Academic Year	2019/20	**Semester**	1
Course Coordinator	Dr Natasha Bhatia		
Course Code	ES4201		
Course Title	Environmental Management and Valuation		
Pre-requisites	ES2201 Law and Economics		
No of AUs	3		
Contact Hours	13 lecture; 26 tutorial; 39 total		
Proposal Date	13 Sept 2019		

Course Aims

Since the 1950s, the 'great acceleration' in human induced impacts on the environment has heralded the new epoch of the Anthopocene. The increasing global population, combined with rising incomes, means the world's environmental and natural resources are under significant pressure. Management of these environmental pressures in a way which ensures sustainability is now a priority in many environmental conventions and agreements. This course will provide in depth knowledge on techniques that can be used to quantify and value environmental resources, and the management strategies that can be implemented for different systems. An understanding of these processes is essential for Environmental Science majors who wish to work in consultancy positions, government bodies, NGOs or private companies in this field.

Intended Learning Outcomes (ILO)

By the end of this course, you (as a student) would be able to:

1. Communicate the importance of managing natural resources both orally and in writing
2. Compare and contrast key strategies for environmental management, and identify appropriate situations for their use
3. Demonstrate how different management plans might be implemented for different situations
4. Engage critically with the issues and limitations surrounding management and valuation of natural resources
5. Use logical and critical thinking to apply this knowledge to real-world situations

Course Content

Content will include natural resource management, valuation techniques, natural capital, ecosystem services, assessment of ecosystem services, and management for decision making.

Assessment (includes both continuous and summative assessment)

Component	Course LO Tested	Related Programme LO or Graduate Attributes (Appendix I)	Weighting	Team/Individual	Assessment Rubrics
1. Final written report	1,2,3,5	1,2,3,4,5	35%	Individual	App II
2. Presentation	1,2,3,4, 5	1,2,3,4,5	35%	Individual	App III

3. Continuous Assessment (participation in tutorials and completion of tutorial activities)	1,2,4,5	1,2,4,5	30%	Individual	NA
Total			100%		

Formative feedback

You will receive informal feedback continuously throughout the course where appropriate, and formal feedback following every assignment. In addition, I will have weekly office hours, and will be available to answer questions regarding your research or assignments throughout this course.

Learning and Teaching approach

Approach	**How does this approach support students in achieving the learning outcomes?**
Active learning	You will engage in active learning techniques periodically throughout lectures, and during tutorial sessions.
Independent learning	This is an upper level course and therefore you are required to show self motivation and initiative in your learning process.

Reading and References

Course textbooks:

- Tallis et al (eds), Natural Capital: Theory and Practice of mapping Ecosystem Services; Oxford University Press, 2011, ISBN-13: 978-0-199-58899-2
- Conroy and Peterson, Decision making in Natural Resource Management: A structured, adaptive approach; Wiley-Blackwell, 2013, ISBN-13: 978-0-470-67175-7

Course Policies and Student Responsibilities

(1) General

Students are expected to complete all assigned pre-class readings and activities, attend all seminar classes punctually and take all scheduled assignments and tests by due dates. Students are expected to take responsibility to follow up with course notes, assignments and course related announcements for seminar sessions they have missed. Students are expected to participate in all seminar discussions and activities.

(2) Absenteeism

Absence from class without a valid reason will affect your overall course grade. Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies. There will be no make-up opportunities for in-class activities

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on

adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Course Instructors

Instructor	Office Location	Phone	Email
Natasha Bhatia	N2-01C-56		nbhatia@ntu.edu.sg

Planned Weekly Schedule

Week	Lecture Topic	Tutorial	Course LO tested
1	Introduction to the Course	Ecosystem Services & Natural Capital	1
2	Mainstreaming natural Capital into Decisions	Valuing Nature- theory and ethics	1,4
3	Valuing ecosystem services	What do we need to consider when valuing ecosystem services?	1,4
4	Practical applications for ES valuation	Modelling socio-economic data (computer based lab)	1,4
5	Structured Decision Making	Using decision making frameworks in different scenarios	1,2,3
6	The DPSIR Management Framework	Applying DPSIR to Management Decisions	1,2,3
7	Environmental Impact Assessment	EIA legislations, trends and applications	1,2,3
8	Working with Stakeholders	Conducting Stakeholder Workshops	
9	Resource management- Aquatic systems	Fisheries Resource Management	1,3,4,5
10	Resource management – Terrestrial systems	Forestry and Agro-forestry Resource Management	1,3,4,5
11	Protected Areas: Selection and Design	Protected Areas: Management Applications	1,4,5
12	Protected Area: Operation Restoration	Moving forward in Modern Conservation and Management	1,4,5
13	Moving forward in modern conservation and management	Presentations	1,5

Appendix I. ASE Graduate Learning Outcomes

ASE learning outcomes

At the completion of your course of study in ASE, you will be able to:

- Demonstrate intellectual flexibility and critical thinking in order to apply environmental knowledge in the real world
- Communicate environmental concepts with enthusiasm to varied audiences both orally and in writing
- Formulate scientific questions, and be able to access and analyse quantitative and qualitative information to address them
- Exhibit the motivation, curiosity and skills for lifelong learning
- Demonstrate ethical values and responsibility
- Collaborate and lead by influence

