Part-Time Student Handbook 2023

School of Mechanical and Aerospace Engineering

MAE PT Student Handbook 2023 e-version 1.1

This Handbook is based on information available at the time of publication. The School reserves the rights to make changes without notice. Students are advised to check the School's website and their NTU emails regularly for updated information.

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The School

Vision

A global leader in education and research in Mechanical and Aerospace Engineering, preferred by students, industry and the community.

Mission

To provide world-class education and conduct cutting-edge research to achieve international eminence and to nurture leaders and professionals to serve society with integrity and excellence.

Key Faculty Members

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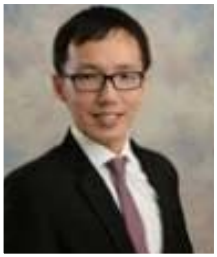
Key Faculty Members



Assistant Chair (Students)
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FYP Coordinator
Professor Li Hua
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Pastoral Care Unit

The Pastoral Care Unit is an embodiment of skills, knowledge and services which the School offers to promote a healthy, enjoyable and fruitful campus life for students. It ensures that all MAE students have access to counselling pertaining to academic matters, financial issues, relationships problems et cetera. Where academic performance is concerned, this unit assists the students in identifying their areas of difficulty and developing strategies to improve their academic performance. This unit also helps to administer the School's Peer Tutoring Programme. (More information)

Contact Point

Asst Prof Ng Bing Feng

Pastoral Care

Phone: 6790 4163 Office: N3.2-02-78

Email: bingfeng@ntu.edu.sg

Undergraduate Office

This unit provides a variety of administrative services for our undergraduate students. Tel: 6790 5492 Location: N3-02a-14 Email: **askMAE@ntu.edu.sg**

Ms Soh Mei Zhen
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General Contact Information

Department / Enquiry of General Issues such as…	Location / General Contact
Office of Academic Services *Please refer to Student Intranet for more information on:* *-Course Registration Matters* *(Step-by-Step Guide, STARS planner, Registration schedule, Class schedule)* *-Examination Matters* *(examination timetable and venue, examination results, GPA system)* *-Administrative Matters* *(change of personal particulars, apply for semester leave, change of programme, withdraw from NTU)*	**Location:** Student Services Centre, Level 2 **Office Operating Hours:** **Mon to Thu**: 8.30am to 5.45 pm **Fri**: 8.30am to 5.15 pm **For enquiries on Matriculation/Change of Programme/Leave of Absence** **Tel:** 6592 2451 **Email:** matric@ntu.edu.sg **For enquiries on Course Registration** **Tel:** 6592 2445/ 2446 **Email:** regn_course@ntu.edu.sg **For enquiries on Examinations/Transcripts/ Degree Certificates** **Tel:** 6592 2447/ 2448 **Email:** exam@ntu.edu.sg
University Wellbeing Office *Professional counseling, group programmes and talks, training workshops*	**Location:** University Health Service Building, #02-01 **Office Operating Hours:** **Mon to Thu**: 8.30am to 5.45 pm **Fri**: 8.30am to 5.15 pm **Tel:** 6790 4462 **Email:** NTUwellbeing@ntu.edu.sg (More Information)
Centre for IT Services *Computer account, resetting password, unlocking of NTU Network or Windows Live account, email application matters*	**IT Service Desk:** 1) Phone Hotline 6790 4357 2) ServiceNow **IT Service Counter:** • One Stop @ SAC, NS3-01-03/03A

General Contact Information

Department / Enquiry of General Issues such as…	Location / General Contact
Centre for Excellence in Learning and Teaching *NTULearn e-learning portal*	**Location:** One Stop @ SAC, N3-01-03 **Tel:** 6790 4357 (from 7:00am to 11:00pm daily) NTULearn
Medical Centres *Fullerton Healthcare @ NTU* *NTU Chinese Medicine Clinic @ School of Biological Sciences*	**Location:** University Health Service Building **Consultation Hours:** **Mon to Fri:** 8.30am – 9.00pm **Sat:** 9.30am – 12.00pm **Tel:** 6793 6974 or 6793 6828 **Location:** School of Biological Sciences, SBS-01s-68 **Consultation Hours:** **Mon, Tue, Wed, Fri, Sat:** 9.00am – 5.00pm **Thu:** 9.00am – 5.30pm, 6.00pm – 8.30pm **Tel:** 6592 1732 or 6592 1733
Office of Finance *All financial matters*	**Location:** One Stop @ SAC, N3-01-03 **Office Operating Hours:** **Mon to Thu:** 8.30am to 5.00 pm **Fri:** 8.30am to 4.45 pm Closed on Sat, Sun & Public Holidays **Tel:** 6790 4619 / 6790 5060 **Email:** UBS@ntu.edu.sg

Programme Educational Objectives

The Programme Educational Objectives of the B.Eng. (Mechanical) programme are to:

(i) Prepare students for successful careers, with the ability to engage in life-long learning.

(ii) Train students to apply knowledge of mathematics, science and engineering to the solution of engineering problems.

(iii) Teach students to conduct experiments, and to analyse and interpret experimental data to arrive at valid conclusions.

(iv) Develop students' skills in the engineering design process, including the ability to formulate problems, to think creatively, to communicate effectively, and to synthesize solutions to meet the desired needs.

(v) Enable students to work collaboratively in teams and understand the fundamentals of project management.

