

# The Hong Kong Polytechnic University

## Subject Description Form

<b>Subject Code</b>	ABCT610
<b>Subject Title</b>	Frontier Catalysis: An Approach Towards Cutting-Edge Sustainable Chemistry
<b>Credit Value</b>	Three
<b>Level</b>	6
<b>Pre-requisite / Co-requisite/ Exclusion</b>	Basic knowledge of General Chemistry and Inorganic Chemistry
<b>Objectives</b>	<p>To acquire the cutting-edge scientific knowledge associated with sustainable chemistry, by means of innovative catalysis and new functional materials</p> <p>To present examples drawn from current catalysis and materials research and their genuine applications towards the environment</p> <p>To understand how molecular sciences could play a role on the development of alternative sources for catalysis, energy saving, production and storage</p>
<b>Intended Learning Outcomes</b>	<p>a) Students are expected to have fundamental knowledge of catalysis and materials research and current trend of related disciplines</p> <p>b) Students are expected to have improved presentation skill</p> <p>c) Students are expected to recognize the key concepts in sustainable chemistry based on new materials development.</p>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p>Course outline:</p> <ol style="list-style-type: none"> <li>1. General properties of organometallic complexes</li> <li>2. Reactions of organometallic complexes</li> <li>3. Photochemistry and photophysics of organic/organometallic molecules</li> <li>4. Homogeneous catalysis</li> <li>5. Organic/organometallic materials and sustainable energy</li> <li>6. Selected examples of applications (e.g. organic light-emitting diodes, organic solar cells, fuel cells, photocatalysis, etc.)</li> </ol>

<b>Teaching/Learning Methodology</b>	<p>Lectures, Tutorials and Demonstrations  This is an advanced subject for research students. Lectures, tutorials and demonstrations will be used, and examples will be drawn from original journal articles. Students are expected to read these articles and participate in the discussion during class and tutorial.</p> <p>They will be given a project and choose one topic from 3-4 current catalysis research areas [15-20 min presentation, a ~10 A4 pages seminar report]</p>																																																														
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	<table border="1" data-bbox="550 548 1460 952"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>1. Project</td> <td>50</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2. Examination</td> <td>50</td> <td>✓</td> <td></td> <td>✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td>100 %</td> <td colspan="6"></td> </tr> </tbody> </table>							Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c				1. Project	50	✓	✓	✓				2. Examination	50	✓		✓				Total	100 %																								
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<b>Reading List and References</b>	<p>Related literature references underlined during the presentation</p> <ol style="list-style-type: none"> <li>Journal papers</li> <li>Robert H. Crabtree, <i>The Organometallic Chemistry of the Transition Metals</i>, John Wiley &amp; Sons, 6<sup>th</sup> Edition</li> <li>Brian Wardle, <i>Principles and Applications of Photochemistry</i>, John Wiley &amp; Sons</li> <li>Carol E. Wayne and Richard P. Wayne, <i>Photochemistry</i>, Oxford University Press</li> </ol>																																																														