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Chapter 21. Applied Sustainable Practices

21.1. COURSE SUMMARY

Table 21–1

Audience and level of studies	Students (Bachelor) Professionals (practitioners)	
Group size	51–75	
Course duration	12 weeks	
Credits	10 ECTS	
Workload	Presence: 36h Self-study: 64h	Total: 100h
Contents/primary topics	• History, policies, legislation and culture relating to sustainability • Sustainability frameworks and impact assessment • Processes that make sustainable societies through advances in public awareness, technology, policy and economics	
Main course objectives	• Critically analyse and discuss environmental movements and controversies leading to the development of SDGs • Acquire knowledge of environmental management and sustainable principles to critically appraise a business or enterprise • Adopt the ability to assess and produce a plan for the development of subject specific businesses and make suitable recommendations for their sustainable development (including the three realms – social, economic and environmental).	
Main teaching approaches	• Lecture-based learning • Experiential learning • Active learning	
Main teaching methods	• Lecture • Group discussion • Sustainability-related research	
Learning environment	Hybrid classroom (face-to-face and online learning)	

Link to Sustainable Development Goals (SDGs)	SDG 11 | Sustainable Cities and Communities | Make cities and human settlements inclusive, safe, resilient and sustainable SDG 12 | Responsible Consumption and Production | Ensure sustainable consumption and production patterns SDG 13 | Climate Action | Take urgent action to combat climate change and its impacts SDG 15 | Life on Land | Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss SDG 16 | Peace, Justice and Strong Institutions | Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Table 21–2

Impact assessment	**(None) Low/ Medium/ High**	**Explanation**
1. Degree of student participation / activeness	High	Students engage in activities based in class and around the lecture content. Students also are expected to actively research a company of their choice, making recommendations for its transition to a more sustainable company.
2. Degree of student collaboration / group work	Medium	There are group discussions in class, where students are expected to participate. There are also opportunities for students to participate in online forums via the Virtual Learning Environment (VLE).
3. Degree of student emotional involvement	High	Generally, after the first few lectures, underlining the rationale for the sustainability agenda, students understand the need for sustainability and become impassioned about making recommendations for change. The viva voce offers a chance for students to show their passion and discuss their emotional involvement in their projects.
4. Degree of inter-/trans-disciplinarity	High	Through this module students are expected to consider other modules that they are concurrently studying (i.e., business) and other disciplines that they may not be studying. This transdisciplinary approach helps students understand the three pillars of sustainability rather than seeing sustainability as a standalone agenda. The students are also mixed groups as this is a cross-college module, so students have the opportunity for peer-peer learning.
5. Degree of student (self-) reflection	High	Students are expected to write a reflective journal about their sustainability experience. There are opportunities for reflective discussion in class on theoretic and case study materials.
6. Degree of experience of real-life situations	High	Whilst on the field trip, discussion will be made on real life technology, along with the effectiveness of policies and legislations surrounding sustainability. The students also spend a significant amount of the module time researching and investigating a chosen real-life business situation.

Impact assessment	(None) Low/ Medium/ High	Explanation
7. Degree of nature-related experiences	Medium	Students have first-hand opportunities to interact with nature on the field trip(s) students also consider nature and industry's impact through their investigations into their chosen business which could be a nature reserve or a national park
8. Degree of stakeholder integration	Medium	Students learn about Mendelow's (1981) stakeholder analysis, considering a range of stakeholders such as farmers, indigenous community members etc. and their wants and needs for the chosen business. Students also interact with key industry representatives through the field trips. The mixture of involvement with the aforementioned stakeholders and students on the programme allows for an element of stakeholder integration within class
9. Degree of integration between theory and practice	High	a module consisting of lecture series providing theory and a practical project that requires direct application of that theory to the students own work. This challenges the student "head on" to think about theory and see how it is embedded into practice within their chosen business.

