

The Hong Kong University of Science and Technology

UG Course Syllabus

Course Code:	CIVL4100V
Course Title:	Green Technology for Sustainable Development
Course Credits:	3
Prerequisite (if any):	CIVL2410
Exclusion (if any):	N.A.
Corequisite (if any)	N.A.
Instructor:	Ir Prof. Dan Tsang
Enrollment requirement (e.g., Instructor's approval is required):	N.A.
Course Description: (within 150 words)	This course covers the recent applications of environmentally friendly and green technology for long-term decarbonization (e.g., carbon capture, utilization, and sequestration), green remediation (e.g., detoxification of air pollutants and water pollutants), and sustainable energy (e.g., hydrogen, ammonia, CO ₂ to fuel), and value-added waste upcycling. The course covers examples of interfacial and catalytic reactions in industry that are environmentally sustainable, in terms of reducing material use (e.g., hazardous solvents), toxic by-product emission, and waste generation. The course will review the underlying principles and new concepts of environmental chemistry as well as material design and fabrication, followed by the discussion of performances and limitations in the context of scientific research and field applications in civil and environmental engineering.
Syllabus:	The course will cover the following topics. <ol style="list-style-type: none"> 1. Overview of green technologies and sustainable engineering 2. Green metrics and environmental chemistry basics 3. Adsorption – working principles and new designs 4. Precipitation – working principles and new designs 5. Catalysis – working principles and new designs 6. Green and sustainable remediation 7. Biomass and plastics waste upcycling 8. Catalysis in H₂ and NH₃ production and CO₂ utilization 9. Group Project Presentations
Intended learning outcomes (ILOs):	On completion of this course, the student will be able to <ol style="list-style-type: none"> 1. Recognize the role of green technologies in today's sustainability agenda from the national and global perspectives. 2. Explain the principles, properties, functions, limitations, and mechanisms of green technologies. 3. Communicate how green technologies work in diverse applications including environmental decontamination, biomass waste valorization, energy and chemical production, gas and water treatment, etc. 4. Critically evaluate chemical processes using the green chemistry metrics and propose viable solutions for improvements.
Assessments:	30% Written Assignment, 30% Project Presentation I, 30% Project Presentation II, 10% Course Participation