Course Specifications

Course Title:	Guidance for Chemical Scientific Research
Course Code:	570CHEM-2
Program:	Master of Science in Chemistry
Department:	Chemistry
College:	Science
Institution:	King Khalid University

Table of Contents

A. Course Identification

1. Credit hours:	2
2. Course type	
a.	University ☐ College ☐ Department ■ Others ☐
b.	Required ■ Elective ☐
3. Level/year at which this course is offered:	Level 2 / Year 1
4. Pre-requisites for this course (if any)**:**	No prerequisite
5. Co-requisites for this course (if any)**:**	No co-requisite

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	1	50%
2	**Blended**	0	0
3	**E-learning**	0.5	25%
4	**Correspondence**	0	0
5	**Other** (IT laboratory)	0.5	25%

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	10
2	**Laboratory/Studio**	0
3	**Tutorial**	10
4	**Others** (IT laboratory)	10
	Total	30
Other Learning Hours*		
1	**Study**	15
2	**Assignments**	15
3	**Library**	10
4	**Projects/Research Essays/Theses**	30
5	**Others** (specify) Present a communication and poster	10
	Total	80

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This is a hands-on course designed to impart education in the foundational methods and techniques of academic research in chemistry. The course delivers skills for critical reading and criticism of research literature and for developing a research proposal for a master's thesis project.

2. Course Main Objective

The main purpose of this course is to demonstrate to students the principles and applications of the methodologies and approaches of scientific research as well as the ethics of scientific research. The course also aims at training students on reviewing and citing literature, writing research proposals and publications, besides avoiding plagiarism and presenting research communications. The strategic research topics in Saudi Arabia as well as the scopes of the research groups at the department of chemistry are demonstrated to students as well.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	To state the significance, concepts, types, and processes of research.	K4 and K5
1.2	To reproduce the ethics of research and the concepts of plagiarism.	K4 and K5
1.3	To recognize the importance of literature review and standards of the quality of publications.	K4 and K5
2	**Skills:**	
2.1	To review and criticize relevant literature.	S2 and S4
2.2	To utilize professionally databases and search engines.	S4
2.3	To comply with the standards of the preparation of publications.	S5
2.4	To write-up publications.	S5
3	**Competence:**	
3.1	To present orally the MSc proposal.	C3
3.2	To show the MSc proposal as poster.	C2, C3 and C4
3.3	To demonstrate responsibility on the adoption of a research problem to be searched on.	C1
3.4	To retrieve specific publications and reports using various databases and search engines.	C4
3.5	To communicate with editors, publishers and funders.	C2

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to scientific research: Concepts, standards, processes & quality	6
2	Adopting research problems	4
3	Strategic research topics in Saudi Arabia	2
4	Quality of publications: citations, indexing and indices	2
5	Research communication skills (Orcid, Research Gate, ACS, RSC, etc.)	2
6	Literature review: Web of Science and Scopus databases	2
7	Ethics and plagiarism	2
8	Preparing research proposals	2
9	Writing thesis and manuscript	2
10	Harvard Referencing Style	2
11	Endnote Referencing	2
12	Presenting research proposals	2
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	To state the significance, concepts, types, and processes of research.	• Lectures • Classroom discussion • Case study	• Homework assignments • Examinations
1.2	To reproduce the ethics of research and the concepts of plagiarism.		
1.3	To recognize the importance of literature review and standards of the quality of publications.		
2.0	**Skills**		
2.1	To review and criticize relevant literature.	• Lectures • Classroom discussion • Case study	• Homework assignments • Writing-up a review manuscript • Writing-up a research proposal • Oral presentation • Examinations
2.2	To utilize professionally databases and search engines.		
2.3	To comply with the standards of the preparation of publications.		
2.4	To write-up publications.		
3.0	**Competence**		
3.1	To present orally the MSc proposal.	• Lectures • Classroom discussion • Case study	• Homework assignments • Oral presentation • Poster presentation
3.2	To show the MSc proposal as poster.		
3.3	To demonstrate responsibility on the adoption of a research problem to be searched on.		

3.4	To retrieve specific publications and reports using various databases and search engines.		
3.5	To communicate with editors, publishers and funders.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework assignment # 1: On-line retrieving reports, thesis, articles, standards, specifications, etc.	5th	5
2	Homework assignment # 2: Registration in Orcid, ResearchGate and KACST and browsing ACS and RCS	9th	5
3	Writing up a review manuscript on the proposed research topic for the MS thesis	9th	20
4	Writing up a research proposal for the MS thesis (KKU Form)	10th	5
5	Writing up a research proposal for a grant application (KACST Form)	11th	2
6	Oral presentation on a proposal for the proposed research topic for the MS thesis	12th	10
7	Poster presentation on a proposal for the proposed research topic for the MS thesis	13th	3
8	Final exam	16th	50

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

10 office hours are offered for students for individual consultations. Communications are available on-site, phone conversations, and chatting by social media.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	1. Chris Welman, Fanie Kruger, Bruce Mitchell, *Research Methodology*, Oxford University Press, 2005. 2. C.R. Kothari, *Research Methodology,* New Age International Pvt Ltd Publishers, 2009.
Essential References Materials	1. Ponsian Ntui, *The Research Methodology*, LAP Lambert Academic Publishing, 2012. 2. N.W. Teresia, *Research Methodology*, VDM Verlag, 2011.
Electronic Materials	1. http://portal.kku.edu.sa/KKU_Website/ar/deanships/Library_Affairs/index.htm 2. http://www.sdl.edu.sa/Pages/Default.aspx 3. https://www.kacst.edu.sa/
Other Learning Materials	No other learning materials.

2. Facilities Required

Item	Resources
Accommodation Classrooms, laboratories, demonstration) (.rooms/labs, etc	Classroom and computer laboratory
Technology Resources AV, data show, Smart Board, software,) (.etc	Accessible databases (Web of Science, Scopus) Accessible publishers (ACS, RSC, Elsevier, Springer, Taylor & Francis, Wiley, and Taylor & Francis) Endnote software package Authenticate software package
Other Resources Specify, e.g. if specific laboratory) equipment is required, list requirements or (attach a list	No other resources are required.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching methods	Students	Questionnaire
	Quality and Development Committee	Workshops
	External reviewers	Reports
Extent of achievement of course learning outcomes	Quality and Development Committee	Reports
Course contents (update)	Faculty	Reports
	Departmental plan and curriculum committee	Workshops
	External reviewers	Reports
Quality of learning resources	Quality and Development Committee	Reports

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Chemistry Department Council**
Reference No.	**Session number 22**
Date	**27/04/2021M / 15/09/1442H**