



|                          |                                                 |                                |
|--------------------------|-------------------------------------------------|--------------------------------|
| Form:<br>Course Syllabus | Form Number                                     | EXC-01-02-02A                  |
|                          | Issue Number and Date                           | 2/3/24/2022/2963<br>05/12/2022 |
|                          | Number and Date of Revision or Modification     |                                |
|                          | Deans Council Approval Decision Number          | 2/3/24/2023                    |
|                          | The Date of the Deans Council Approval Decision | 23/01/2023                     |
|                          | Number of Pages                                 | 06                             |

|     |                                                     |                                                                                                                                  |
|-----|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 1.  | Course Title                                        | Nonparametric Statistics                                                                                                         |
| 2.  | Course Number                                       | 0301733                                                                                                                          |
| 3.  | Credit Hours (Theory, Practical)                    | 3                                                                                                                                |
|     | Contact Hours (Theory, Practical)                   | 3                                                                                                                                |
| 4.  | Prerequisites/ Corequisites                         | None                                                                                                                             |
| 5.  | Program Title                                       | Master's Degree                                                                                                                  |
| 6.  | Program Code                                        |                                                                                                                                  |
| 7.  | School/ Center                                      | Science                                                                                                                          |
| 8.  | Department                                          | Mathematics                                                                                                                      |
| 9.  | Course Level                                        | Elective                                                                                                                         |
| 10. | Year of Study and Semester (s)                      | 1 <sup>st</sup> and 2 <sup>nd</sup> semester                                                                                     |
| 11. | Other Department(s) Involved in Teaching the Course | None                                                                                                                             |
| 12. | Main Learning Language                              | English                                                                                                                          |
| 13. | Learning Types                                      | <input type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input checked="" type="checkbox"/> Fully online |
| 14. | Online Platforms(s)                                 | <input checked="" type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams                                   |
| 15. | Issuing Date                                        | 9/11/2024                                                                                                                        |
| 16. | Revision Date                                       |                                                                                                                                  |

## 17. Course Coordinator:

|                         |                               |
|-------------------------|-------------------------------|
| Name: Amal Helu         | Contact hours: 10:30-11:30 am |
| Office number: 370      | Phone number: 22070           |
| Email: a.helu@ju.edu.jo |                               |



### 18. Other Instructors:

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

### 19. Course Description:

This course explores the theory and application of nonparametric statistical methods, including sign tests, Wilcoxon tests, Kruskal-Wallis, and Friedman tests. Students will study nonparametric point and interval estimation, density estimation techniques, and computing tools relevant for various real-world data analysis in fields like biology, environmental science, and medicine.

### 20. Program Student Outcomes (SO's):

(To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

**SO2.** Analyze and apply different mathematical algorithms and theories and use modern techniques.

**SO4.** Formulate mathematical and statistical problems by modeling real-life problems, and solve those theoretically and/or numerically using technological tools.

**SO5.** Adhere to ethical standards and good conduct in accordance with the rules and standards.

**SO6.** Apply knowledge and mathematical tools and think creatively to solve real life problems and then verify and interpret the results correctly.

**SO8.** Apply methodologies and ethics of scientific research in preparation of scientific research in mathematics field.

**21. Course Intended Learning Outcomes (CLO's):**

(Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

- **CLO1:** Summarize data using graphical and numerical methods for nonparametric applications.
- **CLO2:** Formulate and test hypotheses for location, scale, and independence issues.
- **CLO3:** Construct and interpret interval estimators using nonparametric methods.
- **CLO4:** Apply and compare various nonparametric tests.
- **CLO5:** Generate and interpret density estimates using nonparametric techniques.
- **CLO6:** Present statistical analysis results effectively in both oral and written forms.

| Course CLOs | The learning levels to be achieved |               |          |           |            |          |
|-------------|------------------------------------|---------------|----------|-----------|------------|----------|
|             | Remembering                        | Understanding | Applying | Analysing | evaluating | Creating |
| CLO (1)     | ü                                  | ü             | ü        |           |            |          |
| CLO (2)     |                                    | ü             | ü        | ü         |            |          |
| CLO (3)     |                                    |               | ü        | ü         | ü          |          |
| CLO (4)     |                                    |               |          | ü         | ü          |          |
| CLO (5)     |                                    | ü             | ü        | ü         |            |          |
| CLO (6)     |                                    | ü             | ü        |           |            | ü        |

**22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:**

| Course CLO's \ Program SO's | SO (1) | SO (2) | SO (3) | SO (4) | SO (5) | SO (6) | SO (7) | SO (8) |
|-----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                             |        |        |        |        |        |        |        |        |
| CLO (1)                     |        | ü      |        | ü      | ü      | ü      |        | ü      |
| CLO (2)                     |        | ü      |        | ü      | ü      | ü      |        | ü      |
| CLO (3)                     |        | ü      |        | ü      | ü      | ü      |        | ü      |
| CLO (4)                     |        | ü      |        | ü      | ü      | ü      |        | ü      |
| CLO (5)                     |        | ü      |        | ü      | ü      | ü      |        | ü      |
| CLO (6)                     |        | ü      |        | ü      | ü      | ü      |        | ü      |



