2011-12 Catalog Description:	Mass balances with a residence time of ... kinetics; energy balance and principles of conduction, convection, and mass transfer.
Credit:	3 hr Credit (lecture).
Prerequisites:	BE 2352, BIOL 2051; credit or registration in CE 2200 and ME 3333
Required Textbook:	None required. A set... also be posted on Moodle
References:	Datta, A.K. 2002. Biological and Bioenvironmental Heat and Mass Transfer. Marcel Dekker, Inc., New York, NY. ISBN: 0-8247-0775-3*
	Bailey, J. and Ollis, D. 1986. Biochemical Engineering Fundamentals. 2nd Edition. McGraw-Hill, New York, NY. ISBN 0070032122
	Tchobanoglous, G. and Burton F.L. 1991. Wastewater Engineering: Treatment Disposal and Reuse. Metcalf and Eddy, Inc. 2nd edition. McGraw Hill, New York, NY. ISBN 0070416907.
	Drapcho, Caye or other prior Faculty Members at BAE. 2003. Lecture notes developed at LSU for BE 4352.
	Campbell... and Norman... An Introduction to Environmental ... physics (2nd Ed). Springer-Verlag, New York, NY. ISBN: 0-387-94937-2
Class Schedule:	**Lecture:** 10:40–12:00 P.M. T, TH; Room 1114, Patrick Taylor Hall
Instructor:	Chandra S. Theegala, Associate Professor
	Biological and Agricultural Engineering
	Office Location: Room 101, E.B. Doran Bldg.
	Office Phone: 225-578-1060
	Office Hours: 12:30 PM – 2:00 PM Tuesday
	10:30 AM – 12:00 PM Wednesday
	Other times are ok. Please schedule before you come
	E-mail: theegala@lsu.edu

Purpose of the Course

This is a Junior/Senior/Grad-level course designed to help the students learn the basics of biological kinetics and apply the principles of material and energy balances, reactor design. The students will also learn the concepts of heat/mass/energy transfer (or balances) that are pertinent to the biological systems engineering. The class material is subdivided in broadly six categories...

Course Objectives:

1. To develop an understanding of mass balances with ... reactions and biological growth kinetics

2. To understand and master the principles governing heat and mass transfer in ...

3. To understand the principles of material and energy balances in reactor design

4. To allow students to apply gain hands-on experience on the relevant transport problem (via class project)

BE 4352 Course Topics and Class Schedule*:

Week of	Lecture Topics
1/16/12	Course Introduction Transport Definition, Mass Balances, Rate Basis, Problems
1/23/12	Mass Balance Problems Chemical Kinetics—For Mass Balance Computations
1/30/12	Biological Kinetics Modeling Approaches Growth and enzyme kinetics, computations from experimental data
2/06/12	Biological - MBE Related Topics and Problems
2/13/12	Temperature Dependent Growth, Biological Heat Generation
2/20/12	
	Exam 1 – February 23rd (Thursday during class)
	1-D Steady State and Non-Steady State Conduction and Problems
3/05/12	1-D Composite Material Conduction and Insulation Topics/Problems
3/12/12	Fourier' Law, 1-D Conduction in Radial Direction Convection and Related Topics, Project Topics, Project Report Guidelines
3/19/12	Combined Conduction and Convection (including radial) 3-D Diffusion –Derivation
3/26/12	Diffusion Related Problems, Exam Review **Exam 2 – March 29th (Thursday during class)**
4/02/12	Convection Analysis – Forced and Free Related Convection Problems 1-D Transient Conduction/convection – Heisler 1-D Transient Lumped Capacitance Approach 1-D Transient – Semi-Infinite Approach Related Problems
4/09/12	Radiation and Related Topics/Problems
4/16/12	*April 6-15 – Spring Break (No Tue or Thur class this week)*
4/23/12	Project Presentations- Mass Transfer
4/30/12	Mass Transfer, Mass Transfer Modes and Boundary Conditions Problems, Transient Mass Transfer – Heisler and Semi-Infinite Approaches and Problems Final Exam Review *May 5th - Last Day of Class*
Final Exam	Saturday May 12th, 2012; 7:30 - 9:30 AM

*Note: Instructor reserves the right to alter the schedule during the course of the semester. The instructor also reserves the right to modify the course content to include a lab or advanced topics (such as transport through membranes). However, any alterations will be clarified in the class

Important Dates to Remember in Spring 2012:

Jan 24: Last day to add course "XX"

Jan 26: Last day to add courses for credit and making section change.

Apr 02: Final date for resigning from University and/or dropping course

Exam Schedule:
Tentative Dates for Exam I and Exam II (can change slightly based on class coverage)

        Exam I: February 23rd, 2012.

        Exam II: March 29th, 2012.

According to Spring 2012 Final Exam Schedule (for classes held at 10:40-12:00 Noon on T, TH)

Final Exam Time: Saturday, May 12, 2012; 7:30 – 9:30 AM.

