LIFS1904  Laboratory for General Biology II
Course Outline for Spring 2020 – 2021

Teaching Team
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Course Description
Credit points: 1
Prerequisite: LIFS1901 or Level 3 or above in HKDSE 1x Biology or a passing grade in AL/AS Biology
Corequisite: LIFS1902
Exclusions: NIL
Grading: Pass or Fail

The course LIFS 1904, Laboratory for General Biology II, comprises four laboratory exercises. The aims of these exercises are: 1) to reinforce the materials learnt in lectures by providing related laboratory exercises; 2) to provide some fundamental hands-on experiences in laboratory work; and 3) to equip the students with practical knowledge related to applications of basic scientific principles.

The materials covered in the laboratory exercises of LIFS 1904 are simple but extensive. The students will conduct experiments on animal dissection, DNA fingerprinting, biochemical assays and genetic studies. Through this series of training, the students will be able to appreciate “the applications of simple experiments can bring some meaningful learning experiences”.

This is a practical course accompanying the lecture course LIFS 1902. It provides students with some basic concepts and hands-on experiences in biological investigation within some areas covered by LIFS 1902, including human biology, genetics and molecular biology. The emphasis is on the understanding and application of the scientific principles underlying the experiments.
Intended Learning Outcomes (ILOs)

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

1. Explain the scientific principles underlying the experimental procedures described in individual exercises.
2. Demonstrate basic laboratory techniques for carrying out Life Science experiments in practical session.
3. Analyze and interpret experimental data based on scientific reasoning and knowledge.
4. Abide by ethical principles in laboratory work and result presentation.

Learning Activities

1. **Learning environment**: Zoom meetings will be organized regularly to cover all exercises, during which students can learn individually and interact with instructors or other students to better understand the scientific concepts and technical skills. The recordings of Zoom meetings will be available after class so students can review again at their own pace. Through self registration, students will be assigned to face-to-face practical session to perform experiments in groups of three or four. The workbench, routinely used labware and instruments will be assigned to and managed by each group of students.

2. **Pre-lab talk**: Contents will be focused on basic theoretical and practical issues involved in the experiment.

3. **Practical demonstration**: Specific techniques in each exercise will be demonstrated by the instructor. Real-time or pre-recorded close-up videos will be provided for students to understand the technical details. Registered students will then practice the techniques in assigned practical session.

4. **On-bench supervision**: The bench supervisor, either a technician or a teaching assistant (TA), will take care of one pre-assigned bench of students in practical sessions. The bench supervisor will provide guidance and assistance to students during the experiments.
Course Schedule

Time: Monday, 14:00 – 16:50

Venue: Zoom for online classes or Room 4160 (Lift 33) for face-to-face classes

Students in different laboratory sessions (LA1 and LA2) will attend the online classes at the same time. If the situation allows, face-to-face practical sessions will be arranged for students to join upon optional registration. However, if students registered to join but do not attend the assigned practical session, 30% marks will be deducted unless permission was granted.

<table>
<thead>
<tr>
<th>Date</th>
<th>Class Format</th>
<th>Topic</th>
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<tbody>
<tr>
<td>8 Feb</td>
<td>Online</td>
<td>Course Briefing</td>
</tr>
<tr>
<td>22 Feb</td>
<td>Online</td>
<td>Exercise 1: Rat Dissection</td>
</tr>
<tr>
<td>1 Mar</td>
<td>Face-to-face</td>
<td>Exercise 1: Practical Session 1</td>
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<tr>
<td>8 Mar</td>
<td>Online</td>
<td>Exercise 2: Forensic Study by DNA Fingerprinting</td>
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<tr>
<td>15 Mar</td>
<td>Face-to-face</td>
<td>Exercise 1: Practical Session 2</td>
</tr>
<tr>
<td>22 Mar</td>
<td>Online</td>
<td>Exercise 3: Digestion of Carbohydrate, Protein and Fat</td>
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<tr>
<td>29 Mar</td>
<td>Face-to-face</td>
<td>Exercise 1: Practical Session 3</td>
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<tr>
<td>12 Apr</td>
<td>Online</td>
<td>Exercise 4: Genetic Study using Fruit Fly</td>
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<tr>
<td>19 Apr</td>
<td>Face-to-face</td>
<td>Exercise 1: Practical Session 4</td>
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<tr>
<td>26 Apr</td>
<td>Face-to-face</td>
<td>Exercise 1: Practical Session 5</td>
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<tr>
<td>3 May</td>
<td>Face-to-face</td>
<td>Exercise 1: Practical Session 6</td>
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Assessment Scheme

1. The attendance of practical session is optional, however, any students who registered to join but do not attend the assigned session will receive a 30% mark deduction as a penalty, unless permission was granted.

