

# Advanced Diploma in Built Environment Engineering

## 16 Modules + 1 IA/ Integrated Project

### Module Synopsis

#### 1. Environmental Health & Safety (45 hrs)

To familiarize students with the safety and health hazards in the construction industry and be able to implement and audit the Safety Management System. Introduction to basic principles of environmental health and safety practices and creating awareness of public and occupational health and safety requirements associated with the environment.

*Assessment Weightage: 30% Group Presentation(s) | 30% Field Work | 40% Exam*

#### 2. Intelligent Systems for Building (45 hrs)

This module covers broad fundamentals of building services design and the function of services in commercial buildings and their importance to the core business in areas of electrical services, lighting, heating, ventilation and air conditioning, lifts and water.

*Assessment Weightage: 20 % Individual Assessment/tutorial | 20% Field Work | 60% Exam*

#### 3. Engineering Materials (45 hrs)

To provide an introductory overview of the various materials used in civil and construction engineering and their fundamental principles of structural, physical and long-term performance. At the end of the course, students able to understand various civil and construction engineering material applications and detailing in structural and non-structural building components. Students will gain a comparative knowledge of material properties and possible applications in construction and architecture.

*Assessment Weightage: 20% Group Presentation(s) | 20% Field Work | 60% Exam*

#### 4. Soil Mechanics (45 hrs)

This module introduces to the geotechnical engineering that deals with the engineering properties of various soils, its processes and fundamentals of soil behavior, and skills that will allow them to apply their knowledge to solve real-life problems. This module utilizes a systems approach to the dynamic nature of soil. After completing this course, students will acquire sufficient knowledge and develop critical skills that will enable them to solve practical problems related to soil mechanics.

*Assessment Weightage: 20 % Individual Assessment/tutorial | 20% Group Presentation | 60% Exam*

## **5. Construction Management (45 hrs)**

To provide students with knowledge of the various forms of project delivery methods (Design-Bid-Build, Design-Build, and Construction Management) and the underlying principles for choosing the appropriate system. Students will learn to recognize the complexity of the pre-construction process including conceptual estimating and scheduling, life cycle costing, constructability reviews, value engineering, risk management and special contract requirements.

Assessment Weightage: 20 % Individual Assessment/tutorial | 20% Group Presentation | 60% Exam

## **6. Project Management & Global Sustainability (45 hrs)**

To provide students with the knowledge of principles of project management and their applications in construction projects. Techniques in managing construction projects will be taught including project planning, cash flow analysis, Gantt chart, and critical path methods using network diagrams.

Assessment Weightage: 30% Group Presentation(s) | 30% Business Report/ Case Studies | 40% Exam

## **7. Structural Engineering Drafting (45 hrs)**

Students will learn the basics of technical drawing (sketching/scaling, basic CAD/computer skills, lettering and line work, math as it relates to drawing, architecture, orthographic projection, dimensioning, pictorial drawings, advanced CAD skills, etc.) through a series of projects / assignments.

Assessment weighting: Coursework assignments - 100%

## **8. Structural Analysis (45 hrs)**

To provide students with an introduction to structural systems and basic analysis methods for beams, frames, and trusses. Topics covered include the analysis of statically determinate and indeterminate structures, deflection calculations, influence lines, and an introduction to the stiffness method.

Assessment Weightage: 20 % Individual Assessment/tutorial | 20% Group Presentation | 60% Exam

## **9. Structural Design (45 hrs)**

To provide students with an understanding of the structural design process, the mechanics of reinforced concrete, and the ability to design and proportion structural concrete members including slabs, beams, and columns for strength, serviceability, and economy. Design procedures are based on Eurocode 2 standards.

Assessment Weightage: 20 % Individual Assessment/tutorial | 20% Class Test | 60% Exam

## **10. Applied Mechanics (45 hrs)**

\*This module reviews the fundamental concepts of statics and mechanics of materials and their applications to engineering problems. The topics involve the fundamentals of structural mechanics, material behaviour and simple failure models leading to the appreciation of performances and applications of various types of structures. Both mechanics of rigid bodies and deformable bodies are covered.

Assessment Weightage: 20 % Individual Assessment/tutorial | 20% Class Test | 60% Exam

## **11. Innovation (45 hrs)**

This course provides an overview of technology innovation activity, including evaluation and planning of a new business, financing, team building, product development, marketing and operational management issues, intellectual property protection, alternative models for revenue and growth, and exit strategies.

Assessment Weightage: 60 % Individual Assessment/tutorial | 40% Group Presentation

## **12. Engineering Mathematics 1 (45 hrs)**

To provide students with the knowledge of limits, continuity, differentiation, applications, definition of the integral, and fundamental theorem of integral calculus.

Assessment Weightage: 20 % Individual Assessment/tutorial | 40% Class Test | 40% Exam

## **13. Engineering Mathematics 2 (45 hrs)**

To provide students with the knowledge to apply integration, differentiation, and integration of transcendental functions and methods of integration, L'Hopital's rule, conic sections, parametric equations, polar coordinates, infinite series.

Assessment Weightage: 20 % Individual Assessment/tutorial | 40% Class Test | 40% Exam

## **14. Urban Planning & Design (45 hrs)**

This module provides students with a thorough understanding of the urban planning modes and their historical and socioeconomical contexts. It covers zoning, planning modules and plan-making processes. Zoning as the most fundamental tool managing city development and urban life will be elaborated. Topics of the nature and characteristics of urban planning models such as the Utopian City, the Garden City, the City Beautiful, Neighborhood Unit, and New Town movement, will be covered.

Assessment Weightage: 20 % Individual Assessment/tutorial | 20% Group Presentation | 60% Exam

### **15. Data Analysis for Built Environment (45 hrs)**

This module comprises several mini-projects on programming and data analysis. It is designed to develop students' interest, confidence and ability to read and write computer programmes. Students will also be able to conduct basic data analysis on given sets of data. Students will be competent in incorporating programming components, such as data types, arrays, functions, loops, and decision-making structures, into their programmes. They will make use of these programming skills to organize data and present statistics in a meaningful way for subsequent correlation analysis and regression analysis.

*Assessment weighting: Practical / Project Approach - 100%*

### **16. Green-Sustainability Engineering (45 hrs)**

This course introduces students to professional skills that are integral to an engineering workplace. The focus is on integrating professional skills with technical skills. Students will be asked to apply their theoretical learning to engineering-based assessments. The course will also introduce students to sustainability and 'Green' engineering concepts.

*Assessment Weightage: 60 % Individual Assessment/tutorial | 40% Group Presentation*

### **17. Industrial Attachment\*/Integrated Project (6-month)**

The aim of the industrial attachment is to foster professionalism in student development by placing them in real-world working environment within the context of the industry to develop further their practical skills. This is to bring out the some theoretical underpinnings of the classroom context to a demonstration of their understanding and applications to the dynamic industry. Students are expected to be placed in engineering traineeship position in establishments in the industry to meet the internship criteria for a period of six months.

\* Industrial Attachment (IA)

- Student is entitled to only one Industrial Attachment posting; and
- No further IA posting will be arranged if the student withdraws or is terminated by the IA training partner.
- In the event where student could not be placed as traineeship (IA); due to various reason, he/she will do an integrated project with guidance from NIM IA Lecturer or an appointed member of the academic staff.