

# INDUSTRIAL ENGINEERING

## Wood 330 - Fall 2011

**Instructor:** Dr. Taraneh Sowlati

**Office Hours:** I have an open door policy and would be happy to help students outside the classroom. My contact info:  
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**Text Book:** Russell, R.S., Taylor, B.W, "Operations Management", Third Edition, Prentice-Hall, 2000.

**Other References:**

Winston, W.L., Operations Research: Applications and Algorithms, Third Edition, ITP, 1994.  
Hillier, F.S. and Lieberman, G.L., Introduction to Operations Research, Third Edition, Holden-Day, 1980.

**Lectures:** Monday, Wednesday and Friday 10:00-11:00

**Lab:** Thursday 9:00-12:00

**Teaching Assistants:** Mahmood Ebadian  
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## COURSE DESCRIPTION

### Rationale

The emphasis of the Wood Products Processing Program is on producing graduates who perform confidently in a manufacturing setting, recognize the demands of the marketplace and develop designs and plans to produce a product in a safe, efficient and cost effective manner.

Industrial Engineering (IE) is concerned with the design, installation and improvement of integrated systems of people, materials and equipment in all sectors based on mathematics, physics, social sciences together with the principles of engineering and design. It provides a systematic approach to determine the most effective ways for an organization to use resources, make work safer, easier and faster, increase quality and customer service, etc. that ultimately improves competitiveness and increases profitability. Therefore, it is essential for students in the Wood Products Processing Program to be familiar with IE methods and techniques.

## Objectives

This course provides an introduction to the methods and techniques used in Industrial Engineering. The objectives of the course are:

- To provide students with the understanding of Industrial Engineering methods and techniques, their impact on efficiency, productivity and competitive position of a firm.
- To provide students with the knowledge of real-life situation relative to the concept and systems learned.

## Learning Outcomes

Upon successful completion of this course, the student will be able to:

- define operations, issues and trends in operations, operations strategy, and competition strategy of firms
- classify products and processes, describe the characteristics of each process, advantages and disadvantages of each
- develop flowcharts, process flow and process maps and use them to improve production efficiency
- calculate the optimum production level based on fixed and variable costs
- recognize the importance of facility layout, evaluate a layout and use simple methods to propose an improved one
- recognize the importance of employees as a valuable resource, and explain the new approach in human resources management
- describe and compare time study methods, employ a stop watch to calculate the standard time of a job
- define different types of inventory, different costs associated with keeping inventory, different inventory management systems, and calculate the optimum order quantity
- formulate an LP problem, use Excel Solver to solve it, and perform sensitivity analysis
- develop a mathematical model for transportation and capacity planning problems, use Excel Solver to solve them, and perform sensitivity analysis

## Course Organisation

There will be a mid-term and a final examination based on the material presented in the course, including the readings and class discussions. To pass the course, students need to pass the final exam, in case they fail the final exam, their course mark will be the same as their final exam mark. All the lecture notes are available for downloading from the Online Courses on the Faculty of Forestry website (note that attachments to the notes are not available for downloading) <http://wood330.forestry.ubc.ca>. This will save you most of the note taking, but will require that you take an active part in the classroom dialogue.

## **Class Participation**

In order to succeed in this course, students need to be actively engaged in class discussions and activities, and facilitate the learning of others. Class attendance is mandatory.

## **Problem Sets**

Every week a set of problems will be handed out in the lab and students have to submit their solutions by the end of the lab. In case an assignment requires more time than the lab session, appropriate time will be given to students.

## **Field Trip**

We will have field trips to wood manufacturing facilities in the Lower Mainland. All students must attend and write a report (2 pages). **The due date for the field trip reports submission is one week after the field trips.**

## **Quizzes**

There will be several quizzes during the term. Attendance is mandatory.

## **Case Study/ Small Projects**

Students will work on one case study and two small projects in small assigned groups during the term, participate in class discussions, and submit a memo/ report before the specified deadline.

## **Late Submission Policy**

Please note that when a deadline is set for the submission of problem sets, projects, field trip reports, you must submit them on or before that deadline or there will be a significant penalty, 30% off!

## **Grading**

Class and lab participation	10%
Problem sets/ reports	15%
Mid-term	15%
Quizzes	10%
Case study/ Small projects	15%
Final Exam	35%

**Lectures Schedule (Tentative Plan) - Fall 2011**

<b>Week</b>	<b>Starting</b>	<b>Subject</b>	<b>Chapter</b>	<b>Important Events</b>
1	Sept. 5	What is Industrial Engineering?	-	No Lab
2	Sept. 12	Operations Strategy and Competitiveness	1, 2	First Field Trip (Sept. 15) M&J Woodcrafts
3	Sept. 19	Process Planning	6	Second Field Trip (Sept. 22) Nickels Custom Cabinets Field Trip Report Due (Sept. 22)
4	Sept. 26	Facility Layout	7	Third Field Trip (Sept. 29) Euro-Rite Cabinets Field Trip Report Due (Sept. 29)
5	Oct. 3	Human Resources Issues	8	Field Trip Report Due (Oct. 6)
6	Oct. 10	Work Measurement	8	
7	Oct. 17	Inventory Management/ Review	12	Mid-term (Oct. 21)
8	Oct. 24	Linear Programming	Supplement 11	
9	Oct. 31	Linear Programming	Supplement 11	
10	Nov. 7	Sensitivity Analysis	-	
11	Nov. 14	The Transportation Problem	Supplement 9, Operations Research: 7	
12	Nov. 21	Capacity Planning	-	
13	Nov. 28	Case Discussion/ Review		Case Memo Due