



NORTHERN ARIZONA UNIVERSITY

GRADUATE CURRICULUM

PROPOSAL FOR NEW GRADUATE COURSE

NOTE: Use tab to move between fields. Use space bar to check a box.

1. New course effective beginning what term and year? (i.e., Spring 2006)				Fall 2007	
2. College:		CENS		3. Department	
				CM	
4. Course subject/catalog Number:		EGR 560		5. Units:	
				3	
6. Co-convened with:					
		(Must be approved by UGC prior to submission to UCC. Both course syllabi must be presented.)			
7. Cross-listed with:					
		(Must be approved by UGC prior to submission to UCC. Both course syllabi must be presented.)			
8. Long Course Title:		Operations Analysis and Productivity Improvement			
9. Short Course Title (30-character maximum, including spaces):		Operations Analysis and Improvement			
10: Catalog Course Description (60-word maximum):					
Applications of statistical decision/theory. Markovian analysis, queuing theory and simulation models to problems of design, evaluation and control of operational processes and systems. Using statistical and non-statistical tools to improve operational productivity.					
11. Grading Option:		Letter Grade ☒		Pass/Fail ☐	
				Both ☐	
12a. May course be repeated for additional units?		Yes ☐		No ☒	
12b. If yes, maximum units allowed:					
12c. If yes, may course be repeated for additional units in the same term?		Yes ☐		No ☐	
13.a Please check ONE of the following that most appropriately describes the course:					
Lecture and lab combined ☐		Lecture only ☒		Lab only ☐	
Seminar ☐		Field Studies ☐		Independent Study ☐	
		Activity ☐		Supervision ☐	
13.b In addition, will it also be delivered via:		Web ☒		ITV ☐	
				Other ☐	
If other (e.g., Hybrid), please clarify:					
14. Prerequisites (must be completed before proposed course):					
15. Corequisites (must be completed with proposed course):					
16. If course has no requisites, what consent will all sections require (check one)?					
Instructor Consent ☒		Department Consent ☐		No Consent ☐	
17. Justification for new course (including unique features, if any):					
Added for the technical engineering managment emphasis in the master opf Engineering Program. of all M. Engineering this emphaissis has shown great promise and classes are making minimums					
18.a Is this course need for a new program?		Yes ☐		No ☒	
18.b. If Yes, has the plan been approved?		Yes ☐		No ☐	
				When?	
If plan has not yet been approved, a plan form must accompany this form.					
Name of new plan:					
If no, name of existing plan:					
19. Does this course duplicate content of existing courses within or outside of your college?					
Yes		☐		No ☒	
If yes, list below any courses that may have duplicative material and estimate the percentage of duplication.					

	Please attach letters of support from each department with a course listed above.		
20. Will this course affect other academic plans, units, or enrollment?		Yes ☐	No ☒
	Please provide letters of support from each department affected.		
21. Names of current faculty qualified to teach this course:			
	Greg Ohrn, Stephen Mead, Thomas Rogers		
22. If course requires additional faculty, space, or equipment, how will these requirements be met?			
23. Will present library holdings support this course?		Yes ☒	No ☐

24. Approvals

Department Chair (if appropriate)	Date
Chair of college curriculum committee	Date
Dean of College	Date

For University Graduate Committee use only

For University Graduate Committee	Date

Action taken: _____ **Approved as Submitted** _____ **Approved as Modified.**

COURSE SYLLABUS

College of Engineering and Natural Sciences

EGR 560 Operations Analysis and Productivity Improvement

GENERAL INFORMATION:

Name of College: College of Engineering and Natural Sciences
Construction Management Department
Course Number: EGR 560 Operations Analysis and Productivity
Improvement (This course is planned as a fully on-line
offering)
Semester: All semesters
Credit Hours: 3
Instructor's Name: L. Greg Ohrn, Stephen Mead, Thomas Rogers
Office Address: TBA
Office Hours: TBA

COURSE PREREQUISITES:

Instructors Consent

COURSE DESCRIPTION:

Applications of statistical decision/theory. Markovian analysis, queuing theory and simulation models to problems of design, evaluation and control of operational processes and systems. Using statistical and non-statistical tools to improve operational productivity.

