1. **Instructors**

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Office</th>
<th>Extension</th>
<th>E-mail address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. Yung Hou WONG (Course Co-ordinator)</td>
<td>Room 5461</td>
<td>x7328</td>
<td><a href="mailto:boyung@ust.hk">boyung@ust.hk</a></td>
</tr>
<tr>
<td>Prof. Karl W.K. TSIM</td>
<td>Room 5456</td>
<td>x7332</td>
<td><a href="mailto:botsim@ust.hk">botsim@ust.hk</a></td>
</tr>
</tbody>
</table>

2. **Meeting Time and Venue**

- **Lecture Time:**
  - Tuesday (12:00 pm - 12:50 pm)
  - Thursday (12:00 pm - 12:50 pm)
- **Tutorial Time:**
  - Tuesday (1:00 pm - 1:20 pm)
  - Thursday (1:00 pm - 1:20 pm)

**Venue:** Rm 4504

3. **Course Description**

   - **Credit points:** 3
   - **Pre-requisite:** LIFS3020 or LIFS3030
   - **Exclusion:** NIL
   - **Grading:** A+ to F

   **Brief information/synopsis:** Recent advances in the study of the molecular mechanisms of cell function, with an emphasis on the structure and function of signaling components that control cell growth, differentiation, and integrated responses in eukaryotic cells.

4. **Intended Learning Outcomes**

   - To provide students with contemporary knowledge of cellular communication, including the structural and functional characteristics of receptors; receptor-mediated intracellular signaling; correlations of cell signaling with physiology and pathophysiology; with focus on the biochemical basis of signaling events such as phosphorylation/dephosphorylation and specific protein-protein interaction.
   - To help students apply their cell biology knowledge for bioscience applications.
   - To help students acquire the ability for decision-making and logical thinking.
   - To help students understand the correlations between cell biology and other bioscience topics such as physiology, pharmacology, neurobiology, and the molecular basis of diseases.
   - To help students recognize the essentiality of self-enrichment and life-long learning.
   - To help students gain awareness of complexity of issues facing professionals in biosciences.
Upon completion of this course, students are expected to be able to:

<table>
<thead>
<tr>
<th>No.</th>
<th>ILOs</th>
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<tbody>
<tr>
<td>1</td>
<td>Relate structural characteristics of different receptor systems to distinct signaling pathways in the cell.</td>
</tr>
<tr>
<td>2</td>
<td>Describe and explain how different intracellular signaling events are regulated by extracellular signals.</td>
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<tr>
<td>3</td>
<td>Describe and explain how cellular activities such as growth and differentiation are regulated at the molecular level.</td>
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<tr>
<td>4</td>
<td>Describe and explain the importance of signaling integration in response to multiple cellular stimuli.</td>
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<tr>
<td>5</td>
<td>Possess the basic concepts for designing experiments to study intracellular signaling events.</td>
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</table>

5. Assessment Scheme
   a. Final examination (Open-book; 3 hours)
   b. Group project: Groups of 3-4 students will work together in compiling a written report on a specific area chosen from a list of topics. The report should be no longer than 5 pages of text (12 pt font size, single space, inclusive of references) and 1 page of illustrations.

Students will be evaluated as a group.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Assessing Course ILOs</th>
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</thead>
<tbody>
<tr>
<td>Final examination (60%)</td>
<td>ILO: 1, 2, 3, 4, 5</td>
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<tr>
<td>Group project (40%)</td>
<td>ILO: 1, 2, 3, 4</td>
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</table>

6. Student Learning Resources
   Lecture notes and research articles

7. Teaching and Learning Activities
   Scheduled activities: Two 50-minute lectures and two 20-minute tutorials per week

8. Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>1</td>
<td>08-02-2022</td>
<td>Overview of cell-surface receptors</td>
<td>Wong</td>
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<tr>
<td></td>
<td>10-02-2022</td>
<td>G protein-coupled receptors: overall structure</td>
<td>Wong</td>
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<tr>
<td>2</td>
<td>15-02-2022</td>
<td>G protein-coupled receptors: regulation</td>
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<tr>
<td></td>
<td>17-02-2022</td>
<td>Tutorial 1</td>
<td>Wong</td>
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<tr>
<td>3</td>
<td>22-02-2022</td>
<td>Signal transduction by G proteins: GTPase cycle</td>
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<td></td>
<td>24-02-2022</td>
<td>Signal transduction by G proteins: structure and function</td>
<td>Wong</td>
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<tr>
<td>4</td>
<td>01-03-2022</td>
<td>Activators and regulators of G protein signaling</td>
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<td></td>
<td>03-03-2022</td>
<td>Tutorial 2</td>
<td>Wong</td>
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<td>08-03-2022</td>
<td>Second messengers: adenyl cyclases and phospholipases</td>
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<tr>
<td></td>
<td>10-03-2022</td>
<td>Second messengers: other signaling molecules</td>
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<td>6</td>
<td>15-03-2022</td>
<td>Tutorial 3</td>
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<td>Signal integration: conditional activation</td>
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<td>7</td>
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<td>Signal integration: MAPK cascade</td>
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<td>24-03-2022</td>
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<td>8</td>
<td>29-03-2022</td>
<td>Briefing on Group Project</td>
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<tr>
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<tr>
<td>31-03-2022</td>
<td>Protein kinases: structures and functions</td>
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<td>07-04-2022</td>
<td>Receptor tyrosine kinases: classification and function</td>
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<td>19-04-2022</td>
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<td>21-04-2022</td>
<td>Receptor and non-receptor tyrosine phosphatases</td>
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<td>26-04-2022</td>
<td>Receptor and non-receptor tyrosine phosphatases</td>
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<td>28-04-2022</td>
<td>Ion channels and transporters</td>
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