هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Research Skills in Physics**
Course Code:	**2034101-2**
Program:	**Bachelor in Physics**
Department:	**Physics Department**
College:	**College of Science**
Institution:	**Taif University**

Table of Contents

A. Course Identification **3**

6. Mode of Instruction (mark all that apply) 3

B. Course Objectives and Learning Outcomes **3**

1. Course Description 3

2. Course Main Objective 3

3. Course Learning Outcomes 4

C. Course Content **4**

D. Teaching and Assessment **5**

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods 5

2. Assessment Tasks for Students 7

E. Student Academic Counseling and Support **7**

F. Learning Resources and Facilities **7**

1.Learning Resources 7

2. Facilities Required 8

G. Course Quality Evaluation **8**

H. Specification Approval Data **9**

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: 10th Level/ 4th Year
4. Pre-requisites for this course (if any)**:): Solid State Physics (1) 2033201-4**
5. Co-requisites for this course (if any)**:): NONE**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	3	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	30
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	30

B. Course Objectives and Learning Outcomes

1. Course Description

Graduate research skills course covers a range of topics; including principles of scientific research, literature review, citations, and referencing. This course develops and refines the skills of reading, abstracting writing, preparation and presentation of research work. It covers the identification of ethics of scientific research and time management. In addition, the course improves the necessary thinking skills for students in this level of study and next levels.

2. Course Main Objective

Building upon the skills of scientific research such as literature review, citation, referencing, reading and abstracting. Developing skills in science communication including presenting research work using written and different types of presentations

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Distinguish the basics, concepts and methodologies of scientific research tasks.	K5
1.2	Recognize a thoughtful and reflection on ethical issues and time management within the scientific research.	
2	**Skills :**	
2.1	Apply advanced skills, practices and creativity with critical thinking and analytical reasoning in field of scientific research in physics.	S1
2.2	Demonstrate a range of professional and transferable skills for Interpreting and present real physics subject by comprehending it and writing relevant scientific report and presentation.	S4
2.3	Develop the skills of information and data extraction using textbooks and other available literature, searching databases.	S4
2.4	Use effectively the information sources and communications technologies, including library, E-library, internet, and databases.	S4
3	**Values:**	
3.1	Develop ability to think scientifically, critically and creatively individually or collaboratively.	V1
3.2	Act responsibly and be able to present written and/or oral reports on research topics.	V3

C. Course Content

No	List of Topics	Contact Hours
1	Unit1: **Principles of Scientific Research** ▪ Basics and Definitions ▪ Research Methodology ▪ Observation ▪ Hypotheses ▪ Experimentation ▪ Interpretation	**4**
	Unit2: **Literature review:** ▪ Information ▪ Types of sources ▪ Quality of information sources ▪ How to Search in different Types of sources ▪ Activities and practices	**4**
2	Unit3: **Citations and List of references:** ▪ Citations ▪ List of references ▪ Activities and practices	**2**
3	Unit4: **Reading and Abstracting:** ▪ Reading of research resource ▪ Reading examples ▪ Abstracting a research paper or thesis	**2**
4	Unit5: **Scientific technical Writing:**	**4**

	▪ Structured Scientific technical writing ▪ Research reports and article structures ▪ Scientific technical English ▪ Activities and practices	
5	Unit6: **Time Management** ▪ Planning ▪ Organization ▪ Execution	**2**
7	Unit7: **Ethics of Scientific Research** ▪ The Ethics of science ▪ Scientists' values ▪ Misconduct in research ▪ Plagiarism and its avoidance	**2**
8	Unit8: **Scientific Presentations and Communication** ▪ Academic Seminars ▪ The Oral Presentation ▪ Poster Presentations ▪ Group Communications ▪ Activities	**4**
9	Unit9: **Thinking skills** ▪ Critical analytical thinking skills ▪ Creative Thinking Skills ▪ Activities	**4**
10	**Revision and exams**	**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 and Understanding**		
1.1	Distinguish the basics, concepts and methodologies of scientific research tasks.	▪ Lecture ▪ Discussion ▪ Brain Storming sessions. ▪ Library visits ▪ Reading	▪ Written exam Activities evaluation
1.2	Recognize a thoughtful and reflection on ethical issues and time management within the scientific research.	▪ Lecture ▪ Discussion ▪ Brain Storming sessions. ▪ Library visits ▪ Reading	▪ Written exam Activities evaluation
2.0	**Skills**		
2.1	Apply advanced skills, practices and creativity with critical thinking and analytical reasoning in field of scientific research in physics.	▪ Lecture ▪ Discussion ▪ Cooperative Learning strategy.	▪ Written exam Activities evaluation

