

MECHANICAL ENGINEERING COURSE MODULES

Picture an eco-car that has the best of all worlds - super sleek, and with an engine that's quiet yet powerful and fuelefficient. With the Diploma in Mechanical Engineering [ME] to give you a head start into building such sleek technology, you'll soon be winning on all fronts. One of the core disciplines of engineering, mechanical engineering is needed practically everywhere - from automotive and energy sectors to computer and biomedical industries.

A highly versatile course, ME provides a broad-based education that enables you to excel in diverse career choices. Its strong emphasis on applied design thinking skills gives you an edge in creating innovative solutions for using clean energy, developing new materials and processes, designing and manufacturing products that range from consumer products to medical devices.

In your first year, you will learn the fundamentals of mechanical engineering with a focus on materials and design skills. It covers modules such as Thermofluids, Materials & Manufacturing Technology and Mechanical Engineering Fundamentals. In your second year, you will be introduced to core mechanical engineering modules such as Applied Mechanics and Strength of Materials.

In your final year, you will get to choose one of four specialisation options, and work on a final-year project that involves the design and development of a new product prototype with real-world application. Or you can round off your learning journey with a local or overseas internship with established organisations such as ST Kinetics and A*STAR.

LEVEL 3.1

Engineering System Design 2

This module will equip students with the fundamental knowledge and practice for the design of multiple discipline projects. Case studies where working examples are used to introduce and reinforce the knowledge acquired by students through lectures. A project is used to enhance and cultivate analytical thinking and independent learning in the design environment.

Instrumentation & Control

This module will cover instruments, feedback control systems, control components, system performance and stability. Topics include concepts of feedback control, principles and application of measuring sensors, control valves, control modes, use of analytical tools for system performance and stability analysis, servo control systems, and process control applications.

Mechanics of Machines & Materials

This module will provide students with the experience of solving engineering problems based on the principles and theories covered in the earlier Mechanics modules. Topics include velocity and acceleration diagrams, effects of the mass of members of mechanism, friction mechanisms and the effects of friction on screw threads and belt drives, balancing of shafts and its application to gears and pulleys, and the causes and control of machinery vibration.

Project Management

This module aims to provide students with a thorough understanding of projects and project management techniques such as project planning, scheduling and controlling using network analysis such as Critical Path Method (CPM), Gantt Charts and Program Evaluation & Review Technique (PERT). The major topics include Introduction to Projects and Project Management, CPM, Resource Scheduling, Project Costs, Project Control and PERT. The module is supplemented with tutorial assignments. Case studies are included to reinforce basic understanding and concepts which can be applied in practical situations.

LEVEL 3.2

Six-month Internship

The six-month internship will provide students with the opportunity to apply the knowledge acquired in the classroom to work situations, and demonstrate problem solving, communication and interpersonal skills in a work environment. The programme enables students to hone their ability to work independently and in teams, while they take on one or more practical projects under the supervision of industry practitioners. The objective is to develop a professional approach to work based on the relevant code of practice.

Or

Final-year Project

In this module, students will work in teams to design and develop a product or system related to the final-year specialisation module. In the project, students learn to apply their knowledge and skills in creative problem solving, engineering and design, teamwork and project management. This module focuses on the identification of problem or need, research and design. Student are required to fabricate the prototype, assemble the parts, test and refine the prototype, and prepare the refined design and a project report. Students are also required to do a final presentation to a panel of examiners.

Elective Module:

- **Automotive Technology & Motorsports**

This activity-based module covers the structures, functions, main components and operations of land vehicles and motorsports, including recent development of 'green' vehicles. The module will prepare students to undertake an automotive project, which takes them through the complete cycle of idea generation, design, manufacturing, testing and presentation.

- **Biomedical Applications**

This activity-based module covers biomechanics and rehabilitation engineering, biomaterials and implant, and medical imaging with rapid prototype. The module will prepare students to undertake a biomedical application project, which involves the complete cycle of idea generation, design, manufacturing, prototype testing, report and presentation.

- **Design Innovation**

This activity-based module covers the design, innovation and development process involving problem research and definition, target user group and product design specifications, aesthetic and ergonomic requirements. The module will prepare students to undertake a design innovation project, which involves the complete cycle of idea generation, design, manufacturing, prototype testing, report and presentation.

- **Environment & Energy Systems**

This activity-based module covers environmental issues and energy saving in mechanical systems, alternative and renewable energy sources, and the heat transfer principles and design requirements and applications of air-conditioning systems. The module will prepare students to undertake an environment and energy system project, which involves the complete cycle of idea generation, design, manufacturing, prototype testing, report and presentation.

COURSE CURRICULUM

Module Name	Credit Units
YEAR 3	
Level 3.1 (22 hours per week)	
Instrumentation & Control	5
Mechanics of Machines & Materials	5
Engineering System Design 2	5
Project Management	3
Project ID: Connecting The Dots^	4
Level 3.2 (22 hours per week)	
6-Month Internship/Final-year Project *	22
*Elective Module (FYP only)	
>Automotive Technology and Motor Sports OR	
>Biomedical Applications, OR	
>Design Innovation, OR	
>Environment & Energy Systems	

Notes:

^ For more details on Interdisciplinary Studies (IS) electives, please log on to www.np.edu.sg/is/

IS Modules

The School of Interdisciplinary Studies (IS) delivers a broad-based curriculum, which nurtures a new generation of professionals with multidisciplinary skills and an innovative and entrepreneurial spirit to meet the challenges of a knowledge economy. IS offers both prescribed modules and electives to challenge boundaries. Prescribed modules develop students' competencies in core areas such as Communication, Innovation and Enterprise, Culture and Communication, and Personal Mastery and Development, while elective modules provide insights into Arts and Humanities, Business, Design, and Science and Technology.