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| COURSE #: CHE 342 | | COURSE TITLE: MASS AND HEAT TRANSFER | |
| TERMS OFFERED: Fall | | PREREQUISITES: ChE 230 Material and Energy Balances, ChE 341 Fluid Mechanics, Math 216 Introduction to Differential Equations | |
| TEXTBOOKS/REQUIRED MATERIAL: Welty, Wicks, Wilson, Rorrer, <i>Fundamentals of Momentum, Heat, and Mass Transfer</i> , 5 th ed., John Wiley & Sons, Inc., 2007. ISBN: 978-0470128688. | | COGNIZANT FACULTY: Fogler, Larson, Monroe, Thompson, Wen. | |
| INSTRUCTOR: Linderman | | FACULTY APPROVAL: 2013-12-19 | |
| CoE BULLETIN DESCRIPTION: Theories and applications of mass and heat transport phenomena. Fick's law. Steady and unsteady diffusion. Mass transfer coefficients. Simultaneous momentum and mass transfer. Fourier's law. Steady and unsteady thermal conduction. Heat transfer coefficients. Heat exchangers. Condensation and boiling. Radiation, Kirchoff's law and view factors. | | COURSE TOPICS: (number of hours in parentheses) 1. Heat/mass/momentum transfer analogies (1) 2. Mass transfer mechanisms (2) 3. Mass balance equations (2) 4. Mass transfer by diffusion (6) and convection (3) 5. Mass transfer with chemical reaction (3) 6. Mass transfer equipment (1) 7. Heat transfer mechanisms (2) 8. Energy balance equations (2) 9. Heat transfer by conduction (6), convection (4) and radiation (3) 10. Heat transfer equipment (2) | |
| COURSE STRUCTURE/SCHEDULE: Lecture: 3 per week @ 1 hour; Discussion: 1 per week @ 1 hour | | | |
| COURSE OBJECTIVES | Links shown in brackets are to course outcomes that satisfy these objectives. 1. Teach students heat and mass transfer required to be an effective chemical engineer [1-5] 2. Highlight relationships between heat, mass, and momentum transport [1,2] 3. Encourage creativity in problem solving [4] 4. Introduce students to heat and mass transfer equipment [1-4] 5. Assist students in developing ability to make engineering judgments, including judgements regarding process safety. [4] | | |
| COURSE OUTCOMES | Links shown in brackets are to student outcomes a-k. 1. Ability to solve problems involving steady and unsteady heat conduction, convection, and radiation. [a,e,k] 2. Ability to solve problems involving mass transfer due to diffusion, chemical reaction, and convection [a,e,k] 3. Ability to size some basic heat and mass transfer equipment [c] 4. Ability to apply engineering judgment including an appreciation of cost and safety [e,h] 5. Ability to solve mass transfer problems involving biological and environmental systems [e] | | |
| ASSESSMENT TOOLS | Links shown in brackets are to course outcomes. 1. Weekly homework problems [1-5] 2. Quizzes [1-5] 3. Hourly examinations and one final examination [1-5] 4. Open-ended problems [1-5] 5. End of term course evaluation provides student self-assessment of outcomes [1-5] | | |

