

Material and Energy Balance 1

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|--------------------------|--------------------------------------|---------|---|------------------|------------------|---------------------|
| Course Name | Course section (credit/hours) | | Required course(3/3) | | course code | D046 |
| | course item | | | | course component | |
| | Target students Division/major/grade | | | | opening semester | 2021 1ST SEMESTER |
| | Class time and classroom | | Tue C(CDL106)Fri C(CDL106) | | English Grade | A(100%English) |
| Reference to this course | Credit compositon | | Theory(3) + Design(0) + Practice(0) | | | |
| | Prerequisite courses | | | | | |
| | Related basic courses | | 물리학, 화학 | | | |
| | Recommanded concurrent courses | | 물리화학 | | | |
| | Related advanced course | | 화학공학과 3, 4학년 과정의 전공과목 | | | |
| Instructor | Name (title/division) | | Hwang Jongkook(Assistant Professor, Chemical Engineering) | | | |
| | Office Room Number | 서관 235호 | Extension Number | 0312193846 | e-mail | jongkook@ajou.ac.kr |
| | Office hour | | | Homepage address | | |
| Teaching Assistant | Name (title/division) | | | | | |
| | Office Room Number | | Office phone Number | | e-mail | |

1. Course Introduction

2. Course Objectives & course outcome

물질수지의 원리를 화학공학분야의 공정과 장치에 적용하여 계를 해석할 수 있는 능력을 배양한다.

3. Class types and activities

4. Teaching Method

☒ lecture
 ☐ team project(presentation and case studies)
 ☐ designing and production
 ☐ others

☐ discussion and debate
 ☐ experiments(role-playing,etc)
 ☐ on-site learning(on-site training)

5. Support Systems in Use

☒ AjouBb
 ☐ cyber lecture
 ☐ class behavior analyzing system

☐ automatic recording system
 ☐ online content
 ☐ others

☐ web-based assignment

6. Teaching Tools

☒ PBL(Problem Based Learning)
 ☐ UR(Undergraduate Research)
 ☐ others

☐ CBL(Case Based Learning)
 ☐ FL(Flipped Learning)

☐ TBL(Team Based Learning)
 ☐ DSAL(Data Scienced Active Learning)

7. Evaluation method of course outcome

| Evaluation Item | The Number of Times | Evaluation Proportion | Remarks |
|-----------------|---------------------|-----------------------|--|
| Attendance | | 10% | 10점 만점 기준으로, 3회 초과 결석시 (결석 횟수-3)*(-2)를 감점한다. |
| midterm exam | | | |
| final exam | 1 | 25% | |
| quiz | 2 | 50% | |

7. Evaluation method of course outcome

| Evaluation Item | The Number of Times | Evaluation Proportion | Remarks |
|-----------------|---------------------|-----------------------|---------|
| presentation | | | |
| discussion | | | |
| homework | 5 | 15% | |
| etc | | | |
| study hours | 6시간 | | |

8. Textbook and Reference material

| Main/Sub | Title | Writer | Publisher | Publication year |
|----------|--|---------------------|---------------|------------------|
| Main | Basic Principles and Calculations in Chemical Engineering, 8th ed. | Himmelblau | Prentice Hall | 2013 |
| Sub | Elementary Principles of Chemical Processes | Felder and Rousseau | Wiley | 2004 |

9. Class system and Class shedule

공학연산을 위한 기초사항 학습.
 물질수지 및 에너지수지의 원리 학습.
 학습한 내용의 확인을 위하여 다양한 화학공학 계에 원리를 적용하는 훈련을 함.
 공정해석과 설계 능력을 배양함.

< Schedule >

* language : K-korean, E-English

| Weeks | Title of lecture | language | time distribution(minutes) | | | Teaching Method | evaluation method |
|-------|---|----------|----------------------------|--------|---------------------|-----------------|-------------------|
| | | | theory | design | experiment practice | | |
| 1 | Units and dimension, Engineering system unit, Universal conversion factor gc, Dimensional and nondimensional equations, Dimensional consistency | E | 3 | | | 멀티미디어 활용강의 | |
| 2 | Mole unit, Conventions in methods of analysis and measurement, Basis, Temperature scales, Temperature conversion | E | 3 | | | 멀티미디어 활용강의 | |

< Schedule >

* language : K-korean, E-English

| Weeks | Title of lecture | language | time distribution(minutes) | | | Teaching Method | evaluation method |
|-------|--|----------|----------------------------|--------|---------------------|-----------------|-------------------|
| | | | theory | design | experiment practice | | |
| 3 | Relative pressure, Absolute pressure, Pressure conversion, Chemical equation and stoichiometry | E | 3 | | | 멀티미디어 활용강의 | |
| 4 | Chemical equation and stoichiometry Test #1 | E | 3 | | | 멀티미디어 활용강의 | 진도지필평가 |
| 5 | Principles of material balance, Analysis of material balance problems Material balance problems without chemical reactions | E | 3 | | | 멀티미디어 활용강의 | |
| 6 | Material balance problems without chemical reactions | E | 3 | | | 멀티미디어 활용강의 | |
| 7 | Material balance problems with chemical reactions | E | 3 | | | 멀티미디어 활용강의 | |
| 8 | Material balance problems involving multiple subsystems Material balance problems with recycles or bypasses | E | 3 | | | 멀티미디어 활용강의 | |
| 9 | Material balance problems with recycles or bypasses Purge calculations | E | 3 | | | 멀티미디어 활용강의 | |
| 10 | Purge calculations | E | 3 | | | 멀티미디어 활용강의 | 진도지필평가 |
| 11 | Purge calculations, Test 2 | E | 3 | | | 멀티미디어 활용강의 | |
| 12 | Material balance problems involving condensation and vaporization | E | 3 | | | 멀티미디어 활용강의 | |
| 13 | Material balance problems involving condensation and vaporization | E | 3 | | | 멀티미디어 활용강의 | |
| 14 | Material balance problems involving condensation and vaporization | E | 3 | | | 멀티미디어 활용강의 | |
| 15 | Material balance problems involving condensation and vaporization | E | 3 | | | 멀티미디어 활용강의 | |
| 16 | Test #3 | E | 3 | | | | 기말지필평가 |

10. Contribution index of the course for attaining ABEEK program outcomes

| course outcome | contribution scale |
|----------------|--------------------|
| No Data | |

11. Analysis of improved matters for the previous semester

13. Reference items