<table>
<thead>
<tr>
<th>MiniMasters Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Title</strong></td>
</tr>
<tr>
<td><strong>Masters Module To Be Mapped Into</strong></td>
</tr>
<tr>
<td><strong>Available as Online</strong></td>
</tr>
<tr>
<td><strong>Contact Hours/ AU</strong></td>
</tr>
<tr>
<td><strong>Details</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Scope/ Syllabus</strong></td>
</tr>
</tbody>
</table>
| | 1. Introduction to colour.  
| | - Origins of colour – absorption, emission, photonics.  
| | 2. Dyes and pigments  
| | - Difference between dyes and pigments.  
| | - Synthesis and applications, e.g. bioimaging, of coloured materials.  
| | 3. Dye-sensitised solar cells  
| | - Mechanism of dye-sensitised solar cells.  
| | - Dyes for solar cells.  
| | - Perovskite solar cells,  
| | 4. Electron donors for solar cells  
| | - Bulk-heterojunction solar cells  
| | - Polymer donors for high efficiency – design and synthesis.  
| | 5. Electron acceptors for solar cells  
| | - Fullerenes as acceptors  
| | - Non-fullerene acceptors  
| | 6. Organic luminescence  
- Types of organic emitters – small molecules versus polymers

7. Materials for LEDs
   - Structure-property relationships
   - Super Yellow

8. Frontiers in OLEDs
   - Search for stable blue emitters
   - Phosphorescent materials
   - White emission

### MODULE 5: Analysis of Organic Materials

1. Introduction to analysis of organic materials
   - Overview of methods used in analysis of organic materials: SEC
   - Thermal methods, spectroscopy
   - Microscopy
   - X-ray diffraction

2. Size Exclusion Chromatography
   - Uses and limitations of SEC.
   - Alternative methods for determining molar mass of polymers.

3. TGA and DSC
   - Principles and use of TGA and DSC for analysis of organic materials.

4. IR and Raman spectroscopy
   - Vibrational spectroscopy by IR and Raman – principles, uses and limitations.

5. UV-Vis and PL spectroscopy
   - Principles,
   - Uses and limitations of UV and PL spectroscopy.

6. NMR spectroscopy
   - Principles,
   - Uses and limitations of 1H and 13C NMR spectroscopy,
   - Including 2D NMR and solid-state NMR.

7. Microscopy
   - Introduction to optical,
   - Electron and scanning microscopies and their use in analysing organic materials.

   - Introduction to techniques such as CV,
   - Mobility measurements used in electronic characterization of organic materials.

### Learning Outcome

At the end of this course the students will
- Obtain an understanding of organic materials and their role in modern technological applications.
- Understand the functional requirements of organic materials for various applications.
- Critically analyze and predict future directions in organic materials.
### Assessment

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutorial</td>
<td>20%</td>
</tr>
<tr>
<td>CA</td>
<td>60%</td>
</tr>
<tr>
<td>Assignment</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

### Class Size

Min – Max: 10 to 30 students

### Continuing Education Training (CET)

**Available as CET**

Yes
If Yes, please provide the information required below.

**Assessment for CET**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutorial</td>
<td>20%</td>
</tr>
<tr>
<td>CA</td>
<td>60%</td>
</tr>
<tr>
<td>Assignment</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Duration**

Note: Please complete this if it is different from the MiniMasters Course

**Scope**

Note: Please complete this if it is different from the MiniMasters Course