



Navajo Technical College

<http://navajotech.edu>

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IE 363 - Design of Experiments  
**3 Credits**  
**Spring 2022**

**Instructor:** Monsuru Ramoni  
**Office Location:** Tech Building 322

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**Office Phone:** (505) 387 7440

**Class Location:** Tech Building 322

**Meeting Times:** Mondays and Wednesdays 9:30 – 10:50 AM

**Face-to-Face Teaching:** Mondays and Wednesdays 9:30 – 10:50 AM

**Required Materials:**

**Text:** Design and Analysis of Experiments, 8th Edition, by D.C. Montgomery, John Wiley & sons, New York. ISBN-13: 978-1-118-14692-7 ISBN-10: 1-118-14692-1

**Tools:** Jump drive, Ms Excel, Minitab

**Lab Fee:** None

*Note: NTU requires every student to have a laptop. Students who don't have laptops, the cost of the laptops will be deducted from their Pell grant and then NTU will purchase laptops for them.*

**Course Description:**

$2^K$  factorial design, blocking and confounding in the  $2^K$  factorial design, two-level fractional factorial design. Analysis of variance for different types of factorial designs (single factor, nested, and random factors) will be discussed.

**Course Objectives:**

- 1) Learn how to plan, design and conduct experiments efficiently and effectively
- 2) Analyze the resulting data to obtain objective conclusions

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- 3) Both design and statistical analysis issues are discussed
- 4) Opportunities to use the principles taught in the course arise in all phases of engineering work, including new product design and development, process development, and manufacturing process improvement
- 5) Applications from various fields of engineering (include chemical, mechanical, electrical, materials science, industrial, etc.) will be illustrated throughout the course

COURSE OUTCOMES	COURSE MEASUREMENTS
Students will be able to understand simple comparative experiments, experiments with a single factor	Assessment will be by problems presented in homework, quizzes & tests.
Students will be able to do randomized blocks, Latin squares and related designs	Assessment will be by problems presented in homework, quizzes & tests.
Students will be able to do factorial designs and $2^k$ factorial design, blocking and confounding in the $2^k$ factorial design	Assessment will be by problems presented in homework or projects.
Students will be able to do and analyze two-level fractional factorial designs	Assessment will be by problems presented in homework, quizzes & tests.
Students will be able to and analyze experiments with random factors, nested and split-plot designs	Assessment will be by problems presented in homework, quizzes & tests.

**Grading Plan:**

Homework	30%
Mid term	25%
Quizzes	10 %
Final	25%
Attendance & participation	10 %
Total	100%
Portfolio (Extra Credit)	+%

(A) 90-100; (B) 80-89; (C) 70-79; (D) 60-69; (F) 0-59

### **Grading Policy**

Students must do their own work. Cheating and plagiarism are strictly forbidden. Cheating includes (but is not limited to) plagiarism, submission of work that is not one's own, submission or use of falsified data, unauthorized access to exams or assignments, use of unauthorized material during an exam, or supplying or communicating unauthorized information for assignments or exams.

### **Participation**

Students are expected to attend and participate in all class activities. Points will be given to students who actively participate in class activities including guest speakers, field trips, laboratories, and all other classroom events.

### **Cell phone and headphone use**

Please turn cell phones off **before** coming to class. Cell phone courtesy is essential to quality classroom learning. Headphones must be removed before coming to class.

### **Attendance Policy**

Students are expected to attend all class sessions. If more than ten minutes late, students will be counted as absent. A percentage of the student's grade will be based on class attendance and participation. Absence from class, regardless of the reason, does not relieve the student of responsibility to complete all course work by required deadlines. Furthermore, it is the student's responsibility to obtain notes, handouts, and any other information covered when absent from class and to arrange to make up any in-class assignments or tests if permitted by the instructor. Incomplete or missing assignments will necessarily affect the student's grades. Instructors will report excessive and/or unexplained absences to the Counseling Department for investigation and potential intervention. **Instructors may drop students from the class after three (3) absences unless prior arrangements are made with the instructor to make up work and the instructor deems any excuse acceptable.**

### **Study Time Outside of Class for Face-to-Face Courses**

**For every credit hour in class, a student is expected to spend two hours outside of class studying course materials.**

### **Study Time for Hybrid or Blended Courses**

**For a hybrid or blended course of one credit hour, a student is expected to spend three hours per week studying course materials.**

### **Study Time for Online Courses**

**For an online course of one credit hour, a student is expected to spend four hours per week studying course materials.**

### **Academic Integrity**

Integrity (honesty) is expected of every student in all academic work. The guiding principle of academic integrity is that a student's submitted work must be the student's own. Students who engage in academic dishonesty diminish their education and bring discredit to the University community. Avoid situations likely to compromise academic integrity such as: cheating, facilitating academic dishonesty, and plagiarism; modifying academic work to obtain additional credit in the same class unless approved in advance by the instructor, failure to observe rules of academic integrity established by the instructor. **The use of another person's ideas or work claimed as your own without acknowledging the original source is known as plagiarism and is prohibited.**

### **Diné Philosophy of Education**

The Diné Philosophy of Education (DPE) is incorporated into every class for students to become aware of and to understand the significance of the four Diné philosophical elements, including its affiliation with the four directions, four sacred mountains, the four set of thought processes and so forth: Nitsáhákees, Nahát'á, Ína and Siih Hasin which are essential and relevant to self-identity, respect and wisdom to achieve career goals successfully.

At NTU's Zuni Campus, the A:shiwí Philosophy of Education offers essential elements for helping students develop Indigenous and Western understandings. Yam de bena: dap haydoshna: akkya hon detsemak a:wannikwa da: hon de:tsemak a:ts'umme. *Our language and ceremonies allow our people to maintain strength and knowledge.* A:shiwí core values of hon i:yyułashik'yanna:wa (respect), hon delank'oha:willa:wa (kindness and empathy), hon i:yyayumofa:wa (honesty and trustworthiness), and hon kohł lewuna:wediyahnan, wan hon kela i:tsemanna (think critically) are central to attaining strength and knowledge. They help learners develop positive self-identity, respect, kindness, and critical thinking skills to achieve life goals successfully.

### **Students with Disabilities**

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Navajo Technical University is committed to serving all students in a non-discriminatory and accommodating manner. Any student who feels that she or he may need special accommodations should contact the Accommodations Office (<http://www.navajotech.edu/student-services#accomodations-services>) in accordance with the university's Disability Accommodations Policy (see [http://www.navajotech.edu/images/about/policiesDocs/Disability\\_Exhibit-A\\_6-26-2018.pdf](http://www.navajotech.edu/images/about/policiesDocs/Disability_Exhibit-A_6-26-2018.pdf)).

**Email Address**

Students are required to use NTU's email address for all communications with faculty and staff.

**Final Exam Date:**