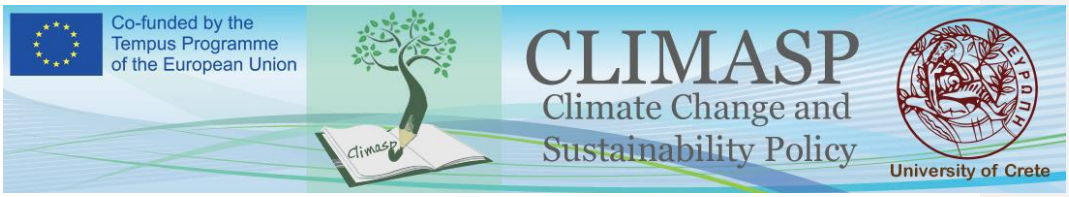

CLIMASP TOOLKIT

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Table of Contents

INTRODUCTION

The Climate Change Challenges

It is widely recognised that the earth is getting warmer and it will continue to do so in the future, creating a wide range of impacts that include sea-level rise, extreme weather conditions, seasonal changes, droughts, and heat waves. The key question that is often posed is: how fast and how severe the impacts will be and whether we can adopt policies for mitigating and adapting to these impacts?

Despite minor controversies, climate change is the greatest long-term challenge facing human development. Climate change is one of the most pressing world issues affecting all mankind and natural environment in today's world. It is not just our biggest environmental, economic and social challenge; it is also a cultural challenge, that raises ethical questions. Much of the discussion around climate change is about reducing carbon dioxide emissions, but preparing for the effects of climate change is just as critical.

For all countries, especially for the most vulnerable ones, climate change is a major challenge which needs to be addressed at every level and in all sectors of society. Accordingly, all kind of specialists in sectors such as education (formal and non-formal), engineering, economics/business, health, agro-forestry, law and politics, need to be ready to tackle the climate change challenges. This will necessitate to be equipped with climate change and sustainability policy knowledge, skills and attributes to minimise threats and maximise opportunities for climate change adaptation. With recent projections suggesting that climate impacts could be even more severe than previously predicted, it is urgent for policy makers, planners and managers in the public and private sectors to understand and assess potential climate impacts in decision making.

The CLIMASP Interdisciplinary Programme

The CLIMASP minor is aimed to provide interested undergraduate students the possibility to acquire knowledge of climate change issues and their effects on policymaking and explore strategic planning to mitigate the consequences of climate change.

In particular, the curriculum of the CLIMASP minor is designed to provide undergraduate students from different majors the flexibility to select courses to enhance their interests in climate change and to enrich their major field of study with professional skills in climate change adaptation policies and planning.

The broad learning outcomes and student attributes are:

To advance all the above stated aims and objectives, students will:

- Play an integrating and leadership role in climate change adaptation in their professional position.
- Demonstrate their understanding of the basic concepts, principles and debates related to climate change adaptation.

- Acquire familiarity with a range of adaptation planning tools and be able to select the appropriate mix of tools in response to particular adaptation scenarios.
- Aware of the ethical framework and shared set of values that govern their everyday actions.
- Develop core adaptation planning competencies/skills; and have an appreciation of climate change requirements associated with a number of sectoral/regional vulnerability themes, including biodiversity, water resources, oceans and coasts, cities, and agriculture.
- Assess what local/national governments do in practice concerning CLIMASP and how this varies over time and between jurisdictions, what they ought to do and ought not to do, and what principles should guide decision making.
- Explore and connect climate change issues with other issues such as poverty, social exclusion, gender equity, food and water security, migration, and human rights.
- Adopt an intergenerational focus when dealing with climate change and sustainability policy issues.
- Build people's voice in decision-making which affects their lives, social awareness and a sense of social solidarity, capacity to consider risks and consequences of climate change, and role as active citizens.
- Demonstrate high-level capacity for critical enquiry in order to comprehend the complexity of climate change adaptation challenges; and demonstrate familiarity with systems-based approaches to climate change adaptation.
- Integrate diverse bodies of scientific knowledge in climate change and sustainability policy, translate and communicate these to a diverse range of stakeholders.
- Recognize, explain and connect the basic principles, concepts, theories, pertaining to the global climate change debate using appropriate scientific language.
- Develop appropriate problem solving and service learning strategies for climate change adaptation and mitigation.

The Structure of the CLIMASP Minor

The interdisciplinary CLIMASP courses will consist of core courses, elective courses, and the required capstone course in the three concentration areas, namely:

1. Climate Change, Environment and Societyy
2. Climate Change, Economics and Public Policy
3. Climate Change, Science and Technology

The number of courses to be taken by undergraduate students choosing the CLIMASP minor, including the capstone course could be weighted between 45-60 ECTS (1125-1350 and 1500-1800 Student Learning Hours, respectively), depending on the partner university. The individual courses will range between 3-5 ECTS, but in some universities it may reach up to 10 ECTS.

- 2 Credit Hours per week = 3 ECTS
- 3 Credit Hours per week = 5 ECTS

- 3 ECTS Course (75-90 Student Learning Hours): 20-30 hours of class sessions; 45-70 hours of learning activities outside of class.
- 5 ECTS Course (125-150 Student Learning Hours): 30-40 hours of class sessions; 85-120 hours of learning activities outside of class.

All students are required to take 3 core courses from the 1st Concentration Area (CA). Such courses should be oriented to social, environmental, economic and cultural aspects of climate change.

Students from the 1st CA have to take at least 2 courses from the 2nd CA and 2 courses from the 3rd CA, according to their preferences (electives). The capstone course will be equivalent of 15 ECTS that will focus on an independent study/internship. Students will choose the concentration area upon which they want to work for an independent study/internship that merges theory with praxis, applying problem-based learning and service learning methodologies.

Key Points to Consider when Revising Courses

- Answer these questions: What should drive a student from one discipline like economics to select a course from engineering and vice versa?

- Categorise the potential courses in terms of the three concentration areas: a) Climate Change, Environment and Society; b) Climate Change, Economics and Public Policy and c) Climate Change, Sciences and Technology.

- Reflect first on your current objectives in the courses you want to revise and identify what is missing in light of the themes chosen using the Table of CLIMASP Knowledge, Skills, Attributes and Competences. Needless to argue that you have to get a deeper understanding of the CLIMASP themes you identified as suitable to your courses and discipline.

- You can develop a matrix that displays the CLIMASP issues identified, what is included in your current objectives and what is missing. Then, reformulate your objectives to address the new CLIMASP themes that you identified suitable to your course and discipline.

- Think about the key themes in your courses and how they might be linked with CLIMASP objectives and learning outcomes.

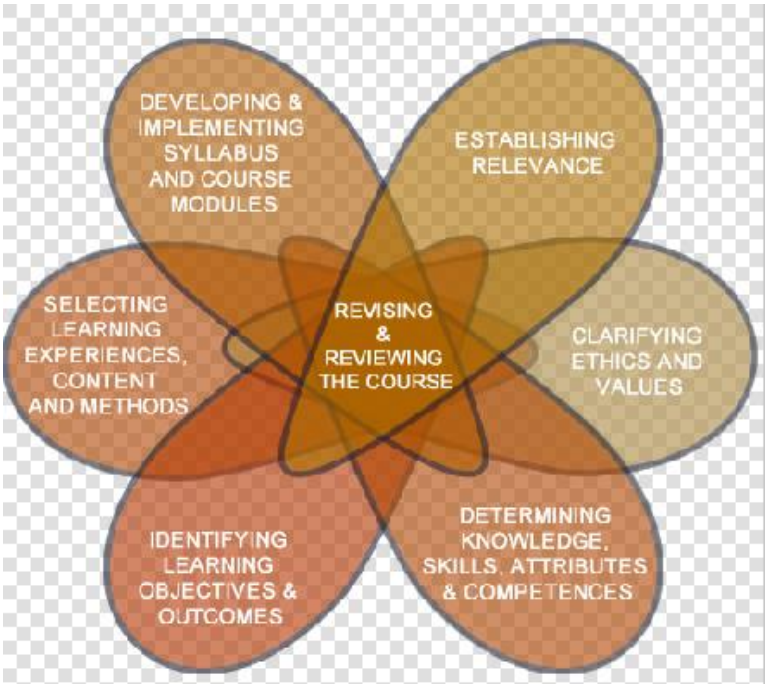
- After identifying the key CLIMASP themes related to the course under revision, start reflecting over of the objectives and learning outcomes generated previously. You have to look what your course and subject can offer to CLIMASP, what is special about your subject and how it can be used to further the goals and principles of a sustainable society.

- Integrate Information & Communication Technologies, including webinars, Skype and social media in your revised courses as well as problem-based learning methods.

- Assess the potential to reformulate titles of the courses to emphasise the concepts of climate change and sustainability policy included.

- In this process, it is suggested to work together with other colleagues from different subjects in order to fulfil the interdisciplinary perspective that is extremely needed in the field of sustainability education. Such an approach will serve as a basis for matching better objectives and content and at the same time build collaborative tasks. Working in cooperation with a colleague—sharing ideas, reflecting on activities attempted, developing resources, planning activities—affirms the skills of both teachers and provides an opportunity to build on each other's expertise to create something that neither would have accomplished alone.

The CLIMASP APPROACH TO COURSE REVISION



Establishing Relevance

Students frequently ask questions, such as: "Why are we doing this? Why do I need to know this? Why are we spending so much time on this? Why do we have to do this assignment? How does this assignment relate to the course outcomes?

Relevance is a key component to motivating student learning and establishing both personal and real-world connection. If students are not provided with an opportunity

to relate their courses to the real world, then they probably find no strong motivation to reach the maximum from the course

Relevance can be established both at the level of designing a course and during the implementation of the course. Through our review we have formulated six essential strategies for establishing relevance.

1. Using real life examples (CLIMASP issues) drawn from the local environment and applying theory to practice, especially through problem-based learning and service learning methods (contextualisation).
2. Balancing, weighing and accommodating a variety of disciplinary perspectives (Curriculum integration/interdisciplinarity).
3. Involving students in the process of setting objectives and learning outcomes (Student-centred learning).
4. Aligning the instructional requirements/methods and curriculum standards with goals/objectives, students' learning styles, personal interests and experiences (Aligning teaching, learning and curriculum).
5. Perceiving students as agents of change through enhancing their abilities to make a difference in their community and take a full role in society, locally and globally (Active citizenship).
6. Involving key stakeholders in curriculum design, development and evaluation (Participatory curriculum design).

Contextualising teaching and learning

Curriculum is an ongoing social process comprised of interactions among students, instructors, and with the environment where they live. The consideration of context in curriculum revision is related to using real life examples, drawing cases from current climate change issues, and local materials/examples. Contextualising learning may help to break down the barriers between the different learning environments (university-community) and thus create a context more conducive to learning.

Exploring current case studies, and discussing local climate change and sustainability policy events through peer interaction, debate and dialogue is of critical importance to contextualising teaching and learning towards CLIMASP. Such a practice can bring theory to real world, and provide the motivation necessary to inspire deep learning.

Curriculum integration

A clear characteristic of a disciplinary-oriented curriculum is the focus on a strict interpretation of the concerned discipline and that no attempts are made for integrating other perspectives from different disciplines. On the contrary an interdisciplinary-oriented curriculum deliberately brings together perspectives from a range of disciplines. Educational experiences are more authentic and of greater value to students when the curricula reflects real life, which is multi-faceted rather than being compartmentalized into neat subject-matter packages." In their view, real-world problems are complex, so no single discipline can adequately describe and resolve these issues. Inter-disciplinary analysis – examines an issue from multiple perspectives, leading to a systematic effort to integrate the alternative perspectives into a unified or coherent framework of analysis.

A suggested strategy for curriculum integration in the case of the CLIMASP minor is to adopt a theme-based approach units as a vehicle for teaching a range of skills and content by integrating curriculum areas around a theme/topic. This method of teaching links curriculum strands and capitalizes on student's interests and life experiences, young people's attitudes, skills and knowledge are developed in meaningful ways. . Inter/cross disciplinary approaches are adopted in planning the integrated curriculum giving more emphasis to the processes involved rather than the outcomes. Interdisciplinary instruction helps students understand that there are ethical dimensions to most climate change issues of concern. Ethical considerations entail moral concerns which means accounting for perceptions of right vs. wrong, good vs. bad, and the provision of justice. This strategy necessitates the transition from teacher directed to more student directed learning.

