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IE 618-852, 854: Engineering Cost & Production Economics

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Mechanical & Industrial Engineering
NEWARK COLLEGE OF ENGINEERING

SYLLABUS
IE 618 Engineering Cost & Production Economics

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COURSE DESCRIPTION

This is a graduate course offers an overview of some important topics in cost management of operational activities. The course focuses on capital investment decision making and efficient resource utilization to achieve cost-effective operations. Topics covered in the course include alternative investment evaluation, budgeting activity-based costing, quality costs, life-cycle management and relevant behavioral science. The topics covered in the course are considered in the context of manufacturing and service industry application.

Prerequisite Knowledge: A basic understanding of manufacturing, engineering and economic concepts, along with the associated mathematical tools and critical evaluation techniques.

Learning Objectives: Demonstrate mastery of techniques necessary for cost analysis and control including standard costs, variance analysis, cost volume relationship, cost estimation, and utilization of accounting data for control of operations.

Canvas

The course will make extensive use of the Canvas system to optimize student-instructor communication. All course materials including lecture slides and homework etc. will be distributed through Canvas. All submission of homework and other assignments will also be through Canvas. To access the system please got to http://canvas.njit.edu , you will need a valid UCID to login.

ONLINE CLASS SESSIONS via Canvas: Several times during the semester we may have an online class session. These sessions will be conducted through Canvas via audio lectures.

WEEKLY ASSIGNMENTS

Success is greatly dependent on your study discipline. A key determinant of course success will be the discipline with which you complete the assigned tasks. The tasks are also listed under below in this document. Typical weekly activities include:

LECTURE: per Canvas file and syllabus.

VIDEO: Click on the Video links in each topic and view the recordings. All videos are 7 minutes or less.

TOPIC 1:
V1 - What is cost engineering?
: https://www.youtube.com/watch?v=kgh5MQjA5do&pp=ygUVd2hhdCBpcyBjb3N0IGVuZ2luZWVy
V2 - Cost of goods sold: https://www.youtube.com/watch?v=GPAIj3qCfLE

TOPIC 2:
V3 - Cost behavior : https://www.youtube.com/watch?v=fFfCck0SVxk
V4 - Estimation of total cost
function: https://www.youtube.com/watch?v=dudBRCS7Qkw
V5 - Activity-based costing (ABC) -1
: https://www.youtube.com/watch?v=Cp2ugvDkMP4
Activity-based costing (ABC) -3
: https://www.youtube.com/watch?v=U_N0MB53vhA

TOPIC 3:
V 6 - Product costing: https://www.youtube.com/watch?v=MC077Pe9XaQ

TOPIC 4:
V9 - Support departments cost allocation - Zingerman's Community of Businesses: https://www.youtube.com/watch?v=n3jcPV4IEVE
V10 -Budgets for profit planning - High Sierra Sport Company: https://www.youtube.com/watch?v=l9pPLfgJ82A

TOPIC 5:
Video: V12. Standard Costing - Navistar International
https://www.youtube.com/watch?v=TaCvXXXVDKg
Video: V13. Economic Value Added (EVA) - Herman Miller, Inc.
https://www.youtube.com/watch?v=YJx_dDysdt0

TOPIC 6:
Video: V14. Strategic Cost Management - BuyCostumes.com
https://www.youtube.com/watch?v=0DpiqcIE1aM
Video: V15. What is Value Chain
https://www.youtube.com/watch?v=tT60_TofYf4&pp=ygUkVGhlIFZhbHVlLUNoYWluIEFuYWx5c2lzIC0gUGl6emEgSHV0

TOPIC 8:
Video: V19. Lean Manufacturing - Inovata Foods Corp.
https://www.youtube.com/watch?v=Ftc7s1hGIAc

GRADING

Based in individual and team performance as follows:

10%	Homework Assignments	25% Midterm Exam	25% Term Project
10%	Corporate Profile	30% Final Exam	

HOMEWORK: There will be homework assignments throughout the semester. The objective of homework is to reinforce the concepts covered in lectures, practicing and implementing solution techniques on problems, and prepare for the midterm and final exams. Homework assignments are individual task and must be done without collaboration. Therefore, **the work you turn in MUST be your own work.** All homework will be distributed online and you will also upload you submission online. Numerical questions will be completed online.

MINIMUM ACCEPTABLE FORMATS: All assignments should be completed in MS Word, PDF or equivalent. Camera images of handwritten pages are NOT acceptable and will NOT be graded.

MIDTERM & FINAL EXAMS - Specific instructions will be provided as we get closer to each exam. Midterm and final exams will be based on the course text and lectures. This is an individual effort and must done without collaboration. Midterm and final exams will be closed-book and closed-notes. Except for non-programmable calculators, electronics, such as laptops or smart phones, are strictly not permitted. As we get closer to the exams, I will upload a detailed instruction sheet describing the exams and how you can take it.

Please note that NJIT recommended grading scheme is as follows:

- A for excellent performance (i.e., 90% or higher)
- B+ for good performance (i.e., 80 to 89.99%)
- B for acceptable performance (i.e., 70 to 79.99%)
- C+ for marginal performance (65 to 69.99%)
- C for minimum performance (60 to 64.99%)
- F or worst otherwise

TEXTBOOK & READINGS

IE 618 Engineering Cost & Production Economics slides - Will be distributed electronically through Canvas

Cornerstones of Cost Management, by Don R. Hansen and Maryanne M. Mowen, 3rd Edition, 2015, Cengage Learning, ISBN-10: 1-285-75178-7, ISBN-13: 987-1285751788.

