

820094 - CCCEEPF - Climate Change: Science, Energy, Economics, Politics and the Future

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering

Teaching unit: 729 - MF - Department of Fluid Mechanics
748 - FIS - Department of Physics

Academic year: 2018

Degree: BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN BIOMEDICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Teaching unit Optional)

ECTS credits: 3 Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: Alcaraz Sendra, Olga
Xercavins Valls, Josep

Others: Alcaraz Sendra, Olga
Buenestado, Pablo
Sureda, Bàrbara
Xercavins Valls, Josep

Prior skills

Not called in; is advisable to have studied the course 820019 - TMS

Requirements

Not called in; is advisable to have studied the course 920019 - TMS

Degree competences to which the subject contributes

Transversal:

02 SCS N3. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 3. Taking social, economic and environmental factors into account in the application of solutions. Undertaking projects that tie in with human development and sustainability.

Learning objectives of the subject



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The student should acquire essential knowledge about the climate change problematique, from the point of view of: its causes and scientific manifestations, anthropocentric drivers factors, the world's energy problems, the economic dynamics during the last 200 years, the inability of the political decision to deal with it, and future prospects of everything.

Study load

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|--------------------------|---------------------|-----|--------|
| Total learning time: 75h | Hours large group: | 30h | 40.00% |
| | Hours medium group: | 0h | 0.00% |
| | Hours small group: | 0h | 0.00% |
| | Self study: | 45h | 60.00% |

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Content

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| <p>1.Prsentations amd introductions</p> | <p>Learning time: 5h Theory classes: 2h Self study : 3h</p> |
| <p>Description: - Several but important presentations and introductions for the good development of the course in all its aspects</p> <p>Specific objectives: - Presenting the objectives, program, bibliography, methodology, etc. of course - Introduction to the work activities and assessment methods. - Give the key dates of the course during the academic year.</p> | |
| <p>2.SCIENCE of Climate Change</p> | <p>Learning time: 10h Theory classes: 4h Self study : 6h</p> |
| <p>Description: - On scientific knowledge it has of the causes and effects of anthropogenic global warming and climate change</p> <p>Specific objectives: - Understand the scientific principles governing the average temperature at the Earth's surface - Know the anthropogenic reasons that explain the variation of the temperature and therefore the foundations of global warming and climate change - Get intensifying the greenhouse effect and its anthropogenic interference with the carbon cycle - The GHG and CO2 equivalent units - Know the evidence of climate change from a historical point of view. The main manifestations and effects of global warming</p> | |
| <p>3.ENERGY, ECONOMY and Climate Chnage</p> | <p>Learning time: 5h Theory classes: 2h Self study : 3h</p> |
| <p>Description: - Factors driving "anthropogenic climate change"; primary energy vector; and identity I = PAT</p> <p>Specific objectives: - Understand historical trends and present recent exponential phenomenology of the drivers factors of climate change - Know the numbers and orders of magnitude of the phenomena. Emissions and concentrations - Know the I = PAT identity</p> | |

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| <p>4.Evaluation of the CO2 emissions associated with the energy mix vector</p> | <p>Learning time: 5h Theory classes: 2h Self study : 3h</p> |
| <p>Description: - Identification of primary energy vectors, and from them, calculating CO2 emissions</p> <p>Specific objectives: - Know the primary energy vectors - Apply methods for calculating CO2 emissions associated with fossil-based primary energy</p> | |
| <p>5.The I = PAT identity and the analysis of the role of the different driven factors in the CO2 emissions</p> | <p>Learning time: 5h Theory classes: 2h Self study : 3h</p> |
| <p>Description: - Learn to understand the role of different factors drivers CO2 emissions</p> <p>Specific objectives: - Deepen the information that gives us identity I = PAT - Analyze the role on different case studies by different factors drivers CO2 emissions</p> | |
| <p>6.The multilateral POLITICS and the agendes fighting against climate change</p> | <p>Learning time: 10h Theory classes: 4h Self study : 6h</p> |
| <p>Description: - From the environmental summits and the creation of the IPCC ... towards Paris 2015 ... trough the UNFCCC, the Kyoto Protocol and the failure of Copenhaguen</p> <p>Specific objectives: - Saber de les NNUU, els tractats internacionals i la seva aplicació i evolució en el tema subjecte de l'assignatura - Descriure la cronologia política i institucional fonamental de la lluita contra el canvi climàtic - Conèixer la UNFCCC - Conèixer el Protocol de Kyoto - Saber del fracàs de Copenhaguen - Sobre les diferents responsabilitats històriques</p> | |

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| <p>7.The IPCC, the assessment reports and the FUTURE</p> | <p>Learning time: 5h Theory classes: 3h Self study : 2h</p> |
| <p>Description:</p> <ul style="list-style-type: none"> - Creation and role of the IPCC - The IPCC AR4 and the Copenhagen Summit - The IPCC AR5 RCPs scenarios and the road to COP 21 in Paris <p>Specific objectives:</p> <ul style="list-style-type: none"> - Get Bali Action Plan towards the Copenhagen Summit - Know the future scenarios of the IPCC and the possible climate change mitigation objectives in the perspective of the first decade of the century - Know the latest IPCC scenarios for the future in view of the second decade of the century - The concept of Global Carbon Budget and specific objectives of stabilizing the Earth's temperature - The INDCs on the road to COP 21 in Paris | |
| <p>8.The RCPs scenarios and the INDCs</p> | <p>Learning time: 5h Theory classes: 2h Self study : 3h</p> |
| <p>Description:</p> <ul style="list-style-type: none"> - The IPCC AR5 RCPs scenarios - The INDCs on the road to COP 21 in Paris <p>Specific objectives:</p> <ul style="list-style-type: none"> - Know the RCPs AR5 scenarios and learn how to calculate "carbon budgets" and its relation to the objectives of stabilizing land temperatures - Learning to analyze countries INDCs | |
| <p>9.The Paris Agreement and the FUTURE</p> | <p>Learning time: 5h Theory classes: 2h Self study : 3h</p> |
| <p>Description:</p> <ul style="list-style-type: none"> - The Paris Agreement 2015 <p>Specific objectives:</p> <ul style="list-style-type: none"> - Understand and analyze the reasons, characteristics and key elements of the 2015 Paris Agreement - Future NDCs and its future aggregate analysis | |

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Bibliography

Basic:

UNFCCC. Web United Nations Framework Convention on Climate Change [on line]. [Consultation: 30/08/2017]. Available on: <unfccc.int/2860>.

IPCC. Web Intergovernmental panel on climate change [on line]. [Consultation: 30/08/2017]. Available on: <www.ipcc.ch>.

UNEP. Web United Nations Environmental Program and CC [on line]. [Consultation: 28/08/2017]. Available on: <<http://www.unep.org/climatechange/>>.

IEA. Web International Energy Agency [on line]. [Consultation: 30/08/2017]. Available on: <www.iea.org>.

UN CLIMATE CHANGE. Web UN and Climate Change [on line]. [Consultation: 30/08/2017]. Available on: <www.un.org/climatechange/>.

Complementary:

WRI. Web CAIT WRI (World Resources Institute) [on line]. [Consultation: 28/08/2017]. Available on: <<http://cait.wri.org/>>.

IISD. Web IISD (International Institute on Sustainable Development) [on line]. [Consultation: 30/08/2017]. Available on: <http://enb.iisd.org/process/climate_atm.htm>.

CAN. Web CAN (Climate Action Network) [on line]. [Consultation: 30/08/2017]. Available on: <www.climatenetwork.org>.