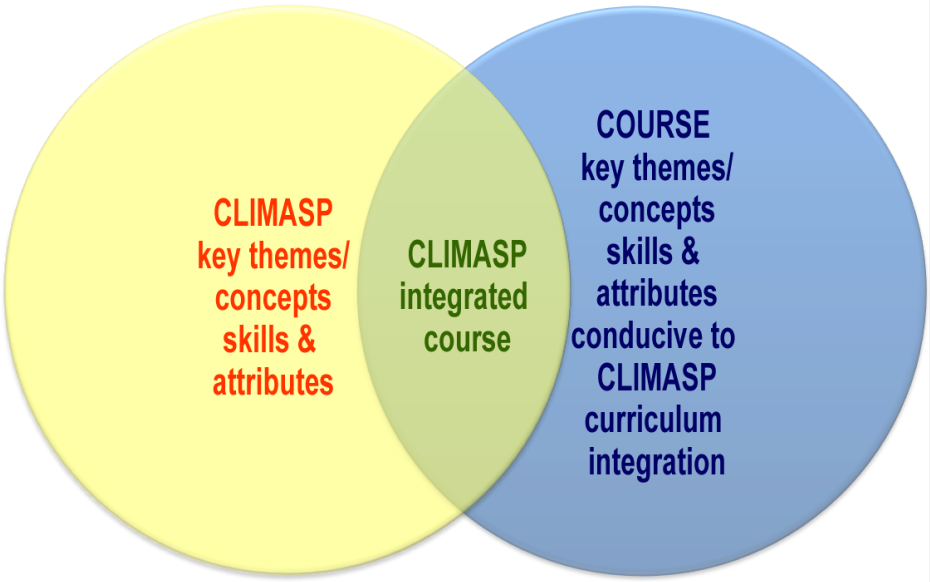
Making a place for CLIMASP in your course

Bringing climate change and sustainability into your course and teaching offers a wide range of benefits to student learning, such as establishing relevance, bridging course content to current climate change themes, and connecting the course to other disciplines. The theme or topic of a course is of the most critical importance in the process to incorporate climate change and sustainability as well as the suitable pedagogies to deliver instruction.

There are certain courses that naturally deal with climate change and sustainability concepts, so tying the threads together into a coherent theme is more easily done. There are also courses that provide more of a challenge to incorporating climate change and sustainability concepts and topics. Integrating climate change and sustainability into courses from academic fields such as education, economics, engineering, social sciences, applied sciences may take additional planning and can involve reshaping the approach to the course. Regardless, giving students the opportunity to encounter climate change and sustainability concepts across the whole study programme or curriculum of a discipline is a powerful way of giving them the knowledge and skills they will need to tackle the challenges of climate change.

Strategies for incorporating CLIMASP in your course

Climate change and Sustainability as a field is vast in terms of the content that could come under its umbrella. Look into the Table of Climate Change Knowledge, Skills, Attributes and Competences to realise it. These offer good prospects for connecting your course content with CLIMASP.



1st Step

First, identify a number of core CLIMASP themes/concepts, skills and attributes that could be related to the content of your course that run through. Think about the key themes in your courses and how they might be linked with CLIMASP objectives and learning outcomes. Use the Table presented in the section on CLIMASP Competences.

After identifying the key CLIMASP themes related to the course under revision, start reflecting over of the objectives and learning outcomes generated previously. You have to look what your course and subject can offer to CLIMASP, what is special about your subject and how it can be used to further the goals and principles of a sustainable society.

2nd Step

Second, identify the course themes/concepts, skills and attributes that lend themselves to CLIMASP integration. See the extend to which they are related with the content of the course and align with the CLIMASP objectives.

3rd Step

Compare the lists of the indentified themes/concepts, skills and attributes in the 1st and 2nd step in light of the CLIMASP objectives and the objectives of your course. Then go to the CLIMASP competences presented in the respective table and try to identify those connected.

Build interdisciplinary perspectives into the course

Climate change and sustainability is an inherently interdisciplinary concept covering the interplay of various kinds of systems. Getting students to understand the extent of

that interdisciplinarity requires that they be exposed to the various perspectives involved and building interdisciplinary teaching into the course is of paramount importance. Try incorporating interdisciplinary and suitable to sustainability teaching strategies, such as Problem-based learning and Service learning. Use the Griffith Graduate Attributes Interdisciplinary Perspective Toolkit accessed at http://www.griffith.edu.au/__data/assets/pdf_file/0010/290773/Interdisciplinary-perspective.pdf which focuses on how you can help students to think about "the same" issue/s from multiple disciplinary perspectives, in a way that tries to integrate or make holistic sense of the various explanations.

For example, in the course "Curriculum and Hypermedia" offered at the Dept. of Education at the University of Crete, students are engaged in collaborative projects, dealing with a wide range of local issues, such as: waste, energy saving, recycling bulling, fair trade, deforestation, over-fishing, racism, social exclusion, active citizenship, etc.

If, you see the title of this courses without giving any indication of its content description, you will probably assume that this course will focus on hypermedia technologies and how they can be integrated into the curriculum. This is a disciplinary interpretation of the title and its perceived interpretation. However, if you read the course description, you will find out that the course bridges a range of perspectives from different disciplines.

Curriculum and Hypermedia: Course Description
Education can be the catalyst for empowering students to become critical, reflective and active citizens. Teachers have the potential to be what Giroux and McLaren described as transformative intellectuals who combine scholarly reflection and practice in the service of educating students to be thoughtful, active citizens. What the course offers is a good introduction to the area of curriculum and hypermedia technology. It does so in a logical order divided into six sections. The first section addresses the perception of curriculum as product, process and praxis. The second section discusses the three curriculum types in the context of hypermedia as Tran missive, transactual and transformative learning technologies. The third section focuses on equipping students with the knowledge and skills to use participatory video and web-based social networking media as empowerment and transformative tools. Here, the course provides case studies, particularly related to climate change issues, showing how children and other marginalised community members can be "empowered" to make their voices heard in the process for building a more sustainable society. The fourth section concentrates on developing participatory video-clips dealing with climate change and local/global issues related to sustainable human development. Using participatory techniques, such as focus group discussions, individual interviews and writing scenarios students are involved in gathering evidence from the children and other community members involved in making the participatory videos. The fifth section examines the uploading of the participatory video clips produced into social networking media and then integrating them across the school curriculum. Finally, the sixth section engages participants in a self-reflective and reflexive process assessing the strengths and limitations of participatory video as a catalyst for transforming themselves and society.

On the one hand, hypermedia technology is used both as a context for explaining and perceiving curriculum theories and practices as well as a subject from which students must learn certain knowledge, skills and competences related to climate change and other sustainable development issues. On the other hand, curriculum is also used as context for explaining and perceiving hypermedia technologies' roles in different curriculum perspectives and how can enable learning of sustainable development issues. It also integrates social and ethics by integrating and contextualising concepts such as social justice, active citizenship and community-based learning. It thus brings perspectives from subjects such as , curriculum, technology, humanities, research methodology, education for sustainability. The course also takes a multi-stakeholder perspective for a particular thematic unit, climate change, integrating, for example, local community, civic society, disadvantaged or marginalised social groups.

In this way, students are exploring connections among various disciplines and to talk critically but reasonably across these perspectives as well as they learn to comprehend and translate ways of knowing and methods, and integrate them.

Student-centred learning

Student-centred learning activities establish relevance through:

- Discussing how theory can be applied in practice
- Making a link to local cases
- Emphasising active rather than passive learning,
- Emphasising deep learning than surface learning
- Encouraging increased learner autonomy
- Applying reflective and reflexive teaching and learning processes

Learning and instruction is often presented through a dual approach of either student-centred learning or teacher-centred learning. In reality, however, these two are seen as a continuum where the direction depends on both the nature of the subject and instructor's epistemological conventions.

Again, Problem-Based Learning (PBL) and Service Learning allow students to set some of their own learning objectives/outcomes, and be active in the learning process.

Aligning teaching, learning and curriculum

Alignment of teaching, learning and curriculum demands that: 1) learning activities are consistent with course goals, student learning styles, personal interests and experiences as well as the needs of society; 2) teaching methods used and the assessment tasks, are aligned to the learning activities assumed in the intended outcomes; 3) Problem-based learning (PBL) and Service Learning integration into the learning process.

The following questions will help you reach the desired consistency or alignment:

- Are the outcomes aligned with the goals and objectives, included the ethics and values inherent in them?

- Do the outcomes clearly define the expected knowledge, skills, attributes, values of the course?

Active Citizenship

Citizenship is about the relationship between an individual and the community in which he or she lives as well as with the global community. As such, the CLIMASP course revision process should take into consideration the following points:

- Develop assignments that encourage students to participate positively in community-based CLIMASP issues.
- Integrate Problem-based learning and Service Learning into the courses to be revised to address CLIMASP objectives.
- Encourage students to take greater individual and group responsibility for their learning.
- Provide opportunities for students to reflect on moral, ethical, spiritual, social and cultural dimensions related to CLIMASP.
- Develop learning assignments/activities that give students a greater sense of personal responsibility and capacity to play an active role in society at local and global level.
- Provide challenged opportunities for students to explore sustainable climate futures in their community.

Participatory curriculum design

Curriculum development benefits from a close involvement of key stakeholders, not just in evaluating the curriculum but taking part across all curriculum design processes. Of particular interest in the current climate is the involvement of students, instructors and other key stakeholders, internally (University) and externally (Community, Ministries, civic societies, employers and professional bodies). It becomes easier to work in partnership with a range of stakeholders, whose input to curriculum design and development may be of critical importance. Stakeholder engagement should make use of various mechanisms and methods. In the context of CLIMASP, specific methodologies and templates have been developed to identify key stakeholders, mapping their inputs to CLIMASP curriculum design as well as along all the subsequent stages.

Making ethics and values explicit

According to the Environmental Justice Foundation (http://www.ejfoundation.org/), every year climate change is attributable for the deaths of over 300,000 people, seriously affects a further 325 million people, and causes economic losses of US $125 billion. Four billion people are vulnerable to the effects of climate change and 500-600 million people – around 10% of the planet's human population – are at extreme risk. Who bears responsibility for protecting those whose basic rights are threatened by climate change? What constitutes an ethically justifiable response? These are just a few of the urgent questions raised by climate change.

Climate change poses historically unprecedented challenges and profound ethical questions – but also new opportunities for global innovation and cooperation
Throughout the world, at all levels of government, decision makers are facing unprecedented challenges in developing appropriate climate strategies for their constituents. Their decisions raise profound economic and ethical concerns. Should developing countries be required to "balance" development with climate-change mitigation, given that rapid economic and social development offer the only hope of adapting to the effects of climate change? What constitutes a reasonable and ethically responsible climate/development "balance" for poorer countries? What about for industrialized nations? Now and in future generations, who is responsible for responding to the unavoidable consequences of climate change?

Climate change by itself raises a wide range of ethical issues due to the anthropogenic emissions of greenhouse gases that directly cause climate change. People are already losing their homes, their livelihoods, and even their lives as a result of the climate change we are causing. Any action on climate change confronts serious ethical issues of fairness and responsibility across individuals, nations, generations, and the rest of nature. In that sense, sustainability without ethics is an empty husk. It thus, climate change poses an 'ethical problem' for humanity to respond.

Although, ethics is difficult to define precisely, in a general sense, it is the code of moral principles and values that governs people's behaviors with respect to what is right or wrong. Values related to sustainable development that are largely discussed in the international literature include:

- Equity – addressing the injustice of poverty and lack of opportunities afflicting so many people in the world

- Environmental justice – closely related to equity but defined as equal access to a clean environment and equal protection from possible environmental harm, irrespective of race, income, class or any other differentiating feature of socio-economic status

- Intergenerational equity – being sure that what we do today leaves a world that is in a good state to support our children, and their children

- Stewardship – taking responsibility for the rest of life on Earth, remembering we depend on the millions of other species for the maintenance of the Earth's ecological systems.

When revising a course or designing a new course for CLIMASP, you should start to think about ethics and values. Climate change and sustainability raises the question of how one ought to live within the threefold relationship with current and future generations, and nature. What way of acting and living would adequately respect the rights of contemporaries, future generations, and nature? What would be just in this threefold relationship? What kind of responsibilities do we have? Etc.

Similarly, when you are going to implement the revised course, it is suggested to integrate the process of learning to clarify one's own ethics and values.

The students at the University of Crete taking the course "Curriculum and Hypermedia" undertake an exercise at the beginning of their course called " Envisioning Preferred Futures", based on the following questions:

- What would you like society to look like in the future?
- What do you want the course to do, to enable you to make a contribution to making that preferred future a reality?
- What are the values that we can incorporate into the way we teach this course that will enable us to achieve this goal?

