

## Tamkang University Academic Year 112, 1st Semester Course Syllabus

Course Title	CARBON NEUTRALITY AND CIRCULAR ECONOMY IN WATER	Instructor	VINCENZO NADDEO
Course Class	TEWXD1A DOCTORAL PROGRAM, DEPARTMENT OF WATER RESOURCES AND ENVIRONMENTAL ENGINEERING, 1A	Details	<ul style="list-style-type: none"> <li>◆ Distance Learning Course</li> <li>◆ Selective</li> <li>◆ One Semester</li> <li>◆ 3 Credits</li> </ul>
Relevance to SDGs	<p>SDG6 Clean water and sanitation</p> <p>SDG11 Sustainable cities and communities</p>		
<b>Departmental Aim of Education</b>			
<ul style="list-style-type: none"> <li>I. Cultivating students with capabilities of carrying out practical works or academic research related to water resources and environmental engineering.</li> <li>II. Cultivating students with capability of solving problems through researching, planning, and management.</li> <li>III. Cultivating students to become professional engineers with care in environment and professional ethics.</li> <li>IV. Preparing students with the capabilities of engaging in international engineering business, to adapt to globalization and social needs, and to expand their global perspectives.</li> </ul>			
<b>Subject Departmental core competences</b>			
<ul style="list-style-type: none"> <li>A. Mathematical and engineering knowledge needed for water resources and environmental engineering applications.(ratio:15.00)</li> <li>B. Capabilities of planning and conducting experiments, analyzing and explaining experimental data, applying information tool, and collecting and compiling data. (ratio:15.00)</li> <li>C. Logical thinking, analysis, integration, problem-solving skills, engineering planning, design and implementation ability.(ratio:15.00)</li> <li>D. Skill of using professional foreign language and global perspective.(ratio:20.00)</li> <li>E. Capabilities of writing and presenting research report.(ratio:25.00)</li> <li>F. Awareness of the importance of teamwork, working attitude and professional ethics, and to learn continuously.(ratio:10.00)</li> </ul>			
<b>Subject Schoolwide essential virtues</b>			
<ul style="list-style-type: none"> <li>1. A global perspective. (ratio:30.00)</li> <li>2. Information literacy. (ratio:5.00)</li> <li>3. A vision for the future. (ratio:20.00)</li> </ul>			

4. Moral integrity. (ratio:5.00)
5. Independent thinking. (ratio:20.00)
6. A cheerful attitude and healthy lifestyle. (ratio:5.00)
7. A spirit of teamwork and dedication. (ratio:10.00)
8. A sense of aesthetic appreciation. (ratio:5.00)

**Course Introduction**

To achieve the sustainable development goals (SDGs), it is necessary to review resource management policies such as energy and water in all sectors of the economy such as industry, production and consumption, major infrastructure, transport, food and agriculture and waste management. At the same time, it is essential to recover resources from our waste.

Join this course and gain the latest academic knowledge on biorefinery which can be applied to their ongoing studies or to advance their careers.

**The correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives.**

Differentiate the various objective methods among the cognitive, affective and psychomotor domains of the course's instructional objectives.

- I. Cognitive : Emphasis upon the study of various kinds of knowledge in the cognition of the course's veracity, conception, procedures, outcomes, etc.
- II.Affective : Emphasis upon the study of various kinds of knowledge in the course's appeal, morals, attitude, conviction, values, etc.
- III.Psychomotor: Emphasis upon the study of the course's physical activity and technical manipulation.

No.	Teaching Objectives	objective methods
1	To understand the tools and techniques needed to efficiently disentangle, separate and convert different biomass based feedstocks into simpler (functional) components.	Cognitive

The correspondences of teaching objectives : core competences, essential virtues, teaching methods, and assessment

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCDEF	12345678	Lecture, Discussion	Report(including oral and written)

**Course Schedule**

**Note for Distance Learning Course : Please clearly indicate synchronous and asynchronous courses.**

Week	Date	Course Contents	Note

1	112/09/11 ~ 112/09/17	Course introduction	
2	112/09/18 ~ 112/09/24	Sustainability and circular economy	
3	112/09/25 ~ 112/10/01	Sustainability and circular economy	
4	112/10/02 ~ 112/10/08	Water Energy nexus	
5	112/10/09 ~ 112/10/15	Water Energy nexus	
6	112/10/16 ~ 112/10/22	Water Energy nexus	
7	112/10/23 ~ 112/10/29	Techniques and processes for biomass activation	
8	112/10/30 ~ 112/11/05	Techniques and processes for biomass activation	
9	112/11/06 ~ 112/11/12	Techniques and processes for biomass activation	
10	112/11/13 ~ 112/11/19	Techniques and processes for biomass activation	
11	112/11/20 ~ 112/11/26	Biorefinery	
12	112/11/27 ~ 112/12/03	Biorefinery	
13	112/12/04 ~ 112/12/10	Biorefinery	
14	112/12/11 ~ 112/12/17	Design for Recycle	
15	112/12/18 ~ 112/12/24	Design for Recycle	
16	112/12/25 ~ 112/12/31	LCA analysis	
17	113/01/01 ~ 113/01/07	LCA analysis	
18	113/01/08 ~ 113/01/14	(Supplementary Teaching)	
Key capabilities	self-directed learning		
Interdisciplinary			
Distinctive teaching			

Course Content	Logical Thinking Green Energy Sustainability issue
Requirement	
Textbooks and Teaching Materials	Self-made teaching materials:Presentations, Videos Using teaching materials from other writers:Presentations
References	
Grading Policy	◆ Attendance : 20.0 %   ◆ Mark of Usual : 20.0 %   ◆ Midterm Exam : % ◆ Final Exam : % ◆ Other 〈report〉 : 60.0 %
Note	<p>1. This syllabus may be uploaded at the website of the Course Syllabus Management System at <a href="https://info.ais.tku.edu.tw/csp">https://info.ais.tku.edu.tw/csp</a> or through the link of the Course Syllabus Upload posted on the home page of the TKU Office of Academic Affairs <a href="http://www.acad.tku.edu.tw/CS/main.php">http://www.acad.tku.edu.tw/CS/main.php</a></p> <p>2. According to the Implementation regulations of distance education for junior college and above are prescribed pursuant to Article 2, "The distance learning course referred to in these Measures refers to more than one-half of the teaching hours in each subject."</p> <p>3. According to the regulations of Tamkang University Enforcement Rules for digital teaching, Paragraph 2 and Article 3, the distance learning course of our school must be "The course of digital teaching with distance learning platform or synchronous video system in our school. Teaching Hours include course lectures, teacher-student interaction discussions, quizzes and other learning activities."</p> <p>4. If there are any temporary course changes (including time changes and classroom changes of distance learning courses, blended courses), please make out an application according to regulations to the Office of Academic Affairs.</p> <p><b>※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.</b></p>