

**The University of Jordan**

**School of Engineering**

**Industrial Engineering Department**

**2nd semester 2022/2023**

|  |  |
| --- | --- |
| Course name: | Research methods for engineering  |
| Course code: | 0916302 |
| Credits hours | 2 hr. |
| **Contact hours& room\office hours:** | **17:30-18:30 Monday and Wednesday Ramadan: 15:30 – 16:30****Office hours:** **18:30-19:00 (Online) Monday and Wednesday Ramadan: 16:10 – 16:30** **12:30 – 13:30 (in person) Sunday, Tuesday, and Thursday. Ramadan: 12:00 – 13:00** |
| Course instructor’s name, E-mail, and phone: | Prof. Dr. Mohammad D. AL-Tahat |
| altahat@ju.edu.jo |
| Phone: 22933 |
| Course Coordinator: |  |
| Textbook: | Text 1: Uma Sekaran, Roger Bougie, Research Methods for Business: A Skill-Building Approach, any Edition, Wiley.Text 2: David F. Beer, David A. MacMurray, A Guide to Writing as an Engineer, any edition., Wiley, 2013. |
| Other reference(s): | * Recorded videos on Microsoft team
 |
| Course Description: | As stated in the approved study plan.The nature and types of research and their characteristics. Survey research, the definition of the research problem and its statement, its theoretical framework and develop hypotheses related to the research, design elements, in addition to the classification of different variables. Methods of sampling, analysis, quantitative and qualitative research data, achieving results, writing research reports, in addition to the submission and the presentation of the research. |
| Providing Department: | Industrial Engineering |
| Prerequisite Course: | 0916356 |
| Course type | Required (Mandatory) |
| Assessment Methods: | Method | Weight % | Date |
| General activities and Quizzes | 30 |  |
| Mid Exam | 30 | Will be determined later |
| Final Exam | 40 | Will be determined later |
|  |  |  |
| Course Learning Outcomes: | **#** | **After successful completion of this course, the student will be able to** | **SO** |  |
| CLO1 | Describe and define engineering research. | 3 |  | Mid Exam |
| CLO2 | Know the characteristics of scientific research | 3 |  |
| CLO3 | Discuss the steps involved when conducting scientific research | 3 |  |
| CLO4 | Develop the problem statement | 3 |  |
| CLO5 | Develop the research proposal | 3 |  |
| CLO6 | Document a literature review | 3 |  |
| CLO7 | Describe some of the databases useful for research | 3 |  |
| CLO8 | Develop a theoretical framework for scientific research. | 3 | 6 |
| CLO9 | Develop hypotheses  | 3 |  |
| CLO10 | Develop an appropriate research design for any given study. | 3 |  |
| CLO11 | Describe some of the nonexperimental data collection approaches, interviews, observations, questionnaires.  | 3 |  |
|  |  |  |  |
|  | Week # | Topic |
| **1**  | Course Orientation and Syllabus DiscussionIntroduction to researchTypes of business research: applied and basic Managers and research Internal versus external consultants/researchersEthics and business research |
| **2**  | The scientific approach and alternative approaches to investigationThe hallmarks of scientific researchThe seven-step process in the hypothetico-deductive methodAlternative approaches to research |
| **3 - 4** | Defining and refining the problemThe broad problem areaDefining the problem statementThe research proposalManagerial implicationsEthical issues in the preliminary stages of investigation |
| **5** | The critical literature review.How to approach the literature reviewSome online resources and databases useful for business researchReferencing and quotation in the literature review section |
| **6 - 7** | Theoretical framework and hypothesis developmentVariablesTheory generationHypothesis development |
| **8** | Elements of research designThe research designs.Elements of research designExtent of researcher interference with the studyStudy setting: contrived and no contrived.Unit of analysisTime horizon |
| **9 - 10** | Non-experimental data collection methods: Interviews |
| **11 -13** | Non-experimental data collection methods: Observations |
| **14 -15** | Non-experimental data collection methods: Questionnaires |
| **16** | **Final Examinations** |
| Important Notes: | * 1. Do not hesitate to ask questions
	2. You are required to bring a notebook and take notes in classes.
	3. Students are expected to attend every class session and they are responsible for all material, announcements, schedule changes, etc., discussed in class.
	4. Discuss the assignments among yourselves
	5. Don’t Cheat; direct copying of others work will NOT be allowed or tolerated and will result in a reduction of grade. If you are found to be cheating in any way, on an exam or assignment, even signing the roll sheet for another student, you will be given an “F” for the course. There will be no exceptions.
	6. All cases of academic dishonesty will be handled in accordance with university policies and regulations. JU policy requires the faculty member to assign ZERO grade (F) if a student misses 15% of the classes that are not excused, and 20% of the classes that are excused
	7. Students are expected to be ready to take a quiz any time they have a class. There will be no make-up quizzes or homework.
	8. Any students with disabilities who need accommodations in this course are encouraged to speak with the instructor as soon as possible to make appropriate arrangements for these accommodations.
 |

|  |
| --- |
| ***The B.Sc. in industrial Engineering program enables students to achieve, by the time of graduation the following program learning outcome (SOs)*** |
| *1* | *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics* |
| *2* | *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors* |
| *3* | *an ability to communicate effectively with a range of audiences* |
| *4* | *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts* |
| *5* | *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives* |
| *6* | *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions* |
| *7* | *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies* |