21.2. COURSE INTRODUCTION

There is an increasing need for all industries to conduct their business in a sustainable way. Students, as the future work force, will need to equip themselves with the relevant knowledge and analytical tools to be able to assess sustainable options and critically evaluate their future impacts. This module is designed to equip students with the knowledge and understanding to promote sustainability within their chosen lines of study/ careers. It should allow students to explore, analyse, and critically evaluate the opportunities for developing sustainable practice within their own sector, reflecting on the United Nation SDG 2030 and 2050 Targets. Students will have the opportunity to investigate a business or enterprise within their discipline area and propose a sustainability strategy based on a sound in-depth review of present sustainability ideas including available technology, economic viability and scientific robustness. The strategies developed should be environmentally sound, economically viable, and meeting the societal needs. Students will have the opportunity to develop a holistic view of contemporary sustainability practice including issues relating to the ethics, politics and economics of sustainable practice, whilst exploring available technologies and scientific developments available within societies. Where possible, reference to Aichi Target 18 will be made. "By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and

their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected" (CBD, n.d.). Thus, lessons from the past will be reflected upon, investigated, refined, and appraised against their current scope of use (CBD, 2021; Chan *et al.* 2020). This course will comprise of a mix of face to face lectures, independent tasks, field visit and will be assessed through written as well as oral assessment. Details can be seen in the "Teaching Approaches and Methods" subchapter.

21.3. LEARNING OBJECTIVES

Table 21–3

Learning objective dimension (UNESCO, 2017)	**Operationalization**	**Competency referred to (Rieckmann, 2018)**
Cognitive	Critically discuss the history, policies, legislation, and culture relating to sustainability.	Critical thinking competency
	Critically analyse and discuss environmental movements and controversies.	Critical thinking competency
	Critically evaluate processes that make sustainable societies through advances in public awareness, technology, policy, and economics.	Critical thinking competency
Socio-emotional	Appraise a range of sustainability frameworks to solve complex environmental, social, and economic problems as they impact the management of a chosen business or enterprise.	Integrated problem-solving competency
	Assess and produce a plan for the development of an organisation's human resource, financial and environmental requirements.	Strategic competency
	Discuss theory in groups and share the findings of investigations with the wider group. This exposes the whole group to the findings of each individual, rather than each individual solely understanding the role of only their chosen company.	Collaboration competency; Self-awareness competency
Behavioural	Apply acquired knowledge of environmental management and sustainable principles to critically appraise a business or enterprise.	Systems thinking competency
	Draw sound conclusions to make suitable strategic recommendations on sustainable development for a chosen business.	Strategic competency
	Defend the analysis, conclusions and recommendations of their research/topic review by viva-voce.	Critical thinking competency

21.4. COURSE OUTLINE

Table 21–4

Structure		Session focus	Homework
Week 1	Session 1 Lecture (2 hours) Short film on Rachel Carson and the role of her book 'Silent Spring" (1962) in the development of sustainability agenda; Discussion on historical milestones: Stockholm conference, Brundtland commission and Brundtland report (1989), Rio Summit etc. Independent learning (1 hours): Explore the major milestones that lead to the development of SDGs	Introduction to the course. Basic principles, philosophical views and history surrounding sustainability	Get acquainted with the course, teaching methods and assessments
Week 2	Session 2 Lecture (1 hour): culture surrounding sustainability Group work (2 hours): case studies from global communities Discussion and sharing of information on sustainable communities	Culture surrounding sustainability	Start writing the proposal (assessment 1)
Week 3	Session 3 Lecture (1 hour) on historical and current legislations pertinent to sustainability. The groups will be allocated into "for" and "against" groups. In class debate (2 hours) on the effectiveness of policies and legislation surrounding sustainability	Policies and legislations surrounding sustainability	Work on the proposal
Week 4	Session 4 Lecture (3 hours):ISO140001 explained. The need for ISO, its development, advantages and drawbacks.	ISO140001 and its implications for sustainable practice	Submit proposal for formative feedback
Week 5	Session 5 Lecture (1 hours): Sustainability Frameworks- an introduction Small group learning (2 hours) Students to explorer most relevant frameworks applicable/ useful for their chosen business	Sustainability frameworks and sustainable development for organisations to move towards more sustainable future	Finalise the chosen organisation for the main report (assessment 2)
Week 6	Session 6 Lecture (1 hours): Sustainable development in practice and its awareness Group work (2 hours) Explore how businesses communicate sustainable development and promote public awareness	Sustainable development in practice. Communicating sustainable development within business.	Literature search for the report

