Data Analysis for Mechanical Engineering
Final Exam Review

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Logistics

Exam Format

- Written Exam - Comprehensive
- Proctored
- Full Time
- Multiple Choice
- Short Answer
- Explanatory
- R Output Interpretation
- Graphical/Table Interpretation

Logistics

Materials Allowed/Provided

- Allowed - Calculator
- Provided - Equation Sheet
- Provided - z, t, F Tables

Topics

Exam Topics

- Graphical Display of Data

Topics

Exam Topics

- Graphical Display of Data
- Mathematical Description of Data Summaries

Topics

Exam Topics

- Graphical Display of Data
- Mathematical Description of Data Summaries
- Central Limit Theorem Ramifications

Topics

Exam Topics

- Graphical Display of Data
- Mathematical Description of Data Summaries
- Central Limit Theorem Ramifications
- Degrees of Freedom

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- Mathematical Description of Data Summaries
- Central Limit Theorem Ramifications
- Degrees of Freedom
- Testing of Means, Difference of Means, Differences of Variance

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- Mathematical Description of Data Summaries
- Central Limit Theorem Ramifications
- Degrees of Freedom
- Testing of Means, Difference of Means, Differences of Variance
- Distribution Ranges and Functions

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- Correlations and Covariances

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- Multiple Linear Regression

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- Multiple Linear Regression
- Interpreting R output of Tests and Regression

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- Mathematical Description of Data Summaries
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- Degrees of Freedom
- Testing of Means, Difference of Means, Differences of Variance
- Distribution Ranges and Functions
- Correlations and Covariances
- Multiple Linear Regression
- Interpreting R output of Tests and Regression
- Conditional Probability and Bayes Theorem

Topics

Exam Topics Continued

- Type I and Type II Errors - Conceptual

Topics

Exam Topics Continued

- Type I and Type II Errors - Conceptual
- Type I and Type II Errors - Quantification

Topics

Exam Topics Continued

- Type I and Type II Errors - Conceptual
- Type I and Type II Errors - Quantification
- Φ Function and its relationship to the Gaussian Distribution

Topics

Exam Topics Continued

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- Type I and Type II Errors - Quantification
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- Hypothesis Testing Process

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- Type I and Type II Errors - Quantification
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- Combinations and Permutations

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- Combinations and Permutations
- Power of a Test - Meaning and Calculations

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- Minimal Sample Sizes required for δ detection significance

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- Publication Concerns of Technical Data

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- Types of Validity [oh yes...that far back!]

Topics

Symbols you should be familiar with

- n

Topics

Symbols you should be familiar with

- n
- α, p

Topics

Symbols you should be familiar with

- n
- α, p
- β as in z_β

Topics

Symbols you should be familiar with

- n
- α, p
- β as in z_β
- β as in β_0

Topics

Symbols you should be familiar with

- n
- α, p
- β as in z_β
- β as in β_0
- ε

Topics

Symbols you should be familiar with

- n
- α, p
- β as in z_β
- β as in β_0
- ε
- t, z, F

Topics

Symbols you should be familiar with

- n
- α, p
- β as in z_β
- β as in β_0
- ε
- t, z, F
- ν

Symbols you should be familiar with

- n
- α, p
- β as in z_β
- β as in β_0
- ε
- t, z, F
- ν
- μ, $\bar{X}$, σ, s

Topics

Symbols you should be familiar with

- Φ

Topics

Symbols you should be familiar with

- Φ
- P as in $P = 1 - \beta$

Symbols you should be familiar with

- Φ
- P as in $P = 1 - \beta$
- P as in $P(A|B)$

Topics

Symbols you should be familiar with

- Φ
- P as in $P = 1 - \beta$
- P as in $P(A|B)$
- r, ρ, τ

Symbols you should be familiar with

- Φ
- P as in $P = 1 - \beta$
- P as in $P(A|B)$
- r, ρ, τ
- $\binom{n}{k}$, ${}_nC_k$, ${}_nP_k$

Heads Up! No griping to the proctor

There WILL be a bonus question regarding a topic and technique we have not covered in this course. You can ace the exam without even touching it, but it is a bonus if you have the time and understanding to accomplish it.

Questions?

Any Questions? Otherwise, Good Luck! Don't for get to turn in your project reports no later than 11PM PST on Thursday of Exam Week!