UNIVERSITÀ DELLA CALABRIA
DIPARTIMENTO DI
INGEGNERIA PER L'AMBIENTE
E IL TERRITORIO
E INGEGNERIA CHIMICA
DIATIC

CLIMATE CHANGE SCENARIOS

A.A. 2020/2021

Denominazione insegnamento	CLIMATE CHANGE SCENARIOS	
Codice insegnamento		
Corso di Studio (CdS)	ENVIRONMENTAL AND TERRITORIAL SAFETY ENGINEERING	
Livello CdS		
Codice CdS		
Settore Scientifico Disciplinare (SSD)	ICAR/02	
Crediti Formativi Universitari (CFU)	6	
Tipologia Attività Formativa (TAF)	ALTRO	
Tipo attività formativa	COMPULSORY	
Anno di corso	2	
Periodo didattico	FIRST SEMESTER	
Docente responsabile		
Altri docenti coinvolti		
Organizzazione didattica*	***Ore Lezioni***	36
	Ore Esercitazioni	21
	Ore Laboratorio	---
	Ore Studio individuale	103
Lingua di insegnamento	ITALIAN	
Propedeuticità	NONE	
Prerequisiti	NONE	
Contenuti	The course deals with the main natural and anthropogenic aspects, direct and indirect, related to climate change for different scales of interest. The course also aims to provide the tools necessary to understand and manage the complex dynamics highlighted by climate risk and its effects on scientific and socio-economic aspects.	
Obiettivi formativi (in termini di risultati di apprendimento attesi)	*Specific skills:* 1) Provide students of the Master's Degree in Environmental Engineering, through quantitative evaluation techniques and numerical modeling, the knowledge of interconnections between climate, hydrological extremes, energy balance, carbon cycle, together with the effects that the same forcing factors determine on political, social and economic dynamics of a given region. 2) The student will also be able to analyze current and future emissions scenarios, together with the social factors that control them, identifying the main critical issues in the water resources. 3) The course completes the skills of the environmental engineer by providing a framework among the three classes of climate change responses: adaptation, mitigation and geoengineering; as well as their advantages, disadvantages and compromises.	
Programma	INTRODUCTION TO CLIMATE PROBLEM RADIATION AND ENERGY BALANCE A SIMPLE CLIMATE MODEL	

	EFFECTS ON HYDROLOGICAL EXTREMES AND WATER RESOURCES THE CARBON CYCLE FORCING, FEEDBACKS AND CLIMATE SENSITIVITY FUTURE SCENARIOS FORECASTING IMPACTS OF CLIMATE CHANGE ON POLITICAL, ECONOMIC AND SOCIAL MEASURES ADAPTATION AND MITIGATION POLICIES GEOENGINEERING SOLUTIONS
Modalità di erogazione	FRONT
Metodologie didattiche	TRADITIONAL
Metodi e criteri di valutazione dell'apprendimento	ORAL EXAM
Testi di riferimento ed eventuali letture consigliate	- Notes of lessons. - Andrew Dessler – "Introduction to Modern Climate Change: Second Edition". Cambridge University Press 2016, 978-1-107-09682-0 – - J. F. Feenstra, I. Burton, J. B. Smith and R.S.J. Tol – "Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies" United Nations Environment Programme (UNEP) 1998. - S. G. Philander – "ENCYCLOPEDIA of Global Warming and Climate Change" SAGE Publications, Inc. 2455 Teller Road Thousand Oaks, California 91320, 2008. -R.L. Bras - 'Hydrology: an Introduction to HydrologicScience', Addison-Wesley, 1990. - U. Maione - 'Le piene fluviali', La Goliardica Pavese, 1998. - L. W. Mays -Water Resources Engineering: Second Edition"Wiley, ISBN 978-0-470-46064-1, 2010. -R M Harrison and R E Hester –"Geoengineering of the Climate System" 2014, https://doi.org/10.1039/9781782621225
Peer review	
Orario delle lezioni	http://diam.unical.it
Calendario degli esami	http://diam.unical.it
Commissione d'esame	http://diam.unical.it