Week 7	Session 7 Trips to a selected organisation to understand sustainable practices (organisations used previously include e.g., Europe's largest coal fired power station (Drax Power), supermarkets, zoos, and local factories), in addition to a trip to the York Wildlife area	Investigative company visit to gain first-hand experience and speak with industry related persons. Outdoor, nature-related experience and talk.	Continue working on the report
Week 8	Session 8 Assignment workshop on Report Writing (3 hours)	Formative feedback to student reports	Bring the draft to class for formative feedback
Week 9	Session 9 Lecture (1 hour): Environmental Impact assessment Workshop (2 hours) on EIA documentation	Evaluation and Environmental Impact Assessment (EIA) documentation	Make changes as per the formative feedback
Week 10	Session 10 Lecture (1hour): International Institute for Sustainable Development (IISD) and Building Research Establishment Environmental Assessment Method (BREEAM) Independent work (2 hours): Explore alternative and environment friendly energy sources (solar, hydro, thermal etc.)	Environmental management systems – Attitudes to sustainable practice within the business sector.	Finalise the report
Week 11	Session 11 Lecture (2 hours): Science and engineering-driven solutions for sustainability problems versus area specific traditional practices for sustainability Active learning/ group work (1 hour) to explore non-contemporary sustainability options	BREEAM and other sustainability options	Submit the report and prepare for an oral defense of your design through a viva voce
Week 12	Session 12 Viva voce (oral defense of their report, each student has a 30-min slot allocated)	Students' defense of analysis, conclusions and recommendations of their research/topic review.	

21.5. TEACHING APPROACHES AND METHODS

This course uses a student centric, discovery approach, as we believe that this fosters critical thinking, helping students with the primary objective of this module. Early in the module, students will choose a business that they have an interest in, this may be a family farm, or a business that they currently have part time work in or a business they have an interest in. The students will be supported in their enquiries into their chosen business through talks with the conservationists. These lectures, generally toward the earlier part of the module, tend to take a more lecturer centric approach (Leary, 2012), with stu-

dents being offered opportunities to contextualise the learning to their subject area and their chosen companies. This mixed session allows for peer-to-peer learning.

Lectures provide an opportunity to transmit bulk content to a large group, assisting in the delivery of outcome two, acquire knowledge of environmental management and sustainable principles. Following the lecture approach to teaching, some of the sessions are based around the teaching methods such as group discussions on the topic/ case studies facilitated by the teacher (Bligh, 1985). Group discussion is an effective way to solve group decision problems, which allows exchanging information and ideas and integrates individual's experience into group intelligence (Yang *et al.*, 2011). Additionally, students will also be involved in class debates viewing aspects from different perspectives and for varying reasons.

Lectures are created and delivered with well designed, achievable, as well as challenging session aims and objectives. These objectives are checked at the end of each session, either through oral question and answers or through short written responses. The 'in class exercises' such as short case studies will require active learning. Students' answers are then tested through further questioning to create assessments for learning opportunities. In these early lectures, key, generic, sustainability principles are transmitted to the student.

As part of investigating a chosen business, students develop their research, critical thinking and investigative skills. Through the report, students will also pursue self-directed learning, where they will take the initiative, with or without the help of the lecturer, in diagnosing their learning needs, and choosing and implementing appropriate learning strategies, and evaluating learning outcomes (Knowles (1975, p. 18) cited based on O´Shea (2003)).

In order to make a connection between the three realms of sustainability (social, economic and environmental), and to address sustainability frameworks, students will experience inter/transdisciplinary learning. Through the inter /transdisciplinary learning, students will study a topic in-depth, by drawing on knowledge from several disciplines at the same time (Greig and Priddle, 2019, p. 3), hence there will be evidence of transfer of knowledge form disciplines such as sociology, history, physics, biology, chemistry, engineering, business etc. Additionally, students will analyse, synthesise and formulate their understanding into a coherent project write up that will include lessons learnt that are beyond the culture of any single discipline. The interdisciplinary approach gives students the ability to assess and produce a business plan, which is the third outcome of the module. Encouraging the students to make links to other subject areas develops their understanding of the three realms of sustainability (part of learning outcome three) rather than them seeing sustainability as a free standing, separate discipline.

