

**Department of Chemical Engineering**

**Cairo University  
Faculty of Engineering**

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| **Course Specifications** | | | | | | | | | | | | | | | | | |
| **Program(s) on which this course is given:** | | | | | | | Chemical Engineering | | | | | | | | | | |
| **Department offering the program:** | | | | | | | Chemical Engineering | | | | | | | | | | |
| **Department offering the course:** | | | | | | | Chemical Engineering | | | | | | | | | | |
| **Academic Level:** | | | | | | | 4th year | | | | | | | | | | |
| **Date** | | | | | | | 2013-2014 | | | | | | | | | | |
| **Semester (based on final exam timing)** | | | | | | | Fall √ Spring | | | | | | | | | | |
| **A- Basic Information** | | | | | | | | | | | | | | | | | |
| **1. Title:** | Mass Transfer and Separation Processes | | | | | | | | | **Code:** | | | CHE 401A | | | | |
| **2. Units/Credit hours per week:** | | Lectures | | | 4 | | | Tutorial | | | 2 | Practical | | **0** | | Total | 6 |
| **B- Professional Information** | | | | | | | | | | | | | | | | | |
| **1. Course description:** | | | | The objective of this course is to provide the students with basic knowledge of mass transfer operations and their applications in process industry. | | | | | | | | | | | | | |
| **2. Intended Learning Outcomes of Course (ILOs):** | | | | **a) Knowledge and Understanding** | | | | | | | | | | | | | |
| 1. Concepts and theories of mathematics and sciences, appropriate to the discipline. | | | | | | | | | | | | | |
| 1. The characteristics of the different states of matter and interfaces between them. | | | | | | | | | | | | | |
| **b) Intellectual Skills** | | | | | | | | | | | | | |
| 1. Select appropriate solutions for engineering problems based on analytical thinking. | | | | | | | | | | | | | |
| 1. Think in a creative and innovative way in problem solving and design. | | | | | | | | | | | | | |
| **c) Professional and Practical Skills** | | | | | | | | | | | | | |
| 1. Apply knowledge of mathematics, science, information technology, design, and engineering practice integrally to solve engineering problems. | | | | | | | | | | | | | |
| 1. Employ principles and concepts of transport phenomena in problem solving. | | | | | | | | | | | | | |
| **D) General and Transferable Skills** | | | | | | | | | | | | | |
| 1) Effectively manage tasks, time, and resources. | | | | | | | | | | | | | |
| 2) Work in stressful environment and within constraints.. | | | | | | | | | | | | | |
| **3. Contents** | | | | | | | | | | | | | | | | | |
| **Topic** | | | | | | **Total hours** | | | **Lectures hours** | | | | | | **Tutorial/ Practical hours** | | |
| Introduction to Mass Transfer | | | | | | 3 | | | 2 | | | | | | 1 | | |
| Fick's law & types of molecular diffusion | | | | | | 7 | | | 4 | | | | | | 3 | | |
| Convective diffusion | | | | | | 4 | | | 2 | | | | | | 2 | | |
| Types of contact | | | | | | 4 | | | 2 | | | | | | 2 | | |
| Introduction to Absorption & it's applications | | | | | | 3 | | | 2 | | | | | | 1 | | |
| Factors affecting absorption | | | | | | 3 | | | 2 | | | | | | 1 | | |
| Multi-component absorption | | | | | | 4 | | | 2 | | | | | | 2 | | |
| Stripping(desorption) | | | | | | 4 | | | 2 | | | | | | 2 | | |
| Introduction to Distillation& it's equilibrium | | | | | | 6 | | | 4 | | | | | | 2 | | |
| Single stage distillation | | | | | | 8 | | | 4 | | | | | | 4 | | |
| Fractional distillation | | | | | | 4 | | | 2 | | | | | | 2 | | |
| Cal. no. of stages using Lewis method | | | | | | 3 | | | 2 | | | | | | 1 | | |
| Cal. no. of stages using Mc cabe Thiele method | | | | | | 8 | | | 4 | | | | | | 4 | | |
| Operating conditions affecting distillation | | | | | | 2 | | | 2 | | | | | | 0 | | |
| Multi-Component Distillation | | | | | | 8 | | | 4 | | | | | | 4 | | |
| **4. Teaching and Learning Methods** | | | | | | Lectures (√) | | | Practical Training/ Laboratory () | | | | | | Seminar/Workshop () | | |
| Class Activity (√) | | | Case Study () | | | | | | Projects () | | |
| E-learning ( ) | | | Assignments /Homework (√) | | | | | | Other: | | |
| **5. Student Assessment Methods** | | | | | | | | | | | | | | | | | |
| * **Assessment Schedule** | | | | | | | | | **Week** | | | | | | | | |
| -Assessment 1; Class test | | | | | | | | | 4 | | | | | | | | |
| -Assessment 2; Assignment | | | | | | | | | 5 | | | | | | | | |
| -Assessment 3; Midterm Exam | | | | | | | | | 6 | | | | | | | | |
| -Assessment 4; Assignment | | | | | | | | | 8 | | | | | | | | |
| -Assessment 5; Class test | | | | | | | | | 10 | | | | | | | | |
| -Assessment 6; Final Exam | | | | | | | | | 14 | | | | | | | | |
| - Assessment 7; Oral exam | | | | | | | | | 14 | | | | | | | | |
| * **Weighting of Assessments** | | | | | | | | | | | | | | | | | |
| -Mid-Term Examination | | | | | | | | | 20 | | | | | | | | |
| -Final-term Examination | | | | | | | | | 90 | | | | | | | | |
| -Assignments | | | | | | | | | 10 | | | | | | | | |
| -Class Tests | | | | | | | | | 10 | | | | | | | | |
| -Oral Exam | | | | | | | | | 20 | | | | | | | | |
| -Total | | | | | | | | | 150 | | | | | | | | |
| **6. List of References** | | | | | | | | | | | | | | | | | |
| 1. Coluson J.M and Richardsons, Chemical Engineering vol(1&2),6th ed. | | | | | | | | | | | | | | | | | |
| 1. R.E,Treybal, Mass Transfer Operations,3rd ed,Mc Graw Hill 1985 | | | | | | | | | | | | | | | | | |
| 1. C.J.Geancoplis,Transport Processes and Unit Operation,3 rd ed, Prentice Hall,1993 | | | | | | | | | | | | | | | | | |
| 1. Web sites,Periodicals,etc | | | | | | | | | | | | | | | | | |
| **7. Facilities Required for Teaching and Learning** | | | | | | | | | | | | | | | | | |
| 1. Organized halls 2. Data show | | | | | | | | | | | | | | | | | |
| **Course Coordinator:** | | | Prof. Nagwa Al Mansy | | | | | | | | | | | | | | |
| **Head of Department:** | | | Prof. Fatma Ashour | | | | | | | | | | | | | | |

