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Ohio Articulation Number (OAN)
Course Submission Form
2005-2006

College/University Lorain County Community College

Course(s) Submitted(Title & Course #) ENGR 268 E, Engineering Statistics

Ohio Articulation Number OES 004

for Date June 15, 2006 Course 1 of a 1 Course OAN mapping.

Name and title of individual submitting on behalf of the college/university

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Credit Hours 3 qtr _____ semester X
Lecture Hours 3
Laboratory Hours N/A (if applicable)
Pre-Requisites(s) Course work (if applicable)
MTHM 281 E- Multivariable Calculus (3 credit hours)
Placement Score (if applicable)
(Name of test)N/A
(Domain)N/A (Score)N/A

Catalog/Course Description (Includes Course Title and Course #)

ENGR 268- Engineering Statistics: - This course introduces students to the areas of probability theory and statistical inferences as they relate to the engineering profession. Topics include: sample spaces, the concept of random variable distributions, functions of random variables, transformation of variables, moment generating functions, sampling and estimation theory, T, F, Chi-Square distribution. This course is co-listed with MTHM 268 – *Prerequisite: MTHM 281: Multivariable calculus*

Texts/Outside Readings/Ancillary Materials

Probability and Statistics for Engineering and Sciences by Jay L. Devore, 6th Ed. 2004. Thompson Publishing ISBN-0-534-39933-9

TOPICAL OUTLINE: (COMMON CORE TOPICS)

- *Introduction to data analysis*
- *Probability theory*
- *Random Variables*
- *Probability distributions*
- *Discrete variables*
- *Continuous variables*
- *Transformation of variables*
- *Sampling distributions*
- *Statistical inferences*

Course Objectives and/or Plan of Work

The objective of this course is to show how the engineers use probability models and select the statistical methods for analyzing data that are most applicable to solve problems. Discussions among students are encouraged on how to correctly apply the chosen approach in specific cases. The statistical procedures are explained in detail and applications are demonstrated by means of working sample problems. Problems in the text are assigned for homework to practice application of statistics in simple small sample data base. The exposition is relatively modest in terms of mathematical development. Substantial use of calculus is required in analyzing problems in continuous variables probability distribution and point estimation However, the text book includes a CD with appropriate statistical software applications to solve large samples and more complex problems and interpret results effectively.

Also, students are encouraged to use Minitab, Maple, or Excel software applications in problem soling.

Description of Assessment and/or Evaluation of Student Learning

Outcomes	Assessment Method(s)
1**. Cognitive/Knowledge:** a. Calculate measures of central tendency and dispersion. b. Describe the shape, mean, and variance of standard discrete distributions c. Describe the shape, mean, and variance of standard continuous distributions d. Explain and apply central limit theorem	Class tests and item analysis Feed back for corrections, demonstrate clarity and accuracy 75% of students should be able to demonstrate these outcomes earning 70% grade- 'C' or better.
2. Psychomotor/Skills and Abilities: a. Demonstrate how probability theory, axioms, and rules are applied in practical settings b. Demonstrate how to estimate point and confidence interval parametric values c. demonstrate applications of sampling distributions and statistical tests. d. Conduct hypothesis testing for one-sample and two-sample means and proportions	Class tests and item analysis Feed back for corrections, demonstrate clarity and accuracy 75% of students should be able to demonstrate these outcomes earning 70% grade- 'C' or better.
3. Affective: Disposition a. Use logical reasoning in synthesizing problem information and analyzing results b. Explain relationships between two random variables including dependence and joint distributions.	Case study analysis Group discussion Report writing 75% of students should be able to demonstrate these outcomes earning 70% grade- 'C' or better.

Embedded General Education Outcomes:		**Assessment Methods:**
1	Demonstrate professional competencies	Class tests
2	Apply mathematical formulas accurately in problem solving	Class tests
3	Demonstrate critical thinking and reasoning skills in justifying answers and decision making	Class tests
4	Demonstrate precision, clarity, and fluency in technical writing	Class/ Group discussion and report writing

Master Syllabi and **Working Syllabi** (if both are used) Sample-
Fall semester 2006:
Section Number: ENGR 268 – E-E1670
Lecture Hours: Tuesday and Thursday 16:00 – 17:15 p.m. Room P.S. 201
Credit Hours 3: contact hours: 3 per week – Total 48 hours.

