科目ナンバー	年度・学期	時間割所属・時間割コード	開講年次	単位数	曜日・時限
KMU2-043-60-1	2023第3ターム	教養教育(A7083)	1	1	金曜3限

科目名(講義題目)	担当教員
Introduction to Science and Technology II (d)(Perspectives on Biomass Utilization)	QUITAIN ARMANDO

学修成果とその割合
1.豊かな教養 ‥‥20% 2.確かな専門性 ‥‥20% 5.グローバルな視野 ‥‥30% 6.情報通信技術の活用力 ‥‥20% 7.汎用的な知力 ‥‥10%

授業の形態	講義・演習
授業の方法	Lecture (Team Teaching Approach with Invited Global Experts from Spain, Australia, Thailand, Malaysia, Indonesia and the Philippines). This course will be linked with a course being offered by Sepuluh Nopember Institute of Technology (ITS, Indonesia) for collaborative online interactive learning (COIL) program and other ASEAN universities.
授業の目的	The students will learn from this multidisciplinary course the fundamentals of biomass utilization to gain broader global perspectives of this exciting field. This will also give the students an opportunity to interact with the invited global experts and overseas students, and enjoy discussing biomass-related topics towards a carbon neutral society and to support attainment of SDGs and carbon neutral society.
学修目標	【A水準】 Students achieve a higher level of understanding about multidisciplinary and global perspectives of biomass utilization, and learn how to integrate those knowledge in solving current societal and environmental issues towards a carbon neutral society in the future. They also acquire the ability to express themselves with confidence about issues related to the course contents in a cross-cultural setting. 【C水準】 Students achieve sufficient level of understanding and comprehension about the multidisciplinary and global perspectives of biomass utilization, and acquire cross-cultural communication skills.
授業の概要	This multidisciplinary and global team teaching course includes basic topics such as raw materials, products and processes, and will be extended to the biorefinery concept related to the biofuel and biochemical conversion. Process integration, optimization, bioeconomy and environmental issues associated with the use of biomass will also be covered. The emphasis of the course is on the basic principles and concepts of biomass utilization viewed on multidisciplinary and global perspectives.

各回の授業内容

回	月日	授業テーマ	内容概略
1		Introduction: Basic Concepts of Biomass Utilization (Quitain/Mahfud/Worapon/Zullaikah)	Explanation of the course contents, expectation from the students, assessment methods and introduction of reading materials.
2		Environmental Issues (Aviso)	Environmental issues associated with biomass utilization
3		Biomass Conversion Technologies (Yusup)	Including raw materials, products and processes.
4		Catalytic Biomass Conversion Technologies (Beltramini)	Includes biofuel and biochemical synthesis.
5		Process Integration (Suttichai)	Integration of biorefinery to existing processes. Includes biofuel synthesis and hydrogen production processes.
6		Biorefinery and Bioeconomy (Cocero)	Analysis of a biorefinery and its economy.
7		Optimization (Aviso)	Optimization of biomass supply chain.
8		Summary and Presentations (Quitain/Zullaikah/Satrio)	Wrap-up and final presentation (or Final exam).

授業外学修時間の目安	This course requires 45 hours of studying to gain 1 credit. Lecture time is 16 hours (2h x 8 sessions). Additional 29 hours are to be spent on lecture preparation and review and assignments.
テキスト	Not required
参考文献	Reading handouts will be distributed in class.
履修条件	Number of students is limited to 40 based on classroom capacity and method of teaching. The minimum number of students is 3. New students will not be accepted after the 2nd class.
評価方法・基準	In-Class Assignments/Homeworks: 50%, Final Presentation: 40%, Class Active/Passive Participation: 10%. Students are required to list all sources when presenting any data, text or ideas that are not originally their own. Any student found to be plagiarizing will receive a zero for their work.
使用言語	「英語」による授業
教科書・資料の言語	「英語」のテキスト
実務経験を活かした授業	該当 (The lecturers are global experts on various fields and backgrounds related to biomass utilization.)