**Course Plan Statistics and Research Methods**

**Syllabus for Statistics and Research Methods Course (Theoretical)**

**Instructor / Instructors:** Statistics Group, Dr. 'Azizeh Rahmani Del

**Number of Units:** 2 **Unit**

**Level:** PhD in Tissue Engineering

**Number of Sessions:** 17 sessions

**Location of In-Person Sessions:** Faculty of Advanced Medical Sciences

**Analysis and Research Methods - Overall Goal and Course Introduction:** The goal of this course is for learners to master the concepts of descriptive statistics,

such that in practice they can design and execute a research study relying on the results of past research, and
acquire the ability to use statistical methods in biological research.

**Overall Session Objectives:**

It is expected that at the end of the course, learners will be able to define the scientific research method and its stages, state the research topic including priorities
of a topic and how to select it, describe research objectives, hypotheses, and questions, express research variables,
explain types of research, define population, sample, and research environment, state ethical principles in research, describe data collection methods,
have the ability to perform statistical tests, explain ways to utilize research results in practice, and finally, describe methods for disseminating research results.

**Goal Domains:** Research, Statistical

# Course Educational Objectives

**It is expected that learners after passing this course will be able to:**

1. Define basic concepts (variable and dispersion, measures of central tendency, measures of dispersion, distribution indices, systematic error, accuracy and precision).
2. Draw various graphs: histogram, line, scatter, and overlay plots.
3. Explain variable and outliers, estimation and hypothesis testing, regression.
4. Explain one-way ANOVA and post-ANOVA comparisons, two-way ANOVA.
5. Explain dose-response analysis in continuous and non-continuous responses, time series analysis, survival analysis.
6. Explain statistical quality control, parametric and non-parametric tests.
7. Explain statistical tests for bioequivalence.
8. Explain how to assess the validity of measurement methods.
9. Master the generalities of research, types of research, and research objectives, and describe them.
10. Be familiar with a research proposal and how to develop its various sections, including title, problem statement, literature review, attribute, variable, scale, hypotheses and objectives, describe them, and be able to write them.
11. Be familiar with ethics in research and observe them.
12. Develop a research plan questionnaire (proposal) as a class exercise.

# Teaching Methodology

Verbal teaching and lecturing, question and answer, discussion, conference, self-study

**Student Assessment Method**

**During the course assessment:** Class activities including seminar presentation, group work and quizzes, participation in class discussions, completing assignments (40%)

**Final assessment:** Written exam (50%)

**Problem solving:** 10%

**Attendance:** Positive points

**Total Score:** 20

**Minimum passing grade for this course:** 12

**Permitted number of absence hours for this course unit:** 8 hours

**Educational Resources**

- Resources from which exam questions will be designed:

✓ Peacock JL, Phil J. Peacock PJ. Oxford Handbook of Medical Statistics. Oxford: Oxford University Press

✓ Walters SJ, Campbell MJ, Machin D. Medical Statistics: A Textbook for the Health Sciences. New Jersey, USA: Wiley-Blackwell

✓ Principles of Biostatistics, Bordaar Roshtar (Note: Likely a transliteration, original Persian title might be اصول آمار زیستی)

✓ Research Methods in Biological Sciences Dr. Mohammad Hasan Tabatabaei

**Learning Opportunities**

- Attending classes and the computer site
- Holding various specialized workshops in the department by faculty members and senior students

- Participating in the department's journal clubs

**Course Instructors:**

- Statistics Group
- Dr. 'Azizeh Rahmani Del
- **Educational Expert:**

Ms. Mina Jasoor Phone: 04133355790

# Session Titles for 2 Units of Statistics and Research Methods

| Session | Date | Week | Topic Title | Responsible |
|---|---|---|---|---|
| **1** | 1403/11/27 | 1 | Definition of basic concepts (Variable and constant, descriptive indices, measures of central tendency, measures of dispersion, distribution indices, systematic error, accuracy and precision) | Statistics Group |
| **2** | 1403/12/04 | 2 | Drawing Histogram, Line, Scatter, and Overlay graphs | Statistics Group |
| **3** | 1403/12/11 | 3 | Variable and Outliers, Estimation and Hypothesis Testing, Regression | Statistics Group |
| **4** | 1403/12/18 | 4 | One-way ANOVA and Post-ANOVA Comparisons, Two-way ANOVA | Statistics Group |
| **5** | 1403/12/25 | 5 | Analysis of: Dose-Response in Continuous and Discrete Responses, Time Series Analysis, Survival Time Analysis | Statistics Group |
| **6** | 1404/01/09 | 6 | Statistical Quality Control, Parametric and Non-Parametric Tests | Statistics Group |
| **7** | 1404/01/16 | 7 | Statistical Tests for Bioequivalence | Statistics Group |

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| **8** | 1404/01/23 | 8 | Review of methods for assessing validity | Statistics Group |
| **9** | 1404/01/30 | 9 | What is Research? Definition and Types | Research Method Instructor |
| **10** | 1404/02/06 | 10 | Research Topic | Research Method Instructor |
| **11** | 1404/02/13 | 11 | Familiarity with Proposal (Research Plan Form) and compiling its sections | Research Method Instructor |
| **12** | 1404/02/20 | 12 | Compiling the introduction section of a research plan (Research Plan Form) | Research Method Instructor |
| **13** | 1404/02/27 | 13 | Compiling the literature review and objectives section of a research plan (Research Plan Form) | Research Method Instructor |
| **14** | 1404/02/03 | 14 | Compiling the variables and design section of a research plan (Research Plan Form) | Research Method Instructor |
| **15** | 1404/03/10 | 15 | Compiling the hypotheses and objectives section of a research plan (Research Plan Form) | Research Method Instructor |
| **16** | 1404/02/17 | 16 | Ethics in Research | Research Method Instructor |

**Time: Saturdays 10:00-12:00**

**Session Conduct Method:** In-person in the classroom, at the Faculty of Advanced Medical Sciences

**Educational Aid Media:** Computer and Whiteboard

دانشگاه علوم پزشکی تبریز

دانشکده علوم نوین پزشکی

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