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		▪ Problem based strategy. ▪ Brain Storming sessions. ▪ Group Projects Strategy. ▪ Database research ▪ Library visits ▪ Reading	
2.2	Demonstrate a range of professional and transferable skills for Interpreting and present real physics subject by comprehending it and writing relevant scientific report and presentation.	▪ Lecture ▪ Discussion ▪ Brain Storming sessions. ▪ Group Projects Strategy. ▪ Presentations Strategy. ▪ Database research ▪ Library visits	▪ Written exam Activities
2.3	Develop the skills of information and data extraction using textbooks and other available literature, searching databases.	▪ Lecture ▪ Discussion ▪ Cooperative Learning strategy. ▪ Group Projects Strategy. ▪ Database research ▪ Library visits ▪ Reading	▪ Written exam Activities evaluation
2.4	Use effectively the information sources and communications technologies, including library, E-library, internet, and databases.	▪ Lecture ▪ Discussion ▪ Cooperative Learning strategy. ▪ Group Projects Strategy. ▪ Database research ▪ Library visits ▪ Reading	▪ Written exam Activities evaluation
3.0	**Values**		
3.1	Develop ability to think scientifically, critically and creatively individually or collaboratively.	▪ Lecture ▪ Discussion ▪ Cooperative Learning strategy.	▪ Written exam Activities evaluation

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		▪ Group Projects Strategy. ▪ Database research ▪ Library visits ▪ Reading	
3.2	Act responsibly and be able to present written and/or oral reports on research topics.	▪ Lecture ▪ Discussion ▪ Cooperative Learning strategy. ▪ Group Projects Strategy. ▪ Presentations Strategy.	▪ Written exam • Activities evaluation

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm exam	6th	30%
2	Short exam	9th	10%
3	Activities	Periodically	10%
4	Final exam	11th	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 :

- Each faculty member is assigned a group of students for continuous academic advice during six office hours weekly (6 hrs./week).
- Also teaching staff are available for individual student consultations during office hours

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	D G Rossiter, Research Concepts & Skills, Volume 2: Skills, Version 3.2, University of Twente, Faculty of Geo-information Science & Earth Observation (ITC), (2011).
Essential References Materials	• Stella Cottrell, The Study Skills Handbook (Macmillan Study Skills) 5th ed., ISBN-13: 978-1137610874 (2019). Stella Cottrell, Critical Thinking Skills: Developing Effective Analysis and Argument (Palgrave Study Skills) 2nd Edition, ISBN-13: 978-1-4039-9685-

	5, (2005).
Electronic Materials	• http://www.physics.emory.edu/faculty/weeks//journal/popescu-tpt07.pdf • https://www.ibo.org/contentassets/b53fa69a03d643b1a739d30543ca8d65/brianhullcriticalthinkingmadrid.pdf • https://media.neliti.com/media/publications/71932-EN-the-using-of-scientific-based-physics-mo.pdf • http://www.iosrjournals.org/iosr-jrme/papers/Vol-7%20Issue-1/Version-5/D0701052632.pdf https://www.cambridgeinternational.org/Images/426483-chapter-4-innovation-and-creativity.pdf
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Classrooms
Technology Resources (AV, data show, Smart Board, software, etc.)	• Data show • Laptop Smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Non

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student Feedback on Effectiveness of Teaching	Students	Indirect
Evaluation of Teaching	• Instructor • Program coordinator • Departmental council Faculty council	Indirect
Improvement of Teaching	• Program leaders • Relevant committee	• Direct
Quality of learning resources	• Students • Instructor Faculty	Indirect
Extent of achievement of course learning outcomes,	• Program leaders • Instructor	Direct
Course effectiveness and planning for improvement	• Program leaders Instructor	Indirect

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	Department Council / Committee of academic development
Reference No.	
Date	**October 2, 2022**