It is also suggested to use the Earth Charter, an inspiring declaration of shared ethical principles.. The four main ideas behind the Earth Charter are:

1. Respect Earth and life in all its diversity.
2. Care for the community of life with understanding, compassion, and love.
3. Build democratic societies that are just, participatory, sustainable, and peaceful.
4. Secure Earth's bounty and beauty for present and future generations.

An adequate recognition and analysis of the ethical meaning of the concept of climate change and sustainability is necessary in order to generate encompassing and adequate analyses and solutions of climate change issues. In this context, culture has always played a role in informing human practices connected with climate change. The anthropogenic cause of climate change implies that learning to clarify ones own values is a very critical learning process.

When examining climate change through a ‘cultural lens’, rather than through an environmental, economic, social or political lens, a number of specific questions come to mind. Here are a few of them:

- How do values, including non-material values, affect decisions and actions about climate change?
- What role does culture play in strategies for adapting to climate change, and in overcoming barriers to change?
- How might climate change impact on aspects of cultural rights within the debate of the impact of climate change on broader human rights issues?
- What do the irreversible losses of cultural and natural heritage caused by climate change mean to societies?
- How does the impact of climate change on the culture of a society differ from other impacts and changes (technological, demographic, social)?
- What can cultural practitioners, such as artists, designers and architects, contribute to the search for creative solutions to the negative impacts of climate change?
- Can art offer a way of communicating more powerfully the effects of climate change, and is the role of art and artists wider than communication?
- What might alliances between scientists, political leaders, economists and artists achieve that none of these groups would be able to achieve individually?

- What are the opportunities for working across the boundaries of culture, education, identity and geography to create alliances and collaborations?

Determining CLIMASP Competencies

Competence development in sustainability and climate change adaptation is essential Development of competencies associated with CLIMASP focus on generic and disciplinary ones. Generic competencies for students graduating from the CLIMASP programme, besides disciplinary competences refer to the following example of abilities to:

With competence we mean the integrated set of knowledge, skills and attitudes which are conditional for effective performance. For example, to become sustainability literate, an accountant may have to understand and be able to apply environmental or sustainability accounting and non-financial risk management techniques. A chartered engineer may be expected to know about the existence of this type of accounting practice and have an idea of how it can help in cost-benefit analysis of any project.

A matrix has been developed based on both desk-top research and the on-going multi-stakeholder survey. The CLIMASP competencies matrix may be used to help identify the sustainability competencies for any of the three CLIMASP concentration areas, whether designing a new course, or adapting an existing one. Establishing relevant climate change and sustainability policy (CLIMASP) competencies for a course is an important step on the route to writing learning objectives, outcomes and select learning experiences, content and methods. You need to identify exactly what a successful CLIMASP competent graduate will be able to do as a result of your revised course. To begin with, start reflecting what knowledge, skills, attributes and competences from the CLIMASP Competence Matrix are included in your course. Then, start to think what of them are needed to be integrated.

KNOWLEDGE (Concepts, theories, processes)	SKILLS (Tools, methodologies, dynamics)	ATTRIBUTES (Innate abilities)	CLIMASP CORE COMPETENCES
Mitigation and adaptation Disaster risk management Mainstreaming adaptation Economics of climate change Gender and climate change Value chains and market access Science, impacts & scenarios Fairness and climate change justice Strategic planning Integrated assessment Vulnerability assessment Legislation, regulations and compliance Environmental awareness Environmental management	Systems thinking Agency Anticipatory adaptation Validation and testing Dealing with uncertainty Contextualising Prioritising Monitoring Reporting Anticipating risk Reducing vulnerability Building resilience Risk assessment Scenario analysis and planning Monitoring and evaluation Impact assessment Futures thinking	Optimism Openness to novelty and change Global mind-set/consciousness Accountability Fairness Justice Change agent Open-minded Proactive Organised Decisive Democratic Responsible Empathy Gender-sensitive	1. Analyze the effects of climate change from both male and female perspectives 2. Understand historical community reactions to and coping strategies for climatic hazards. 3. Compare and prioritise the most critical local climatic hazards. 4. Identify the most likely impacts of local climatic hazards. 5. Identify and categorise local livelihood assets and resources. 6. Assess the intensity of impact of climatic hazards on livelihood resources. 7. Compare and contrast the impacts of major climatic hazards on livelihoods of the community. 8. Differentiate vulnerability to climatic hazards across different sectors and social groups.

Green products/design Green growth Renewable energy technologies Mainstreaming and planning Spatial decision tools Conflict resolution Occupational health and safety issues Water management and recycling Carbon footprint/monitoring Heritage impact assessment Energy efficiency behaviour Policies and regulation Technology and innovation Consumer habits Anticipation and monitoring Climate change policy Climate change adaptation Risk assessment Climate variability Weather and climate Migration & climate change Climate change communication Gender-sensitive response to climate change Gender & climate change	Local knowledge Risk prediction Critical thinking Crisis management Emergency psychology Risk assessment Risk management Emergency management Anticipating effects Integrated assessment Costing and valuation Mainstreaming (Integrating) Maladaptation (action or process) Global dynamics Multicriteria analysis Vulnerability assessment Managing uncertainty Adaptation assessment Estimating adaptation costs Adaptive capacity Climate Risk Management (CRM) Life cycle assessment (LCA) Dealing with complexity and uncertainty Critical, systemic and futures thinking Spatial planning systems	Perspective Co-responsibility Systematic Focussed Confident Transparency Representivity Solidarity Ecocentrism Corporate compliance Being vs. having Deep ecology social responsibility Justice Intergenerational equity Stewardship Social & ecological justice Environmental justice Human wellbeing Social cohesion Tolerance Virtue Basic human needs Human rights Interdependency Sense of urgency Interspecies equity Ecological integrity	9. Gain an overview and quantify climatic hazard risk and resilience capacity of local communities. 10. Identify and assess the effectiveness of the current coping mechanisms practiced by communities to secure and improve their livelihoods and conserve ecosystem bio-diversity in the context of climate change. 11. Analyse effectiveness of existing coping and adaptation strategies against the severity of climatic hazards. 12. Explore the institutional context in which the community operates and identify appropriate institutional partners for adaptation. 13. Develop urgent and immediate short term and long term adaptation priorities for district, regional and national level planning. 14. Demonstrate knowledge of the relevant professional, legal and ethical obligations to develop and share information about climate change effects on health. 15. Demonstrate knowledge of how to access local, national and international information about climate change effects on health, relevant to adapting health services 16. Shows how to use information about climate change effects on health to improve decisions about health services delivery 17. Demonstrate knowledge of how to access local,

Sustainable consumption and production Sustainable communities Sustainable construction Biodiversity and climate change Green economy Green economics Green jobs Climate change and health Strategic planning and climate change Role of international institutions Environmental economics Environmental law Environment and governance Economics and growth Environmental awareness Environmental ethics Conflict & natural disasters and humanitarian responses Low carbon development Urban and rural environment Conflict over natural resources. Multilateral environmental agreements Vulnerability risk assessment	Strategic environmental assessment Climate scenarios Disaster risk management Vulnerability indicators Integrated coastal planning Scenario planning Adaptive management Project management Resolve ethical dilemmas Action-oriented Motivate and manage change Stakeholder engagement Carbon management Mapping gender impacts Problem solving Communicating Connecting Leadership Decision-making Team management Ecological footprinting SWOT analysis Discourse Debating Advocating Awareness and advocacy raising Monitor, reporting and	Ecological sustainability Needs vs. wants Social & economic justice Gender equality Health care Inclusive participation Nonviolence & peace Economic welfare Fairness Social and economic justice Respect and care for the community Respect for diversity Holistic	national and international information about climate change effects on health, relevant to adapting health services. 18. Show how to use information about climate change effects on health to improve decisions about health services delivery. 19. Initiate and participates in collaborative learning opportunities with health and environmental professionals active in climate change management. 20. Demonstrate application of this knowledge to adapt and improve health services delivery. 21. Identifying and nurturing collaborative partnerships either within an organisation or in the wider community to create common purpose to resolve systemic problems. 22. Questioning business as usual can threaten our ideals, values, beliefs, business strategies and technical understanding and is not necessarily what everyone wants to hear. 23. Dealing with values and 'big picture' sustainability is outside the comfort zone of many people in the workplace. 24. Understanding sources of risk and insecurity, their impacts on livelihoods and application to building resilience (to climate and natural resource shocks, food and nutrition insecurity, political economy and in fragile contexts). 25. Knowledge and application of natural resource-

Forecasting and scenario planning Spatial decision tools Mainstreaming adaptation Climate change and rural livelihoods Climate change and urban development Biodiversity, ecosystems and resilience to climate change Water resources and climate change Social learning processes GIS: geographic information systems Climate change: Science, impacts & scenarios Integrated coastal planning Role of land use planning Urbanization's role in climate change Climate change implications for integrated coastal planning The wickedness of coastal planning Fairness and climate change justice Sustainable development and resilience	reviewing carbon lifecycle analysis/costing Carbon literacy for procurement Adaptive management Critical media literacy Decision making and communication Strategic planning Adaptive learning and self-reflection; Networked learning		based livelihoods (including agricultural services, value chains, adaptation and mitigation to climate change in agriculture and natural resource management). 26. Understanding dynamics of change in and between rural and urban areas and resource-based livelihoods and likely trajectories. 27. Knowledge and application of analytical tools, ways of working and evidence, innovation and learning. 28. Compare local problems with problems elsewhere and to gain adaptation ideas from this comparison. 29. Anticipate possible future environmental change and identify possible development consequences. 30. Analyse and evaluate complex and sometimes competing environment and development issues and integrate these into practical, balanced and sustainable solutions. 31. Evaluating the risks that climate change poses to economic development and evaluating potential adaptations that address risks to economic development 32. Be able to give local examples of the effects of climate change on agriculture and how producers might help adapt to climate change. 33. Evaluating the risks that climate change poses to public health and quality of life and

Adaptation and governance Freshwater trends at the global level Future climate change scenarios Changing approaches to water management Integrated Water Resources Management Resilience in water management Integrated adaptive water management Biodiversity, protected areas and climate change Global biodiversity picture Issues and principles of coastal governance for adaptation Mitigation/adaptation relationships and warming Synergies, trade-offs and mainstreaming Urban systems adapting to climate change			evaluating potential adaptations that address risks to public health and quality of life. 34. Determine what happens with climatic variations, which components are most vulnerable and how they are affected. 35. Knowledge and understanding of tools and mechanisms for achieving sustainable development and green growth. 36. Build linkages between poverty reduction, MDGs, macroeconomic policies, environment, energy, climate change and sustainable development. 37. Able to carefully and systematically examine research to judge its trustworthiness and its value and relevance in a particular context and other potential sources of evidence. 38. Able to interpret, use and present data and evidence in defining policy and practice. 39. Able to design, commission and manage evaluations including rigorous impact evaluations. 40. Assess and monitor impacts of climate variability and climate change on agriculture, forestry and fisheries and the livelihoods that rely on these sectors, taking into account socio-economic scenarios and drivers of change in agricultural sectors per major eco-region. 41. Conduct integrated climate change vulnerability assessments for agriculture, forestry, and

			fisheries systems and associated livelihoods. 42. Develop and disseminate guidelines, methodologies and tools for collection, processing and analysis of climate change-related data and information, and strengthen databases for use in impact and vulnerability assessments and adaptation. 43. Communicate information and promote equitable access of rural people and institutions to information related to impacts of climate variability and change and adaptation in the agriculture, forestry and fisheries sectors from global to local levels, and vice versa through appropriate channels. 44. Document, evaluate and disseminate successful experiences in sustainable natural resources management, agriculture and food production and gender and rights-based adaptation strategies and practices. 45. Advocate at the regional and international level for a stronger recognition of the challenges to and potential of agriculture, forestry and fisheries sectors in climate change adaptation frameworks and financing mechanisms, and ensure that main stakeholders, including indigenous people and vulnerable groups, have a voice in advocacy. 46. Integrate climate change adaptation into national and sub-national agriculture, forestry

			and fisheries sector policies and plans, land use and water policies, food security programmes, legal frameworks and investment priorities, and ensure appropriate representation of the sectors in climate change and disaster risk management policies and strategies. 47. Strengthen dialogue and networks and develop multi-stakeholder partnerships for adaptation across public and private sectors, non-governmental organizations and communities at all levels. 48. Strengthen community- and locally-based mechanisms (e.g. forest-user groups, agricultural and fisheries cooperatives, community networks and media) for management and delivery of services for agriculture, forestry and fisheries and to facilitate locally appropriate adaptation measures, including community-based adaptation. 49. Reinforce national and regional capacities for plant, forest and animal health and food safety and improve monitoring and control of variations in pests, diseases and food safety, related to climate change. 50. Strengthen food value chains and, in particular, improve small-scale producers' access to markets to increase resilience of food systems. 51. Explain how climate change impacts health and

			health inequalities within a model of the wider determinants of health 52. Define the relationship between adaptation and mitigation and the health co-benefits of each 53. Demonstrate advocacy skills for more efficient participation of the health sector in addressing climate change mitigation and adaptation 54. Understand the links between sustainability, carbon, climate change and health. 55. Explain how climate change impacts health and health inequalities within a model of the wider determinants of health. 56. Define the relationship between adaptation and mitigation and the health co-benefits of each. 57. Understand the concept of 'footprinting', for example, the 'carbon footprint' and 'ecological footprint' of individuals and organizations; the different methods of footprinting; and the advantages and disadvantages of each. 58. Understand models for the psychology of people's response to the environment and models for why people and organizations do and do not take action to mitigate and adapt to climate change. 59. Analyse how decisions can be made that reduce the impact of health care on climate change. 60. Demonstrate advocacy skills for more efficient participation of the health sector in addressing climate change mitigation and adaptation