(vi) Impart in our students an understanding of their professional and ethical responsibilities, and the impact of engineering solutions in a societal context.

Overview of the Curriculum

Curriculum Structure

Academic Unit Requirement

Core	Major PE	CC	FC	BDE	Total
72	6	15	5	0	98

The curriculum structure for the Part-Time B.Eng. (Mech) Engineering programme comprises of the following categories of requirements:

I. Core Courses (Core) – These are compulsory courses required to satisfy a programme's requirement.
II. Major Prescribed Elective (Major PE) – These are courses for specialization in a particular degree programme
III. Common Core (CC) – This is a common curriculum requirement across the university.
IV. Foundational Core (FC) – These are required foundational courses for broadening study.
V. Broadening & Deepening Elective (BDE) – These are optional courses for specialization in a particular degree programme.

Prerequisites

Some courses may only be offered to students who have obtained at least the specified grade in related courses offered at a lower level. These lower-level courses are called the "prerequisites" for the higher-level courses.

Table of Curriculum

Courses offered are subject to changes due to future curriculum planning. Students are advised to check the part-time programme webpage for updated information.

Year of Study	Semester 1	Semester 2	Special Term
Year 1 **23 AU**	EG2810 Mathematics A (4 AU) PH1012 Physics A (4 AU) MA2001 Mechanics of Materials (3 AU) HW0001 Introduction to Academic Communication (0 AU) *	MA1001 Dynamics (3 AU) MA1008 Introduction to Computational Thinking (3 AU) MA2006 Engineering Mathematics (3 AU) CC0005 Healthy Living & Mental Wellbeing (3 AU)	
Year 2 **25 AU**	MA2003 Introduction to Thermo-fluids (3 AU) MA2024 Engineering Materials & Manufacturing Processes (3 AU) MA2005 Engineering Graphics (3 AU) CC0002 Navigating the Digital World (2 AU)	EG1001 Engineers in Society (2 AU) MA2002 Theory of Mechanism (3 AU) MA2009 Introduction to Electrical Circuits & Electronic Devices (3 AU) MA3002 Solid Mechanics and Vibration (3 AU) CC0001 Inquiry & Communication in the Interdisciplinary World (2 AU)	MA2071 Laboratory Experiments (1 AU)

* For students who failed Qualifying English Test.

Year of Study	Semester 1	Semester 2	Special Term
Year 3 **27 AU**	MA3001 Machine Element Design (3 AU) MA3010 Thermodynamics & Heat Transfer (3 AU) MA3005 Control Theory (3 AU) CC0003 Ethics & Civics in a Multi-Cultural World (2 AU)	MA4079 Final Year Project (2 AU) ** MA3004 Mathematical Methods in Engineering (3 AU) MA3006 Fluid Mechanics (3 AU) MA0218 Introduction to Data Science & Artificial Intelligence (3 AU) HW0288 Engineering Communication (2 AU)	MA4079 Final Year Project (2 AU) ** MA3071 Engineering Experiments (ME) (1 AU)
Year 4 **23 AU**	MA4079 Final Year Project (2 AU) ** MA4001 Engineering Design (4 AU) MA4002 Fluid Dynamics (3 AU) MA48xx Major PE 1 (3 AU)	MA4079 Final Year Project (2 AU) ** MA48xx Major PE 2 (3 AU) CC0006 Sustainability: Society, Economy & Environment (3 AU) CC0007 Science & Technology for Humanity (3 AU)	

** The 8 AU academic workload of MA4079 Final Year Project is spread over three semesters and one special term (i.e. 2+2+2+2 = 8 AU); however, the tuition fees for this module are billed over the first two semesters (i.e. 4 AU will be billed in Year 3 Semester 2 and another 4 AU will be billed in Year 4 Semester 1).

Laboratory Experiments and Project

MA2071 Laboratory Experiments (ME) and MA3071 Engineering Experiments (ME) are scheduled in the special terms of your second and third year of study respectively.

For MA2071, students are required to complete ten laboratory experiments consisting of nine Log-Sheet and one Technical Report submissions.

For MA3071, students are required to complete six laboratory experiments and one project.

Attendance for Laboratory Experiments and Project is COMPULSORY. A medical certificate (MC) or approved leave of absence will be required if you are absent.

Each student will be assessed on his/her performance during the laboratory sessions (i.e. CA – Continual Assessment) and the individual written assessments (Log Sheet or Technical Report). If you are absent from any lab session without MC or approved leave, you will be marked Absent (ABS) and will be given Zero Marks for that session.

The weights for the MA2071 experiments are given in the following table:

9 Log-Sheet Experiments		**1 Technical Report Experiment**	
80%		20%	
CA	Log Sheets	CA	Report
50%	50%	50%	50%

The weights for the MA3071 experiments and project are given in the following table:

6 Experiments		**1 Project**	
50%		50%	
CA	Log Sheets	CA	Report
50%	50%	50%	50%

Submission of Reports

Students will submit the project report to the respective supervisor for assessment by the last lab session or as instructed by the course coordinator. It is the student's responsibility to complete the report before the assessment deadline.

