Course Specification
(Postgraduate)

Course Title: Research Methods	
Course Code: 501824-3	
Program: Master in Artificial Intelligence	
Department: Computer Science	
College: College of Computers and Information Technology	
Institution: Taif University	
Version: V2	
Last Revision Date: 5 May 2024	

قسم علوم الحاسب
Computer Science Department

TU
جامعة الطائف
TAIF UNIVERSITY

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A. General information about the course:

1. Course Identification:

1. Credit hours: (3)

2. Course type

A.	☐University	☐College	☒ Department	☐Track	
B.	☒ Required			☐Elective	

3. Level/year at which this course is offered: (Level 4 – Year 2)

4. Course general Description:

Introduces research methodologies for scientific research in data science. The course focuses on developing a range of skills involved in formulating research proposals, including framing research questions, reviewing the literature, and choosing the appropriate methodologies for different types of study and different data nature. The methods employed by researchers from various research traditions for collecting research data will be explored, including the utilization of current tools and applications for research in data science.

5. Pre-requirements for this course (if any):

This item is subject to the regulations governing postgraduate studies in Saudi universities and its executive rules at Taif University.

6. Co-requirements for this course (if any):

None.

7. Course Main Objective(s):

- Understand research methods and experimental design in data science.
- Develop skills of rigorous research necessary to propel the field forward.
- Develop skills for selection of methods for the type of research being conducted.
- Able to use current tools and applications for research in data science.

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	-	-
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	45	100%
4	Distance learning	-	-

3. Contact Hours: (based on the academic semester)

No	Activity	Contact Hours

1.	**Lectures/Seminars**	**20**
2.	**Laboratory/Studio**	**10**
3.	**Field**	**-**
4.	**Tutorial**	**3**
5.	**Others (specify): Supervisor meetings**	**12**
	Total	**45**

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods:

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Understand research methods in data science.	**K1**	Discovery Discussion Self-Learning E-Learning	Proposal Seminars
2.0	**Skills**			
2.1	Analyze selection of methods for the type of research being conducted.	**S1**	Discovery Discussion Brainstorming Self-Learning E-Learning	Proposal Presentation
2.2	Design and develop skills of rigorous research methods necessary to propel the field forward.	**S2**	Discovery Discussion Brainstorming Self-Learning E-Learning	Proposal Presentation Seminars
2.3	Able to communicate current tools and applications for data science research.	**S3**	Discussion Self-Learning	Proposal report Final paper
2.4	Write a research proposal addressing issues in data science.	**S2**	Discussion Self-Learning	Proposal report Final paper
3.0	**Values, autonomy, and responsibility**			
3.1	Incorporate legal and ethical standards in scientific research to contribute effectively to the field.	**V1**	Discussion Self-Learning	Proposal Thesis report

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.2	Recognize the need for lifelong learning due to ongoing technological advancements.	V1	Discussion Self-Learning	Thesis report Presentation Seminars
3.3	Present research findings to the target audience.	V2	Discussion Brainstorming Self-Learning	Thesis defense Presentation Seminars

C. Course Content:

No	List of Topics	Contact Hours
1.	Basics of research methodology in data science	03
2.	The research process	03
3.	Formulating a research problem (reviewing the literature, constructing hypothesis)	06
4.	Conceptualizing a research design (analytical & empirical methods, controlled experiments, quantitative, qualitative, and mixed Methods)	03
5.	Constructing an instrument for data collection	03
6.	Selecting a sample (sampling techniques, sampling distribution)	06
7.	Writing a research proposal	03
8.	Collecting data (primary and secondary sources, data analysis and exploration methods)	06
9.	Processing and displaying data (t-tests, ANOVA, Chi-square tests, correlation and regression)	06
10.	Writing a research report (final paper).	06
Total		**45**

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Weekly tasks/assignments (4 tasks)	3,6,10,12	20 %
2.	Oral Presentations (4 presentations)	5,7,11,15	20 %
3.	Proposal	8	20 %
4.	Term paper	15,16	40 %

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities:

1. References and Learning Resources:

Essential References	▪ Research Methodology: A Step-by-Step Guide for Beginners, Ranjit kumar, SBN-10: 9781446269978, ISBN-13: 978-1446269978
Supportive References	▪ Principles of Data Science: Learn the techniques and math you need to start making sense of your data, by Sinan Ozdemir, Packt Publishing.
Electronic Materials	▪ Saudi Digital Library (SDL) ▪ The Data Science Method, by IBM, https://www.edx.org/course/data-science-method
Other Learning Materials	▪ To be announced during the course.

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	▪ A seminar room appropriate for maximum 15 students with a personal computer, a data show, and a smart board.
Technology equipment (Projector, smart board, software)	▪ Lab materials and required software. ▪ Video projector / data show ▪ White board.
Other equipment (Depending on the nature of the specialty)	▪ To be announced during the course.

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	▪ Students ▪ Coordinator	**Indirect** (Course exit survey) **Indirect** (Feedback from Course Coordinator)
Effectiveness of students assessment	▪ Faculty member ▪ Coordinator	**Indirect** (Feedback from Faculty member) **Indirect** (Feedback from Course Coordinator)
Quality of learning resources	▪ Students ▪ Faculty member ▪ Coordinator ▪ Council ▪ Curriculum Committees	**Indirect** (Course exit survey) **Indirect** (Feedback from Faculty member) **Indirect** (Feedback from Course Coordinator) **Indirect** (Feedback from council) **Indirect** (Feedback from Graduate Committees)
The extent to which CLOs have been achieved	▪ Students ▪ Faculty member ▪ Coordinator ▪ Curriculum Committees	**Indirect** (Course exit survey) **Indirect** (Feedback from Faculty member/ Course Coordinator/ Graduate Committee)

Assessment Areas/Issues	Assessor	Assessment Methods
Other	-	-

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	GRADUATE PROGRAMS COMMITTEE – CS DEPT.
REFERENCE NO.	V2
DATE	5/5/2024

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