			61. Use systems and ‘futures’ thinking allows us to better appreciate the natural and social systems that come together and interact in the built environment. 62. Use techniques for resolving or avoiding conflict in an ethical manner and know where to get help if ethical dilemmas arise. 63. Understanding of environmental management systems and tools, risk assessment and due diligence in the public and private sector (e.g. EMS, ESN, SEA etc) 64. Knowledge and understanding of relationship between poverty, environment, climate change, economics and social issues. 65. Ability to translate scientific climate information into policy and practical guidance 66. Articulating what good climate resilient development actually look like. 67. Develop students' understanding of the natural carbon cycle. 68. Investigate the causes of climate change. 69. Explore solutions to problems that cause climate change. 70. Quantify the school's carbon footprint. 71. Identify ways to reduce the school's carbon footprint. 72. Design and conduct a carbon-reduction action project. 73. Describe and put into effect relevant processes,

			tools and practices employed for adaptation planning. 74. Analyse climate change scenarios in the context of planning for sustainable development. 75. Comprehend the opportunities for planners and the social, economic and ecological risks of climate change. 76. Demonstrate capacities for self-reflection and self-evaluation as integral aspects of the adaptive learning cycle. 77. Develop skills to plan and engage collaboratively with a diverse range of stakeholders. 78. Develop skills to facilitate stakeholder engagement and conflict resolution. 79. Identify vulnerable populations and ecosystems and developing plans to enhance their resilience. 80. Become familiar with the basic terminology and core concepts of climate change adaptation planning. 81. Interpret and apply such knowledge in planning adaptation to climate change impacts. 82. Describe the relationship between human activities and climate change. 83. Analyze and compare carbon-producing resources. 84. Assess the impact of human activities and carbon production on the environment.

			85. Propose solutions to climate change issues. 86. Collect, interpret and present information. 87. Communicate about strategies to confront climate change to a variety of audiences, including other students, parents and the local community. 88. Work cooperatively with others. 89. Identify the links between local and global climate change and sustainability policy contexts. 90. Make judgements for climate change policy making scenarios for local, national and regional impacts 91. Analyse methods of ensuring local participation in climate change adaptation. 92. Develop a solid understanding of generic climate change adaptation/mitigation issues. 93. Appreciate the importance and practical characteristics of adaptive approaches. 94. Describe and compare anthropogenic and natural factors responsible for climate change at different timeframes. 95. Draw on active teaching and learning approaches to empower learner, young people and civic engagement. 96. Relate climate change and sustainability policy to a range of curricular areas in formal, non formal and informal education. 97. Provide a sound understanding of climate

			change risks and their relevance to participants' organisations 98. Describe how to identify and overcome potential barriers to adaptive action including through knowledge transfer and exchange and capacity building. 99. Understand how human actions are contributing to global environmental change. 100. Contribute to the debate on global environmental change and societal adaptation strategies; to become an informed citizen and decision maker. 101. Describe and interpret the evolution of Earth's climate system to communicate, analyse and explain the past and possible future effects of global climate change on Earth's inhabitants. Interpret information, knowledge and policy about climate change from a range of sources and perspectives. 102. Think about problems holistically and through the 'lense' of climate change understand principles of sustainable development. 103. Comprehend the significance of the climate change problem locally and globally. 104. Interpret information about impacts and vulnerabilities specific to the locality, region or sector students are expected to work in.

Identifying Objectives to Structure a Course

Goals and objectives are similar in that they describe the intended purposes and expected results of teaching activities and establish the foundation of course assessment. In particular, goals are statements about general aims or purposes of the course that are formulated broadly. Objectives are brief, clear statements that describe the desired learning outcomes, that is, the specific skills, values and attitudes students should exhibit that reflect the broader goals.

Learning outcomes are statements that describe significant and essential learning that learners have achieved by the end of the course. Learning outcomes identify what the learner will be able to do by the end of the course. There should be as many outcomes as needed to clearly reflect what the students will gain from the course. Also, each learning outcome can be subdivided into sub-outcomes to make it clear.

To structure learning outcomes there is need of: 1) an action word that identifies the performance to be demonstrated; 2) a learning statement that specifies what learning will be demonstrated in the performance and 3) a broad statement of the criterion or standard for accepted performance. Accordingly, the learning outcomes are the competences to be achieved in a course.

Selecting learning experiences, content and methods

After identifying and formulating the goals/objectives and learning outcomes of the course under revision, the next step is to select learning experiences, activities and methods that are likely to attain the objectives and learning outcomes set up.

Think about the key themes in your courses and how they might be linked with CLIMASP.

After identifying the key CLIMASP themes related to the course under revision, start reflecting over of the objectives generated previously. You have to look what your course and subject can offer to CLIMASP, what is special about your subject and how it can be used to further the goals and principles of a sustainable society.

To begin, you have to look at the objectives for teaching your course. Reflect on your current objectives in the courses you want to revise and identify what is missing in light of the themes chosen and the definition of sustainability you have contextualised previously. Needless to argue that you have to get a deeper understanding of the CLIMASP themes you identified as suitable to your courses and discipline.

You can develop a matrix that displays the sustainability issues identified, what is included in your current objectives and what is missing. Then, reformulate your objectives to address the new sustainability themes that you identified suitable to your courses and discipline.

In this process, it is suggested to work together with other colleagues from different subjects in order to fulfil the interdisciplinary perspective that is extremely needed in

the field of sustainability education. Such an approach will serve as a basis for matching better objectives and content and at the same time build collaborative tasks.

Traditional classroom activities typically consist of lecture/discussion mixes or lectures coupled with laboratory demonstrations, yet a variety of other methods exist for the delivery of instruction. The lecture is one of the weakest types of teaching methods, especially when dealing with sustainability issues. Instructional design usually tends to adopt a mixed or eclectic approach that integrates elements of various instructional design models with contrasting philosophical assumptions. Indeed, some learning problems may require prescriptive solutions, whereas others may need more flexibility to accommodate different learning styles and roles of education. Although it might be practical to use a mixed instructional design, it is of critical importance to consider the philosophical orientations inherent in your instructional design preferences since every decision concerning instructional design is driven consciously or unconsciously by a certain human interest. The RUCAS strategic approach places a focus on a number of ESD learning processes most of them defined by Tilbury (2011) is highly recommended for CLIMASP:

Learning to clarify one's own values
Learning to think critically
Learning to reflect on own practices
Learning to think systemically
Learning to envision
Learning to merge the head, the heart and the hand.

All these learning processes are inherent within an experiential, constructivist and transformative learning paradigm abbreviated as ExConTra (Makrakis & Kostoulas-Makrakis, 2012).

The CLIMASP learning activities should be flexible, allowing students self-direction to guide their learning. They have to be structured to guide and help students to focus on what-to-do rather than how-to-do.

- Select active teaching techniques that are designed to get students more involved in learning.
- Analyze learning objectives to determine course content.
- Use course objectives to develop learning activities and methods of assessing student performance.
- Use media to support learning activities and their intended outcomes.
- Choose cases that connect to real-world problems so that students grapple with issues that they would likely encounter in the field or profession. Service-learning is another powerful way for students to appreciate the relevance of your material. In service-learning, students volunteer in the community at sites that relate to the class and then make connections between their field work and coursework through reflection assignments.

In matching strategies and methods, the following questions should be considered:

- Is the activity you plan cooperative rather than competitive?

- Does it provide opportunities for getting students actively involved?
- Does it connect global with local?
- Does it examine root causes?
- Does it examine the historical context of a situation?
- Does it examine power issues?
- Is it experiential, constructivist and transformative and does it address various learning styles?
- Does it address the whole student (intellectual, social, psychological, spiritual) and encourages connection with personal experience?
- Does it include a futures orientation?
- Does it allow to record processes related to head, heart and hand?

Developing & Implementing Syllabus & Course Modules

The syllabus

A syllabus can be seen as a "learning contract" between the instructor and the students that sets the basic rules and commitments regarding the course goals, objectives, as well as road map to monitor and assess the teaching and learning process. In the CLIMASP project we will use the RUCAS syllabus template will be used. It also serves as a planning tool for structuring the course modules, course implementation and assessment.

Structuring the course modules

After you have developed your syllabus for the revised course, you need to develop a list of the modules composed in the course, taking into consideration: a) the weekly structure of topics in the syllabus and b) the supported literature listed in the syllabus. Structuring the course modules is a process that turns university instructors to clarify more the syllabus. It implies first a re-organisation of the weekly topics in the syllabus and second aligning the course goals/objectives and learning outcomes to course modules structure. Regarding the first, it does not necessarily imply that there must be a module for every week elaborated in the syllabus. It could be that a module can run for more than one week, depending on the topics of the course. As the weekly topics are placed in a logic sequence, this should also be reflected in the modules. The revised course content could be broken into manageable and meaningful modules. The general practice is that a 14 weeks syllabus can be composed of 5-10 modules. However, exceptions are allowed depending on the demands of a course.

Reviewing learning resources

Review the readings that are provided in the syllabus of the course you are involved and prepare the supporting readings and resources in each module. More specifically, you should provide the corresponding pages of readings, tools and other resources necessary for each module. In the context of books, you must be clear about the chapter title and/or pages to be read.

Setting-up module units

Break-up each module on a set of units. Think of a unit as a chapter in a textbook. Using the same metaphor, all units of each module and all modules should reflect the course aims and learning outcomes. For the development of each module aims and learning outcomes, take also into consideration the course aims and learning outcomes provided in the syllabus for the whole course. Write 1-3 aims for each module and no more than 6 learning outcomes for each module. As you write the learning outcomes, begin to think of the learning activities that will allow students to achieve them as well as the assessment techniques you'll use to measure success.

Following-up, the course modules template developed for RUCAS, formulate the module overview, aims, objectives, learning outcomes, and key concepts. An overview is a general introduction to the course, basically in a narrative form (between 100-150 words), perhaps supplemented by an outline and/or mind map. It may also include video and/or audio clips as well as graphics, slides or other images. The key concept is usually the main idea that you want to explore in the module. Select the most important concepts that every module in the course will deal with.

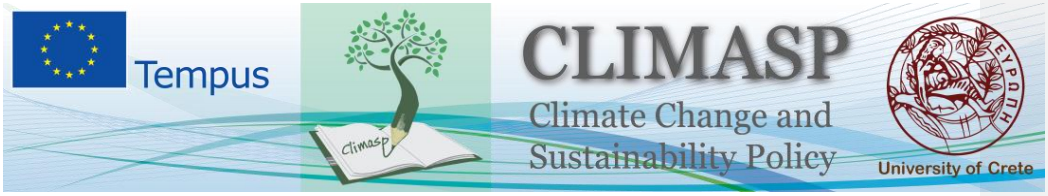
Developing learning activities/assignments

Learning activities are designed for each module in the course. They provide opportunities for the learners to immediately apply new knowledge that they gained from the learning. You can identify which activities are required for each module. Points to keep in mind when planning learning activities include:
It is important to make sure that a learning activity/assignment addresses one or more than one learning outcomes of the module. If an important activity does not relate to a module learning outcome, consider writing an additional learning outcome. Take into consideration the tools, methods that can be used and can be combined in learning activities.