Locations of Laboratories

- CAE Lab 1 (N3-B3b-05)
- Energy Systems Lab (N3.1A-B4-01)
- Fluid Mechanics Lab (N3-B2b-03)
- Heat Transfer Lab (N3-02a-01)
- Manufacturing Process Lab 1 (LHN-B4-03)
- Manufacturing Process Lab 2 (LHN-B4-06)
- Materials Lab 1 (N3.1-B2b-02)
- Mechanics of Machines Lab (N3-B1c-03)
- Mechanics of Materials Lab (N3.2-B2-01)
- Mechatronics Lab (N3.2-B1-03)
- Metrology Lab (N3.1-B3b-03)
- Thermal & Fluids Lab (N3-B2c-06)

For more information, students may contact **Dr Sellakkutti Rajendran** (Lab Coordinator) |6790 6891|N3-02c-78| msrajendran@ntu.edu.sg

Final Year Project

The final year project (FYP) is an integral and important part of the degree programme. It is equivalent to 8 academic units (AUs), and the award of honours is dependent upon the student's performance in the FYP.

You will commence your FYP in Semester 2 of the third year of study. It is to be completed over three semesters and one special term. No extension of this period is allowed.

In order to qualify for commencement of the FYP, students must have:

(a) Gained Waiver of MA2079 Engineering Innovation & Design (EID) and MA3079 Professional Internship (PI), and
(b) Accumulated at least 57 AUs

All students who have met the above requirements are required to embark on the FYP immediately at the beginning of the following semester. No delay in the commencement of the FYP is allowed.

If a student has successfully obtained waiver of EID/PI but is unable to accumulate the required number of AUs after completing his third year of study, he will be permitted to commence his FYP only after he has accumulated the required number of AUs following another semester of study.

All FYP students are strongly advised to consult their project supervisors on a regular basis as such meetings are very necessary and important to the students' progress and performance in the projects. All FYP students are required to submit FYP reports and undergo oral presentations for their FYP at the end of the project. The oral presentations are scheduled immediately after the examination period.

FYP students who have to go for in-camp training or overseas business assignment on the scheduled date of the oral presentation are required to

submit supporting documents to the FYP coordinator as soon as it is known so that an alternative (earlier) date can be arranged for their oral presentation.

If the student's progress is unsatisfactory, the supervisor may recommend an extension of the project beyond the three semesters and one special term duration. Such extension, if approved by the School, will come with a substantial penalty on the student's grade for the FYP. If a student fails his/her FYP, he/she has to do a new FYP with a different supervisor for another three semesters and one special term period.

The School will notify students by email when they become eligible to start FYP.

For more information, students may contact **Prof Li Hua** (FYP Coordinator) |6790 4953|N3-02c-79| lihua@ntu.edu.sg

Course Description

(Listed in alphabetical-numerical order)

CC0001 Inquiry and Communication in an Interdisciplinary World (2 AU) Foundational course to develop written and oral communication skills, ability to read and analyse texts, to understand revision as integral to the process of composition, to convey interpretations and ideas with confidence and clarity, and to consider audience and purpose when communicating	**Pre-requisite:** HW0001 (co-requisite)
CC0002 Navigating the Digital World (2 AU) To equip students with problem-solving techniques with the aid of computers, to acquire some common but essential digital skills,to apply the concept of computational thinking and quantitative reasoning to solve problem and analyse data, to identify online threats and understand the principles of ethics and intellectual property rights, to be exposed to current issues, such as cybersecurity and the rise of fake news, to use some of the latest online tools for effective presentation, communication, and collaborative skills in teams.	**Pre-requisite:** Nil
CC0003 Ethics & Civics in a Multicultural World (2AU) To equip students with the philosophical foundations necessary to understand theories of ethics, to apply those theories to real-life scenarios and issues, to critically assess the civic institutions, to examine the nature of ethics; topics to be explored include human rights, democracy, freedom of speech, inequality, and sexuality, the rights and duties of citizenship	**Pre-requisite:** Nil

CC0005 Healthy Living & Wellbeing (3 AU)	**Pre-requisite:**
To examine what constitutes living a good, healthy and flourishing life, be it through improving one's physical fitness, seeking authentic relationships with others, or making a positive change in the environment, to know and understand how the different components of a 'good life' contribute to one's overall functioning and wellbeing	Nil

CC0006 Sustainability: Society, Economy & Environment (3 AU)	**Pre-requisite:**
To inspire a long-lasting mindset of awareness, critical thinking, curiosity, and collaboration across disciplines through the lens of current sustainability challenges, to analyze sustainability issues from different perspectives (social, economic, and environmental) and on different scales (individual, organizational, Singaporean, and global), to use these skills to discuss and propose solutions for sustainability challenges facing Singapore and the world	Nil

CC0007 Science & Technology for Humanity (3 AU)	**Pre-requisite:**
To inspire a long-lasting mindset of awareness, critical thinking, curiosity, and collaboration across disciplines through the lens of contemporary and near-future challenges for human communities in relation to scientific and technological innovations, learn to perceive and analyze the potential benefits and costs of scientific/technological innovations and applications from different perspectives and on different scales to use these skills to identify real-life challenges and to propose solutions	Nil

EG1001 Engineers in Society (2 AU)	**Pre-requisite:**
To provide a general understanding of the society we live in and the engineers' roles and responsibilities towards society's well-being, covers a wide range of topics including the history of engineering, engineering ethics and practices, sustainability, and contributions by engineers towards society in the future	Nil

EG2810 Mathematics A (4 AU)	**Pre-requisite:**
Functions and Derivatives; Integration; Complex numbers and Vectors; Power Series; Multivariable Functions & Partial Derivatives; Ordinary Differential Equations	Nil