### 23. Topic Outline and Schedule:

| Week  | Topic                                    | CLO/s Linked to the Topic | Learning Types<br>Face to Face (FF)<br>Blended (BL) | Platform Used | Synchronous (S)<br>Asynchronous (A) | Evaluation Methods | Learning Resources              |
|-------|------------------------------------------|---------------------------|-----------------------------------------------------|---------------|-------------------------------------|--------------------|---------------------------------|
| 1-3   | Dichotomous Data, Binomial Tests         | CLO1, CLO2                | FF                                                  |               | S                                   | Quiz, Discussion   | Notes, Textbook Ch. 1, Articles |
| 4-5   | One-Sample Location Problems             | CLO2, CLO3                | FF                                                  |               | S                                   | Quiz, Assignment   | Notes, Textbook Ch. 2           |
| 6-7   | Two-Sample Location Problems             | CLO2, CLO3                | FF                                                  |               | S                                   | Quiz, Exercise     | Notes, Textbook Ch. 2           |
| 8-9   | One-Way and Two-Way Layout               | CLO4                      | FF                                                  |               | S                                   | Quiz, Assignment   | Notes, Textbook Ch. 3           |
| 10-11 | Independence Problems, Efron's Bootstrap | CLO5                      | FF                                                  |               | S                                   | Quiz, Assignment   | Notes, Textbook Ch. 4           |
| 12-15 | Density Estimation Techniques            | CLO5, CLO6                | FF                                                  |               | S                                   | Quiz, Exercise     | Notes, Textbook Ch. 4           |
| 16    |                                          |                           |                                                     |               |                                     | Final Exam         |                                 |

**24. Evaluation Methods:**

Opportunities to demonstrate achievement of the CLOs are provided through the following assessment methods and requirements:

| Evaluation Activity         | Mark | Topic(s)                                | CLO/s Linked to the Evaluation activity | Period (Week)   | Platform  |
|-----------------------------|------|-----------------------------------------|-----------------------------------------|-----------------|-----------|
| <b>First Midterm Exam</b>   | 15%  | Dichotomous Data, One-Sample Tests      | CLO1, CLO2                              | Week 5          | Classroom |
| <b>Second Midterm Exam</b>  | 20%  | Two-Sample Tests, Independence Problems | CLO3, CLO4                              | Week 10         | Classroom |
| <b>Quizzes</b>              | 10%  | Random topics                           | CLO1, CLO2, CLO3                        | Unannounced     | Classroom |
| <b>Project Presentation</b> | 25%  | Density Estimation                      | CLO5, CLO6                              | Week 15         | Classroom |
| <b>Final Exam</b>           | 30%  | Comprehensive                           | All CLOs                                | End of Semester | Classroom |

**25. Course Requirements:**

Account on Microsoft Teams.

**26. Course Policies:**

- Attendance: Attendance is essential. Missing more than 10% of classes without a valid excuse may result in a failing grade.
- Exams: All exams are scheduled. Exceptions are considered only in extreme circumstances.
- Cheating: The university's policy on academic integrity applies to all assessments.
- Submission: Assignments and projects must be submitted by the deadline. Late submissions may incur penalties.

**27. References:****Required Textbook:**

Hollander, M., Wolfe, D. A., & Chicken, E. (2014). Nonparametric Statistical Methods, 3rd Edition, John Wiley & Sons.

**Additional Resources:**

Supplementary readings and additional materials will be shared through the course platform.

**28. Additional information:**

1. Do not miss any classes.
2. Print out and review the lecture notes before each class.
3. Take notes directly on the printed materials.
4. Collaborate in groups of two or more.
5. If you are experiencing significant difficulties, please see me or make an appointment right away.

|                                                                                                     |                     |                            |
|-----------------------------------------------------------------------------------------------------|---------------------|----------------------------|
| Name of the Instructor or the Course Coordinator:<br><b>Prof. Amal Helu</b>                         | Signature:          | Date:<br><b>12/11/2024</b> |
| Name of the Head of Quality Assurance Committee/ Department:<br><b>Prof. Manal Ghanem</b>           | Signature:<br>..... | Date:<br>.....             |
| Name of the Head of Department:<br><b>Prof. Baha Alzalg.</b>                                        | Signature:<br>..... | Date:<br>.....             |
| Name of the Head of Quality Assurance Committee/ School of Science:<br><b>Prof. Emad A. Abuosba</b> | Signature:<br>..... | Date:<br>.....             |
| Name of the Dean or the Director:<br><b>Prof. Mahmoud I. Jaghoub</b>                                | Signature:<br>..... | Date:<br>.....             |