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| **Course Syllabus** | | | | | | | | | |
| **Course Information** | | | | | | | | | |
| **Code** | CHE317 | | | **Contact Hours** | **Lecture** | | | 2 | |
| **Name** | Heat Transport Operations | | | **Tutorial** | | | 1 | |
| **Prerequisites** | CHE201, CHE315 | | | **Lab** | | | 2 | |
| **Course Description** | | | | | | | | | |
| **Scope** | This course deals mainly with an introduction of of thermal energy transfer problems which occur in the process industry (Chemical, Petrochemical, food, Pharmaceuticals etc.) It also gives an Introduction to the 3 modes of heat transfer: Conduction, convection c and radiation, heat transfer. Finally, the course reviews heat transfer with phase change and describe heat exchangers and their design. | | | | | | | | |
| **Textbook** | * C. J. Geankoplis, “Transport Processes and Separation Process Principles”, Prentice Hall ,2003, 4th ed. | | | | | | | | |
| **references** | * F. kreith and M.S. Bohn,”Principle of Heat Transfer “ , PWS Pub. Company, 1997, 5th ed. * Y. A. Cengel and A. J. Ghajar, “Heat and Mass Transfer”, Mc Graw Hill, 2011, 4th Ed. | | | | | | | | |
| **Instructor Information** | | | | | | | | | |
| **Name** | Dr. Othman Y. Alothman | | **Office** | | | | 2B59/2 | | |
| **Phone** | (011)469-5251 | | **Email** | | | | [Othman@ksu.edu.sa](mailto:Othman@ksu.edu.sa) | | |
| **Office Hours** | Mon. and Wed.: 01:00-02:00 pm or by appointment | | | | | | | | |
| **Exams** | | **Grading** | | | | | | | |
| **1st Midterm** | Sun. 12/06/1440 H (05:30 pm) | | **Attendance** | | | 5% | **Quizzes (5)** | | 15% |
| **2nd Midterm** | Sun. 17/07/1440 H (05:30 pm) | | **Homework** | | | 10% | **Midterm Exams (2)** | | 20% |
| **Final** | Sun. 23/08/1440 H (08:00 am) | | **Lab Work** | | | 10% | **Final Exam** | | 40% |

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| **Main Topics** | **Covered Sections** | **Start Date** | **Wk #** |
| Introduction and mechanisms of heat transfer | 4.1 | 30/04/1440 | **1** |
| Conduction Heat Transfer | 4.2 | 07/05 | **2** |
| Conduction Through Solids in Series | 4.3 | 14/05 | **3** |
| 21/05 | **4** |
| Forced Convection Heat Transfer Inside Pipes | 4.5 | 28/05 | **5** |
| 05/06 | **6** |
| Heat Transfer Outside Various Geometries in Forced Convection | 4.6 | 12/06 | **7** |
| 19/06 | **8** |
| Natural Conviction Heat Transfer | 4.7 | 26/06 | **9** |
| Introduction to Radiation Heat Transfer | 4.10 | 03/07 | **10** |
| Boiling and Condensation | 4.8 | 10/07 | **11** |
| 17/07 | **12** |
| Heat Exchangers | 4.9 | 24/07 | **13** |
| Design Problem |  | 02/08 | **14**  **4** |
| Review Week | | 09/08 | **15** |
| Final Exams | | 16/08 | **16** |

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| **Course Learning Outcomes - CLOs** | |
| CLO 1 | To familiarize the students with basic modes of heat transfer, appreciate the physical principles and basic concepts underlying the transfer of heat by conduction, convection and radiation. |
| CLO 2 | To present the methodology required to solve problems to be encounter in actual practice (determine heat transfer coefficient, LMTD). |
| CLO 3 | To introduce the student to the design of heat exchangers |
| CLO 4 | To familiarize the students with the concept of heat transfer parameters measurement (conductivity, heat flux, temperatures…) |
| CLO 5 | To enable students to prepare written technical reports and oral presentation. |
| CLO 6 | To expose students to open ended problems solving. |