



**Department of CHIMISTRY**

**College of EDUCATION**

**University of SALLAHADDIN**

**Subject: PRACTICAL INDUSTRIAL CHEMISTRY**

**Course Book – (Year 3)**

**Lecturer's name: DARYA JALEEL RAHEEM. MSc**

**Academic Year: 2023/2024**

# Course Book

1. Course name	Practical Industrial Chemistry
2. Lecturer in charge	Darya Jaleel Raheem
3. Department/ College	Chemistry/Education
4. Contact	e-mail: darya.raheem@su.edu.krd Tel: 07504946335
5. Time (in hours) per week	Practical: 12
6. Office hours	Sunday-8:30am-10:30pm While I have put official office hours on the syllabus that I will honor, I expect to see each student in my office any time he is struggling too much. In addition, I have put my cell phone on the syllabus that you may call at any courteous hour (before 9:00 p.m.). Very Important: If you find yourself struggling in the course, please see me quickly. Don't wait!
7. Course code	
8. Teacher's academic profile	<p><b>Academic Qualification</b>  1999 B.Sc. Salahaddin University / College of Education /Department of Chemistry  2004 M.Sc. Salahaddin University / College of Education / Department of Chemistry</p> <p><b>Academic Works:</b>  2000 - 2001 Assistant researcher.  2001 - 2004 M.Sc. Student  2004 - 2015 Assistant lecturer  2016- 2018 Lecturer  During my work in Salahaddin University, I have taught the following courses at all the four undergraduate levels.  1- Practical Industrial Chemistry.  2- Practical Petroleum Chemistry.  3- Practical Polymer Chemistry.  4- Practical Organic Chemistry.  5-Chemical safety  <b>Employment:</b></p> <ul style="list-style-type: none"> <li>Member of examination committee of the college of Education-Salahaddin University for many years.</li> <li>Member of the Kurdistan teachers union.</li> <li>Member in the Kurdistan Chemistry syndicate.</li> </ul>
9. Keywords	Practical industrial chemistry

#### 10. Course overview:

As undergraduates of Industrial Chemistry, this course provides you with the knowledge of the basic foundational concepts in industrial processing. Away from the traditional branches: Organic, Inorganic, Physical, and Analytical Chemistry; this course introduces you to the actual operations in chemical industries and provides knowledge of the key areas such as raw materials sourcing and processing , intermediates and conversion of chemical materials to final products. It teaches important concepts such as optimisation, mass balance and energy balance which are very crucial to the processing of materials in the chemical industries. Ultimately, the course will prepare you for your future role as a chemist in the Industrial sense. However, given the multiplicity of the industries that have come up as a result of liberalizing the economy attracting investors and privatizing non-performing industries, it became imperative to restructure this programme, Now in its third year, the Programme has had to be revised to further strengthen the realization of this goal.

Industrial Chemistry is designed to provide graduates with the skills, knowledge and learning tools required to carry out professional research, and development and production activities in the field of chemistry, including the following sectors: health, food, cosmetics, the environment, energy, communications, furnishing, and the automotive sector.

#### 11. Course objective:

The objectives of this course are to:

- Introduce the students to industrial processing principles as applicable to chemical and allied industries.
- Provide the students with the knowledge of how raw materials are sourced for various chemical industries and how these materials are processed.
- Teach the students the important concepts of material and energy balances, and process optimization.
- The degree programme in Industrial Chemistry prepares students either for immediate entry to the workplace, or to pursue further studies, offering a solid theoretical, experimental and applied grounding in the main sectors of chemistry.
- Also aims to offer students the knowledge required to occupations in: industrial activities such as the development of chemical processes; research laboratories, the synthesis and characterization of new materials.

#### 12. Student's obligation

**Attendance:** All students are expected to attend every class meeting. Attendance will be taken. In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible to any of the instructors, indicating the reason for the absence. **The student that attended all the classes will take 0.5 degree all over the total marks.**

**Scientific trips:** the lessons include a number of scientific trips to the many projects and factory in our region. The student attendance will be taken, **The student that attended all the trips will take 2 degree all over the total marks.**

**Electronic devices:** As described in lab Student rules, unwarranted disruption of classroom activities is not permissible. Accordingly, with the exception of calculators, ALL electronic devices, including cell phones, MP3 players, etc. must be TURNED OFF and stowed during

class. The use of laptop, tablet, or other portable computers during class is strictly limited to recording notes or viewing course-related materials, such as on-line lecture notes or topic-related web sites. Prior to the start of examinations, all calculator memories must be cleared of any stored text or equations.

- Actively **participate** in class/group discussions.
- **Relate** knowledge gained in class which can be applied to “real-world” problems.
- Working in **groups** for support throughout the term.