Give clear and appropriate instructions

For every activity/assignment you must write: 1) an overview; 2) students instructions and 3) explanation. The overview refers to the content of the activity/assignment, the length, the date of completion and what it includes. The activity/assignment – student instruction refers to a more detailed description of the activity/assignment and what must be done. Last, the explanation shows the meaning of the activity/assignment.

APENDIX I: The CLIMASP Course Syllabus Template Example



CLIMASP COURSE SYLLABUS TEMPLATE

Course Syllabus

Course Number:

Curriculum and Hypermedia

University of Crete, Faculty of Education, Department of Primary Teachers Education,

Spring Semester, 2011-2012

Instructor Information

Instructor:	Prof.Dr. Vassilios Makrakis
Office Location:	Gallos University Campus
Telephone:	Office – +30 28310 77625
Office Hours:	Tuesday 14.30- 17.00, Wednesday 14.00 – 16.00
E-mail:	makrakis@edc.uoc.gr
Website:	

Course Identification

Course Number:	**Γ0**
Course Name:	**C**urriculum and Hypermedia
Course Location:	University Campus
Class Times:	Wednesday 8:30pm – 11:30am
Prerequisites:	ICT literacy
Faculty Web Page:	http://www.edc.uoc.gr

Course Description/Overview

Education can be the catalyst for empowering students to become critical, reflective and active citizens. Teachers have the potential to be what Giroux and McLaren described as transformative intellectuals who combine scholarly reflection and practice in the service of educating students to be thoughtful, active citizens. What the

course offers is a good introduction to the area of curriculum and hypermedia technology. It does so in a logical order divided into six sections. The first section addresses the perception of curriculum as product, process and praxis. The second section discusses the three curriculum types in the context of hypermedia as transmissive, transactual and transformative learning technologies. The third section focuses on equipping students with the knowledge and skills to use participatory video and web-based social networking media as empowerment and transformative tools. Here, the course provides case studies, particularly related to climate change issues, showing how children and other marginalised community members can be "empowered" to make their voices heard in the process for building a more sustainable society. The fourth section concentrates on developing participatory video-clips dealing with climate change and local/global issues related to sustainable human development. Using participatory techniques, such as focus group discussions, individual interviews and writing scenarios students are involved in gathering evidence from the children and other community members involved in making the participatory videos. The fifth section examines the uploading of the participatory video clips produced into social networking media and then integrating them across the school curriculum. Finally, the sixth section engages participants in a self-reflective and reflexive process assessing the strengths and limitations of participatory video as a catalyst for transforming themselves and society.

Course Learning Objectives

The overarching goals of this course are: a) to provide a critical approach to curriculum supported by new advanced technologies in the context of education for sustainability; b) raise awareness of the role of some technologies in enabling learners to reflect critically on the rights, roles and responsibilities of an active citizen in preparing for a sustainable future for all; and c) use participatory video and social networking technologies as tools to help the community, including children, identify risks and develop climate change adaptation strategies.

Course Content Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Discuss the various epistemologies of curricula addressing issues of education for sustainability
2. Connect curriculum theories with hypermedia-based learning and education for sustainability.
3. Produce a 5-10 minute digital video (including storyboarding, lighting, shooting, editing sound tracks and graphics).
4. Use social media to raise awareness for action and advocacy from the bottom up.
5. Develop a lesson plan that integrates the produced digital artifact.
6. Apply principles of transformative learning design.
7. Demonstrate awareness and ability to discourse on ethical issues in using social media and social networking tools.

Course Resources

Course Website(s)

Required Course Texts and Materials

Hands-out prepared by the instructor for the class

Melliadou, E. et al., (2011). Digital storytelling, learning and education. Proceedings of the 6th International Conference in Open & Distance Learning - November 2011, Loutraki, Greece.

Chapter 3: Curriculum Theory. Available at http://www.sagepub.com/upm-data/6042_Chapter_3_Glatthorn_(Sage)_I_Proof_2.pdf

Watson, D. (2001). Pedagogy before technology: Re-thinking the relationship between ICT and teaching. Education and Information Technologies 6:4, 251–266. Available at http://cursa.ihmc.us/rid=1129290598718_1343349371_1835/watson_pedagogy_bef_technol_2001.pdf

Hargreaves, LG (2008). The whole-school approach to eduation for sustainable development: From pilot projects to systemic change' in Policy & Practice: A Development Education Review, Vol. 6, Spring 2008, pp. 69-74, available: http://www.developmenteducationreview.com/issue6-perspectives2.

Windows Movie Maker free online video tutorials from Atomic Learning available at http://www.atomiclearning.com/moviemaker2.

Lunch, N. and Lunch C. (2006). Insights into Participatory Video: Published by InsightShare. Available at http://www.insightshare.org/resources/pv-handbook

Henderson, K and Tilbury, D. (2004) Whole-School Approaches to Sustainability: An International Review of Sustainable School Programs. Report Prepared by the Australian Research Institute in Education for Sustainability (ARIES) for the Department of the Environment and Heritage, Australian Government. Available at http://aries.mq.edu.au/projects/whole_school/files/international_review.pdf

Ferreira, J., Ryan, L. and Tilbury, D. (2006) Whole-School Approaches to Sustainability: A review of models for professional development in pre-service teacher education. Canberra: Australian Government Department of the Environment and Heritage and the Australian Research Institute in Education for Sustainability (ARIES). Available at **http://aries.mq.edu.au/projects/preservice/files/TeacherEduDec06.pdf**

Shallcross, T. Whole school approaches to education for sustainable development through school-focused professional development (The SEEPS Project). Available at http://www.ceeindia.org/esf/download/paper51.pdf

Getting started on a whole of school approach to Education for Sustainability (EfS). Available at http://www.decd.sa.gov.au/efs/pages/default/20754/?reFlag=1

Grundy, S. (1987). Curriculum: Product or Praxis. Lewes: Falmer

Aristotle (1976). The Nicomachean Ethics ('Ethics'). Harmondsworth: Penguin.

Optional Course Texts and Materials

Assignments and Grading Scheme

Grading System

0 to 10 (where 5 is the least pass mark)

Grading Policy

Grades can be based on the following: (Example)

Assignments	80%
Exams	
Class attendance/participation	20%
Total Points	**100**

Course Policies

Late Assignments

It is essential that papers and other assignments be completed and submitted on time. Once the due date is past, without notice and justification, the submission is not accepted.

Classroom Protocol

This is a seminar type of course, which means that students are expected to come to ALL classes. You cannot pass the class under any circumstances if you miss more than three classes. Students are expected to arrive on time and stay until the class period ends. If you know that you have to leave early, you should notify me before class starts. You are expected to treat faculty and other students with respect. During class students are obliged to not disrupt class by making noise and/or leaving and re-entering during class. Students who violate these minimal expectations will be asked to leave and counted as absent. You are expected to have read and thought about the assigned material before you come to class. I expect active class participation, which counts for 20% of the grade.

Dissability

Students who have disabilities should have a confidential appointment to discuss their need for accommodations. Establishing reasonable accommodations should be considered on a case-by-case basis.

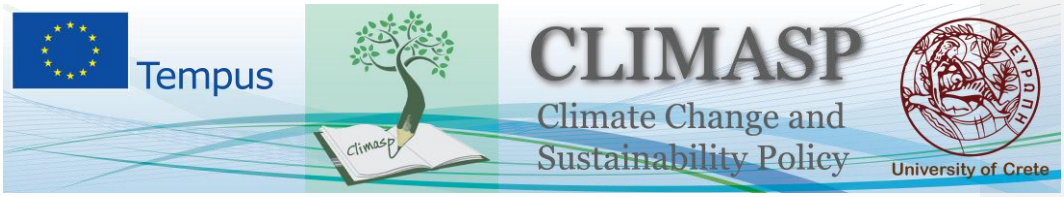
Important Dates to Remember

Course Schedule

Week	Date	Topics, Reading, Assignments and Deadlines (Details on assignments and more bibliography are available in the course modules)
1	15/2/2012	**Course Overview** Discussion of syllabus and assignments, course requirements and prerequisites; Criteria for student selection
2	22/2	Curriculum theories and epistemologies

3	29/2	Curriculum and whole-school aproaches to ESD
4	7/3	Cross0curriculum approaches to teaching and learning for sustainability
5	14/3	Digital storytelling, participatory video (PV) and social media
6	21/3	Examples of participatory video clips and educational digital storytelling
7	28/3	Setting up a PV project addressing an ESD-related local issue
8	4/4	The planning & design process for video clip/s production
9	25/4	Using scenarios in PV design and creating a storyboard
10	2/5	Participatory video clip production
11	9/5	Participatory video clip production
12	16/5	Integrating participatory video clip in lesson planning
13	23/5	Integrating participatory video clip in lesson planning
14-16		Video clip uploading and posting along with other resources planning for action. Final assessment Reflections on participatory video and social media as catalysts for personal and social change

APENDIX II: The CLIMASP Course Modules Template Example



Course	**Curriculum and Hypermedia**
Module 1	Curriculum: Different Types and Functions
Key Concepts	Curriculum theory and types, technology,
Overview	When I ask my students what curriculum means to them, they always indicate that it means the hidden or written curriculum. However, the word "curriculum" means more things. Melding theory and the reality of school curriculum is also another issue often ignored in the educational process. It is therefore essential for students to develop a fundamental understanding of curriculum theory by providing the tools necessary for that. Questions to be addressed in this module include the following: What is the nature and function of curriculum theory? Why is it important to meld the theory and reality of school curriculum? What are the major classifications of curriculum theory? How has technology been a catalyst for curriculum change?
Aim	The overriding aim of this module is to turn students able to discourse on curriculum theories, types and functions and the impact technology can exert on curriculum change.
Learning Outcomes	At the end of this module learners will be able to: • Identify and discuss the different types and functions of curriculum • Discuss how technology can contribute to curriculum change
Units	Unit 1.1 Curriculum as a Body of Knowledge/Product Unit 1.2: Curriculum as Process Unit 1.3: Curriculum as Praxis (practice) Unit 1.4: Curriculum as Context
Readings	Fulya Damla Kentli (2009). Comparison of hidden curriculum theories. European Journal of Educational Studies 1 (2) 83-88. Grundy, S. (1987) *Curriculum: Product or Praxis*, Lewes: Falmer Aristotle (1976) *The Nicomachean Ethics* ('Ethics'), Harmondsworth: Penguin. Chapter 3: Curriculum Theory. http://www.sagepub.com/upm-data/6042_Chapter_3_Glatthorn_(Sage)_I_Proof_2.pdf Watson, D. (2001). Pedagogy before technology: Re-thinking the relationship between ICT and teaching. Education and Information Technologies 6:4, 251–266
Activity	**Overview** Assignment 1.1: Reflecting Upon Curriculum 1. Which theories and approaches to learning fit with your current attitude towards and/or method of teaching? (3-4 paragraphs) 2. Which theories and approaches to learning do you disagree with in part or

	whole? Describe your reasons. 3. "Role play" – Set up four characters in a short play. Have each of the four characters represent a different theory/type of curriculum. Ask each character to convince the other. Through that character's words in this role play, we will come to know of each of these curriculum types and their functions. Assignment 1.2: Applying Theory Which education theory are you most attracted to? Why? Which theory are you able to apply to your classroom? Why? What challenges or obstacles do you face in applying the chosen theory in your classroom? What kind of help do you need to overcome these obstacles? What is the Design Studio? Access and explore the following dynamic Web-based toolkit entitled Design Studio(http://jiscdesignstudio.pbworks.com/w/page/45526271/technologies%20for%20curriculum%20change) which draws together a range of existing and emerging resources around curriculum design and delivery and the role technology plays in supporting these processes and practices.
Module 2	Curriculum and a Whole School Approaches to ESD
Key Concepts	Holism, whole school approach, ESD
Overview	Education for Sustainable Development (ESD) consistently advocates a holistic and integrated approach to the infusion of ESD in the formal education system. This module will outline a whole-school approach, to ESD that includes examples where such an approach has been successfully implemented and highlights some of the key challenges that must be addressed to make the widespread adoption of the whole-school approach to ESD a reality. Questions to be addressed in this module are: A whole-school approach to sustainability addresses the concern that the day-to-day practices of the school, evident in the non-formal or hidden curricula, ought to be consistent with the teaching espoused within the classroom. Schools that employ whole-school approaches practice what they preach and also reinforce their espoused sustainability values with action. What is a "whole-school" approach to education for sustainability (EfS)? Is there more than one kind of whole-school approach? Does your school have a whole-school approach? If yes, how can you describe it? If not, how could you design a whole-school approach? How would be implemented?
Aim	The overriding aim of this module is to Enhances understandings of the processes and practices that advance a whole school approach to EfS.
Learning Outcomes	• At the end of this module learners will be able to: • Identify examples of whole school • Understand the processes to initiate a whole school approach to EfS
Units	Unit 2.1: Clarifying the concept of "whole school approaches" to EfS. Unit 2.2: The processes to initiate a whole school approach to EfS. Unit 2.3: The means to implement a whole-school approach

