| Module code | SP-4301 | | | |
|-----------------|--|------------------------|----|------------|
| Module Title | Characterization and Evaluation of Materials | | | |
| Degree/Diploma | Bachelor of Science (Applied Physics) | | | |
| Type of Module | Major Option | | | |
| Modular Credits | 4 | Total student Workload | 10 | hours/week |
| | | Contact hours | 4 | hours/week |
| Prerequisite | None | | | |
| Anti-requisite | None | | | |

Aims

This module aims to engage students to develop practical and analytical skills in the principal techniques for materials characterization.

Learning Outcomes

On successful completion of this module, a student will be expected to be able to:

| Lower order : | 0% | None | |
|----------------|-----|--|--|
| Middle order : | 30% | - explain and interpret microstructures and their relationship with proper | |
| | | - choose methods for the evaluation of materials for specific applications | |
| Higher order: | 70% | - perform tests for the suitability of materials for given applications | |
| | | - explain and apply test data from materials evaluation | |
| | | - interpret and apply materials specification data | |
| | | - work independently and also collaboratively in a team | |
| | | - interpret the results of analyses, and make appropriate reports and | |
| | | presentations for effective communication | |

Module Contents

- Material properties and how these determine material choice for specific applications
- Concepts of atomic, chemical, and micro- structures
- Structure-property relationships
- Overview of many techniques in mechanical, thermal, microstructural, surface, and non-destructive characterization, including: thermal analysis, X-ray methods, optical microscopy, scanning electron microscopy, electron probe micro-analysis, tensile tests, 3-point bend tests, micro-hardness, NMR, NDT, optical spectroscopy, and impedance spectroscopy.
- Practical demonstration of NDT, optical spectroscopy, and impedance spectroscopy.

| Assessment | Formative | In-class questions and feedback |
|------------|------------|---------------------------------|
| assessment | | |
| | Summative | Examination: 0% |
| | assessment | Coursework: 100% |
| | | - 2 class tests (30%) |
| | | - 5 laboratory reports (50%) |
| | | - 1 project (20%) |