HW0001 Introduction to Academic Communication (0 AU)	**Pre-requisite:**
Introduction; Drafting clear paragraphs; Constructing clear and concise sentences; Reading and oral skills	Nil

HW0288 Engineering Communication (2 AU)	**Pre-requisite:**
Concepts in engineering communication and advanced professional communication skills, with reference to technical communication and the Final Year Project, and Communication in the contemporary workplace	CC0001

MA0218 Introduction to Data Science & Artificial Intelligence (3 AU)	**Pre-requisite:**
Data-Analytic Thinking; Data Pipeline; Data Presentation; Data-driven Inference; Data-driven Identification; Digital Storytelling; Artificial Intelligence; Reinforcement Learning and AI; Ethics in DS&AI; State-of-Art in DS&AI	MA1008

MA1001 Dynamics (3 AU)	**Pre-requisite:**
Kinematics of Particles; Kinematics of Rigid Bodies; Kinetics of Particles; Kinetics of Rigid Bodies	Having read PH1012 and EG2810

MA1008 Introduction to Computational Thinking (3 AU)	**Pre-requisite:**
Concepts of Computational Thinking; Overview Programming Language; Basic internal operation of computer; Basic program structure; CT concept; Limit of computing; Computing Trends; Social-Ethical Issues and Ramifications of Computing	Nil

MA2001 Mechanics of Materials (3 AU)	**Pre-requisite:**
Review, Stress and Strain; Torsion; Shearing Stress in Beams; Transformation of Stress and Strain; Deflection of Beams; Columns	Nil

MA2002 Theory of Mechanism (3 AU)	**Pre-requisite:**
Fundamental Concepts of Mechanisms; Gears and Gear Train; Motion in Mechanisms: Kinematic Analysis; Motion in Mechanisms: Static-Force Analysis; Motion in Mechanisms: Dynamic-Force Analysis; Design and Analysis of Cam-and-Follower Systems	MA1001

MA2003 Introduction to Thermo-fluids (3 AU)	**Pre-requisite:**
Properties of pure substances; Work and heat; Energy and the first law; Energy balance for closed systems and steady state control volumes; Submerged surfaces and bodies; Elementary fluid dynamics	Nil

MA2024 Engineering Materials & Manufacturing Processes (3 AU)	**Pre-requisite:**
Introduction and overview of manufacturing; Dimensions and surfaces measurement; Casting; Shaping processes for polymers; Sheet metalworking; Materials removal processes; Joining processes; Microelectronics manufacturing	Nil

MA2005 Engineering Graphics (3 AU)	**Pre-requisite:**
Orthographic projections; Pictorial views and technical sketching; Drawing standards and practices; Sectional views and machine drawings; Development of surfaces; Dimensioning standards, systems and conventions; Dimensioning features and finishes; Tolerance dimensioning and limits; Geometric dimensioning	Nil

MA2006 Engineering Mathematics (3 AU)	**Pre-requisite:**
Linear algebra; vector calculus; Laplace transformation; Fourier Analysis	EG2810

MA2009 Introduction to Electrical Circuits & Electronic Devices (3 AU)	**Pre-requisite:**
Analysis of Resistive Linear Networks; Energy Storage Elements and Transient Analysis; AC Network Analysis; Operational Amplifiers and applications; Basic semiconductor devices and applications; Logic Circuits	Nil
MA2071 Laboratory Experiments (ME) (1 AU)	**Pre-requisite:**
Consists of 10 experiments related to Year 2 core courses	Nil
MA3001 Machine Element Design (3 AU)	**Pre-requisite:**
Power transmission components; Dimensioning and tolerancing according to ISO standards, surface finish; Bearings; Threaded fasteners, power screw; Design of load carrying joints; Designing against fatigue loading and wear; Design of machine structures	Having read MA2001 and MA2002 and MA2005
MA3002 Solid Mechanics and Vibration (3 AU)	**Pre-requisite:**
Energy Methods of Analysis; Fracture Mechanics; Fatigue; Vibrations for Single-Degree-of-Freedom System; Vibrations for Two-Degree-of-Freedom System	MA2001
MA3004 Mathematical Methods in Engineering (3 AU)	**Pre-requisite:**
Partial Differential Equations (PDEs); Finite Element Method (FEM); Computational Fluid Dynamics (CFD)	EG2810
MA3005 Control Theory (3 AU)	**Pre-requisite:**
Introduction and Revision of Laplace Transform; System Responses - transient and steady; PID Controls; Root Locus Technique; Frequency Response Methods	Having read MA2006
MA3006 Fluid Mechanics (3 AU)	**Pre-requisite:**
Momentum equation and its applications; Dimensional analysis and similitude; Internal flows and piping systems; Principles and applications of fluid machines	MA2003

MA3010 Thermodynamics & Heat Transfer (3 AU)	**Pre-requisite:**
Second law and entropy. Entropy balance for closed systems and steady state control volumes. Ideal gas mixtures and psychometrics. Heat transfer: conduction, convection and radiation	MA2003

MA3071 Engineering Experiments (ME) (1 AU)	**Pre-requisite:**
Consists of 6 experiments and 1 project related to Year 3 core courses	Nil

