SYLLABUS
BE 478
Food Engineering: Solids

Catalog Description: *Spring. 3(2-2) Prerequisities: BE 350 and BE 351 and BE 360.* Analysis and design of unit operations and complete systems for handling, processing, and manufacturing food products, with emphasis on bulk, granular, and solid products. Consideration of biological constraints, including material variability and microbial, chemical, and physical hazards.

Course Time: Tuesday & Thursday 10:20 – 12:10
Course Location: 119 Farrall Hall

Lead Instructors:
Dr. Yan Liu
203 Farrall Hall; ph: 432-7387
e-mail: liuyan6@msu.edu
Office Hours: Monday to Friday 12:30-1:30 p.m. or by appointment.

TA: Casulli, Kaitlyn email: casullik@msu.edu

Limited portions of the course will also be taught by: Dr. Dolan (dolank@msu.edu)

Required Reading:
Handouts and on-line readings, which will include selections on engineering principles for the relevant unit operations and processes.

Course Objectives (read carefully):
Upon successful completion of this course, *students will be able to*:

1. Analyze and design systems for material handling, including storage, conveying, mixing, and size reduction and separation of powders, grains, horticultural crops, and muscle foods.
2. Describe the impact of regulations and standards on the design and operation of food manufacturing systems, particularly for solid foods.
3. Quantify the effects of common processing operations (e.g., dryers, retorts, ovens, freezers) on the physical, chemical, and microbial characteristics of solid food products.
4. Specify equipment and/or operating conditions to design or improve a multi-step system for manufacturing solid food products.

Grading:

On-Line Quizzes (~6)	**15%**
Individual Assignments, including lab reports and design assignments	**50%**
Mid-Term Exam	**15%**
Final Exam	**20%**
TOTAL:	**100%**

On-Line Quizzes:
Students are responsible for reading assigned materials in a timely manner. On-Line Quizzes will cover the content of the assigned readings, which will *precede* any discussion of the material during class. The purpose of the quizzes is to help guide your reading, by directing you to the concepts of highest priority within the text. Because it is *essential* that you read the assigned material *prior* to class, and because the quizzes are computerized, the deadline for completion of each quiz is rigid and unchangeable.

Other Extremely Important Information
(Be sure to commit to memory and/or reread occasionally!):

- 90, 85, 80, 75, 70, 65, 60% or greater of the total semester score will correspond to a 4.0, 3.5, 3.0, 2.5, 2.0, 1.5, and a 1.0, respectively.
- **Individual assignments** will include individual problem sets for homework, laboratory reports, and/or in-class assignments.
- **Late assignments will not be accepted** without prior approval of the instructor. *In-class assignments missed without a prior excuse cannot be made-up.*
- Homework assignments *must* be submitted on **engineering paper** (or typed) and clearly communicate the work completed. **Spreadsheet solutions** *must* be presented in a professional format, including a description of the problem, name of student, assignment number, date, *and* must report in words or symbols (not just in hidden formulas) the underlying principles and calculations used. All spreadsheet submission should be accompanied by a cover memo and/or summary document describing the analysis embedded in the spreadsheet.
- Any appeals regarding the grading of a particular assignment must be submitted to the instructor *in writing* within three days of when the graded assignment is returned to the class.
- As in all professional activities, **attendance at each scheduled class meeting is presumed**. If at all possible, please inform the instructor of unavoidable absences *in advance.*
- *Students* are responsible for understanding and being able to utilize course material. The *instructor* will strive to be an effective facilitator in bringing together the best resources to aid in this process.
- **Accommodations for Students with Disabilities:** Students with disabilities should contact the Resource Center for Persons with Disabilities to establish reasonable

accommodations. For an appointment with a counselor, call 353-9643 (voice) or 355-1293 (TTY). Thereafter, please notify the instructor as early as possible in the semester.

- **Academic Honesty:** Standards of **academic honesty and ethics** are presumed, per General Student Regulation 1.0, Protection of Scholarship and Grades at https://www.msu.edu/~ombud/academic-integrity/index.html. Standards defining acceptable levels of student collaboration on individual assignments are as follows:

Student Collaboration in Biosystems Engineering (BE)

Discussion among students to understand the homework problems or to prepare for laboratories or quizzes is an educationally beneficial activity; however, to preserve the academic integrity of the process, you must fairly represent the authorship of the intellectual content of any work you submit for credit. At the end of each problem on which you collaborated with other students, you must cite the students and the interaction. The purpose of this is to acknowledge their contribution to your work. Some examples follow:

1. You discuss concepts, approaches, and methods that could be applied to a homework problem before either of you start your written solution. This process is encouraged. You are not required to make a written acknowledgment of this type of interaction.

2. After working on a problem independently, you compare answers with another student, which confirms your solution. You should acknowledge that the other student's solution was used to check your own. No credit will be lost if the solutions are correct and the acknowledgment is made.

3. After working on a problem independently, you compare answers with another student, which alerts you to an error in your own work. You should state at the end of the problem that you corrected your error on the basis of checking answers with the other student. No credit will be lost if the solution is correct and the acknowledgment is made, and no direct copying of the correct solution is involved.

4. You and another student work through a problem together and exchange ideas as the solution progresses. Each of you should state at the end of the problem that you worked jointly. No credit will be lost if the solutions are correct and the acknowledgment is made.

5. You copy all or part of a solution from a reference such as a textbook. You should cite the reference. Partial credit will be given, since there is some educational value in reading and understanding the solution. However, this practice is strongly discouraged, and should be used only when you are unable to solve the problem without assistance.

6. You copy verbatim all or part of a solution from another student. This process is prohibited. You will receive no credit for verbatim copying from another student when you have not made any intellectual contribution to the work you are both submitting for credit.

7. Verbatim copying of any material that you submit for credit without reference to the source is considered to be academically dishonest.

* Source: Syllabus, MIT 10.302 Transport Processes, Dept. of Chem. Engr., MIT