هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Chemistry of Dyes and Paints
Course Code:	ICHM457-2
Program:	Bachelor of Science in Industrial Chemistry
Department:	Department of Physical Sciences
College:	College of Science
Institution:	Jazan University
Version:	TP-153 (2024)
Last Revision Date:	31 January 2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3hrs)

2. Course type

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

3. Level/year at which this course is offered: ((7th Level /4th year)

4. Course General Description:

Course Title	Course	Number of Study Hours				Year	Level	Pre-
		Theo.	Tut.	Lab.	Credit			
Chemistry of dyes and paints	ICHM 457-2	2	0	0	2	4th	7th	Chem 336-2

This course covers the nomenclature, classification, chemical properties, and synthesis of dyes and paints.

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

CHEM 336-2

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

None

7. Course Main Objective(s):

This course has been designed to give students these concepts:

1. **To recognize the definition and nomenclature of dyes.**
2. **To know the classifications all types of dyes.**
3. **To describe the different methods of preparations of dyes.**
4. **To know preparation methods of some organic pigments such as azo.**
5. **To study the constituents of paints.**
6. **To know the classifications of paints.**
7. **To discuss the applications of paints.**

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%
2	E-learning		
3	Hybrid • Traditional classroom		

No	Mode of Instruction	Contact Hours	Percentage
	• E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	$2 \times 15 = 30$
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
Total		30

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;** *Upon completion of the course, students are able to:*			
1.1	**Demonstrate a broad knowledge and understanding of the different dyes and paints. (M)**	**K1**	**lecture/ discussion Seminars/presentation**	**Objective question**
1.2	**Explain the classification, properties, and synthesis of dyes and paints. (M)**	**K2**	**lecture/discussion/**	**Essay question**
2.0	**Skills;** *Upon completion of the course, students are able to:*			
2.1	**Demonstrate ability in critical thinking, analyzing different methods of synthesis and industrial use of dyes and paints (M)**	**S1**	**lecture/discussion / Seminars /Individual presentation**	**Solving Problems & Essay question**
2.5	**Communicate scientific information and research findings effectively in writing research papers, or orally, using clear and concise scientific language. (M)**	**S5**	**Research /Seminars /Individual presentation**	**Interactive Discussions/ Rubric**
3.0	**Values, autonomy, and responsibility;** *Upon completion of the course, students are able to:*			
3.2	**Recognize a chemist's ethical and scientific responsibilities.**	**V2**	**Research project or presentation**	**group work Rubric**

C. Course Content

1- Theoretical Part

No	List of Topics	Contact Hours
1.	Introduction to Dye Chemistry. Color theory. Dye classification. Structure-property relationships.	2
2.	Classification of dyes: Classification based on chemical structure; Classification of dyes based on their applications. (acid dyes, basic dyes, direct dyes, disperse dyes, fiber reactive dyes, vat dyes, insoluble azo dyes, mordant dyes).	3
3.	Synthetic Methods. Diazonium coupling. Azo dyes. Vat dyes. Reactive dyes.	4
4.	Application Methods and Factors Affecting Dyeing.	4
5	Dye Stability and Degradation. Factors affecting dye stability (pH, temperature, light). Chemical degradation of dyes.	2
6.	Environmental Impact and Sustainability. Eco-friendly dye synthesis. Efficient waste treatment and disposal.	2
7.	Pigments: definition and classification.	2
8.	Paints: definition and Composition of paints (pigments, Extenders or fillers, Film-forming materials, Driers, Thinners or Diluents, Antiskinning Agents, Plasticizers, Resins, and Binders).	3
9.	Classification and Types of Paints (Architectural Coatings, Industrial Coatings, Special Purpose Coatings, Varnishes and Lacquers).	2
10.	Special Applications of Paints.	2
11.	Problem-Solving. Problem-solving exercises.	2
12.	Course Review. Comprehensive assessment materials. Review of key concepts.	2
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in the week no)	Percentage of Total Assessment Score
1.	*Periodic Exams*	*During Semester*	*15%*
2.	*Assignments & Classroom Activities*	*During Semester*	*5%*
3.	*Lab Work*	*During Semester*	*30%*
4.	*Final Exam*	*16-17*	*50%*
	Total		*100%*

*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	1. **Industrial Dyes: Chemistry, Properties, Applications by Klaus Hunger- WILEY-VCH Verlag GmbH & Co. 2. 2004** 2. **2. EIG F. Principles of Paint Formulation. Woodbridge R. Blackie, Glasgow (1991).**
Supportive References	1. **Physico-chemical principles of color chemistry, A. T. Peters, H. S. Freeman, 1996 • Colorants for 2.Non – Textile Applications by Freeman - Elsevier, 2000.**
Electronic Materials	• https://en.wikipedia.org/wiki/Chemical_industry • http://www.rsc.org/learn-chemistry • https://www.khanacademy.org/science/organic-chemistry • https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/intro1.htm • https://chem.libretexts.org/
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room(s) for groups of 50 students and a Lab. For 20 students.
Technology equipment (projector, smart board, software)	Smartboard, Data show, Blackboard, internet
Other equipment (depending on the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Likert-type Survey CES) Indirect
Effectiveness of Students' assessment	Instructor & Course Coordinator	Classroom evaluation (direct & indirect
Quality of learning resources	Program coordinator	Indirect
The extent to which CLOs have been achieved	Assessment committee	Indirect
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Physical Sciences Department Council
REFERENCE NO.	Meeting (3)
DATE	12/03/2024 -02/09/1445