



## Course Specifications

<b>Course Title:</b>	<b>Material Science</b>
<b>Course Code:</b>	<b>2044204-2</b>
<b>Program:</b>	<b>Bachelor in Chemistry</b>
<b>Department:</b>	<b>Department of Chemistry</b>
<b>College:</b>	<b>College of Sciences</b>
<b>Institution:</b>	<b>Taif University</b>

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## A. Course Identification

<b>1. Credit hours:</b> 2 (Theoretical)
<b>2. Course type</b>
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> 8 <sup>th</sup> Level, 4 <sup>th</sup> Year
<b>4. Pre-requisites for this course (if any):</b> Principle of Nanotechnology (2044103-2)
<b>5. Co-requisites for this course (if any):</b> NA

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

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2 Theoretical hours/ Week	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)	---
	<b>Total</b>	<b>30</b>

## B. Course Objectives and Learning Outcomes

### 1. Course Description

This course is designed to introduce students to a wide range of advanced materials including, porous materials, composite materials and carbon-based materials.

### 2. Course Main Objective

The main purpose of this course is to gain a better understanding of advanced materials' structures, preparation, function and properties.

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
<b>1</b>	<b>Knowledge and Understanding:</b>	
1.1	Recognize differences between fullerenes, carbon nanotubes and graphene	K1
1.2	Determine the interaction between advanced materials and industrial applications	K3
<b>2</b>	<b>Skills:</b>	
2.1	Explain a fabrication method for porous metals, porous ceramic, and	S1

CLOs		Aligned PLOs
	polymer foam	
<b>3</b>	<b>Values:</b>	
3.1	Participate in the development of the performance of work teams	V1

### C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Materials Science and Engineering	2
2	Porous Materials: General introduction to porous materials	2
3	Porous Metals	4
4	Porous Ceramics	4
5	Polymer Foams	4
6	Composite Materials: General introduction to composite materials (Reinforcement, Matrix Materials and Interfaces)	4
7	Polymer Matrix Composites	2
8	Ceramic Matrix Composites	2
9	Carbon Fiber / Carbon Matrix Composites	2
10	Carbon-Based Materials: General introduction to carbon-based materials	4
<b>Total</b>		<b>30</b>

### D. Teaching and Assessment

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

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	Recognize differences between fullerenes, carbon nanotubes and grapheme.	Lecture	Written exam
1.2	Determine the interaction between advanced materials and industrial applications	Lecture	Written exam
<b>2.0</b>	<b>Skills</b>		
2.1	Explain a fabrication method for porous metals, porous ceramic, and polymer foam.	Discussion	Report assignments
<b>3.0</b>	<b>Values</b>		
3.1	Participate in the development of the performance of work teams	Collaborative Learning	Individual presentations

#### 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework Assignments (Electronic)	Throughout Semester	15%

#	Assessment task*	Week Due	Percentage of Total Assessment Score
2	Individual presentations	Throughout Semester	5%
3	Periodical Exam	7/8	15%
4	Mid Term Exam	11/12	15%
5	Final exam	16	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 :

Commitment to the rules of the Academic Advising Department at the university in accordance with the academic guidance manual approved by the university and the attached forms, there are different arrangements made by teaching staff to support student consultations including;

- Office hours: 8 hours per a week for each academic member.
- Academic guidance: an academic member has a number of students to guide them throughout degree journey.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	<ul style="list-style-type: none"> <li>• <a href="#">Advanced Carbon Materials and Technology</a>, A. Tiwari, S. Shukla, 2014. Wiley (USA), Latest Edition. ISBN: 9781118686232.</li> </ul>
<b>Essential References Materials</b>	<ul style="list-style-type: none"> <li>• <a href="#">Materials Science and Engineering</a>, Callister, William D., and David G. Rethwisch, 2011. John Wiley &amp; Sons (USA). ISBN: 978-1-119-40549-8.</li> </ul>
<b>Electronic Materials</b>	<ul style="list-style-type: none"> <li>• <a href="#">Saudi Digital Library (SDL)</a></li> </ul>
<b>Other Learning Materials</b>	<ul style="list-style-type: none"> <li>• <a href="#">Learning Management System (Blackboard)</a></li> <li>• Computer programs for graphing organic compounds and chemical reactions (Chem draw , Chem sketch)</li> </ul>

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	A classroom with movable tables and chairs conducive to group discussion and teamwork.
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Data show, smart board
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	--

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and assessment.	Students	Survey (indirect method)

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Extent of achievement of course learning outcomes	Program leader	Reports (Direct method)
Quality of learning resources	Peer referees Students	Reports (Direct method) Survey (indirect method)

**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/ Quality assurance committee
Reference No.	7-3-1445
Date	27/2/1445 HJ 12/09/2023 G

قسم الكيمياء  
Chemistry Department  
TU  
جامعة تبوك  
TAIF UNIVERSITY

Chemistry Program