Appendix II: Assessment criteria for Final Management Report

Grade / Numerical Score	Criteria
A+ (Exceptional) A (Excellent)	- Report is exceptionally structured in a clear and logical manner. - Content thoroughly covers all important concepts in enough detail to provide ample information to add to the narrative of the report, without being unnecessarily detailed. - Issues included for discussion are correctly prioritised according to how pertinent they are for the overall report - Management scenario is interesting, feasible and meaningful - Report conveys a distinct originality of thought, with clear links to regional, national or global issues where appropriate - Management framework is thoroughly researched and exceptionally executed. - Suggestions and recommendations naturally and obviously adhere to the 10 tenets - Correct use of referencing throughout. - Use of professional yet stylish language, with no grammatical or spelling errors. - Ability to introduce, review and engage critically with secondary readings (where relevant) - Clear understanding of key concepts and theories, and interpretation of wider context issues.
A- (Very good)	- Report is structured in a clear and logical manner. - Content thoroughly covers all important concepts - Issues included for discussion are correctly prioritised according to how pertinent they are for the overall report - Management scenario is interesting and feasible - Report makes some links to regional, national or global issues where appropriate - Management framework is thoroughly researched and well executed. - Most suggestions and recommendations adhere to the 10 tenets - Correct use of referencing throughout. - Use of professional language, with no grammatical or spelling errors. - Ability to introduce, review and engage critically with secondary readings (where relevant) - Reasonable understanding of key concepts and theories, and interpretation of wider context issues.
B+ (Good) B (Average)	- Report has a reasonably clear and logical structure. - Content reasonably covers all important concepts - Issues included for discussion are mostly prioritised according to how pertinent they are for the overall report - Management scenario is feasible - Report makes some attempt to link to regional, national or global issues where appropriate - Management framework is well researched and reasonably executed. - Some suggestions and recommendations adhere to the 10 tenets - Correct use of referencing throughout. - Use of professional language, with mostly no grammatical or spelling errors. - Some attempt to engage critically with secondary readings (where relevant) - Some understanding of key concepts and theories, and interpretation of wider context issues.

B- (Satisfactory) C+ (Marginally satisfactory) C (Bordering unsatisfactory)	- Report has a somewhat clear and logical structure. - Most important concepts are covered - Some important issues are considered - Management scenario is mostly feasible - Management framework is somewhat researched and execution was attempted. - Correct use of referencing throughout. - Use of semi-appropriate language, with many grammatical or spelling errors. - Limited attempt to engage critically with secondary readings (where relevant) - Limited understanding of key concepts and theories, and interpretation of wider context issues.
C- (Unsatisfactory) D (Deeply unsatisfactory)	- Report has an unclear and illogical structure. - Few important concepts are covered - Few important issues are considered - Management scenario is not feasible - Management framework is not researched and execution is not feasible - Incorrect use of referencing. - Inappropriate language, with many grammatical or spelling errors. - No attempt to engage critically with secondary readings (where relevant) - No understanding of key concepts and theories, and interpretation of wider context issues.
F (0-44)	Failure to submit final report

Appendix III. Assessment criteria for oral presentation

Grade / Numerical Score	Criteria
A+ (Exceptional) A (Excellent)	Presenter: - Exceptionally prepared for the presentation, showing calm confidence yet enthusiasm. Delivery is clear, articulate and concise. - Content and language are specifically tailored and appropriate for the designated stakeholder audience. - Presentation is exceptionally structured, and slides are stylish and informative - Presentation is precisely timed to allow introduction and conclusions, as well as adequate time for questions. - Any questions are answered knowledgably and thoroughly, showing the ability to make links to wider regional, national or global issues Audience: - Feedback provided is meaningful and constructive, providing specific details of well executed elements, and achievable points which the speaker can improve upon in the future - Questions to the presenter are appropriate and thoughtful, showing understanding and engagement with the content, allowing for the integration of wider regional, national or global issues.
A- (Very good)	Presenter: - Well prepared for the presentation, showing calm confidence yet enthusiasm. Delivery is clear, articulate and concise. - Content and language are specifically tailored and appropriate for the designated stakeholder audience. - Presentation is well structured, and slides are stylish and informative - Presentation is precisely timed to allow introduction and conclusions, as well as adequate time for questions. - Any questions are answered knowledgably and thoroughly, showing the ability to make links to wider regional, national or global issues Audience: - Feedback provided is meaningful and constructive, providing indication of well executed elements, and suggestions for future improvements - Questions to the presenter are appropriate and thoughtful, showing understanding and engagement with the content, allowing for the integration of wider regional, national or global issues.
B+ (Good) B (Average)	Presenter: - Reasonably prepared for the presentation. Delivery is clear and concise. - Content and language are appropriate for the designated stakeholder audience. - Presentation is reasonably structured, and slides are informative - Presentation is somewhat well timed to allow introduction and conclusions, as well as some time for questions.

	- Any questions are answered appropriately <u>Audience:</u> - Feedback indicates points well executed - Questions to the presenter are appropriate and show engagement with the content
B- (Satisfactory) C+ (Marginally satisfactory) C (Bordering unsatisfactory)	<u>Presenter:</u> - Somewhat prepared for the presentation - Content and language are somewhat appropriate for the designated stakeholder audience. - Presentation is somewhat structured - Presentation is timed to allow introduction and conclusions - Most questions are answered appropriately <u>Audience:</u> - Feedback indicates points well executed - Questions to the presenter are somewhat appropriate
C- (Unsatisfactory) D (Deeply unsatisfactory)	<u>Presenter:</u> - Shows no preparation for the presentation - Content and language are not appropriate for the designated stakeholder audience. - Presentation has no clear structure - Presentation is not well timed and does not allow ample time for introduction and conclusions - Some questions are answered <u>Audience:</u> - Feedback gives no appropriate feedback - No questions are asked
F (0-44)	Failure to give presentation