By watching videos/ TED talks, and reflecting on the global case studies, students will have a broader, and both contemporary as well as old-fashioned insight of sustainability related issues from various perspectives and countries.

Students continue working on the individual projects incorporating the lessons learnt in class, on the visit, from the guest lecture talks and through the case studies and videos. The student's project is to choose a business which they have a personal interest in and produce a plan for the development of these specific businesses (e.g., a zoo, wildlife park, a pet shop, equine business, farm, veterinary practice, a nature reserve or a national park etc.). Then, they analyse their current sustainable practices and then based on the lessons learnt in class, as well as the field trip report, make recommendations for further enhancing the business's sustainability agenda/ vision.

21.6. EXERCISES

TED Talks Meet Sustainable Development

Students are asked to watch a TED talk of their choice on a relevant topic on sustainability such as alternative sources of energy, building designs and architecture, new technology such as bioremediation, bioaugmentation etc. Students should then share the information in class. The shared information should give a background to the issue being addressed and present a solution to the issue. Where possible, the solution should be evaluated against the 17 SDGs of the United Nations (2015).

Calculate Your Carbon Footprint!

As a self-analytical/ exploratory fun exercise, students can find an online carbon footprint calculator and evaluate their own personal choices and impact on the environment. In recent years several online "carbon calculators" have been developed to facilitate awareness and effects of personal choices. There are many different options that break down a person's impact into household, transportation and food categories, which are then usually illustrated in a comparitive analysis.

Investigating Ways of Living in Local Communities

Students will go through the case studies from global historical communities and their lifestyle. These case studies will be made available on the Virtual Learning Environment. Sustainability is the long-term viability of a community, set of social institutions, or societal practices. It is considered as a form of

intergenerational ethics in which the environmental and economic actions taken by the present generation does not diminish the opportunities for future generations to enjoy similar levels of wealth, utility, environment, nature or welfare. Students should investigate the ways of living followed by these societies, and then prepare their own notes regarding sustainable lifestyles from these case studies. Students will share the information gathered with their peers, in the form of class discussion/ blog or oral presentation.

Exploring Viewpoints on Sustainability Practices

In class discussions are vital in this module, with this particular subject matter as these opportunities afford students the ability to observe from multiple viewpoints. In the classes there are usually a variety of viewpoints on what sustainability is, what good and bad practice are and where companies' responsibilities end. In a monoculture situation, where all opinions are the same in the class, various stakeholder wants and needs prompt cards could be used to enliven debate and prompt students to consider various alternative viewpoints. It is noted that in these classes these cards have never been used as within the groups there has been sufficient variety of opinion and ability to observe, consider and understand the opinions of others outside the formal group.

Planning Sustainability Field Trips

Industry specific trips form part of the formal organised activities for this module. The college is well placed in a semi-rural area of Northern England, to be able to access both land based and heavy commercial industry. Trips for this module are usually tied in with other business module learning to maximise the value of the trip. Recent trips have included a tour of Drax power station and an assessment of their conversion from coal to biomass burning and a trip to a former clay extraction area, landfill site and brick works which is slowly being converted back to a nature area. These trips allow the students face to face visual learning, contextualising the theory into actual practice in their local area. The trips are usually accompanied by college staff and an employee of the visit location; this enables students to ask some (often challenging) questions around sustainable practices.

Being a Sustainability Scholar

Students are asked to read an article from either the journal named 'Sustainability' or 'Journal for Education for Sustainable Development', with a view to write an article for the journal based on their own research finding. Students can then produce a poster and present their finding in a conference-like setup.

Students should be mindful to incorporate the three realms of sustainability and where appropriate link it to the SDG targets.

Highlighting Corporate Sustainability Examples

Students are asked to individually investigate companies that they are interested in – this is the preliminary task to the overall assessment. Investigation could be through reviewing the company's social media, insider knowledge, publicity campaigns, reviews of the company, financial information provided by the company to UK Companies House or any other accessible materials on the company. This element develops the student as an independent learner and peaks the students' interest in the particular company. Regular peer to peer learning opportunities can informally take place here as students compare their chosen companies with each other to assess who "has the best company" and which company is portrayed as the "worst performer". This exercise feeds directly into the summative assessment.