Week	Contents covered	Contact Hours	Homework and tests	
1	Ch 1- Descriptive statistics, Measures of location and variability	Lecture 1 ½ Problems 1 ½	Ch 1- 15, **17**, 26, 31, 35, 63, 77	
2	Ch 2- Probability, Axioms, counting techniques, conditional probability	Lecture 1 ½ Problems 1 ½	Ch 2- 3, **5,** 9, 17, 23, 31, **39**, 45, 65	
3	Ch 3- Discrete random variables and probability distributions	Lecture 1 ½ Problems 1 ½	Ch 3- 11, 17, 26, **45**, 51, **77**, 87	
4	Ch 4- Continuous random variables and probability density functions	Lecture 1 ½ Problems 1 ½	Ch 4- 5, 7, 15,31, **33,** 67, 73	
5	**Assessment 1- Muddiest point** **Class test 1- (Chapters 1-4) =20%**	Discussion 1 ½ Test 1 ½	**Home work 1 =10%**	
6	Ch 5- Joint probability distributions and random samples	Lecture 1 ½ Problems 1 ½	Ch 5- 3, **5**, 19, 37, 58, 65, 71	
7	Ch 6- Point estimation	Lecture 1 ½ Problems 1 ½	Ch 6 – 3, 7, 19, 23, **25**,	
8	Ch 7- Statistical interval confidence bounds, normal population	Lecture 1 ½ Problems 1 ½	Ch 7- 3, **5**, 11, 29, 35, 51, 57	
9	Ch 8- Hypothesis and test procedures on a single sample	Lecture 1 ½ Problems 1 ½	Ch 8- 3, 7, **11**,19, 21, 31, **49**, 61	
10	**Assessment 1- Muddiest point** **Class test 1- (Chapters 5-8) =20%**		**Home work 2 =10%**	
11	Ch 9- Inferences based on two samples	Lecture 1 ½ Problems 1 ½	Ch 9- 3, 7, 13, 19, 25, 41	
12	Ch 10 – Analysis of variance, F tests, t - tests	Lecture 1 ½ Problems 1 ½	Ch 10- 3, 7, 9, 15, 19, 21	
13	Ch 11- Multifactor analysis of variance	Lecture 1 ½ Problems 1 ½	Ch 11- 3, 7, 13, 17, 23, 29	
14	Ch 12- Simple linear regression and correlation	Lecture 1 ½ Problems 1 ½	Ch 12- 3, 5, 7, 1117, 21, 57, 61	
15	Revision	Group discussion 3		
16	**Final examination Part 1 = 20%** **Final examination Part 2 = 20%**	Test 1 ½ Test 1 ½		

Additional Documentation

COURSE DESCRIPTION WITH STUDENT OUTCOMES

LORAIN COUNTY COMMUNITY COLLEGE

DIVISION: Engineering Technologies **COURSE TITLE: Engineering Statistics**
COURSE NUMBER: ENGR 268 E

		Contact Hours/Week			Weight		ILU's				
LECTURE/ RECITATION	=	3	x	LECTURE/ RECITATION	(1.0)	=	3				
LAB	=	0	x	LAB	(0.85)	=	0				
CLINICAL	=	0	x	CLINICAL	(1.0)	=	0				
TOTAL CONTACT HOURS:	=	3		TOTAL COURSE ILU's		=	3		CREDIT HOURS:	=	3

* Please refer to the "Quality Point Checklist for New and Revised Courses" and/or Pages 500.01 through 500.05 of the Ohio Board of Regents Operating Manual for Two-Year Campus Programs for Instructional Arrangements that are not identified as Lecture/Recitation, Lab or Clinical. (http://www.regents.state.oh.us/progs/2yrmanual.pdf)

IS THERE A SEPARATELY SCHEDULED LAB: No
IS THERE A SEPARATELY SCHEDULED CLINICAL: No
SPECIAL FACILITIES: No

FAS ACCOUNT NUMBER: 02-150
START YEAR/SEMESTER: on going

PREREQUISITE: MTHM 281
(Please indicate course/s that must be taken before this course.)

COREQUISITE: None
(Please indicate course/s that must be taken with this course.)

CONCURRENT: None
(Please indicate course/s that must be taken before or with this course.)