MA4001 Engineering Design (4 AU)	**Pre-requisite:**
Product Definition; Conceptual Design; Embodiment Design; Detailed Design & Engineering; Analysis & Documentation; Mechanical Power Transmission Systems; Hydraulic & Pneumatic Systems; Electric Motors & Linear Motion Systems; Programmable Logic Control (PLC) techniques; Review of basic engineering materials properties & failure modes; Basics materials selection in design; Effect of component geometry in materials selection; Compound objectives & multiple constraint problems; Cost estimation tools	Having read MA3001

MA4002 Fluid Dynamics (3 AU)	**Pre-requisite:**
General equations of motion; Potential flow; Isentropic compressible flow; Normal shock waves, Fanno & Rayleigh line flows; Boundary layer flow; External flow; Performance characteristics of pumps & turbines; Unsteady flow	MA3006

MA4079 Final Year Project (8 AU) *This project spans across 3 semesters and 1 special term*.	**Pre-requisite:**
Students are required to analyze and synthesize problems in any of the disciplines of mechanical and production engineering through a project requiring application of basic engineering principles. The project may take any one or a combination of the following forms: feasibility study, product development, computer modelling and analysis, design and construction, testing and experimental investigation.	Accumulated at least 57 AUs and obtained waiver of EID/PI

PH1012 Physics A (4 AU)	**Pre-requisite:**
Vectors; Kinematics; Forces and Torques; Newton's Laws of Motion; Impulse and Momentum; Work and Energy; Thermal Physics; Electric Field; Magnetic Field; Motion of Charged Particles and Applications; Circuits	Nil

Major Prescribed Electives

In addition to the Year 4 core courses, students need to read two Major Prescribed Electives (Major PEs) to fulfill their programme requirement. Students may choose their Major PEs from the below specialization groups. Students who wish to specialize will have to read an additional Broadening & Deepening Elective (BDE) such that they pass one BDE and two Major PEs, with all three from the same specialization group. Specialization is optional.

Manufacturing Engineering

This provides students with a broad knowledge of materials engineering and a fundamental understanding of automated flow lines, vibratory bowl feeders, industrial robots, rapid prototyping and computer-aided manufacturing.

COURSE CODE	COURSE TITLE	OFFERED AS
MA4842	Engineering Metrology	Major PE/BDE
MA4845	Additive Manufacturing in Industry 4.0	Major PE/BDE
MA4853	Manufacturing Systems	Major PE
MA4882	Advanced Manufacturing & Materials Processing	Major PE

Systems Engineering

This helps to integrate both engineering and non-engineering disciplines in the conceptualisation, design, development (or manufacture) and distribution of products and in the collection of used products for reuse, recycling and disposal. Systems Engineers help to realise the notion of integrated development in each sector of the economy.

COURSE CODE	COURSE TITLE	OFFERED AS
MA4849	Operations Research	Major PE/BDE
MA4850	Supply Chain & Logistics Management	Major PE/BDE
MA4853	Manufacturing Systems	Major PE
MA4854	Quality Assurance & Management	Major PE/BDE

Course Description

MA4842 Engineering Metrology (3 AU)

Introduction to the fundamentals of measurement; SI system; Terminology; Calibration; Areas of metrology; Principles, Instrumentation; Application; Case studies of historical examples of famous metrological failures, various measurement examples as well as industry-based problems

MA4845 Additive Manufacturing in Industry 4.0 (3 AU)

General overview of Industry 4.0, encompasses manufacturing automation, smart manufacturing, additive manufacturing: process and systems, design and applications, case examples

MA4849 Operations Research (3 AU)

Refresher on probability models; Decision-making under uncertainty; Utility and risk analysis; Forecasting; Queuing models; Inventory models, planning and control; linear and integer programming; transportation and assignment problems; network optimization; Application to manufacturing, logistics and healthcare systems

MA4850 Supply Chain and Logistics Management (3 AU)

Introduction to supply chain management; Value of information; Multi-echelon Inventory models; Supply Chain strategies; Supply chain and logistics network design; Warehousing and transportation management; SC benchmarking and performance measurement.

MA4853 Manufacturing Systems (3 AU)

Introduction to Manufacturing Systems, Facility layout design and line balancing, Production planning, Variability, Production scheduling and shop floor control.

MA4854 Quality Assurance and Management (3 AU)

Introduction to Quality Assurance and Management including the fundamentals, philosophies, practices, tools and international standards

MA4882 Advanced Manufacturing & Materials Processing (3 AU)

(pre-requisites: MA2004/MA2024)

Essential knowledge that entails transformation of raw materials into usable forms, limitations of advanced manufacturing processes, principles associated with processes for a variety of industry use in component manufacturing and semi-conductor industries

Academic System

The University's academic structure for its undergraduate programmes is based on the Academic Unit System. The system provides opportunities for students to broaden their learning experience and progress at a pace most suited to their individual needs while maintaining high academic standards.

The main features of the Academic Unit System are the semester arrangement of the academic year and the use of Academic Units (AU) for measuring academic workload.

Academic Calendar

The academic year starts off with an orientation week. It is divided into two semesters, Semester 1 of 17 weeks and Semester 2 of 17 weeks. Examinations are held at the end of each semester. There is a special term immediately following Semester 2.

Academic Units

Under the Academic Unit System, each course is assigned a certain number of AUs. The AU is a measure of the student's workload associated with both class attendance and preparation. For a typical one-semester course, the number of AUs is calculated as follows:

- 1 hour of lecture/tutorial per week: 1 AU
- 3 hours of laboratory/fieldwork per week: 1 AU

Academic Workload

To complete the degree requirements within the normal specified period of candidature, students are encouraged to carry an academic load as specified in the Table of Curriculum. Overloading of courses is subject to School's approval.

