

**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.
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| 1. The characteristics of the different states of matter and interfaces between them.
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| **b) Intellectual Skills** |
| 1. Select appropriate solutions for engineering problems based on analytical thinking.
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| 1. Think in a creative and innovative way in problem solving and design.
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| **c) Professional and Practical Skills** |
| 1. Apply knowledge of mathematics, science, information technology, design, and engineering practice integrally to solve engineering problems.
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| 1. Employ principles and concepts of transport phenomena in problem solving.
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| **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**
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| -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.
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| 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
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| 1. Web sites,Periodicals,etc
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| **7. Facilities Required for Teaching and Learning** |
| 1. Organized halls
2. Data show
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| **Course Coordinator:** | Prof. Nagwa Al Mansy |
| **Head of Department:**  | Prof. Fatma Ashour |