### 13. Forms of teaching

All documents used in this year are copied, you have the right to copy all the documents for your personal academic use. Other forms of teaching are hand out and discussion.

### 14. Assessment scheme

**Lab report:** the lab report should be complete during the lab lesson, student is expected to collaborate with his fellow students to complete the lab report. You are not allowed to make copies of another person’s work and submit it as your own; that is plagiarism

**Weekly Quizzes:** Every lab lesson a quiz will be given at the beginning of class.

**Activity and participate** in class discussions and home works preparation.

### 15. Student learning outcome:

A word to the prospective students. Why study Chemistry? I suppose this is a most likely pertinent question to be asked by them. First of all, chemistry is a very exciting branch of science. Basically it is about knowing and investigating the structure and reactions of substances of matter. It is a central science bridging many aspects of other sciences, physical and biological, opening a door to many technological developments. Remember it is only the chemist who understands how to change one substance into another based on knowledge of constitution of the building blocks of matter, via: atoms and molecules, the micro particles of matter.

The BSc degree includes an industrial placement year to boost students’ skills and employability. It provides them with a thorough understanding of all the main areas of chemistry, including:

- organic chemistry
- physical chemistry
- inorganic and structural chemistry
- bio- chemistry
- data handling

In Stage 3 you take a paid year in industry. It is a great opportunity for you to gain first-hand experience in the chemical sector and some host companies offer their placement students a job after they graduate.

We have some of the highest specification teaching laboratories in the country and our research-active staff mean you’ll study at the cutting edge of this life-changing field.

Chemistry graduates have many more career opportunities than graduates of other degrees. Within their area of specialization, they can get jobs as;

<ol style="list-style-type: none"> <li>1. chemical researchers at university, in government research institutes, and chemical industries</li> <li>2. product and process development,</li> <li>3. production control, quality control,</li> <li>4. Plant management in chemical industries.</li> <li>5. Teaching at secondary schools, universities, and other tertiary institutions.</li> <li>6. Sales and marketing representatives/managers of chemical and related industries.</li> <li>7. By the nature of their training, which demands a lot of logic, our graduates have also found it easy to get jobs outside non-chemical related areas.</li> </ol>	
<b>16. Course Reading List and References:</b> <ol style="list-style-type: none"> <li>1. <i>Ullman's Encyclopedia of Industrial Chemistry</i>, P9.U57.1985</li> <li>2. <i>Industrial Organic Chemicals</i>, 2nd ed., by H.A. Wittcoff, B.G. Reuben, and J.S. Plotkin, Wiley-Interscience (2004).</li> </ol>	
<b>17. Practical Topics</b>	<b>Lecturer's name</b>
<p>Experiment 1: Water pollution treatment &amp; testing the waters</p> <p>Experiment 2: Extraction of plant oil.</p> <p>Experiment 3: Synthesis and Properties of Soaps.</p> <p>Experiment 4: Preparation of powder laundry detergent.</p> <p>Experiment 5: Extraction of essential oils from plants.</p> <p>Experiment 6: Preparation of skin care cream.</p> <p>Experiment 7: Extracting sugar from sugar beet. (2 weeks)</p> <p>Experiment 8: Determining the amount of Sugar in Soft Drinks.</p> <p>Experiment 9: Fermentation- testing Yeast.</p> <p>Experiment 10: Preparation of Ammonium sulfate fertilizer &amp; Determination of alkalinity percent of urea.</p> <p>Experiment 11: Corrosion &amp; How much <math>O_2</math> consumed during rusting? (2 week)</p> <p>Experiment 12: Preparation of Fluorescein and Eosin dyes.</p> <p>Experiment 13: Glass making.</p> <p>Experiment 14: Decolorizing and deodorizing by carbon black.</p>	Darya Jaleel (2 hrs)
<b>18. Examinations:</b> <ol style="list-style-type: none"> <li>1. <b>Compositional:</b> Explain the role of surfactants in the cleaning action of detergent?</li> <li>2. <b>True or false type of exams:</b></li> </ol>	-Answer: It lower the surface tension of water, and lower the interfacial tension

<p>Rusting is the term used for corrosion in Iron only.</p> <p><b>3. Multiple choices:</b></p> <p>The process of soap formation is called .....</p> <p>a. Salting out   b. Saponification   c. Extraction   d. Corrosion</p>	<p>between oil and water by adsorbing at the liquid-liquid interface.</p>
<p><b>19. Extra notes:</b></p>	
<p><b>20. Peer review</b></p> <p style="text-align: center;"><i>Azad S. Sadraddin</i></p> <p style="text-align: center;"><b>Dr. Azad S. Sadraddine</b></p>	