Course Readings – Several papers/reports/videos have been selected to complement the weekly topics. These are listed below, please complete each reading prior to the start of the topic.

TERM PROJECT:

Students are required to work in groups in a term project. Groups' size will be determined by the number of students in class, but typically a maximum of 3 students would be in a group. Two components of the term project; a report documents all the project work, and a PowerPoint file to present (10-minute presentation) w/ audio.

1. Each team must (theoretically) manufacture a product of their own design (*can't use project material from work / another class*) and use the material learned in the course to present the business case for the product. The team will create a cost structure and will assign this cost using budget, activity-based costing system, create key performance indicators, perform value stream mapping, and show consideration to break-even analysis and non-production costs and do future planning.
2. The team will do an in-class ten (10) minutes PowerPoint presentation (*all members must present*) and submit a 10 pages minimum, Times Roman 12 font, 1.5 line spacing, 1 inch margins, (*page count excludes pictures and graphs*) team paper based on project (*one paper for the group with a work breakdown structure to show individual contributions*). The paper must include key concepts from each lecture to demonstrate mastery over the subject matter.
3. **Group members and product should be determined by lecture 2**. Project will expect to be insightful comments that reflect an understanding of economic considerations both local and global as related to the subject. Please email me (one person per group) with the name of your group members.
4. PowerPoint slides with audio **DUE** electronically via email **by 12:00 pm noon on date of presentation**.

CORPORATE PROFILE PRESENTATION:

Each student should select a company noted in the requirements below. No two students should have the same company. The companies will be assignment based on first come first serve. **Please send me an email stating which company you have selected.**

Industry	Major Companies
Oil and Gas	British Petroleum (UK) Total (France) Royal Dutch Shell (Netherlands) Statoil (Norway) Exxon-Mobil (USA) Saudi Aramco (Saudi Arabia)
Personal Computers Manufacturing	Hewlett-Packard (USA) Acer (Taiwan) Dell (USA) Lenovo (China) Toshiba (Japan) Apple, Inc. (USA)
Pharmaceutical	Sanofi-Aventis (France) GlaskoSmithKline (UK) Roche (Switzerland) Johnson & Johnson (USA) Bayer Schering (Germany) Pfizer (USA)
Automotive Manufacturing	Toyota (Japan) General Motors (USA) Volkswagen (Germany) Hyundai (South Korea) Fiat-Chrysler (Italy) Tata (India)
Food and Beverage	Nestle (Switzerland) Mondelez International (USA) Kraft-Heinz Company (Canada) Danone (France) General Mills (USA) Associated British Foods (UK)

ADDITIONAL ASSIGNMENT

Wk	TOPIC
1.	*Lecture #1:* Introduction to Cost Management *Video:* Topic 1 *Reading #1.* Effective Cost Management —Back to Basics
2.	*Lecture #2:* Cost Behavior and Activity-Based Costing Video: Topic 2 *Reading #2.* Activity-Based Costing at Diebold
3.	*Lecture #3:* The Job-Order Costing System and Process Costing *Video:* Topic 3
4.	*Lecture #4A:* Allocating Costs of Support Departments *Lecture #4B:* Budgeting for Planning and Control *Video:* Topic 4 *Reading #3.* Excellence in cost management
5.	*Lecture #5:* Standard Costing and Decentralization *Video:* Topic 5
6.	*Lecture #6:* Strategic Cost Management and Activity-Based Management *Video:* Topic 6 *Reading #4.* Cost improvement practices and trends in the Fortune 1000
7.	*Lecture #7:* The Balanced Scorecard and Quality Costs Management
10.	*Lecture #8:* Lean Accounting and CVP Analysis *Reading #5.* Making cost savings real and making them stick
11.	*Lecture #9:* Tactical Decision Making *Lecture #10:* Pricing and Profitability Analysis *Reading #6.* Re-evaluating the total cost of truck fleet ownership
12.	*Lecture #11:* Capital Investment *Lecture #12:* Inventory Management *Reading #7.* Profitability and Cost Analysis – An Eye on Value

Week	Day	Topic	HW Sets
1	Jan 19	Intro to Cost Mgmt / Basic Cost Mgmt Concepts - Ch.1 & 2	Bio
2	Jan 26	Cost Behavior / Activity-Based Costing - Ch. 3 & 4	
3	Feb 2	Product and Service Costing / Process Costing - Ch. 5 & 6	HW1 Due
4	Feb 9	Allocating Costs / Budgeting - Ch. 7 & 8	
5	Feb 16	Standard Costing / Decentralization - Ch. 9 & 10	HW2 Due
6	Feb 23	Strategic Cost Mgmt / Activity-Based Mgmt - Ch. 11 & 12	
7	Mar 1	Strategic-Based Control / Cost of Quality - Ch. 13 & 14	HW 3 – Corp Profile
8	Mar 8	**Midterm Exam**	
9	Mar 10-16	**SPRING Break**	
10	Mar 22	Lean Accounting and Productivity Measurement - Ch. 15	
11	Mar 29	Cost-Volume-Profit Analysis - Ch. 16	
12	Apr 5	Tactical Decision Making / Pricing & Profitability - Ch. 17 & 18	
13	Apr 12	Capital Investment/ Inventory Management - Ch. 19/20	HW 4 Due
14	Apr 26	Term Project - Team's Presentations	
15	May 3	**Final Exam**	
16	May 11	Final Grades	