# *HIGHER NITEC* IN BIOTECHNOLOGY

## CERTIFICATION

Credits required for certification:

| | | |
|---|---|---|
| Core Modules | : | 47 |
| Life Skills Modules | : | 9 |
| Elective Modules | : | 4 |
| Total | : | 60 |

## COURSE STRUCTURE

| Module Title | Credits |
|---|---|
| **CORE MODULES** | |
| Introductory Chemistry | 5 |
| Analytical Chemistry | 4 |
| Laboratory Techniques and Quality Control | 3 |
| Laboratory Mathematics and Data Analysis | 8 |
| General Microbiology | 7 |
| Analytical Biochemistry | 6 |
| Molecular Bioscience | 6 |
| Industry Attachment | 8 |
| **ELECTIVES (COURSE SPECIFIC)** | |
| Tissue Culture Techniques | 2 |
| Medical Laboratory Practice* | 2 |
| Essentials in Environmental Science | 2 |
| Introduction to Cosmetic Science | 2 |
| Urban Farming Laboratory Techniques | 2 |
| **ELECTIVES (GENERAL) AND LIFE SKILLS MODULES** | |
| For details, click here | |

*Note: The offer of electives is subject to the training schedule of respective ITE Colleges. Students are advised to check with their Class Advisors on the availability of the elective modules they intend to pursue.*

* *Students, who opt to study the Elective Module – Medical Laboratory Practice in Year 2 of study, are required to undergo Health Screening for Hepatitis B. Students will be reassigned to another elective if they are found to be Hep B positive.*

## MODULE OBJECTIVES

### Core Modules

#### Introductory Chemistry

On completion of the module, students should be able to perform manual titration, as well as identify the common elements of organic molecules, nomenclature used, chemical structure and bonding, common functional groups, and the properties associated with the various functional groups of organic compounds.

#### Analytical Chemistry

On completion of the module, students should be able to perform analysis using simple equipment to perform pH test, automated titration, physical tests, extractions, gravimetric and particle size analysis.

#### Laboratory Techniques and Quality Control

On completion of the module, students should be able to prepare stock solution and perform dilution, maintain the quality standards of chemical laboratory, including record-keeping for traceability purposes, calibration of measuring instruments, and application of quality control tools for laboratory applications.

### Laboratory Mathematics and Data Analysis
On completion of the module, students should be able to apply the various mathematical principles such as algebra, logarithms and graphs construction for laboratory operations and analysis. They should also be able to collate data and perform basic functions using common software programme.

### General Microbiology
On completion of the module, students should be able to handle the micro-organisms safely, perform isolation of micro-organisms, identify the characteristics of common groups of micro-organisms, and perform various techniques for their microscopy and cultivation.

### Analytical Biochemistry
On completion of the module, students should be able to perform the analysis of biological compounds using various biochemical and chromatographic techniques as well as to interpret the results obtained.

### Molecular Bioscience
On completion of the module, students should be able to perform various molecular biology techniques for the manipulation and analysis of proteins and DNA.

### Industry Attachment
Students are provided with the opportunity to work in a laboratory-based environment to gain hands-on training in the real work environment.

## Electives (Course Specific)

### Tissue Culture Techniques
On completion of the module, students should be able to apply the fundamentals of tissue culture, and to prepare culture media, as well as seeding and propagating cell cultures in a tissue culture laboratory.

### Medical Laboratory Practice
On completion of the module, students should be able to perform basic preparative and analytical techniques which are relevant to a medical diagnostic laboratory.

### Essentials in Environmental Science
On completion of the module, students should be able to perform tests on air, water and effluent waste in monitoring of environment and pollution in the manufacturing industries.

### Introduction to Cosmetic Science
On completion of the module, students should be able to prepare simple cosmetic products using basic formulations as well as to perform stability tests to apply the safety concept of cosmetic evaluations based on international legislations.

### Urban Farming Laboratory Techniques
On completion of this module, students should be able to perform quality testing on growth media (water, soil, compost, etc.) for the aquaculture and agriculture industries.

## Electives (General) and Life Skills Modules
For details, click here.