STUDENT LEARNING OUTCOMES:

This is an advanced treatment of operations analysis. We assume that the student has completed an undergraduate course in statistics or equivalent.

The course objective is to provide the student with advanced knowledge of operations analysis and productivity improvement. Upon successful completion of this course, the student will be able to:

Apply stochastic and statistical thinking of real world operations in systems design and analysis.

Apply a variety of basic concepts and methods in probabilistic modeling of service and production operations.

Demonstrate a thorough knowledge of scientific management theory and worker motivation theory.

Demonstrate the ability to analyze operations and plan productivity analysis and improvement.

Demonstrate presentation skills for the delivery of operations analysis and productivity improvement related information.

COURSE STRUCTURE AND APPROACH:

This is a fully on-line course. Through a series of modules the course will begin with a presentation basic stochastic and deterministic operations terminology and theory. The course will then move into less mathematical analysis, ending with a series of modules on using the operations analysis results to determine a series of operational revisions leading to productivity improvement.

TEXT BOOK:

Title: Introduction to Operations Research

ISBN: 0073017795

Publisher: McGraw-Hill Professional

Author(s): Frederick S. Hillier, Gerald J. Lieberman Jul 27, 2004

Title: Performance Improvement Methods: Fighting the War on Waste

ISBN: 0070271410

Publisher: McGraw-Hill Professional

Author(s): H. James Harrington and Kenneth C. Lomax, 2000

Much of the reading is on-line and a variety of on-line readings and PDF's will be provided to the student.

COURSE OUTLINE:

Introduction

Pure Mathematical analysis

The analysis of manufacturing and service operations

Characterizing a queue and the notion of steady-state

Linear programming

- Non-linear programming
- Statistical forecasting and prediction
- Markovian analysis
- Operations problems
- Less mathematical analysis
 - The operations component of a service organization
 - People, workflow, information, and other resources
 - Applying a systems approach to improving operations
 - Identify unique operations customers (internal and external)
 - The effect of management decisions on operational performance
- Productivity Improvement
 - Aligning operations activities to mission and strategic objectives
 - Key success factors in managing an organization's operations
 - Scientific management theory
 - Worker motivation theory
 - Productivity improvement
 - Six sigma tools
- Wrap-up

ASSESSMENTS OF STUDENT LEARNING OUTCOMES:

Assessment of Student learning will be through:

- Demonstration of skill set acquisition through assignments and submissions (Written assignments)
- Quizzes
- Midterm essay examinations
- Independent research papers
- Discussion participation
- Journal submission

As part of the on-line course experience you will be required to create, update, keep and submit a bound journal (logbook) of your online and off-line activities relating to this course. We suggest a hardbound type book made especially for journals. The journal will include, but not be limited to:

- 1 recording the work assigned as journal assignments
- 2 recording notes from the readings and exercises
- 3 notes on dead links, typographical errors, or other difficulties encountered
- 4 notes on other web sites or references used by the student notes from interviews or meetings with colleagues to discuss any issues that are related to the course
- 5 busy work, notes, doodles, or math used in any quizzes
- 6 notes for your research paper work
- 7 preparation notes for the final exam essay questions

- 8 rational and congenial comments on how to improve online learning (from your perspective)

Grades will be determined from the percentage of points earned to total points possible. Letter grades based on these percentages will be as follows:

Approximate Weight of Activities

Written Assignments	20%
Quizzes	10%
Examinations	30%
Independent research papers	30%
Discussion participation	5%
Journal submission	5%

100-90	= A
89-80	= B
79-70	= C
69-60	= D
59-00	= F

ASSIGNMENTS:

Assignments must meet designated deadlines and be presented according to the required format or be subject to 10% loss of credit. Late work will be accepted up to one week after the assigned due date.