Grading Policy:

1.	Homework(s), Quizzes (announced and unannounced) and Attendance/Participation*)	20%
2.	Exam I	20%
3.	Exam II	20%
4.	Project Presentation# (group)	15%
5.	Design Problem	5%
5.	Final Exam (comprehensive)	20%
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	Total	*100%*

*   *More emphasis will be on quizzes, followed by homework and attendance/class participation. Some or all homework assignments will be graded for completion only and the key will be discussed in class or posted on blackboard.*

\#   *Limited for a long course if ideal for a group work. Please read details in separate sheet for planning a project.*

Grading Scale:

90 - 100%	A
80 - 89%	B
70 - 79 %	C
60 - 69 %	D
Below 60%	F

Course Policies:

Class Participation/Attendance Policy: Attendance is expected. Regular lateness will not be allowed, unless you have a valid excuse. Class participation and attendance account for 5% of grade (can change slightly at instructor's discretion). I expect active participation, not just that you list their presence (remember that tardies count as absent). I am expecting you not to browse the internet or attend to other academic issues like assignments from other classes. I am encouraging you to bring your calculator and work out the problems in class. Keep in mind that this 5% can make a grade difference. Class participation grades will be as follows:

I strongly encourage you to let me know in advance if you are going to miss a class. Letting me know in advance is very important. I will assign you a "P" (for permission). Although a "P" is not considered present, it will allow you to take a makeup quiz (if given on that day) or get a copy of class notes/handouts. In any case, you will not be marked as "present" if you are not in class.

Submission Policy: Homework assignments and project report must be turned in on or before the due date. The format for project presentations (PowerPoint) will be discussed in class. Homework assignments may be graded for your homework along with others (in class).

Makeup Exam/Quiz Policy: No makeup or proctored exams/quizzes will be given for students that miss exams/quizzes unless the student has a legitimate excuse documented properly (e.g. letter from court clerk that he/she must appear in a court, or a letter from a physician stating that he/she is/was sick). If you know that you will be missing a class, let me know in advance. If (if) I decide to give a makeup for someone without a valid excuse, it will be graded to a lower maximum score (like 80 or 85%). In such cases, be prepared for a longer (more questions) make up exams and quizzes. This measure is to dissuade students from not taking the exam in the last minute (just because they are not well prepared). Look at the examples below. The first student demonstrates time (even though they may not be fully prepared).

Situation 1: Student has a presentation/medical procedure/wedding that he/she has to attend/undergo on Feb 22nd. He/she let me know 2 weeks ahead and discussed the option of taking the exam ahead of time and taking a make-up exam.

Situation 2: Student does not show up for exam. Sends an email during exam time and does not have any legitimate reason for missing the exam.

Graduate Students: Graduate students will work independently for the class project. They will submit an independent project report and make an independent final presentation, while the undergrad students will work in groups of 3 or 4. The graduate students may also be required to prepare a relevant presentation and/or handout that will be useful for the entire class. Depending on the topics of the graduate student chooses, the instructor will decide if the topic chosen is valid for the exam.

Academic Misconduct Policy: Cheating and plagiarism will not be tolerated. The LSU Code of Conduct this document and be familiar with its contents (http://saa.lsu.edu/code-student-conduct). If you have any questions/concerns about that matter, feel free to ask me. It is my professional/ethical duty and will forward the case to resolve to relevant authorities. It will be outside my control/discretion.

Other Helpful Information (to understand the instructor and get better grades)
Very Important: This applies just for my courses (not other instructors)

- Understand why am I am standing here?
  - I had exposure to the subject matter before you and may have relevant experience

  - My primary responsibilities as an instructor:
    - 1) Deliver the information in a compact format and shorten the learning curve
      - Examples: STELLA Modeling, Numerical solution (no need beyond dy/dt)

    - Data acquisition using DasyLAB and USB based hardware
      - Final Equation Sheets (7-8 pages)

    - 2) Treat all students fairly
      - Examples: Very fair grading. Compare if you wish policy!
        - Uniform policies and no exceptions for a few selected students
        - Clarifications during exams, "look up before attempting" (uniformity!)
        - Review my unexcused absence and exam/quiz makeup policies

- What can you expect from me?
  - Open door policy - but prefer you email me for an appointment if it is outside the posted office hours. I reply emails promptly.
    - problems, mnemonics, acronyms, and analogies to help you understand better and remember for a life-time. If I cannot find an appropriate, interesting, and practical problem from my 7-8 reference textbooks, I will create a problem like I. Hopkins I, ate Magic has no iodine mnemonic, "stranded in island" analogy, and Challenge Quizes)
    - Lot of partial notes for all lectures
    - I will first equip you with knowledge and information. Then I will challenge you. Examples
    - No manual data recording on projects. A 50 page data acquisition self-learn tutorial with screenshots and photos will be posted on Moodle.
    - I will challenge you on your calculus skills. But on defined operations (mostly covered in class). Please don't expect an "A" without basic calculus and derivations. My views on the role of a Biological Engineer?
    - I will never ever say "Don't you know this?" I believe in proper foundation
    - I can guarantee that I will never fail to give you an answer in the classroom. Why?
    - Artistically challenged instructor! If I say "If only I had more time..." Don't believe it
    - I will try hard to get your names in about 6-8 class periods. Memorization and cheating

- Grading Policy and Grade Related:
  - My views on grading and the meaning of grades A, B, C, D, F
    - Do not shoot at the low end of a particular grade (if examine, shoot for 91 or higher instead of 90 for an A).

o Grades from last time I taught this course
o Last year's grade calculator (see attachment)

responsibility to keep it till the end of the semester.

♦ I want you to expect more from me!
  o Grocery analogy

♦ I cannot overstress the importance of coming to class.

o Remember class participation has 5% grade. It can mean a letter grade drop.

♦ On class projects – expecting you to go beyond "observations"

♦ Follow through on the course material
  o 1 hour lecture will require a minimum of 1-2 hours of effort outside class
  o It will help you on quizzes and exams (one every 2-3 weeks)

• Exam Related
  for each exam will be handed to you.
  o Optional "suggested order" will be provided
  o Important – pick the right equation (biggest point loss)

• Classroom Related
  o Use a 1.5" or 2" ring binder for keeping class material.

  assignments, quizzes, exams, project presentation, and attendance.