CATALOG DESCRIPTION: This course introduces students to the areas of probability theory and statistical inferences as they relate to the engineering profession. Topics include: sample spaces, the concept of random variable distributions, functions of random variables, transformation of variables, moment generating functions, sampling and estimation theory, T, F, Chi-Square distribution. This course is co-listed with MTHM 268. *Prerequisite MTHM 281*

REQUIRED TEXTBOOK(S)/MATERIAL(S):
Probability and Statistics for Engineering and Sciences by Jay L. Devore, 6th Ed. 2004. Thompson ISBN-0-534-39933-9

TOPICAL OUTLINE: (COMMON CORE TOPICS)

- *Introduction to data analysis*
- *Probability theory*
- *Discrete random variables and probability distributions*
- *Continuous variables and probability distributions*
- *Joint probability distributions and random samples*
- *Point estimation*
- *Statistical intervals*
- *Tests of hypotheses*
- *The Analysis of variance*
- *Linear regression and correlation*

COURSE OUTCOMES & ASSESSMENT:	***(Tools, Methods, and Expected Results)***
Outcomes	***Assessment Method(s)*** ****Most courses will address all three domains. In the instance when only two domains are addressed, include a justification in the Division cover letter.***
1. ***Cognitive/Knowledge:*** *a. Calculate measures of central tendency and dispersion.* *b. Describe the shape, mean, and variance of standard discrete distributions* *c. Describe the shape, mean, and variance of standard continuous distributions* *d. Explain and apply central limit theorem*	*Class tests and item analysis* *Feed back for corrections, demonstrate clarity and accuracy* *75% of students should be able to demonstrate these outcomes earning 70% grade- 'C' or better.*
2. Psychomotor/Skills and Abilities: *a. Demonstrate how probability theory, axioms, and rules are applied in practical settings* *b. Demonstrate how to estimate point and confidence interval parametric values* *c. demonstrate applications of sampling distributions and statistical tests.* *d. Conduct hypothesis testing for one-sample and two-sample means and proportions*	*Class tests and item analysis* *Feed back for corrections, demonstrate clarity and accuracy* *75% of students should be able to demonstrate these outcomes earning 70% grade- 'C' or better.*
3. Affective: Disposition *a. Use logical reasoning in synthesizing problem information and analyzing results* *b. Explain relationships between two random variables including dependence and joint distributions.*	*Case study analysis* *Group discussion* *Report writing* *75% of students should be able to demonstrate these outcomes earning 70% grade- 'C' or better.*

GENERAL EDUCATION REQUIREMENT: OUTCOMES AND ASSESSMENT (Tools, Methods, and Expected Results)

1. Develop the professional competencies to function effectively within their chosen academic disciplines and careers.
2. Develop technological literacy and demonstrate knowledge of the applications of technology in everyday life.
3. Understand and apply methods of scientific inquiry.
4. Develop an appreciation for and an understanding of the arts and humanities.
5. Develop an understanding of the history of the diverse social, economic, and political models of society.
6. Develop precision, clarity, and fluency in writing.
7. Develop accuracy, conciseness, and coherence in spoken communication.
8. Apply mathematical concepts to solve quantitative problems.
9. Develop critical thinking and reasoning skills for problem solving.
10. Develop an awareness and understanding of gender, ethnic, minority, multicultural, and global issues.
11. Develop an appreciation for and an understanding of the benefits of a healthy, active and well-balanced lifestyle.

General Education Outcomes	Assessment Method(s)
1. Demonstrate professional competencies	Class tests
8. Apply mathematical formulas accurately in problem solving	Class tests
9. Demonstrate critical thinking and reasoning skills in justifying answers and decision making	Class tests
6. Demonstrate precision, clarity, and fluency in technical report writing	Class /Group discussion Report writing

SUGGESTED INSTRUCTIONAL METHOD(S) AND TECHNIQUE(S):

- *Lectures*
- *Class discussion*
- *Homework assignments – formative feed back*
- *Technical report writing on case study*

GRADING PROCEDURES:

Class tests = 40%
Homework assignments = 10%
Group discussion = 10%
Final examination = 40%

TRANSFER MODULE REQUIREMENT CHANGES:

____ None
____ Add to English Composition area of Transfer Module
____ Add to Arts/Humanities area of Transfer Module
____ Add to Social and Behavioral Sciences area of Transfer Module
____ Add to Mathematics area of Transfer Module
____ Add to Natural and Physical Sciences area of Transfer Module

MISCELLANEOUS

OES 004 Add Ohio Articulation Number (OAN) and Department Code
____ Add "G" for International Course (at least 30% of content is outside U.S.)
____ Course/Cluster Program Review Underway

OTHER RESOURCES INCLUDING EQUIPMENT AND SOFTWARE:

Students are encouraged to use Minitab, Maple, or Excel software applications in problem soling.

Date: September 4, 2006

OBR Use	Action
Approved	
Additional Information Requested	
Rejected	
Date	