	Unit 2.3: Examples of whole-school approaches to EfS
Readings	Hargreaves, LG (2008) 'The whole-school approach to eduation for sustainable development: From pilot projects to systemic change' in Policy & Practice: A Development Education Review, Vol. 6, Spring 2008, pp. 69-74, available: http://www.developmenteducationreview.com/issue6-perspectives2. Henderson, K and Tilbury, D. (2004) Whole-School Approaches to Sustainability: An International Review of Sustainable School Programs. Report Prepared by the Australian Research Institute in Education for Sustainability (ARIES) for The Department of the Environment and Heritage, Australian Government. Ferreira, J., Ryan, L. and Tilbury, D. (2006) Whole-School Approaches to Sustainability: A review of models for professional development in pre-service teacher education. Canberra: Australian Government Department of the Environment and Heritage and the Australian Research Institute in Education for Sustainability (ARIES). Whole School Approaches To Education For Sustainable Development Through School-Focused Professional Development (The SEEPS Project) Tony Shallcross http://www.ceeindia.org/esf/download/paper51.pdf Getting started on a whole of school approach to Education for Sustainability (EfS) http://www.decd.sa.gov.au/efs/pages/default/20754/?reFlag=1 Kay-Barr, S. (2011). Green schools that teach: identifying attributes of whole-school sustainability. M.A. Thesis. Colorado State University http://www.ibe.colostate.edu/thesis/Barr_Thesis%20Final.pdf Gough, A. (2005). Sustainable Schools: Renovating Educational Processes. Applied Environmental Education and Communication, 4:339–351 Birney, A. and Reed, J. (2009) Sustainability and Renewal: Findings from the Leading Sustainable Schools research project, Nottingham: National College for Leadership of Schools and Children's Services. Available at: www.nationalcollege.org.uk/docinfo?id=33296&filename=sustainability-and-renewal-full-report.pdf. Department for Children, Schools and Families (2010) National Framework for Sustainable Schools. Available at: www.rm.com/_RMVirtual/Media/Downloads/National_Framework_Sustainable_Schools_poster.pdf. D Department for Children, Schools and Families (2010) Planning a Sustainable School. Available at: www.education.gov.uk/publications/eOrderingDownload/planning_a_sustainable_school.pdf. Government Office for London (2008) Towards Whole School Sustainability: A view from London schools. London: GOL. Available at: http://lssf.co.uk/Documents/Towards_Whole_School_Sustai1.pdf . H Hicks, D. (2012) A sustainable future: four challenges for geographers, Teaching Geography, 36 (1): 9-11 Ofsted (2009) Education for sustainable development: Improving schools, improving lives. Available at: www.ofsted.gov.uk/resources/education-for-

	sustainable-development-improving-schools-improving-lives . A framework for developing whole-school approaches to EfS. http://www.tlri.org.nz/sites/default/files/projects/9245_Appendix%20A.pdf Prain, V. & Hand, B. (2003). Using new technologies for learning: A case study of a whole school approach. Journal of Research on Technology in Education. 35, 4 pp.441-458. .
Activity	**Overview**
	Design a plan taking into consideration the rubrick found in the readings. This framework has been developed by a team of researchers who worked on a project funded by the Teaching and Learning Research Initiative: Investigating the Impact of Whole-school Approaches to Education for Sustainability on Student Learning.
Module 3	Curriculum and Thematic Learning addressing Sustainability Themes
Key Concepts	Curriculum, thematic instruction, ESD
Overview	As the world becomes more interlinked by human activities our problems become more complex - and their solutions more difficult to grasp. This has to be reflected in curricula. Interdisciplinary thematic units are a powerful tool for guiding learners in "seeing" the connections between the disciplines they study. Aiding learners in recognizing the patterns that weave facts, ideas, generalizations together across time and space helps them better understand themselves and the larger world. ESD-oriented thematic instruction is the organization of a curriculum around "themes that integrates basic disciplines like reading, writing, math, and science with the exploration of a broad subject such as communities, rain forests, river basins, the use of energy, etc. In other words, thematic instruction organizes activities or lessons around a general idea or theme meaningful to the learner. Thematic instruction can be a powerful tool for reintegrating the curriculum and eliminating the isolated, reductionist nature of teaching that is centered around disciplines rather than experience.
Aim	This module aims at examining the relationship of curriculum with theme-based learning focussing on sustainability issues.
Learning Outcomes	At the end of this module learners will be able to: • Demonstrate knowledge on the principles and practices for thematic instruction • Plan a lesson based on thematic instruction
Units	Unit 3.1: Models of sustainability curriculum integration Unit 3.2: Choosing a sustainability theme Unit 3.3: Designing the integrated sustainability curriculum Unit 3.4: Developing the thematic instruction Unit 3.5: Assessing the thematic instruction
Readings	Apgar1, J.M., Argumedo, A. & Allen, W. (…). Building Transdisciplinarity for Managing Complexity: Lessons from Indigenous Practice http://learningforsustainability.net/pubs/BuildingTransdisciplinarityforManagingComp

	lexity.pdf UNESCO: Teaching and Learning for a Sustainable Future: A Multimedia Teacher Education Programme. WWF (2008). Learning for sustainability: from the pupils' perspective A report of a three-year longitudinal study of 15 schools from June 2005 to June 2008 http://assets.wwf.org.uk/downloads/wwf_report_final_web.pdf Kennelly, J. & Taylor, N. (2007). Education for Sustainability for the K-6 Curriculum: A Unit of Work for Pre-Service. Australian Journal of Environmental Education, vol. 23, 3-12 Scott, W. Sustainability and learning: what role for the curriculum? Council for Environmental Education in association with the Centre for Research in Education and the Environment, University of Bath http://www.bath.ac.uk/cree/resources/scott.pdf Educating for a sustainable future: A national environmental Education Statement for Australian Schools Commonwealth of Australia 2005 http://www.environment.gov.au/education/publications/pubs/sustainable-future.pdf
Activity	**Overview** *Assignment 1: Generating Themes* 1. Think of 5 possible themes dealing with sustainability 2. Next consider whether these themes are important in your community 3. Look at your list, and choose one. Write 3-4 sentences telling more about it. Why might it be a useful theme? How does it fit into your community's and personal interest? Find Sample Thematic Units Using the World Wide Web, locate at least three units (lesson plans) related to the theme you have chosen. Start your search for lesson plans using both lesson plans sites and/or writing key words describing your theme. Explain why a thematic approach is applied in the three chosen lesson plan? Plan Your Own Thematic Unit You will develop the unit for a class of your choice. This unit plan will be described in a paper (maximum 4 pages) comprised of five interlinked sections (Activation, Teaching/Learning Tasks, Learning Processes, Reflective Feedback and Cross-curriculum Extensions) that are explained in class.
Module 4	Digital Video Design for Advocacy, Empowerment and Change
Key Concepts	Video, advocacy, rights and equality , empowerment
Overview	The rapid development of multimedia and hypermedia technologies has provided new avenues for merging images, sound, movies and animation together with texts. Digital video production could offer possibilities for advocacy, empowerment and change. An empowering process is where video

	itself plays an emancipating role and advocacy for "lobbying," "campaigning," and "activism". In this way technology becomes a means to bring about social justice and environmental protection.
Aim	The overriding aim of this module is first to explore the potentialities of hypermedia technology through digital participatory video for advocacy, empowerment and capacity building and second to learn design digital vide-clips to serve the first aim.
Learning Outcomes	At the end of this module learners will be able to: • Demonstrate knowledge on the concept of participatory video (PV) • Plan, develop and assess a participatory video product addressing ESD themes
Units	Unit 3.1: Conceptualising PV project idea Unit 3.2: Developing PV project proposal Unit 3.3: Doing PV research Unit 3.4: Writing/revising script/storyboard
Readings	Manual on Movie Maker 2 and other software Mackay, W. E. Video Techniques for Participatory Design: Observation, Brainstorming & Prototyping. CHI 2000 Tutorial http://www.daimi.au.dk/~mackay Lynagh, M. (2010). Using video in community health advocacy: Critical review of a participatory workshop with Breastfeeding Patrol, Mandaluyong City, Manila. Submitted in partial fulfilment of the MA degree in Development and Emergency Practice Oxford Brookes University Fab, S. & Kay, S. Using communication media as a tool for campaigning: Air France In-flight Video Evaluation of the Austria In-flight Video. ECPAT International
Activity	**Overview** **Assignment**: Good video production begins with good planning and storyboarding. Go to KidzOnline, select the Guest Login link and register for this free resource. Then select the Tech Training tab and check out the Technology Units available. Select the Digital Video Unit and Stream the following selections: #2 Digital Video: Getting Started and #4 Digital Video: Storyboard. Assignment : Using the WWW search for participatory video clips addressing ESD themes with particular to your own theme chosen. **Assignment :** **Prepare a research proposal** **Do research** **Storyboarding Exercise** For your object description assignment, you¹ll need to create a storyboard as part of the planning and development process. As storyboarding practice, this exercise asks you to take a TV commercial and construct a storyboard for it, the

	reverse of the normal storyboarding process.In assessing your Storyboarding Assignment, consider the rubrick provided.
Module 5	**Video Clips Production**
Key Concepts	Production processes, techniques
Overview	Digital Video Production is the filming that brings your video storyboard to life. The actual filming "on location" is known as production, while the editing process is known as post-Production. Like, the planning (pre-production) process, some tasks, such as research for post-production narration or sound, may take place both in the planning and production phases. Here are just a few of the issues that must be considered throughout the shot. Where to focus the lens How the light is striking the subject Does the iris or white balance need to be set for the light conditions Will the camera have to be moved during the shot Is the background appropriate How to frame the shot Whether to move the zoom or change the focus during the shot Is the mike picking up the sound at the right level Is there distracting background sound or noise
Aim	The overriding aim of this module is to equip students with the capacity to actualise their storyboards.
Learning Outcomes	At the end of this module learners will be able to: • Shooting video • Work with others in groups • Use video equipment • Logging and capturing footage
Units	Unit 5.1: Filming Unit 5.2: Logging and capturing footage
Readings	Windows Movie Maker free online video tutorials from Atomic Learning are available at http://www.atomiclearning.com/moviemaker2. These tutorials are very helpful in learning the various features of Movie Maker. (You will need the QuickTime video player to view the Atomic Learning tutorials. If needed, click on QuickTime to download the latest version.)
Activity	**Overview** **Start the production process**
Module 6	**Video-clip Post-Production**
Key Concepts	Editing, narrating, exporting
Overview	Once the footage has been captured, it needs to be put together in a meaningful way based on the story and storyboards. This process is called editing. Clips may need to be trimmed to make them shorter, and in some cases a shot may

	need to be redone because of lack of media or bad lighting etc. Students can creatively determine which shots best tell the story. Sometimes a simple change in camera angles makes one shot better than another. During editing, students also may add a soundtrack or narration. This may require hooking up a microphone so the "voice talent" can narrate based on the footage being used for the project. Students can experiment with transitions between clips, as well. Remember it is really easy to overuse transitions. In most cases, simple cuts work well to tell a story. **Titles, Text, Credits** - Although this may be part of the editing step, this can also be done during post-production as well. Make sure every project participant is in the credits since it may eventually appear in the student's portfolio. Any other graphics or enhancements can also be added at this time. **Print to tape/export for web -** Once the project is complete, it's ready to be printed back to tape via Firewire or to be exported as a movie for use on the web or CD.
Aim	The overriding aim of this module is to learn the processes for editing and finalising the video clip assigned
Learning Outcomes	At the end of this module learners will be able to: • Apply all techniques for editing and exporting the video clip assigned
Units	Unit 6.3: Editing Unit 6.4: Titles, Text, Credits Unit 6.5: Print to tape/export for web
Readings	A compilation of hands-out
Activity	**Overview**
	Implementing the production
Module 7	**Integrating the video clip into the thematic unit**
Key Concepts	Lesson planning, thematic integration
Overview	Planning, developing and producing a video clip dealing with a sustainable development issue should be seen in the context of teaching and learning process. Accordingly, the video clip should be integrated into a lesson plan.
Aim	The overriding aim of this module is to help students integrate the video clip into the curriculum
Learning Outcomes	At the end of this module learners will be able to: • Demonstrate knowledge on lesson planning • Applying knowledge and techniques for integrating learning objects such as a video clip into lesson planning
Units	Unit 6.1: Integrating the video clip into the curriculum Unit 6.2: Uploading video clip
Readings	Ourmedia.org Publish & store your creations- video, audio, text or graphics. Google Video: Upload or download, digital videos of any size or length.
Activity	**Overview**
	You Tube: Upload almost any video format, watch streaming video and share your video creations with anyone. Converting You Tube files for use in Movie Maker.