Registration of Courses

All students must register their courses through the Student Automated Registration System (STARS) according to the schedule announced by the Office of Academic Services. Students who join any classes without registration will not be allowed to take the examination(s) for the course(s) involved.

Students with outstanding fees will be barred from course registration. Students must clear their outstanding fees at least three working days before their scheduled date of course registration or they will be denied access to STARS for course registration.

Students may add or drop any course within the add/drop period as announced by the Office of Academic Services. A course that is dropped during the add/drop period will not appear in the official transcript. A student who is still registered for a course after the add/drop period but did not subsequently sit for the examination will be deemed to have read and failed the course. An 'F' will then appear on his/her official transcript in such a case.

Freshmen in their first semester of study do not need to register as the courses will be pre-allocated by the School. However, they will have to register for courses on their own from their second semester onwards.

Freshmen Course Exemption

Students who were awarded a *Certificate of Merit* and/or have obtained a *Diploma-Plus Certificate in Mathematics and/or Science* and have met the *exemption criteria* may be considered for exemption from:

- EG2810
- PH1012
- MA1008

The School will notify students via email to apply for these exemptions before the start of their matriculating semester.

Waiver of Practical Training Modules

A Full-Time B.Eng. (Mech) student is required to pass the practical training courses, MA2079 Engineering Innovation & Design (EID) and MA3079 Professional Internship (PI), in the Second and Third Year of study, respectively.

However, a Part-Time B.Eng. (Mech) student must apply for waiver of these courses by obtaining the relevant industrial work experience on a technical job.

For waiver of EID, you need six months of full-time industrial work experience on a technical job. For waiver of PI, you need another six months of full-time industrial work experience on a technical job.

You must have gained these twelve months of experience preferably between the start of Year 1 Semester 1 and end of Year 2 Semester 1. However, if you already have prior work experience before joining NTU, your prior experience may be considered.

Wavier of EID and PI is a pre-requisite for commencing MA4079 Final Year Project (FYP) in Semester 2 of the third year of study. Hence, any delay in obtaining EID and PI waiver may lead to a delay in the completion of FYP.

The School will notify students via email to apply for waiver of MA2079 and MA3079.

Classification of Students

Students are classified as Year 1 to Year 4 according to the number of AUs earned. Students placed on Academic Warning and Academic Probation will not be re-classified until they have been restored to good academic standing.

Number of Academic Units Earned (Core and Prescribed Electives)			
Year 1	**Year 2**	**Year 3**	**Year 4**
0 - 15	16 - 39	40 - 56	57 and above

Period of Candidature

The period of candidature is as follows:

Normal: 4 years
Minimum: 3.5 years
Maximum: 6 years

Examination

The final examinations for the courses offered in the semester are held at the end of the semester. Students are not allowed to retake courses they have passed in order to improve on the grades of these courses. The grades for all attempts in all courses taken by a student are shown in his/her official transcript.

Grade Point Average (GPA) System

Grades and grade points are assigned as follows:

Letter-Grade	Grade Point
A+	5.00
A	5.00
A-	4.50
B+	4.00
B	3.50
B-	3.00
C+	2.50
C	2.00
D+	1.50
D	1.00
F	0.00

The Cumulative Grade Point Average (CGPA) represents the grade average of all courses (including failed courses) attempted by a student. The computation of CGPA is as follows:

$$\frac{[\text{Grade Point x AU for Course 1}] + [\text{Grade Point x AU for Course X}] + \ldots.}{[\text{Total AUs attempted in all the semesters so far}]}$$

Freshmen Year GPA Exemption

Effective from AY2014-15, up to six letter-graded courses with fail grades on first attempt in the Freshmen Year will be excluded from GPA computation. This applies to examinable and non-examinable courses taken in the student's first two semesters of study, including adjoining Special Terms.

GPA exemption is not applicable for courses with fail grade taken on the second or subsequent attempts in the Freshmen Year.

The unused quota of six courses will lapse after the Freshmen Year.

Students are not eligible for promotion to the next study year if their CGPA is nil arising from GPA exemptions, even if they meet the AU criteria.

The fail grade exempted from GPA computation will remain on the transcript.

Graduation Requirements

To be eligible for the award of a Bachelor's degree from NTU, a part-time student must fulfill the following conditions:

i. Successful completion of the prescribed academic unit requirement as set out by the course curriculum.
ii. A CGPA of at least 2.00 upon completion of the prescribed academic unit requirement.

The criteria for satisfactory academic standing in any given semester are:

i. Maintaining a minimum CGPA of 2.00
ii. Completing at least 75% of the normal AU workload

Academic Standing

i. Students with poor results will be accorded the following academic standing and subjected to performance review:
    - Academic Warning – if the CGPA falls below 2.00 for any given semester.

- Academic Probation – if the CGPA stays below 2.00 for the following semester.
- Academic Termination – if the CGPA is still below 2.00 for the 3rd consecutive semester, or at the end of the final semester of study.

A letter of termination will be issued. Appeal against termination on the grounds of extenuating circumstances may be made, subject to the following rules:

- The appeal must be submitted to the relevant School within 2 weeks after the release of the semester examination results or before the start of the next semester, whichever is earlier.
- Normally only one appeal is allowed per candidature.

ii. Students on Academic Warning or Academic Probation are not allowed to read more than three courses per semester.

