

**Birzeit University**

 **Chemistry Department**

**Chemistry 221 course outline: 2nd Sem. 2017/2018**

**Instructors information:**

 **Names Office phone Office Location**

|  |  |  |
| --- | --- | --- |
| **Imad A. Qamhiyeh**  | **2253** | **SCI324** |
| **Adi A. Qamhiyeh**  | **5334**  | **SCI320** |
| **Saleh A. Rayyan**  | **5331**  | **SCI322** |
| **Adel J. Hidmi** | **5260**  | **SCI310** |

**Lectures:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| [**Section**](https://ritaj.birzeit.edu/instructor/edit-office-hr?id=33074) **1** | **Adel J. Hidmi** | **R** | **13:00 - 13:50** | **SCI013** |
| [**Section**](https://ritaj.birzeit.edu/instructor/edit-office-hr?id=33074) **2** | **Saleh A. Rayyan**  | **W** | **13:00 - 13:50** | **SCI021** |

**Laboratories:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| [**Section**](https://ritaj.birzeit.edu/instructor/edit-office-hr?id=33074) **1** | **Imad A. Qamhiyeh**  | **R** | **14:00 - 16:50** | **SCI358** |
| [**Section**](https://ritaj.birzeit.edu/instructor/edit-office-hr?id=33074) **2** | **Adi A. Qamhiyeh**  | **M** | **08:00 - 10:50** | **SCI375** |
| [**Section**](https://ritaj.birzeit.edu/instructor/edit-office-hr?id=33074)**3** | **Adi A. Qamhiyeh**  | **W** | **14:00 - 16:50** | **SCI375** |
| [**Section**](https://ritaj.birzeit.edu/instructor/edit-office-hr?id=33074)**4** | **Adel J. Hidmi** | **R** | **14:00 - 16:50** | **SCI375** |

**Course description:**

Basic Experiments in organic chemistry for Biology, Pharmacy and Nutrition students emphasizing laboratory techniques, isolation, purification, synthesis and identification of selected organic compounds. The students will also be trained in the proper way to write a scientific laboratory report.

**Text:**

**1. D. Eaton: The world of Organic Chemistry, a laboratory approach, MeGraw Hill Book Co., New York.**

 **2. Chemistry 221 Laboratory manual available at the bookstore.**

**Course goals:**

 The major goals of this course are to:

1-Introduce the students to the fundamental principles of organic chemistry including physical properties in the purification and identification of an organic compound.

2-Provide the students with basic information about the separation and purification of organic compounds from a mixture or reaction medium.

3-Provide the students with hand-on experience to study the classification properties, reactions of various organic compounds, and synthesis of various classes of organic compound

4-Develop ability and techniques in handling and using organic compounds in various environments.

5- teach good laboratory practices in executing an experimental procedure and acquire safety habits in handling such compounds.

6- provide the students with basic information about the environmental implication and toxic hazards of various organic compounds.

**Course outcomes:**

 Upon successful completion of this course, students should be able to:

 **A. Problem-solving skills:**

• Apply knowledge obtained from the lecture to problem solving and critical thinking in the laboratory.

• Utilize mathematical knowledge gained from general chemistry to perform common calculations, including, limiting reagent and percent yield.

 **B. Experimental learning skills (laboratory skills):**

 • Engage in safe laboratory practices by handling laboratory glassware, equipment, and chemical reagents appropriately, using general guidelines and basic knowledge about the common hazards associated with them in an organic chemistry laboratory.

• Maintain an appropriate scientific notebook using notational and descriptive content containing information on relevant chemical reagents, experimental procedure followed, data collected, and observations made during the experimental process.

 **C. Practical skills (laboratory skills):**

• Assemble glassware and perform the following techniques as a part of synthetic procedures: aqueous workup, distillation, reflux, separation, isolation, and crystallization.

 **D. Cognitive skills (laboratory skills):**

• Predict the outcome of several common organic reaction types through a basic understanding of starting materials, functional groups, mechanism, and typical reaction conditions.

 **E. Communication skills**

Develop effective communication and team work skills

**Classes:**

 One lecture and a three hours laboratory period per week. Students are required to attend all

 lectures and laboratory sessions. Prelaboratory preparation by the student is expected in

 order to be able to complete the experiment within the assigned period: A report for each

 experiment including answers to assigned questions should be submitted one week later

**Laboratory Report:**

 This should be brief but informative. It should include the following information:

1. Cover sheet: Title of experiment, name and partner name, experiment date and submission date.
2. Goal of the experiment, reactions and mechanisms if any.
3. Experimental Procedure (brief and in clear items)
4. Calculations, Results and Discussion
5. Conclusion, comments and errors encountered if any.
6. Answers to assigned problems.

**Course Assessment Details:**

Midterm exam 15%

Final exam 25%

Laboratory Reports 55%

Lab work/participation/ prelab quizzes 5%

**Prerequisite:** Chemistry 230 or concurrent.

**Course Schedule**:

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| --- | --- | --- | --- |
| Exp. No. | Experimenttitle | Textbook Pages | Problems |
|  | Check in  | - | - |
| 1 | Melting points | 26-31  | 1, 2, 3 |
| 2 | Distillation-,fractional distillation | 19-25 | 1, 3, 5 |
| 3 | Recrystallization of Acetanilide | 32-39 | 2, 6, 7 |
| 4 | Extraction of Aspirin, β-Naphthol, and moth crystals | 40-46 | 1, 3, 4 |
| 5 | Preparation of cyclohexene from cyc1ohexanol | 47-50 | 2, 5, 6  |
| 6 | The synthesis of Nerolin, Willimson Synthesis of ethers | 120-123 | 2, 5, 6  |
| 7 | The Essential oils of plants. Steam distillation  | 124-133 | 1, 2, 3 |
| 8 | Local Anesthetic- the synthesis of Benzocaine | 162-168  | 2, 3, 5 |
| 9 | The Aldol Condensation | 142-150 | 1, 2, 4 |
| 10 | Thin Layer and Column Chromatography | 261-279  | handout |
| 11 | Soaps and Detergents. Preparation of soap, preparation of a detergent | 214-223 | 1, 2, 3 |
| 12 | Azo dyes, the Synthesis of para- red dye  | 280-285  | 1, 2, 4 |
| 13 | Biodiesel  | handout |  |

**GOOD Luck**