	Native format not supported in Movie Maker. TeacherTube: Video and social networking site offers 11 customized channels for teachers to upload and share videos of best practices, tutorials and student projects in a content-controlled environment.

Guidelines to infuse ESD and climate change into existing courses in Egypt, Jordan and Lebanon

Developed by Leuphana University of Lüneburg
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CLIMASP – Guidelines to infuse ESD and climate change into existing courses

«Learning processes are a necessary condition
for the acquisition of prerequisites for successful
mastery of complex demands.
This means a lot must be learned,
but cannot directly be taught.»
(F. E. Weinert)

1. The context

The CLIMASP project aims at developing a minor in Climate Change and Sustainability Policy at partner universities in Egypt, Jordan and Lebanon, which will offer students the necessary knowledge, skills and attributes to tackle the challenges of climate change and turn them able to act as agents of change locally and globally (cp. Makrakis 2014, National Training Workshop in Egypt).
The idea is to infuse climate change and education for sustainable development (ESD) into existing university courses. This will take place both via integrating climate change topics as well as interactive methods. Present document shall present a guideline how this can be achieved, which is based on experiences of Leuphana University of Lüneburg on addressing a whole of institution approach of sustainable development.

1.1 Sustainability at the Leuphana University of Lüneburg

The Leuphana University of Lüneburg pursues the target to become a sustainable university, which is reflected in the value principles of the university:

- **Lüneburg as a humanist university.** Understanding higher education as both the shaping of values and attitudes and the instruction of professional expertise. The humanist tradition emphasizes an awareness of social context for the acquisition of knowledge.
- **Lüneburg as a sustainable university**. Education and research further sustainability in societal development by promoting the interdisciplinary skills of problem-solving required to face complex situations, and by encouraging students to engage in autonomous learning activities. Universities are strategic agents in furthering critical thinking and fusing readiness and ability to assume civic responsibility.
- **Lüneburg as a proactive university**. Encouraging creative spirits and non-conformist personalities to seek out opportunities for change, take the initiative, and bring reflection on consequences together with a will to actively bring about constructive change in the public sphere.

The university sees itself as an engine for innovation, centre of regional knowledge clusters, think tanks for the challenges of the 21st century, and drivers of change in politics, business and civil society. The integration of sustainable development is seen

as a whole-of-institution approach (cp. COPERNICUS Alliance 2012), which is highlighted in the figure below.

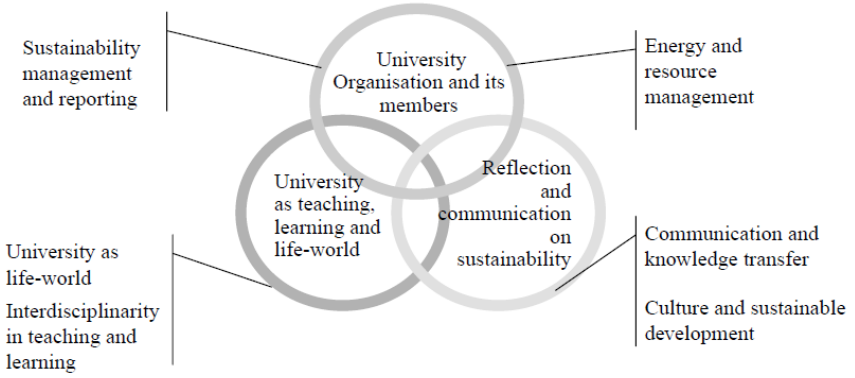

Figure 1: Dimensions of research and development for sustainable development at Leuphana University of Lüneburg (Adomßent et al. 2007, p.392)

A systematic combination of top-down and bottom-up approaches enables a widely accepted and supported implementation process in the institutional field of education, research, outreach and campus management and administration. Additionally strategic partnerships in the above mentioned fields play an important role. The identification and engagement of stakeholders in the CLIMASP project can be seen as a similar attempt, focusing on the field of education.

Education for Sustainable Development in Lüneburg

Sustainable development in research and education means more than integrating sustainability issues into curricula, but refers to the competences to analyze and understand sustainability problems and to actively work on solutions. Education for Sustainable Development (ESD) hence aims at modifying and shaping the futures of those societies we live in via active participation in terms of sustainable development. This has consequences for higher education teaching and its didactic conception. For the integration of Education for Sustainable Development into teaching, following learning principles need to be considered:

- **Self-directed learning**. The acquisition of competences calls for autonomous and constructive learning processes, in which knowledge is actively developed in a self-directed manner. The aim is to stimulate learning processes in which students independently construct their own knowledge base.
- **Collaborative learning**. The acquisition of competences takes place both as an individual and as a social act. With forms of collaborative learning, both cognitive and social-affective aspects are taken into account and an additional dimension of reflection is integrated.
- **Problem oriented learning**. Traditional learning processes often face the problem of focusing only on factual knowledge which cannot be used for action in specific situations. A problem-oriented approach is especially suited to action-relevant procedural knowledge and skills (Burandt & Barth 2010).

As an example of the characteristics of the study model in Lüneburg the structure of the Leuphana Bachelor programme is presented below. It shows that interdisciplinary

learning settings play an important role – one third of the student performance is dedicated to interdisciplinary courses. As an example, all students, no matter which major they have chosen, study the first semester, the Leuphana Semester, together. It mainly consists of project work and covers the scientific and academic basics. One third of the first semester accounts for the module "Science bears Responsibility", which focuses on research-based learning and imparts sustainability issues to all Bachelor students. Challenges in the 21st century are scientifically reflected by the students under the concept of sustainable development (Otte et al., 2014).

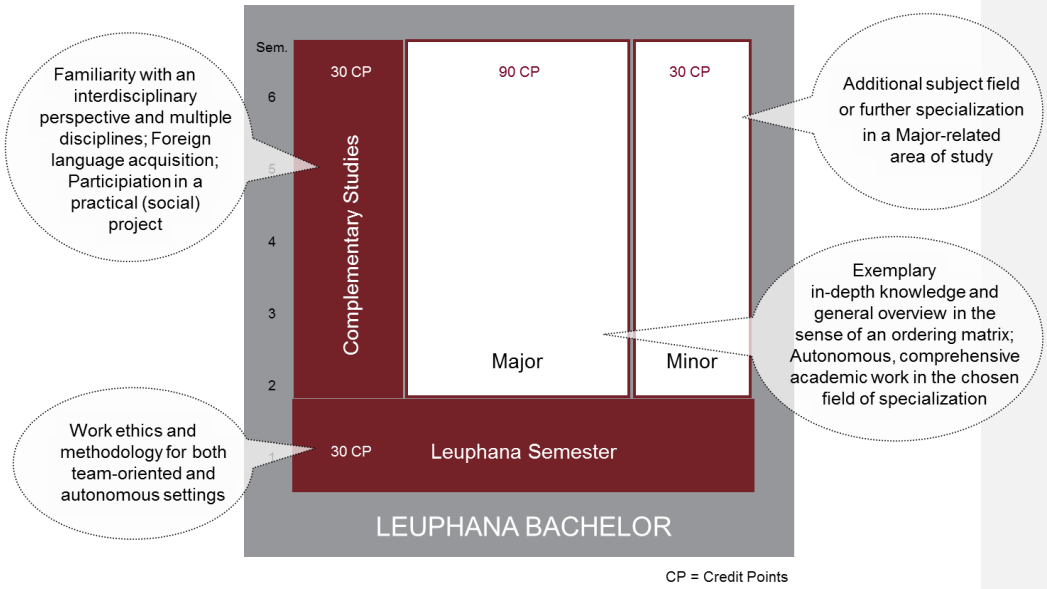

Figure 2: Structure of the Leuphana Bachelor (Leuphana University of Lüneburg)

1.2 Competences for sustainable development

In the course of the CLIMASP project core competences in climate change in the partner countries in Egypt, Jordan and Lebanon have been identified. Wiek et al. (2011) developed a reference framework for key competences in sustainability, which highlights five competences (see table 1):

Key competence in sustainability (Wiek et al., 2011)	
Systems thinking competence	is the ability to collectively analyse complex systems across different domains (society, environment, economy) and scales (local to global)
Anticipatory competence	is the ability to collectively analyse, evaluate and craft "rich" pictures of the future related to sustainability issues; also known as "future/ foresighted thinking"
Normative competence	is the ability to collectively map, specify, apply, negotiate sustainability values, principles, goals and targets; concepts of justice, equity, ethics, etc.
Strategic competence	is the ability to collectively design and implement interventions, transitions and transformative governance strategies toward SD; also known as "action-oriented; transformative"
Interpersonal competence	is the ability to motivate, enable, and facilitate collaborative and participatory problem solving

Table 1: Key competence in sustainability (Wiek et al., 2011)

These competences are relevant for every sustainability process. Climate change as a highly complex field especially requires a set of competences that for instance allow people to develop adaptation and mitigation strategies. Pérez Salgado et al. (2012) confirm that the acquisition of scientific knowledge on climate change alone is insufficient, but requires additional knowledge and skills. Climate change education needs to take an interdisciplinary approach and raise awareness of different perspectives and scales on anthropogenic climate change and related environmental and social challenges (Pérez Salgado et al. 2012, UNESCO 2010[b]). In climate change education for sustainable development the transboundary competence and intervention competence are additionally identified as being essential.

Transboundary competence refers to the ability to engage across boundaries, which implies for instance to be aware of diverse perspectives on climate change, understand that the perception of climate change depends on physical and socio-cultural contexts, be able to work and communicate interdisciplinary and learn to consider both scientific as well as contextual knowledge about climate change (Pérez Salgado et al. 2012). **Intervention competence** refers to *"the ability to inform policy and practice on the basis of acquired knowledge about climate change"* (Pérez Salgado et al. 2012, p.59). This means that students need to be able to employ their knowledge, propose strategies for solutions and estimate its possible impacts on society and environment. While the transboundary competence to a certain extent relates to the systems thinking competence, the intervention competence refers to the strategic and anticipatory competences, as defined by Wiek et al. (2011).

With a focus on Higher Education Barth et al. (2007) indicate that the development of sustainability competences requires a reorientation of learning processes, which can be summarised as:

- **Competence-orientation**. Learning processes, which aim at acquiring sustainability competences, require both a normative competence framework as well as an educational concept, including content and identified learning opportunities.

- **Societal orientation**. ESD is always societal learning, as it addresses societal driven issues and takes part in real-life settings.
- **Individual centring**, which refers to learning by the individual. Also Higher Education teaching needs to consider that learning often takes place in informal settings. Hence a change from teacher-centred to learner-centred approach is of importance (Barth et al. 2007).

Tilbury also addresses this educational shift from teaching to learning:

Educational shifts proposed by ESD	
From …	***To …***
Passing on knowledge	Understanding and getting to the root of issues
Teaching attitudes and values	Encouraging values clarification
Seeing people as the problem	Seeing people as facilitators of change
Sending messages	Dialogue, negotiation and action
Behaving as expert - formal & authoritarian	Acting as a partner - informal & egalitarian
Raising awareness	Changing the mental models which influence decisions & actions
Changing behaviour	More focus on structural and institutional change

Table 2: Educational shifts proposed by ESD (UNESCO 2011, p. 25)

Learning for Sustainable Development can be divided into five pillars of learning (UNESCO 2010[a], Delors 1996):

- **Learning to know**: relates to knowledge, values and skills for respect, understanding and search for knowledge and wisdom
- **Learning to do**: relates to knowledge, values and skills for active engagement in productive employment and recreation
- **Learning to live together**: relates to knowledge, values and skills for international, intercultural, intergenerational and community cooperation and peace
- **Learning to be**: relates to knowledge, values and skills for personal and family wellbeing
- **Learning to transform oneself and society**: relates to knowledge, values and skills for a sustainable future (Delors 1996 in UNESCO 2010[a]).

