ISE 723 Course Syllabus

ISE 723 – Production Planning Scheduling & Inventory Control

Sections 001 and 006
SPRING 2016
3 Credit Hours

Special Notes

Course Philosophy: This is a first course in Production and Inventory Control designed to develop both a theoretical understanding and a practical basis for work in the area. Learning is achieved through hard work (no pain, no gain) and classroom interaction (if you don’t understand what is going on … say so now!!) Of course, this is a little hard to do on EOL, so try e-mail. Tests are designed to stretch you. Note that historically, grades have been positively correlated with class attendance.

Knowledge and Physiological Prerequisites: Calculus (we actually use it); Probability & statistics (we actually use this too); A resting heart rate greater than 40 beats/minute and less than 80 beats/minute is required; Positive electroencephalogram

Captured Lectures: This on campus course will be captured and distributed via the Internet and/or electronic media as part of the Engineering Online (EOL) program for the distance students. These video recordings may contain an image of you entering the classroom, asking a question or being a part of the studio class. Please notify Dr. Linda Krute, Director of EOL, in writing at ldkrute@ncsu.edu if you DO NOT want your image to be included in the lecture presentation. If we do not hear from you after the first week of the class, we will assume that you are in agreement with this procedure.

Supporting Fellow Students in Distress: As members of the NC State Wolfpack community, we each share a personal responsibility to express concern for one another and to ensure that this classroom and the campus as a whole remains a safe environment for learning. Occasionally, you may come across a fellow classmate whose personal behavior concerns or worries you. When this is the case, I would encourage you to report this behavior to the NC State Students of Concern website: http://studentsofconcern.ncsu.edu/. Although you can report anonymously, it is preferred that you share your contact information so they can follow-up with you personally.

Course Description

This is a first course in Production and Inventory Control designed to develop both a theoretical understanding and a practical basis for work in the area. Topics include: Inventory Control, Production Planning and Scheduling, and Demand Forecasting.

Learning Outcomes

Students should be able to:
1. Analyze time series data, chose an appropriate forecasting model, and then optimize that model;
2. Apply the concepts of sequencing and scheduling in their personal lives and on the factory floor;
3. Analyze standard production and inventory data, determine lot sizes (if appropriate), determine least cost lot size schedules.

Course Structure
The material in the course is delivered by lecture and re-enforced through active learning and participation on in-class exercises.

### Course Policies

Texting and cell phone use are not allowed in class. In addition, no eating and drinking is allowed in the classroom.

### Instructors

**Dr. Russell E King** (king) - *Instructor*

**Email:** king@ncsu.edu  
**Phone:** 919-515-5186  
**Fax:** 919-515-1543  
**Office Location:** 126-B Daniels Hall  
**Office Hours:** Whenever my door is open. Note: I am in class on Mon and Wed from 8:00-9:45 and 3:00-4:15

- **TA**  
**Email:**  
**Phone:** TBA  
**Office Location:** Daniels Hall  
**Office Hours:** TBA

### Course Meetings

**Lecture**

- **Days:** MW  
- **Time:** 1:30pm - 2:45pm  
- **Campus:** Main  
- **Location:** DAN 327

### Course Materials

#### Textbooks

- **A Text for Production & Inventory Control, Forecasting, Scheduling, and Stochastic Modeling** - Thom Hodgson  
  **Edition:** Spring 2016 Available on course Wolfware site  
  **Cost:** $0  
  *This textbook is required.*

- **Production and Operation Analysis** - S. Nahmias  
  **Edition:** 4th  
  **Cost:** $55  
  *This textbook is optional.*

- **Production and Operations Management** - R. Chase, N. Aquilano and B. Jacobs  
  **Edition:** 8th  
  **Cost:** $80  
  *This textbook is optional.*

#### Expenses

None.

#### Materials

None.

### Requisites and Restrictions
Prerequisites

1. Calculus (we actually use it)
2. Probability & statistics (we actually use this too)
3. At rest heart rate greater than 30 beats/minute, but less than 90 beats/minute
4. Positive electroencephalogram

None.

