1 INSTRUCTIONAL SUPPORT

1.1 Instructor

Instructor: Ashutosh Singh, Ph.D.
Office: THRN 2342, ext. 53048
Email: asingh47@uoguelph.ca
Office hours: Open door or by appointment

2 LEARNING RESOURCES

2.1 Course Website

Course material, news, announcements, and grades will be regularly posted to the ENGG*6160 Courselink site. You are responsible for checking the site regularly.

2.2 Required Resources

No specific textbook has been selected for this course, however, a book that is recommended is “Valentas, Kenneth J., Enrique Rotstein, and R. Paul Singh. Handbook of food engineering practice. CRC Press, 1997.”. Supporting resources will be posted on Courselink site.
2.3 Additional Resources

Lecture Information: All the lecture notes will be posted on Courselink as they are finalized (prior to lectures).

Assignments and Projects: Download the assignments from Courselink as per the schedule given in this handout and as they are posted on Courselink site.

2.4 Turnitin

Accounts will be made available to students on Turnitin to help with the editing of their project/assignment submissions to ensure that plagiarism did not take place. The College has assured the School that Turnitin does not store student work, so please take advantage of this tool when preparing your written submissions.

Note: Login details will be provided soon.

2.5 Communication & Email Policy

Please use lectures sessions as your main opportunity to ask questions about the course. Major announcements will be posted to the course website. It is your responsibility to check the course website regularly. As per university regulations, all students are required to check their <mail.uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its student. You are encouraged to use [ENGG6160] in the subject line while emailing your instructor.

3 ASSESSMENT

3.1 Dates and Distribution

The final grade will be determined from the individual and teamwork submitted to the course instructor. The submitted work will be evaluated according to the grading sheets posted on CourseLink (CL), with the assessment weighted as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weightage</th>
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</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>10 %</td>
</tr>
<tr>
<td>Project</td>
<td>40 %</td>
</tr>
<tr>
<td>Project Oral Presentation</td>
<td>10 %</td>
</tr>
<tr>
<td>Final Examination</td>
<td>40 % (Take Home Exam)</td>
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</table>
3.2 Course Grading Policies

**Missed Assessments:** If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor. See the graduate calendar for information on regulations and procedures for Academic Consideration:

http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1400.shtml

**Accommodation of Religious Obligations:** If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the graduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations:

https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e2116.shtml

**Passing grade:** In order to pass the course, students must obtain an overall grade of 65% or higher for the course work outlined in Section 3.1.

3.3 Course Format

This course will be taught using Lectures and Discussion in an informal setting (3h/week), Assignments, project topic seminar presentation and project submission.

The Project is both an individual and a group activity. It is worth 50% (report & presentation) of the course grade and is on a topic selected by the student related to food engineering, food processing and bio-processing. Students will discuss with the course instructor and select a topic for their project by week 3.

Final exam will include a take home exam and students would be graded individually.

4 AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

4.1 Calendar Description

Application of heat and mass transfer, fluid flow, food properties, and food-processing constraints in the design and selection of food process equipment. Development of process specifications for the control of the flow of heat and moisture and the associated microbial, nutritional and organoleptic change in foods. Food system dynamics and process development.

*Prerequisite(s): NONE*
4.2 Course Aims

The course aims at addressing the advanced aspects of food engineering concepts. The course will introduce students with basics of core engineering concepts of mass and energy transfer. It will allow them to identify the key components of a food process design.

4.3 Learning Objectives (LO)

1. To develop process conditions for unit operations such as dehydration.
2. To describe conceptually the basic transfer mechanisms and provide several approaches to the reduction of transfer resistances for given heat, mass, or momentum processes, as restricted by product considerations.
3. To identify the physical and chemical basis for food component orientation in food materials and the changes in physical structures which result from treatments.
4. To select a food product, process and/or analysis approach in which the property is significant and justify the selection in terms of principles for similar model systems.
5. To select reasonable indicators of microbial, nutritional, and organoleptic quality for a given product and process; and to identify the major areas of process uncertainty for a given product-process and to outline a program for improved process definition and control.

