

| MM 524 Momentum and Mass Transfer |                                                                                                                                                                                                                          |        |      | MECHANICAL ENGINEERING DEPARTMENT |                     |       |                |         |             |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-----------------------------------|---------------------|-------|----------------|---------|-------------|
| Semester                          | Methods of Education                                                                                                                                                                                                     |        |      |                                   |                     |       |                | Credits |             |
|                                   | Lecture                                                                                                                                                                                                                  | Recit. | Lab. | Project/Field Study               | Homework            | Other | Total          | Credit  | ECTS credit |
| 1,2                               | 42                                                                                                                                                                                                                       |        |      |                                   | 30                  | 24    | 96             | 3       | 7.5         |
| Language                          | Turkish                                                                                                                                                                                                                  |        |      |                                   |                     |       |                |         |             |
| Compulsory / Elective             | Optional                                                                                                                                                                                                                 |        |      |                                   |                     |       |                |         |             |
| Prerequisites                     | -                                                                                                                                                                                                                        |        |      |                                   |                     |       |                |         |             |
| Course Contents                   | Mass diffusion in solids, liquids, and gases; transport equations for multicomponent systems; laminar forced and natural convective mass transfer; mass transfer in turbulent flows; interface mass transports. Analogy. |        |      |                                   |                     |       |                |         |             |
| Course Objectives                 | This course is intended to familiarize the students with the developments in mass transfer phenomena. Emphasis, coefficient under various regimes of and various interphase geometries. To teach application of analogy. |        |      |                                   |                     |       |                |         |             |
| Learning Outcomes and Competences | Understanding of the mass transport phenomena. Applying the equations of mass transfer at the different regimes. Understanding analog.                                                                                   |        |      |                                   |                     |       |                |         |             |
| Textbook and /or Reference        | 1. W.Kays, M. Crawford and B. Weigand, Convective Heat and Mass Transfer, 4th Edn.,McGraw-Hill International Edition, 2005.<br>2. Skellands, A.H.P., Diffusional Mass Transfer, John Wiley and Sons, 1985.               |        |      |                                   |                     |       |                |         |             |
| Assessment Criteria               |                                                                                                                                                                                                                          |        |      |                                   | If any, mark as (X) |       | Percentage (%) |         |             |
|                                   | Midterm Exams                                                                                                                                                                                                            |        |      |                                   | X                   |       | 28             |         |             |
|                                   | Quizzes                                                                                                                                                                                                                  |        |      |                                   |                     |       |                |         |             |
|                                   | Homeworks                                                                                                                                                                                                                |        |      |                                   | X                   |       | 12             |         |             |
|                                   | Projects                                                                                                                                                                                                                 |        |      |                                   |                     |       |                |         |             |
|                                   | Term Paper                                                                                                                                                                                                               |        |      |                                   |                     |       |                |         |             |
|                                   | Laboratory Work                                                                                                                                                                                                          |        |      |                                   |                     |       |                |         |             |
|                                   | Other                                                                                                                                                                                                                    |        |      |                                   |                     |       |                |         |             |
|                                   | Final Exam                                                                                                                                                                                                               |        |      |                                   | X                   |       | 60             |         |             |
| Instructors                       | Assist.Prof. Oguz TURGUT                                                                                                                                                                                                 |        |      |                                   |                     |       |                |         |             |
| Week                              | Subject                                                                                                                                                                                                                  |        |      |                                   |                     |       |                |         |             |
| 1                                 | Introduction                                                                                                                                                                                                             |        |      |                                   |                     |       |                |         |             |
| 2                                 | Conservation Principles                                                                                                                                                                                                  |        |      |                                   |                     |       |                |         |             |
| 3                                 | Fluid Stresses and Flux Laws                                                                                                                                                                                             |        |      |                                   |                     |       |                |         |             |
| 4                                 | Differential Equations for the Laminar Boundary Layer                                                                                                                                                                    |        |      |                                   |                     |       |                |         |             |
| 5                                 | Differential Equations for the Laminar Boundary Layer                                                                                                                                                                    |        |      |                                   |                     |       |                |         |             |
| 6                                 | Mass Diffusion in Solids, Liquids and Gases                                                                                                                                                                              |        |      |                                   |                     |       |                |         |             |
| 7                                 | Mass Diffusion in Solids, Liquids and Gases                                                                                                                                                                              |        |      |                                   |                     |       |                |         |             |
| 8                                 | MIDTERM I                                                                                                                                                                                                                |        |      |                                   |                     |       |                |         |             |
| 9                                 | Convective Mass Transfer: Basic Definitions and Formulation of a Simplified Theory.                                                                                                                                      |        |      |                                   |                     |       |                |         |             |
| 10                                | Convective Mass Transfer: Evaluation of the Mass-Transfer Conductance From the Conserved – Property (P) Equation.                                                                                                        |        |      |                                   |                     |       |                |         |             |
| 11                                | Convective Mass Transfer: Evaluation of the Mass-Transfer Conductance From the Conserved – Property (P) Equation.                                                                                                        |        |      |                                   |                     |       |                |         |             |
| 12                                | Convective Mass Transfer: Examples for Application of the Smplified Method.                                                                                                                                              |        |      |                                   |                     |       |                |         |             |
| 13                                | Convective Mass Transfer: Examples for Application of the Smplified Method.                                                                                                                                              |        |      |                                   |                     |       |                |         |             |
| 14                                | MIDTERM II                                                                                                                                                                                                               |        |      |                                   |                     |       |                |         |             |