Organizzazione didattica

STIMA DEL CARICO DI LAVORO PER LO STUDENTE				
	Lezioni [Ore]	Esercitazioni [Ore]	Laboratorio [Ore]	Studio individuale [Ore]
Descrizione blocco argomenti 1 INTRODUCTION TO CLIMATE PROBLEM	2			4
- Andrew Dessler – "Introduction to Modern Climate Change: Second Edition". Cambridge University Press 2016, 978-1-107-09682-0 –				
Descrizione blocco argomenti 2 RADIATION AND ENERGY BALANCE	3	2		8
- Andrew Dessler – "Introduction to Modern Climate Change: Second Edition". Cambridge University Press 2016, 978-1-107-09682-0 –				
Descrizione blocco argomenti 3 A SIMPLE CLIMATE MODEL	4	4		10
- Andrew Dessler – "Introduction to Modern Climate Change: Second Edition". Cambridge University Press 2016, 978-1-107-09682-0 – - L. W. Mays -Water Resources Engineering: Second Edition"Wiley, ISBN 978-0-470-46064-1, 2010.				
Descrizione blocco argomenti 4 EFFECTS ON HYDROLOGICAL EXTREMES AND WATER RESOURCES	6	5		14
- L. W. Mays -Water Resources Engineering: Second Edition"Wiley, ISBN 978-0-470-46064-1, 2010. -R.L. Bras - 'Hydrology: an Introduction to HydrologicScience', Addison-Wesley, 1990. - U. Maione - 'Le piene fluviali', La Goliardica Pavese, 1998.				
Descrizione blocco argomenti 5 THE CARBON CYCLE	4	2		10
- Andrew Dessler – "Introduction to Modern Climate Change: Second Edition". Cambridge University Press 2016, 978-1-107-09682-0 –				
Descrizione blocco argomenti 6 FORCING, FEEDBACKS AND CLIMATE SENSITIVITY	2			4
- Andrew Dessler – "Introduction to Modern Climate Change: Second Edition". Cambridge University Press 2016, 978-1-107-09682-0 –				
Descrizione blocco argomenti 7 FUTURE SCENARIOS FORECASTING	6	4		14
- Andrew Dessler – "Introduction to Modern Climate Change: Second Edition". Cambridge University Press 2016, 978-1-107-09682-0 –				
Descrizione blocco argomenti 8 IMPACTS OF CLIMATE CHANGE ON POLITICAL, ECONOMIC AND SOCIAL MEASURES	3	2		6

- Andrew Dessler – "Introduction to Modern Climate Change: Second Edition". Cambridge University Press 2016, 978-1-107-09682-0 – - J. F. Feenstra, I. Burton, J. B. Smith and R.S.J. Tol – "Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies" United Nations Environment Programme (UNEP) 1998.				
Descrizione blocco argomenti 9 ADAPTATION AND MITIGATION POLICIES - J. F. Feenstra, I. Burton, J. B. Smith and R.S.J. Tol – "Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies" United Nations Environment Programme (UNEP) 1998. - Andrew Dessler – "Introduction to Modern Climate Change: Second Edition". Cambridge University Press 2016, 978-1-107-09682-0 –	3	2		6
Descrizione blocco argomenti 10 GEOENGINEERING SOLUTIONS -R M Harrison and R E Hester –"Geoengineering of the Climate System" 2014, https://doi.org/10.1039/9781782621225 - Andrew Dessler – "Introduction to Modern Climate Change: Second Edition". Cambridge University Press 2016, 978-1-107-09682-0 – - S. G. Philander – "ENCYCLOPEDIA of Global Warming and Climate Change" SAGE Publications, Inc. 2455 Teller Road Thousand Oaks, California 91320, 2008.	3			6
Ore riservate allo sviluppo delle competenze trasversali *(possono essere previste anche ore di lezione frontale)*				0
Tesine/altri homework				0
Ulteriori ore da dedicare alla preparazione dell'esame *(es. ore che gli studenti dedicano allo svolgimento di precedenti tracce d'esame)*				21
TOTALE *(Attenzione: i totali devono coincidere con le ore inserire dall'ufficio)*	**36**	**21**		**103**
ORE COMPLESSIVE	✓ **160**			