4.4 Instructor’s Role and Responsibility to Students

The instructor’s role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on CourseLink/D2L but these are not intended to be stand-alone course notes. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for tests and project.

4.5 Students’ Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and tutorials. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.
5 Teaching and Learning Activities

5.1 Timetable

<table>
<thead>
<tr>
<th>Lectures:</th>
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<tbody>
<tr>
<td>Tuesday</td>
<td>12:00 PM – 3:00 PM</td>
<td>RICH 3527</td>
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</tbody>
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5.2 Lecture Schedule

Week 1:
In the first week we will discuss why modeling and simulation is required and also refresh basic concept of mass and energy balances using examples and some mass transfer basics to be discussed in the later weeks.

Week 2:
In this week we will review the basics of mass transfer:
1) Modeling Food Processes Involving Transport Processes
2) One Dimensional Mass Transfer in an Infinite Slab
3) One Dimensional Mass Transfer in an Infinite Cylinder
4) One Dimensional Mass transfer with Concentration dependent Moisture Diffusivity–Infinite Slab
5) One Dimensional Heat and Mass transfer with Concentration dependent Diffusivity–Infinite Cylinder

Week 3: Continuation of the topic discussed in week 2
6) Modeling Mass transfer by Diffusion and Convection in an Infinite Slab
7) Modeling Mass transfer by Diffusion and Convection in an Infinite Cylinder
8) Modeling Mass transfer by Diffusion, Convection and Depletion by Chemical Reaction in an Infinite Slab
9) Modeling Mass transfer by Diffusion, Convection and Depletion by Chemical Reaction in an Infinite Cylinder
10) Frozen food transport in insulated containers - modeling
Week 4:

4. Food Unit Operations

In this week you will be introduced to various unit operations both thermal and non thermal. For example: Conventional drying processes; Dielectric and microwave drying; Osmotic drying; High electric field (Electrohydrodynamic Drying); Pulsed Electric field processing; high pressure processing; Pulsed light.

Week 5:

5. Food Quality Modeling

In this week we will look at various examples related to modeling of food processes based on food quality.

Week 6:

6. Process Optimization

In this week we will discuss the product development process, process flowcharts and how we can use some novel tools (software’s) to design them.

Week 7:

7. Process Modeling and Design

In this week we will discuss various examples and students would be required to come up with a technical brief on examples of food process modeling and design (Part of the assignment).

Week 8-12: The following weeks will include special topic presentation by students (10% of the grade); project submission (40% of the final grade); industrial visit (TBA).

5.4 Other Important Dates

Thursday, September 8, 2016: First day of class
Monday, October 10, 2016: Thanksgiving holiday
Tuesday, October 11, 2016: Study break, no classes
Friday, November 4, 2016: 40th class day, last day to drop classes
Friday, December 2, 2016: last day of class
6 LAB SAFETY

There is no lab in this course. However, safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. If you take a lab course, you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, when present in a lab and observe unsafe practices, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible.

7 ACADEMIC MISCONDUCT

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community - faculty, staff, and students - to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. The Academic Misconduct Policy is detailed in the Graduate Calendar.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member.

8 ACCESSIBILITY

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability for a short-term disability should contact the Centre for Students with Disabilities as soon as possible.

For more information, contact CSD at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: http://www.uoguelph.ca/csd/
9 RECORDING OF MATERIALS

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

10 RESOURCES

The Academic Misconduct Policy is detailed in the Graduate:
https://www.uoguelph.ca/registrar/calendars/graduate/2014-2015/genreg/sec_d0e1780.shtml.

A tutorial on Academic Misconduct produced by the Learning Commons can be found at:
http://www.academicintegrity.uoguelph.ca/

The School of Engineering has adopted a Code of Ethics that can be found at:
http://www.uoguelph.ca/engineering/undergrad-counselling-ethics.

The Graduate Calendar is the source of information about the University of Guelph’s procedures, policies and regulations, which apply to graduate programs:
http://www.uoguelph.ca/registrar/calendars/graduate/current/.