Classification of Degree

The cut-off for each degree class is as follows:

CGPA Range	Degree Classification 4-year Courses
4.50 - 5.00	Honours (Highest Distinction)
4.00 – 4.49	Honours (Distinction)
3.50 – 3.99	Honours (Merit)
3.00 – 3.49	Honours
2.00 – 2.99	Pass

A minimum CGPA of 4.50, plus at least a B+ grade for Final Year Project (FYP), are required for the award of an Honours (Highest Distinction) degree.

Administrative Matters

Change in Personal Particulars

Postal address and contact numbers are important means of correspondence. To avoid any communication lapse, all students are advised to update his/her personal particulars via **Studentlink** whenever there is a change in address, employment or contact number(s).

Leave of Absence

Students must apply for medical leave or short leave of absence with their respective Schools if they cannot attend classes on the following occasions:

- On days when there are laboratory sessions
- On days when quizzes or tests are conducted during classes
- On any other occasions that tutor(s) or lecturer(s) deemed as compulsory for students' attendance

i. Categories of Leave Not Approved

- Returning to home country during festive periods e.g., Chinese New Year, Hari Raya, etc.
- Participating in activities (in and outside campus) organised by student bodies

ii. Medical Leave during Term Time

Students who are granted medical leave on the various abovementioned occasions must complete a Short Leave Application Form and submit the form attached with the medical certificate (MC) to the MAE Undergraduate Office via email to askMAE. The form is available here.

All medical certificates must be submitted not later than 7 working days after the medical leave. If students submit the medical certificate after the deadline, they will be given zero mark for any test or quiz that they were absent from.

iii. Medical Leave taken during Examination Periods

Students who are absent from an examination due to illness are required to upload their medical certificate by accessing the MC Submission online application via login to their StudentLink.

These applications must reach the Office of Academic Services within two working days of absence from the examination. For further details, please click here.

iv. Short Leave of Absence (< 7 days)

Students who are absent from school due to non-medical reasons like in-camp training, business trip or other personal commitments must complete a Short Leave Application Form and submit the form attached with supporting documents to the MAE Undergraduate Office via email to askMAE. The form is available here.

v. Compassionate Leave

Compassionate leave will be granted in the event of the demise of an immediate family member (defined as parents, siblings and grandparents). Normally, absence from School within 7 days of the event and on the day of the funeral is accepted as valid leave of absence on compassionate ground.

vi. Semester Leave (1 – 2 semesters)

Students who wish to apply for leave of absence for 1 – 2 semesters need to apply for their leave online via Studentlink → Administrative Matters → Semester Leave of Absence and upload the relevant supporting documents. **Application must be submitted by the end of Week 2 of the semester, otherwise the student will be required to pay the tuition and miscellaneous fees for the entire semester.** Upon receipt of the student's application, he/she

will be called for an interview if necessary. The purpose of the interview is to advise the student from an academic perspective to ensure that he/she is fully aware of the implications of taking semester leave. The Office of Academic Services will write to the student about the outcome of the application. Please refer to further details here.

Student Intranet Account / Studentlink / PIN

All students who are admitted into NTU will be given access to the NTU student network account. Students are required to log into their account with their PIN number within the first week of the semester. If student forget their PIN number, he/she can submit a request to ServiceNow for assistance. More details are available here.

A host of important information and notices such as examination time-table, examination seating arrangement, semester time-table, make-up class schedule, report submission schedule, academic calendar, application to appeal for examination results, subject registration, FYP selection, etc. can be obtained through NTU Internet website and **StudentLink**.

All students are strongly encouraged to log into the website regularly to update themselves with the latest news, events and happenings.

NTU E-Mails

NTU students' E-mail account will be allocated to all students at the beginning of his/her admission to the Part-Time B.Eng Programme. All students are strongly encouraged to **read NTU e-mails** regularly as important information to students from the School/NTU will be disseminated through this media. Lecturers may also contact students through this avenue.

Time-Table

Students may have to attend classes for 4 or 5 weekday evenings depending on the number of courses they have registered. The semester timetable can be obtained at the School website for part-time undergraduate programme.

Submission of Reports / Correspondence

Any reports to be submitted for assessment, or any correspondences, can be dropped into the collection box marked "Deposit Box" at the MAE Undergraduate Office (N3-02a-14) during or after office hours.

The opening hours of MAE Undergraduate Office are from 8.30am to 5.30pm, Monday to Thursday and 8.30am to 5.00pm for Friday, unless otherwise informed. Kindly indicate clearly the name of lecturer/tutor on the reports/correspondences intended for them.

Make-Up Classes / Lab Sessions

Should any class sessions fall on a public holiday, make-up classes may be arranged if the lecturer/tutor deemed that it is necessary. You will be notified of all make-up classes accordingly by the lecturer/tutor.

If a student misses or knows that he/she is going to miss any class test/quiz (for continual assessment), he/she should email as soon as possible the lecturer/tutor concerned to seek their acknowledgement and to enquire about any make-up test/quiz. Please be informed that these continual assessments contribute towards the overall grades for the course. In addition, the student is also required to submit the respective application forms for submission of Medical Leave or application of Short Leave, whichever is applicable, to the MAE Undergraduate Office, together with supporting documents and the acknowledgement from the lecturer/tutor.