LATE POLICY FOR ASSIGNMENTS AND EXAMS:

All assignments, examinations, quizzes, journals and research papers must be turned in at the assigned place, date and time. (A schedule of the assignments)

Late assignments will be penalized a flat 25% regardless of when they are turned in, except that all submission must be before the scheduled end of semester examinations.

ATTENDANCE:

For in person classes:

Students are expected to attend all classes. In the event that a student will be unable to attend class, the individual student should notify the instructor in advance. In the event that the non attendance is due to an excusable illness, or injury, the student will advise the instructor as soon as reasonably possible, but no later than one week after the absence.

No make up of class writing will be allowed unless the student properly notifies the instructor.

For on-line classes:

Students are expected to complete all work to the course schedule posted at the beginning of each semester. In the event that a student will be unable to complete the work the individual student should notify the instructor in advance. In the event that the non-completion is due to an excusable illness, or injury, the student will advise the instructor as soon as reasonably possible, but no later than one week after the absence.

ATTACHEMENTS PER UNIVERSITY POLICY IN EFFECT AT TIME OF USE

STATEMENT ON PLAGIARISM AND CHEATING Created by Ken Wedding 01.30.02.

Last updated by the Plagiarism Committee 08.26.03 URL:

<http://www.hopkins.k12.mn.us/pages/high/acad/plaq.html>

PLAGIARISM: The unauthorized use of the language and thoughts of another author and representation of them as one's own (*Random House Webster's College Dictionary, 2000*)

In simpler terms, plagiarism is using someone else's words or ideas in your writing and not properly giving the other person credit.

Examples of plagiarism:

- Copying an article from the Internet or print source and turning it in as your own paper with no quotation marks and no sources indicated.
- Copying parts of articles from a number of sources and putting them together in your own paper, with no quotation marks and no sources indicated.
- Paraphrasing a paragraph from a book, article, or website without indicating the source.
- Using a few sentences from a book, article, or website word-for-word in your paper and not using quotation marks AND indicating the source.
- Using the same structure, thesis, or concept that an author uses in a book, article, or website and not indicating the source.

How to avoid plagiarism:

- When you use information from a book, article, or website, always indicate where your information came from within the text of your paper. It is NOT enough to list your sources in a bibliography attached to your paper. Even if you are paraphrasing someone else's ideas or words, you need to indicate the author in the text of your paper.
- Avoid copying and pasting from the Internet or photocopying information from books. Instead, TAKE NOTES and keep careful track in your notes of where your information is from.
- Keep track in your notes of whether information is a paraphrase or a word-for-word quotation (use quotation marks for quotes), and keep track of the source and page

number.

CHEATING: Taking OR GIVING answers or information about assignments or tests or any class related work.

Examples of Cheating:

- Copying someone else's answers on a test.
- Using a crib sheet on a test without the teacher's permission.
- Copying someone else's homework OR letting someone copy your homework.
- Sharing test answers electronically during a test (via cell phone, PDA, or other device).
- "Working together" on an assignment without permission.
- Telling a student from a later class what the test covered or what specific questions ask.
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How to avoid cheating?

- Simple, ALWAYS, ALWAYS, ALWAYS do YOUR OWN work.
- NEVER let someone copy your work on a test or assignment.
- NEVER talk about a test in the halls or at lunch, no matter how much someone begs you to spill the beans!

Created by Ken Wedding 01.30.02. Last updated by the Plagiarism Committee 08.26.03
URL: <http://www.hopkins.k12.mn.us/pages/high/acad/plag.html>

**NORTHERN ARIZONA UNIVERSITY
POLICY STATEMENTS**

SAFE ENVIRONMENT POLICY

NAU's Safe Working and Learning Environment Policy seeks to prohibit discrimination and promote the safety of all individuals within the university. The goal of this policy is to prevent the occurrence of discrimination on the basis of sex, race, color, age, national origin, religion, sexual orientation, disability, or veteran status and to prevent sexual harassment, sexual assault or retaliation by anyone at this university.