21.7. ASSESSMENT

Initial Proposal

Students are required to produce a proposal (500 words) and a bibliography. They will be expected to choose a business, critically appraise the business, and briefly apply the acquired knowledge of environmental management and sustainable principles. The initial proposal covers course objectives one and two. Formative feedback will be given based on the proposal.

Main Report

Students will produce a research report (4000 words) on the chosen business within their discipline area. Students should outline the nature of a business enterprise in a clear and succinct format. Students will be required to carry out a literature review on the current state of understanding relating to sustainable practice and technology relevant to their business. They are advised to collect a range of data that will allow them to demonstrate the viability of introducing sustainable practice and / or technology. The data should contain costing, information on present energy needs and future energy demands, and the need for sustainable practice etc. The main report covers course objectives one, two and three. The main report covers 80 % of the overall mark.

Viva Voce Examination

Viva voce examination will be conducted around four key questions; these questions will be around the chosen business and the written report. This will enable the students to articulate their understanding and undertake a free discussion on their professional thoughts and opinions on sustainability within their chosen area of interest, an oral defense of your designs for the chosen business. Duration of the examination is approximately 10 minutes. The examination covers 20 % of the overall mark.

21.8. PREREQUISITES

Required prior knowledge from students:

- None

Required instructors and their core competencies:

- Lecturer (competencies: technology, sustainability, innovation management, systems and design competency)
- Industry expert (competences: real-life business expertise)

Required tools:

- Online collaboration platforms (e.g., Zoom, Google docs, Moodle)
- Additionally, for effectively re-enforcing leaning, field trips can be used as a useful activity/ tool. Planning for one trip to the most appropriate organization/ business such as (a power station, zoo, hospital, a supermarket, market stalls, museum etc.) can aid students learning processes.

21.9. RECOMMENDED RESOURCES

Topic 1 (Introductory resources):

- Elliott, J. (2012). *An Introduction to Sustainable Development*. Routledge.
- Adams, B. (2019). *Green Development: Environment and Sustainability in a Developing World*. Routledge.
- American Experience: PBS (2017, January). *Chapter 1: Rachel Carson [Video]*. YouTube https://www.youtube.com/watch?v=SeJNRaE11A0.

Topic 2 (Sustainability and Culture):

- Benson J.F. & Roe M. (2006). *Landscape and Sustainability*. Routledge.

Topic 3 (Policy and Legislation):

- Bell. S., and McGillvrary, D. (2008). *Environmental Law*. Oxford.
- Hughes, D., Jewell, T. and Lowther, J. (2002). *Environmental Law*. London: Butterworths.

Topic 4 (ISO14001):

- International Organization for Standardization (ISO) (2021). *ISO 14000 Family: Environmental Management.* https://www.iso.org/iso-14001-environmental-management.html.

Topic 5 (Sustainability frameworks):

- Hussen, A. (2004). *Principles of Environmental Economics*. London: Routledge.
- Monkelbaan, J. (2019). *Governance for the Sustainable Development Goals: Exploring an Integrative Framework of Theories, Tools, and Competencies*. Geneva: Springer.

Topic 9 (Environmental Impact Assessment):

- Carroll, B. and Turpin, T. (2009). *Environmental Impact Assessment book: A practical Guide for Planners, Developers and Communities*. 2nd ed., London: ICE Publishing.

Topic 10 (Environmental Management Systems):

- Goudie, A. (2006). *The Human Impact on the Environment*. London: Blackwell.
- Elliott, J.A. (1999). *An Introduction to Sustainable Development*. Routledge.

Topic 11 (BREEAM and sustainable options):

- Building Research Establishment Ltd. (2021). *Building Research Establishment Environmental Assessment Method*. https://www.breeam.com/

21.10. GENERAL TIPS FOR TEACHERS

This module will be delivered using formal lectures, seminars and discussion groups over the course of the delivery. Weekly timetabled lectures and seminars will provide an outline of the key themes. Students will also be given directed study time under tutor's supervision/guidance to develop their understanding

further. Lecturers will ensure support is provided via opportunities for small group discussions over the course of the delivery, in addition to regular formative learning opportunities to consolidate learning. This module may include visits and guest speakers with specific industry-based expertise in sustainability and sustainable practices. In order to conduct the viva voce, care must be taken on the number of students, and a strict time allocation followed.

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