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| Joliet Junior College 1901 logo with belltower  ***Department of Mathematics*** | **STAT228**  **Advanced Statistics** |

**Course Description**

A second course in statistics, focusing on advanced topics including: data manipulation, variable creation, and transformations; multiple regression; nonlinear regression; ANOVA; and non-parametric statistics. This course uses a statistical software package such as R or other equivalent programs.

**Illinois Articulation Initiative (IAI) number:** N/A

**Credit and Contact Hours:**

**Lecture 3**

**Lab 0**

**Credit Hours 3**

**Prerequisites**: Minimum grade “C” in MATH 128 or equivalent.

**Books, Supplies, and Supplementary Materials**

1. **Required Textbooks**

Statistics: Informed Decisions (Set: Text/CD/*MyStatLab*), 6th Ed., 2020, Sullivan, ISBN: 9780134135366, Pearson Education

R Guidebook, <https://www.sullystats.com/statistics-6e/r-guidebook/>

1. **Other Required Materials**

R or R-Studio free download

1. **Methods of Instruction:**

Lecture, Hybrid, or Online

**General Education Student Learning Outcome**

1. Applied Knowledge: Students draw from learning experiences/concepts to solve a variety of problems or challenges.

**Course Learning Outcomes (CLO’s)**

1. Students should apply data science techniques to prepare data sets for analysis.
2. Students should analyze multiple regression problems.
3. Students should analyze ANOVA problems.
4. Students should analyze problems using non-parametric statistics.

**Lesson Learning Outcomes (LLO’s)**

1. Students build probability models using simulation.
2. Students use transformations to create a normal random variable.
3. Students create new variables within a data set.
4. Students learn how to access existing data sets and clean them.
5. Students perform a One-Way ANOVA.
6. Students perform post hoc tests on one-way ANOVA.
7. Students analyze the randomized complete block design.
8. Students examine a two-way ANOVA.
9. Students review least-squares regression.
10. Students use randomization techniques on the slope of the least-squares regression line.
11. Students perform a test of significance of the least-squares regression model.
12. Students construct a correlation matrix.
13. Students perform a residual analysis on multiple regression.
14. Students perform polynomial regression.
15. Students build a regression model with forward selection and backward elimination.
16. Students build a regression model using stepwise regression.
17. Students analyze data using the runs test for randomness.
18. Students analyze data using the one-sample sign test.
19. Students analyze data using the Mann-Whitney test.
20. Students analyze data using the Wilcoxon matched-pairs signed-ranks test.
21. Students analyze data using the Spearman’s Rank-Correlation test.
22. Students analyze data using the Kruskal-Wallis test.

## Final Course Grading Scale

Grade Percentage

A 90-100%

B 80-89%

C 70-79%

D 60-69%

F lower than 60%

## Faculty Commitment

Faculty members are committed to providing a quality learning experience through thoughtful planning, implementation, and assessment of course activities. They are also committed to being readily available to students throughout the semester by returning e-mails and phone calls within 48 hours and to returning graded course work within a week. Furthermore, they are committed to selecting appropriate course materials and making them available in an organized and timely manner.

## Student Commitment

For every credit hour a student is enrolled in, they should expect to spend at least 2 hours outside of class studying, working on assignments, and preparing for classeach week of the fifteen-week semester. For example, for this three credit-hour class, students can expect to spend three hours per week in class actively engaged in learning the material by participating in face-to-face classes or viewing lectures and instructional material online. In addition, students should expect to spend another six hours per week outside of class completing homework and assignments, posting to discussion boards online, or studying for quizzes and tests. This means students should spend a minimum of 9 hours per week engaged in achieving the learning outcomes for this course. If you are not achieving your desired results in this class, you should consider increasing your prep time outside of class, in addition to using available resources such as instructor office hours and tutoring services.

By registering for this course, you commit yourself to active participation in course activities as well as the submission of all assignments and exams on time. Furthermore, you commit to accessing the course site and checking your JJC e-mail several times a week.