Course Code & Title : **CM2011 Analytical Chemistry**

Academic Units : 3 AU

Pre-requisite : CM1021, CM1041 or CM9001 or by permission

Course Description :

**CM2011 Analytical Chemistry**
[Lectures: 39; Pre-requisite: CM1021, CM1041 or CM9001 or by permission; Academic Units: 3]

**Learning Objective**
The lectures provide an introduction to modern analytical methods that are used to quantify species and instrumental methods used to monitor the progress of reactions. The course comprises a mixture of mathematical problem solving and descriptive chemical analysis.

**Content**
This course introduces the fundamental principles of analytical chemistry.
1. Errors and data analysis.
2. Electrochemical theory and practice.
3. Spectroscopic techniques applied to analysis.
4. Chromatography and separation science

**Course Outline**

<table>
<thead>
<tr>
<th>S/N</th>
<th>Topic</th>
<th>Lecture Hours</th>
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<tbody>
<tr>
<td>1</td>
<td>Errors and statistics</td>
<td>3</td>
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<tr>
<td>2</td>
<td>Introduction to electrochemistry and electrodes, potentiometry and ion-selective electrodes.</td>
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<tr>
<td>3</td>
<td>Fundamentals of spectrophotometry, operation of spectrophotometers, UV-vis, fluorescence, atomic absorption spectroscopy and inductively coupled plasma optical emission spectroscopy.</td>
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<tr>
<td>4</td>
<td>Extractions. Partition coefficients, single and multiple extraction efficiency and the influence of pH upon extraction efficiency.</td>
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<td>5</td>
<td>Chromatography. Theory, classification, Van Deemter equation, resolution, column efficiency, gas chromatography (GC), liquid chromatography (HPLC) and development of chromatographic methods.</td>
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<tr>
<td>6</td>
<td>Electromigration methods. Fundamentals, electrophoresis, electroosmosis, capillary electrophoresis, electrophromatography, micellar elektrokinetic chromatography and gel electrophoresis.</td>
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**Learning Outcome**
Students will understand the most commonly used techniques in analytical chemistry. Students will be able to apply the knowledge they have learned to devise appropriate experiments that can be used to quantify different species. The students will understand the limitations of the analytical methods and how the precision and accuracy of each method can be assessed.

**Student Assessment**
Students will be assessed by:
a. Final 2-hour written examination (60%)
b. Continuous assessment (40%)

**Textbooks/References**