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| Course Name [科目名] | Separation Process |
| Instructor Name [教員] | Hidehiro Kamiya, Hiroshi Takiyama, Hideaki Tokuyama, Syuntaro Amari |
| Office Hours and Contact Information  [オフィスアワー、連絡先] | Office hours: encourage appointments by e-mail  Location: 1-215, e-mail: htoku@cc.tuat.ac.jp  Location: BASE-229, e-mail: htakiyam@cc.tuat.ac.jp  Location: BASE-223, e-mail: [kamiya@cc.tuat.ac.jp](mailto:kamiya@cc.tuat.ac.jp)  Location: 4-318, e-mail: fs4181@go.tuat.ac.jp |
| Course Structure [授業形態] | Lecture |
| Course Credits [単位数] | 3 |
| Course Overview [概要] | Introduction to unit operations in chemical engineering: evaporation, liquid-liquid separation, liquid vapor separation, liquid-liquid extraction, solid-liquid separation, and mechanical separation process. |
| Course Key Words [キーワード] | Separation design, Equilibrium, Kinetics, Mass balance |
| Academic Goal [目標] | 1. Capable to understand equilibrium, kinetics and mass balance.  2. Capable to design the separation process. |
| Course Schedule [授業内容] | 1. Guidance  2. Diffusion  3. Gas absorption  4. Thermodynamics for separation process  5. Multiphase equilibrium  6. Fundamentals of liquid-liquid separation  7. Application of liquid-liquid separation  8. Fundamentals of separation process, for environmental and material recycling, history and background in various industrial field  9. Fundamentals of particulate behavior in fluid, Brownian motion and sedimentation behavior, Stokes equation, terminal velocity  10. Gas-solid separation, Filtration process, pressure drop  11. Gas-solid separation, sedimentation, cyclone, impaction process  12. Inorganic membrane technology for gas separation  13. Polymeric membrane technology for gas separation  14. Membrane for electrochemical and bio-related applications  15. Examination |
| Textbooks, References,  and Supplementary Materials  [テキスト、参考書、その他] | J. D. Seader, Ernest J. Henley, D. Keith Roper, Separation Process Principles, 3rd Edition, Wiley (2011). Handouts and materials given on or before the lectures. |
| Grading Philosophy  (Percentage / Criteria / Methodology)  [成績評価の方法] | Examinations |