and indirect risks and impacts due to natural hazards
5. Understand and discuss the spatial variability of the risk and impacts due to compound events
6. Communicate the risk of different natural hazards effectively through maps
7. Understand, quantify, critically assess and discuss the impact of different drivers of change (e.g. climate and population change) and resulting plausible future conditions on changes in impact and risk
8. Understand, quantify, critically assess and discuss the advantages, disadvantages and relative effectiveness of different risk reduction options
9. Understand, apply, critically assess and discuss different approaches to measuring risk and resilience
10. Develop, critically assess and discuss adaptive risk management plans under deep uncertainty
11. Understand, critically assess and discuss different approaches and mechanisms for increasing the chances of implementing adaptive risk management plans
12. Use GIS tools effectively for natural hazard risk mapping and management
13. Use different data sources for natural hazard risk mapping and management
14. Collect and harmonise data from different sources in order to undertake analysis

HOW IS THE COURSE STRUCTURED AND ASSESSED?

This is a 2-week intensive course, with a subsequent 6-week period during which students can complete a project of their choice in their own time. In each week of the 2-week intensive period, students watch a series of recorded lectures and complete related GIS modelling exercises, culminating in the completion of a weekly project. Each week will be divided into two parts. The first three days will set aside time to watch the online lectures in the morning and time to complete the GIS modelling exercises in the afternoon. These exercises relate to the online lectures to build the "components" of the overall weekly activity and introduce students to relevant datasets, methods, and tools. The fourth and fifth day of each week is set aside to work on the weekly project. At the completion of the two weeks, students have 6 weeks to work on a project of their choice to put what they have learnt into practice in an area of their interest.

Course Structure & Assessment			
WEEK 1: DEVELOPMENT OF INTEGRATED REGIONAL RISK MAP	**Morning**	**Afternoon**	**Assessment**
Day 1: Natural Hazards and Likelihood	Online Lectures	GIS Exercises	3%
Day 2: Exposure, Vulnerability and Values	Online Lectures	GIS Exercises	3%
Day 3: System-Wide Impacts and Risks	Online Lectures	GIS Exercises	3%
Days 4 & 5: Project Work (Development of Integrated Regional Risk Map)	Project Work	Project Work	13%

WEEK 2: DEVELOPMENT OF ADAPTIVE RISK MANAGEMENT PLAN	**Morning**	**Afternoon**	**Assessment**
Day 6: Uncertainty and Change in Natural Hazard Risk Assessment	Online Lectures	GIS Exercises	3%
Day 7: Risk Reduction Options	Online Lectures	GIS Exercises	3%
Day 8: Risk Reduction Option Implementation Mechanisms and Strategies	Online Lectures	GIS Exercises	3%
Days 9 & 10: Project Work (Development of Adaptive Risk Management Plan)	Project Work	Project Work	19%

WEEKS 3-8: MAJOR PROJECT	**Assessment**
Students work independently on project of their choice (assistance available)	50%

WHAT WILL BE COVERED IN THE ONLINE LECTURES?

CONTENT	PRESENTERS (Indicative)
Day 1: Natural Hazards and Likelihood	
• Physical processes and likelihood of a range of natural hazards (e.g. bushfire, riverine flooding, coastal inundation, heatwaves, cyclones/storms and earthquakes) • Compound events	Presenters from research, industry and government, including Universities of Queensland and Adelaide, Natural Hazards Research Australia, Dept for Environment and Water (SA), Climate Extremes Consulting, Risk Frontiers, World Bank
Day 2: Exposure, Vulnerability and Values	
• Potential impacts of natural hazards on things we value, such as buildings, critical infrastructure, people and the environment • Examples of methods for quantifying impacts	Presenters from research, industry and government, including Universities of Queensland and Adelaide, CSIRO, Insurance Council of Australia, SA Power Networks, Edge Environment, World Bank
Day 3: System-Wide Impacts and Risks	
• Potential system-wide impacts of natural hazards • Different ways of conceptualising and representing risk	Presenters from research, industry and government, including Universities of Western Australia and Adelaide, Deakin and Curtain Universities, CSIRO, Natural Hazards Research Australia, Insurance Council of Australia, Value Advisory Partners, Shoal Engineering, National Recovery and Resilience Agency, Dept for Environment and Water (SA), SA Water
Day 6: Uncertainty and Change in Natural Hazard Risk Assessment	
• Drivers of change affecting hazards, impact and risk (e.g. climate and population change, TCFD[1]) • Methods for modelling drivers of change and their impact • Real-world case studies	Presenters from research, industry and government, including University of Adelaide, Research Institute for Knowledge Systems, CSIRO, Dept of Environment, Water, Land and Planning (VIC), City of Port Adelaide-Enfield, Finity Consulting
Day 7: Risk Reduction Options	
• Risk ownership • Risk reduction options (e.g. structural measures, land use planning, land management, building codes, communication) • Real-world case studies	Presenters from research, industry and government, including Universities of Melbourne, Wollongong and Adelaide, Victoria University, Research Institute for Knowledge Systems, CSIRO, Dept for Environment and Water (SA), City of Port Adelaide-Enfield, SA Power Networks
Day 8: Risk Reduction Option Implementation Mechanisms and Strategies	
• Resilience and adaptation • Risk reduction mechanisms and strategies (e.g. economic, financial, insurance, stakeholder engagement, political) • Real-world case studies	Presenters from research, industry and government, including Universities of New England and Adelaide, TU Delft, Research Institute for Knowledge Systems, CSIRO, Dept for Fire and Emergency Services (WA), City of Port Adelaide-Enfield, Resilient South, Insurance Council of Australia, Committee for Sydney, Edge Environment, Value Advisory Partners, SGS Economics and Planning

[1] Task Force on Climate-Related Financial Disclosures

WHEN WILL THE COURSE BE OFFERED?

The 2-week intensive teaching period for the course will be from 14/02/2022 to 25/02/2022. Further details are available online:

- CEME 4005 – Undergraduate Course – Course Planner
- CEME 7045 – Postgraduate Course – Course Planner

CAN I TAKE THE COURSE?

YES, the course can be taken by anyone, including:

- Students who would like to attend in person at the University of Adelaide campus and students who would like to take the course remotely from anywhere in Australia or around the world.
- Students currently attending the University of Adelaide and those wanting to take the course in isolation (e.g. people in industry or government working in or interested in natural hazard management).

The course can also be taken different modes, including:

- Students who would like to complete the course for credit, including all of the assessment tasks.
- Students who would like to audit the course and not be assessed.

HOW DO I ENROL AND HOW MUCH DOES IT COST?

If you are not taking the course as part of an existing University of Adelaide degree, you will have to enrol as a full fee paying student, the full background and process for which is available here. As part of the enrolment process, please complete the non-award enrolment form (form here) and email the completed form to askecms@adelaide.edu.au (please also cc in holger.maier@adelaide.edu.au).

Please check the above links for actual fees, but indicative costs are:

- AU$ 3,999 for Australian domestic students
- AU$ 5,499 for international students

Further enquiries and information

Email: holger.maier@adelaide.edu.au
Web: www.adelaide.edu.au
Course outlines: CEME 4005; CEME 7045