

Module Handbook for Course on Cleaner Production (EN4019)

Module designation	<i>Cleaner Production (EN4019)</i>
Semester(s) in which the module is taught	<i>1 and 2 (depending on selection and enrolment of students)</i>
Person responsible for the module	<i>Associate Professor Vo Le Phu</i>
Language	<i>Vietnamese and English</i>
Relation to curriculum	<i>Compulsory (specialisation) Environmental Engineering</i>
Teaching methods	<i>Lecture, documentary films, group works/discussion/ presentation.</i>
Workload (incl. contact hours, self-study hours)	<i>Total workload: 36 hours (theory: 15, assignment: 21, homework: 13.5) Contact hours: 3 hrs/week Private study including examination preparation, specified in hours: 25 hrs</i>
Credit points	<i>2</i>
Required and recommended prerequisites for joining the module	<ul style="list-style-type: none"> - <i>Pre-requisite course: N/A</i> - <i>Pre-courses: Environmental Law and Policy (EN2025), Urban and Industrial Environmental Management (EN3037)</i> - <i>Parallel courses: Green Technology (EN4015); ISO & Environmental Auditing (EN3017)</i>
Module objectives/intended learning outcomes	<p><i>Upon the completion of this course, students are able to achieve the following knowledge and skills:</i></p> <ul style="list-style-type: none"> - <i>Knowledge: (i) Understand and explain the significance and important role of cleaner production (CP); (ii) Understand and analyse steps of cleaner production process; (iii) Identify and analyze reasons for generating waste streams.</i> - <i>Skills: (i) Develop skills for analysis and argument of waste flows in industrial process; (ii) Teamwork and multidisciplinary cooperation.</i> - <i>Competences: (i) Analyse and evaluate economic benefits of cleaner production; and (ii) Evaluate the paradigm of resource conservation in industrial production.</i>
Content	<p><i>The purpose of this course is to provide students with following topics:</i></p> <ul style="list-style-type: none"> - <i>The overview of economic development, control and preventive pollution, history of industrial pollution control, connections between cleaner production and sustainable development.</i> - <i>Basic concepts and terminologies: cleaner production, clean technology, clean-up technology, green technology, waste minimization at source, waste; cleaner production techniques; pros and cons of cleaner production.</i> - <i>Cleaner production process and steps of assessment and methods for getting profits from cleaner production for a cleaner production project.</i> - <i>Approaches to reduce greenhouse gases (GHGs) through Clean Development Mechanism (CDM) and product-redesigning for resource conservation.</i> - <i>Case studies of cleaner production projects in Vietnam and Ho Chi Minh City which were implemented towards resource conservation and pollution minimization.</i>

Exams and assessment formats	<ul style="list-style-type: none"> - One (01) Individual Essay (take-home written assignment): students work in 6 weeks and submit in the 9th week of the course. - One (01) Group Works: each group consists of 4-5 students, choose their own topic from week 2. Group presentation in week 7 for about 30 minutes. Assessment of each group is based on an agreed rubric. - One (01) Mid-term exam (week 7) - One (01) final exam: quizzes-based and calculation.
Study and examination requirements	<ul style="list-style-type: none"> - All materials (lecture handouts, article papers, reports and case studies) are provided on BK-elearning (BKeL). - Students are required to be at least 90% attendance of theoretical lectures and 100% of individual assignments, discussion, presentation of the course. - Students are provided with ideas of individual essay's topics in Week 2 of the course. Individual essays should be submitted in Week 9. Maximum length of the essay is 2,500 words (excluded tables, diagrams, figures). - Group works presentation will be performed in Week 7 – 10. Assessment Rubrics for group presentation will be discussed in Week 1 of the course. - The final grade includes individual Essay (30%); group presentation (20%); final exam (50%). - Students must have a final grade of 50% or higher to pass the course. - Students do not submit individual assignment and do not participate group presentation will not be allowed to participate the final exam.
Reading list	<p>Textbook and main readings:</p> <p>[1] Kirkwood, R.C. and Longley, A. (Eds.) (1995). <i>Clean Technology and the Environment</i>. Blackie Academic & Professional, London.</p> <p>[2] Rossiter, A.P. (Ed). (1995). <i>Waste Minimization through Process Design</i>. McGraw-Hill Inc, New York.</p> <p>[3] Mitchell, C. (2003). <i>Promoting Cleaner Production in Vietnam: The Role of Training and Education in Strengthening Industry's Environmental Behaviour</i>. Final Master Report, University of Toronto, Canada</p> <p>Additional readings:</p> <p>[4] Mitchell, C. (2006). <i>Beyond Barriers: Examining Root Causes behind Commonly cited Cleaner Production Barriers in Vietnam</i>. <i>Journal of Cleaner Production</i>, 14(18): 1576-1585.</p> <p>[5] UNEP and Ministry of Planning and Investment of Vietnam. (2001). <i>Profiting from Cleaner Production</i>. Project on "Strategies and Mechanism for Promoting Cleaner Production in Developing countries".</p> <p>[6] Van Berkel, R. (1999). <i>Cleaner Production Opportunities for Small to Medium Sized Enterprises</i>. Waste & Recycle Convention, 5-6 August 1999, Perth, Australia.</p>