You may obtain a copy of this policy from the college dean's office or from the NAU's Affirmative Action website <http://www4.nau.edu/diversity/swale.htm>. If you have concerns about this policy, it is important that you contact the departmental chair, dean's office, the Office of Student Life (928-523-5181), or NAU's Office of Affirmative Action (928-523-3312).

STUDENTS WITH DISABILITIES

If you have a documented disability, you can arrange for accommodations by contacting the office of Disability Support Services (DSS) at 928-523-8773 (voice), 928-523-6906 (TTY). In order for your individual needs to be met, you are required to provide DSS with disability related documentation and are encouraged to provide it at least eight weeks prior to the time you wish to receive accommodations. You must register with DSS each semester you are enrolled at NAU and wish to use accommodations.

Faculty are not authorized to provide a student with disability related accommodations without prior approval from DSS. Students who have registered with DSS are encouraged to notify their instructors a

minimum of two weeks in advance to ensure accommodations. Otherwise, the provision of accommodations may be delayed.

Concerns or questions regarding disability related accommodations can be brought to the attention of DSS or the Affirmative Action Office. For more information, visit the DSS website at <http://www2.nau.edu/dss/>.

INSTITUTIONAL REVIEW BOARD

Any study involving observation of or interaction with human subjects that originates at NAU—including a course project, report, or research paper—must be reviewed and approved by the Institutional Review Board (IRB) for the protection of human subjects in research and research-related activities.

The IRB meets monthly. Proposals must be submitted for review at least fifteen working days before the monthly meeting. You should consult with your course instructor early in the course to ascertain if your project needs to be reviewed by the IRB and/or to secure information or appropriate forms and procedures for the IRB review. Your instructor and department chair or college dean must sign the application for approval by the IRB. The IRB categorizes projects into three levels depending on the nature of the project: exempt from further review, expedited review, or full board review. If the IRB certifies that a project is exempt from further review, you need not resubmit the project for continuing IRB review as long as there are no modifications in the exempted procedures.

A copy of the *IRB Policy and Procedures Manual* is available in each department's administrative office and each college dean's office or on their website:

<http://www4.nau.edu/ovp/regulatorycompliance/irb/index.htm>. If you have questions, contact Melanie Birck, Office of Grant and Contract Services, at 928-523-8288.

ACADEMIC INTEGRITY

The university takes an extremely serious view of violations of academic integrity. As members of the academic community, NAU's administration, faculty, staff and students are dedicated to promoting an atmosphere of honesty and are committed to maintaining the academic integrity essential to the education process. Inherent in this commitment is the belief that academic dishonesty in all forms violates the basic principles of integrity and impedes learning. Students are therefore responsible for conducting themselves in an academically honest manner.

Individual students and faculty members are responsible for identifying instances of academic dishonesty. Faculty members then recommend penalties to the department chair or college dean in keeping with the severity of the violation. The complete policy on academic integrity is in Appendix G of NAU's *Student Handbook* <http://www4.nau.edu/stulife/handbookdishonesty.htm>.

ACADEMIC CONTACT HOUR POLICY

The Arizona Board of Regents Academic Contact Hour Policy (ABOR Handbook, 2-206, Academic Credit) states: "an hour of work is the equivalent of 50 minutes of class time...at least 15 contact hours of recitation, lecture, discussion, testing or evaluation, seminar, or colloquium as well as a minimum of 30 hours of student homework is required for each unit of credit."

The reasonable interpretation of this policy is that for every credit hour, a student should expect, on average, to do a minimum of two additional hours of work per week; e.g., preparation, homework, studying.