Education for Sustainable Development shall address all five dimensions of learning in order to empower people to act and strive for a sustainable future. Additionally when addressing ESD it needs to be considered that a shift from an input approach (Which knowledge shall be acquired?) to an outcome approach (Which competences shall be developed?) is required (Michelsen & Rieckmann, 2014).

Therefore active and participatory learning approaches are important for ESD as they encourage learners to:

- *ask critical reflective questions;*
- *clarify values;*
- *envision more positive futures;*
- *think systemically;*
- *respond through applied learning;*

- *explore the dialectic between tradition and innovation* (UNESCO 2011, p.29).

2. Recommended steps for the CLIMASP consortium to infuse ESD and climate change into their courses

2.1 What has been achieved so far?

1. The CLIMASP partner universities in Egypt, Jordan and Lebanon have identified and mapped a list of existing courses within their institutions that will be part of the CLIMASP minor programme. The courses have been mapped related to the three CLIMASP concentration areas: Climate Change, Economics and Public Policy, Climate Change, Environment and Society, and Climate Change, Science and Technology.
2. The CLIMASP partner universities in Egypt, Jordan and Lebanon have completed a comprehensive stakeholder planning, where relevant stakeholders for CLIMASP have been identified, strategies have been developed how the stakeholders can get engaged, climate change threats and opportunities related to different sectors as well as required competences of CLIMASP students have been identified.
3. The identified CLIMASP core competences have been summarised by Prof. Vassilios Makrakis, as well as relevant knowledge, skills and attributes.

2.2 What can be next steps for infusing ESD and climate change into the identified CLIMASP courses?

In a next step the CLIMASP partners will need to infuse the mapped courses with ESD and climate change principles in order to meet the requirements of the CLIMASP minor. Following approach is recommended:

1. Allocate the CLIMASP core competences, which have been identified by your stakeholders, to the three CLIMASP concentration areas. Table 3 below presents an attempt to allocate all CLIMASP competences that have been summarized by Prof. Makrakis to the concentration areas. Several competences go with more than one concentration area. Additionally it becomes obvious that most competences fit into the concentration area “Climate Change, Environment and Society”.
2. You might reflect your pool of identified competences again in your team or with your stakeholders. Are there further competences – especially in concentration areas, where you do not have many competences so far – that would be important as well?
3. After updating this list, you should compare your list of mapped courses (allocated to the three concentration areas) with the list of competences (allocated to the three concentration areas). Identify which competences could best be addressed in which courses.

Identified CLIMASP core competences related to the three concentration areas		
Climate Change, Economics and Public Policy	**Climate Change, Environment and Society**	**Climate Change, Science and Technology**
	Analyse the effects of climate change from both male and female perspectives	
	Understand historical community reactions to and coping strategies for climatic hazards	
	Identify and categorise local livelihood assets and resources	
	Assess the intensity of impact of climatic hazards on livelihood resources	
	Compare and contrast the impacts of major climatic hazards on livelihoods of the …	
	Gain an overview and quantify climatic hazard risk and resilience capacity of local communities	
	Identify and assess the effectiveness of the current coping mechanisms practiced by communities to secure and improve their livelihoods and…	
	… conserve ecosystems bio-diversity in the context of climate change	
	Develop urgent and immediate short term and long term adaptation priorities for district, regional and national level planning	
	Identify the most likely impacts of local climatic hazards	
	Compare and prioritise the most critical local climatic hazards	
	Analyse effectiveness of existing coping and mitigation strategies against the severity of climatic hazards	
Explore the institutional context in which the community operates and identify appropriate institutional partners for adaptation		
Demonstrate knowledge of the relevant professional, legal and ethical obligations to develop and share information about climate change effects on health		
Demonstrate knowledge of how to access local, national and international information about climate change effects on health, relevant to adapting health services		

Comment [MM1]: Dear Vassilis, point 7 in your table is not complete and point 8 is missing (I've taken it from the ppt) – may I kindly ask you to send us the complete table. Many thanks!

Table 3: Identified CLIMASP core competences related to the three concentration areas

4. Beside this list of identified competences relevant for climate change, we suggest to have a look at the key competence in sustainability by Wiek et al. (2011), see page 4 of this document, as they address sustainability in a holistic way.
5. Additionally reflect how your courses relate to the five pillars of learning (UNESCO 2010 [a]). The table below briefly summarises the explanations of the pillars and attempts to relate them to the CLIMASP project.

Pillars of Learning and the CLIMASP project		
Pillars of Learning	**Explanation**	**Meaning for CLIMASP**
Learning to know	respect, understanding and search for knowledge and wisdom; including "learning to learn"	Basic knowledge and understanding of climate change issues
Learning to do	active engagement in productive employment and recreation	Acquisition of skills and the competence to put the climate change knowledge into practice (e.g. to develop adaptation and mitigation strategies)
Learning to live together	international, intercultural, intergenerational and community cooperation and peace	Importance of interpersonal competence and collaboration to cope with climate change impacts
Learning to be	personal and family wellbeing	Individual reflection of values, self-regulation and individual learning for climate change (e.g. how am I affected by climate change; what actions can I take to fight climate change)
Learning to transform oneself and society	sustainable future	Raising awareness, behaviour change and collective actions towards a resilient and sustainable future

Table 4: Pillars of Learning and its meaning for the CLIMASP project

6. Now you know which competences shall be addressed in which courses. As a next step you can identify which knowledge and topics shall be imparted in order to acquire the proposed set of competences. In Table 5 we have allocated the relevant knowledge that has been summarized by Prof. Makrakis to the CLIMASP concentration areas. You can see that a lot of knowledge areas are relevant to all three concentration areas. Regarding skills an allocation is hardly possible.

   Several of the topics in the table below will already be addressed in your courses, but this list can guide you to identify which topics are not covered yet and to which courses you can allocate them.

Identified relevant CLIMASP knowledge related to the three concentration areas		
Climate Change, Economics and Public Policy	**Climate Change, Environment and Society**	**Climate Change, Science and Technology**
Economics of climate change	Gender and climate change	Disaster risk management
Value chains and market access	Fairness and climate change justice	Science, impacts and scenarios
Legislations, regulations	Heritage impact assessment	Renewable energy technologies
Green product design		Spatial decision tools
Green growth		Carbon footprint/ monitoring
Policies and regulation		Technology and innovation
Climate change policy		Weather and climate
Conflict resolution		
Occupational health and safety issues		
Consumer habits		
Energy efficiency behaviour		
Climate change communication		
Climate change mitigation and adaptation		
Mainstreaming adaptation		
Strategic planning		
Integrated assessment		
Vulnerability assessment		
Mainstreaming and planning		
Water management and recycling		
Anticipation and monitoring		
Risk management		
Climate variability		

Table 5: Identified relevant CLIMASP knowledge related to the three concentration areas

7. After identifying which content is relevant for your courses, you need to find ways and methods to integrate it into the mapped courses.

   A defined set of methods or a recipe does not exist in ESD, as ESD very much depends on the specific context. A systematic and integrated didactic planning of goals, contents and methods is key. Nevertheless the table below lists different pedagogical strategies that can support you in integrating different interactive methods in your CLIMASP courses. While planning the methodological part of your courses, you can follow Confucius: *"I hear, and I forget, I see, and I remember, I do, and I understand."*

Pedagogical strategies	Learning process involved
Role-plays and Simulations	These often cited techniques provide an opportunity for learners to gain an in-depth understanding of another person's perspective and to empathize with others.
Group Discussions	Group discussions were frequently mentioned by both school teachers and lecturers when asked to describe an appropriate pedagogy for sustainability. The use of discussion attempts to counteract the risk of tutor taking a transmissive or authoritarian approach, thereby enabling students to explore their own and others' views. The facilitator often encourages listening and self-reflection rather than argument.
Stimulus Activities	A stimulus activity might involve watching a video or looking at photos, poems or newspaper extracts to initiate reflection or discussion. Students may even be involved in producing their own work such as photos taken to stimulate a discussion. Use of videos or externally produced documents enables the facilitators to bring in a wide range of viewpoints for critical analysis.
Debates	Debates in which two groups of students put forward opposing arguments on an issue are often cited as a common method of teaching about sustainability since they encourage students to gather information about the topic and develop an argument. However, they need to be carefully handled as they can become confrontational and learners may be discouraged from engaging or empathizing with other's views.
Critical Incidents	The use of critical incidents to teach sustainability is relatively new. Learners are given an example and asked what they would do, what they could do and what they should do. This allows them to consider their personal perspectives and actions in the light of a moral or ethical stance. The approach can also be used with groups to promote awareness about multiple perspectives on sustainability.
Case Studies	Considering their own position in relation to new knowledge about sustainability can help students understand how individual actions contribute to sustainability. This pedagogical approach provides opportunities for learners to reflect on personal roles, attitudes and responsibilities in relation to a range of sustainability issues.
Critical reading and writing	Reading and writing are seen by tutors as important social practices and the key to progressing sustainability and literacy. Learners can gain from deconstructing discourses to identify the possible motivation of the author. They may also be able to envisage alternative futures, and write a contrasting account based on differing perspectives.
Problem-based learning	Problem-based learning is an iterative learning process that is used to teach a whole range of subject matter. In the context of ESD, a sustainability-related issue may be identified and students asked to investigate this to generate a body of knowledge. They can then develop a vision of alternative actions and potential solutions to the problem, which they use to devise a plan of action. The action may then be carried out, followed by a period of reflection and evaluation. This process promotes both the conceptual and practical aspects of sustainability literacy.

Fieldwork and outdoor learning	Research has shown that fieldwork is an example of experiential pedagogy that can influence students' emotions (Sivek, 2002) and help develop the critical thinking skills so essential to understanding the complexity of sustainability (Jones, 2003; Scott and Gough, 2003). Fieldwork for sustainability is often based on issues in the local community and environs, linking theory to real-world examples (Hope, 2009). There is also evidence that outdoor experience is an important precursor to understanding sustainability (Palmer and Suggate, 1996) and promotes learning by encouraging active learning (Hope, 2009).
Modelling good practice	Learning also taking place implicitly through the hidden curriculum. The research captured how many educators sought to reduce paper use and turned off lights out at the end of sessions as a means of teaching learners the importance of action-taking.
Experiments	Experiments involve activities that encourage students to investigate or test a particular concept, idea or hypothesis. Experiments are usually conducted within a controlled environment and involve students collecting and analysing data.
Demonstrations	Demonstrations usually involve the teacher showing students an activity or experiment. The students usually stand around the teacher and observe what the teacher is doing. Demonstrations can be used in any lesson that includes a practical element.
School Games	A game is an interactive activity that is usually established around a set of rules and can be, yet does not necessarily have to be, competitive. Games can be powerful learning strategies (Partin, 2009, p.228) and while they can be employed for amusement and enjoyment purposes, they can also be used to promote and reinforce learning in specific subjects. Games are fun, can energize students, get them active during the lesson and gain their interest. Furthermore, they can help develop and improve group cooperation, communication skills, confidence and critical thinking skills.
Group Works	Group works are popular teaching strategies. They are generally appreciated because of their flexibility and broad applicability, as well as their high potential to promote communication, active participation of students, social competences and creative work. It is an appropriate instrument to support the diverse phases of the teaching-learning process: theme introduction, information collection, experimentation and demonstration activities, discussion and processing of the collected information, critical reflection, presentation of conclusions, knowledge creation, self-assessment and evaluation of results.

Table 6: Overview of pedagogical strategies for ESD (UNESCO 2011, p. 26-27; the strategies "experiments" to "group works" were added to the list in another Tempus project called EduCamp)

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Additional resources

Climate change education portal, University of California, Berkely
http://www.climatechangeeducation.org/university_materials/index.html
You can find course materials for university level (e.g. PowerPoint slides) according to different disciplines.

UNESCO – Climate Change Education for Sustainable Development
http://www.unesco.org/new/en/natural-sciences/special-themes/global-climate-change/education/

UNESCO (2013) **Climate Change in the Classroom**

http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/climate-change-education/cce-clearinghouse/publications/

"Climate change in the classroom" is a comprehensive teaching toolkit on climate change education, targeting especially secondary school teachers. It provides several course materials, which might serve as an inspiration for infusing climate change and ESD into the university courses as well.