2. Every student will need to submit 4 experimental worksheets. The questions of these worksheets cover underlying principles of the experiment, data reporting, data interpretation and statistical analysis.

3. Every student will need to submit be the final assessment, which will evaluate the factual knowledge in concepts and principles, as well as the ability to analyze and present data.

Students will be graded as “Pass” or “Fail” depending on their overall achievement in experimental worksheets and final assessment. Only the students who submitted ALL 5 required assessments will be considered for “Pass”, unless permission was granted.

<table>
<thead>
<tr>
<th>Method of Assessment</th>
<th>Contribution to Final Grade</th>
<th>ILOs to be Assessed (as listed on Page ii)</th>
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<tbody>
<tr>
<td>Experimental Worksheets</td>
<td>50% (12.5% per worksheet)</td>
<td>(1), (3) &amp; (4)</td>
</tr>
<tr>
<td>Final Assessment</td>
<td>50%</td>
<td>(1), (3) &amp; (4)</td>
</tr>
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Evaluation on Experimental Worksheets:

Every student is required to submit experimental worksheet for all exercises, altogether 4 worksheets. In each worksheet, you are required to put down your Name, Student Number, Date, Course Code and Title of the Exercise. Moreover, you should provide answers to ALL questions in the worksheet, but there is NO NEED to prepare an extensive laboratory report with sections like Introduction and Discussion.

Detailed instructions and experimental results of each exercise will be provided on Canvas Assignments. Completed worksheets should be submitted in doc or pdf format on Canvas for Turnitin check by 5 pm on the next Monday. Any late submission on the same day will receive a 3% mark deduction (out of 12.5%), whereas any submissions on later date will be given zero marks.
All submissions MUST BE your own work and written in your own words. Since academic integrity and honesty are key values at HKUST, any CHEATING (e.g. making up data) or PLAGIARISM (e.g. copying from others or external sources) may be subjected to ZERO MARKS and “FAIL” this course. (For details, please visit [http://ugadmin.ust.hk/ug-guide/integrity/dishonesty.html](http://ugadmin.ust.hk/ug-guide/integrity/dishonesty.html); [https://libguides.ust.hk/referencing/plagiarism](https://libguides.ust.hk/referencing/plagiarism))

**Laboratory safety:**

Working in a laboratory may expose one to potentially dangerous tools and hazardous reagents. Therefore, students need to exercise discipline and caution in your work. The following rules are mandatorily enforced in the LIFS 1904 laboratory in order to ensure all experiments are conducted under the best and safest conditions.

- DO NOT bring food or drinks in the laboratory.
- DO NOT place anything, e.g. stationery or apparatus, in your mouth.
- Wear gloves when handling dissection work, hazardous chemicals or reagents, and/or nucleic acid and protein work.
- Take off your gloves before touching door handles, your face, phones, etc.
- Discard your gloves and wash your hands before leaving the laboratory.
- Bring and wear lab coats at all times as protection against any potential hazards.
- DO NOT wear shorts, skirts, or open-toe shoes to minimize injuries against spillage.
- Tie up long loose hair and remove dangling accessories to minimize contact with flame or chemicals.
- **Report any accidents**, e.g. cuts, burns, spillage of bacterial cultures or toxic reagents, to the bench supervisor and/or instructor immediately.
General laboratory practices:

- Pay attention to any instructions or demonstrations. Make sure you understand the correct procedures of experiment and know the proper use of equipment or apparatus. Ask for advice if you are not sure.
- Communicate well with your groupmates to complete the experimental works in a timely manner, but DO NOT talk loudly unless there is an emergency. Set mobile phones to mute.
- Label all containers of reagents or samples with your group number, date and nature of the specimen.
- Make sure all equipment, e.g. microscope and Bunsen burner, is turned off when not in use.
- Discard all used plastic or glass consumables, remaining reagents, as well as other laboratory wastes to designated receptacles.
- DO NOT take any of the equipment, consumables or samples away from the laboratory without permission.
- Tidy up your bench and obtain permission from your bench supervisor before leaving the laboratory.