Grading

Grade Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm Exam 1</td>
<td>30</td>
<td>In-class exam on Scheduling Topics</td>
</tr>
<tr>
<td>Midterm Exam 2</td>
<td>30</td>
<td>In-class exam on Inventory Topics</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40</td>
<td>Final cumulative exam</td>
</tr>
<tr>
<td>Forecasting Project</td>
<td>0</td>
<td>The forecasting project must be completed with a passing grade in order to receive a grade in the course.</td>
</tr>
</tbody>
</table>

Letter Grades

This Course uses Standard NCSU Letter Grading:

- $97 \leq A+ \leq 100$
- $93 \leq A < 97$
- $90 \leq A- < 93$
- $87 \leq B+ < 90$
- $83 \leq B < 87$
- $80 \leq B- < 83$
- $77 \leq C+ < 80$
- $73 \leq C < 77$
- $70 \leq C- < 73$
- $67 \leq D+ < 70$
- $63 \leq D < 67$
- $60 \leq D- < 63$
- $0 \leq F < 60$

Policies on Incomplete Grades

If an extended deadline is not authorized by the instructor or department, an unfinished incomplete grade will automatically change to an F after either (a) the end of the next regular semester in which the student is enrolled (not including summer sessions), or (b) the end of 12 months if the student is not enrolled, whichever is shorter. Incompletes that change to F will count as an attempted course on transcripts. The burden of fulfilling an incomplete grade is the responsibility of the student. The university policy on incomplete grades is located at http://policies.ncsu.edu/regulation/reg-02-50-3.
### Academic Integrity

**Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct found at** [http://policies.ncsu.edu/policy/pol-11-35-01](http://policies.ncsu.edu/policy/pol-11-35-01)

### Academic Honesty

See [http://policies.ncsu.edu/policy/pol-11-35-01](http://policies.ncsu.edu/policy/pol-11-35-01) for a detailed explanation of academic honesty.

The instructor will make every effort to fully identify and pursue any issues of academic dishonesty.

### Honor Pledge

Your signature on any test or assignment indicates "I have neither given nor received unauthorized aid on this test or assignment."

### Electronically-Hosted Course Components

Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course.

### Accommodations for Disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, student must register with the Disability Services Office ([http://www.ncsu.edu/dso](http://www.ncsu.edu/dso)), 919-515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation at [http://policies.ncsu.edu/regulation/reg-02-20-01](http://policies.ncsu.edu/regulation/reg-02-20-01).

### Non-Discrimination Policy

NC State University provides equality of opportunity in education and employment for all students and employees. Accordingly, NC State affirms its commitment to maintain a work environment for all employees and an academic environment for all students that is free from all forms of discrimination. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and/or NC State University policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and/or NC State University policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. NC State’s policies and regulations covering discrimination, harassment, and retaliation may be accessed at [http://policies.ncsu.edu/policy/pol-04-25-05](http://policies.ncsu.edu/policy/pol-04-25-05) or [http://www.ncsu.edu/equal_op/](http://www.ncsu.edu/equal_op/). Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equal Opportunity (OEO) at 919-515-3148.

### Tentative Course Schedule

**NOTE:** The course schedule is subject to change.

**Lecture MW 1:30pm - 2:45pm — Scheduling — 01/06/2016 - 02/03/2016**

Scheduling: Single Machine, Multiple Machines, Stochastic Environments, and the Traveling Salesman Problem

*Note: January 18th is a holiday.*
Lecture MW 1:30pm - 2:45pm — Production Control and Inventory — 02/08/2016 - 03/30/2016

Inventory: Classic models: simple lot-size, discounting, constraints, stochastic demand, single period; Lot-size scheduling; Just-in-time, agile manufacturing; Materials requirements planning

Note: March 7-11th is a holiday as is March 25th.

Lecture MW 1:30pm - 2:45pm — Forecasting — 04/04/2015 - 04/13/2015

Forecasting: Moving Average; Exponential smoothing; Adaptive smoothing

Lecture MW 1:30pm - 2:45pm — Stochastic Modeling of Production Systems — 04/18/2016 - 04/25/2016

Properties of the Exponential Distribution; Using the exponential distribution to model systems; Modeling systems with non-Markovian behavior