Please note that there is no make-up lesson for laboratory sessions should the student fail to attend it.

Academic Counselor

To provide students with academic guidance, student may approach the academic coordinator of the Programme for academic advice:

Associate Professor Hoon Kay Hiang
Phone: 6790 5523
Email: mkhhoon@ntu.edu.sg
Office: N3-02c-94

Conversion from Part-Time to Full-Time

After the end of year-2 semester-2, students may be allowed to convert their candidature to full-time study. Consideration for conversion is on a case-by-case basis and students who convert to full-time study **ARE NOT** permitted to revert back to part-time study.

Students who wish to convert to full-time study are required to apply for conversion at the end of year-2 semester-2. More information can be found here.

Please note that no conversion is allowed from Year-3 semester-2 onwards.

Examination Issues

All examination matters such as examination timetable, examination rules and regulations, examination hall, seat allocation, etc. are planned by the Office of Academic Services (Examination Branch). The School may relay relevant information to you.

You will be required to sit for the examination of a course once you are registered for it, except for non-examinable courses such as lab experiments and projects. Under Statute 14 of the University's Regulations, a student who has been registered for a course and fails to take the examination for the course shall be deemed to have sat and failed the examination unless the Board of Examiners is satisfied that there is good and sufficient reason for such failure to take the examination.

All calculators to be used in the examination hall must be registered and bear a valid seal from the School. A list of approved calculators and the registration period for calculators is available on the School's website.

A certification letter can be obtained from the School to facilitate the application of examination leave from your work. Please contact the School if you require the letter.

A student who is absent from an examination on account of illness should see a doctor and obtain a Medical Certificate (MC). The MC issued by the Medical Practitioner must indicate the diagnosis of your illness on the MC. The MC submitted should cover the date(s) of the affected examination(s). The scanned copy of the MC must be uploaded online via your **StudentLink** under the MC Submission Application and should be submitted within two (2) working days of absence from the examination.

Examination Seating Arrangement

All students will be required to check their Examination Seating Arrangements on-line by logging onto the **StudentLink.**

Examination Papers

Questions of past years' examination papers submitted by the various schools are managed by NTU Libraries and made available here.

Facilities within the School

For computer facilities, the following labs will be available to you, provided that you do not interrupt any scheduled activities such as lessons, VIP visits or maintenance.

Laboratory	Location	Time Available For Use
Computer Aided Engineering Lab 1	N3-B3b-05	0830 to 1700hrs on weekdays Closed on Saturdays, Sundays and Public Holidays
Computer Aided Engineering Lab 2	N3.2-01-34	0830 to 1700hrs on weekdays Closed on Saturdays, Sundays and Public Holidays

For the use of other lab facilities apart from the scheduled lessons such as projects, you will need to get permission from your project supervisor. Your project supervisor will inform the lab concerned. Please bring along your student card for identification when you use any of the School's facilities.

Library Services

NTU Libraries provide a wide and diverse range of resources to support the NTU scholarly and research community. Currently there are eight NTU libraries on campus providing space, resources and services to support learning and research. Some of these libraries open extended hours before and during examination periods. All libraries are wireless enabled and there are more than 700 work stations available for use.

All NTU students (including part-time students) are automatically library members.

LIBRARY	LOCATION
Art, Design & Media Library	ART-01-03, 81 Nanyang Avenue
Business Library	N2-B2b-07, 50 Nanyang Avenue
Chinese Library	S3.2-B5-01, 50 Nanyang Avenue
Communication & Information Library	CS-01-18, 31 Nanyang Link
Humanities & Social Sciences Library	S4-B3c-05, 50 Nanyang Avenue
Lee Wee Nam Library	NS3-03-01, 50 Nanyang Avenue
Library Outpost	LHS-01-03, 52 Nanyang Avenue

More information can be found here. Students are encouraged to browse through the websites to familiarize themselves with the rules and regulations governing the use and loan of the library materials, as well as the procedure of searching the library through OPAC.

Photocopying Services

Photocopying services are available at all libraries, provided by commercial suppliers for user's convenience. Payment for photocopying services is by CashCard only.

Financial Assistance

NTU believes that no student should be denied the opportunity of a university education because of financial difficulties. In order to enable such students to pursue a university education, NTU offers several financial assistance programmes for students pursuing a part-time degree programme:

Financial Scheme	Brief Details (for updated info, please enquire at the **Office of Admissions and Financial Aid**)
NTU Study Loan	• Singaporean part-time students pursuing their first undergraduate degree • Must be held concurrently with the maximum 90% Tuition Fee Loan • Per capita monthly household income (PCI) <= S$2,700 • Balance of 10% of tuition fee payable, no living allowance loan option
Tuition Fee Loan	• Singaporean part-time students pursuing their first undergraduate degree • Pursuing a part-time programme due to financial reasons • Loan covers up to 90% of the subsidised tuition fee payable, does not cover compulsory miscellaneous fees and hostel fee
Post-Secondary Education Account (PSEA)	• Full-time and part-time undergraduates who have a PSEA account • PSEA scheme allows students to utilize their own and/or their siblings' PSEA funds for the payment of their tuition fees and miscellaneous fees
SkillsFuture Credit	• Every Singapore Citizen aged 25 and above will receive an initial credit of $500 • These credits can be used to offset the total course fees payable
Higher Education Bursary	• Singaporean students pursuing their part-time undergraduate degree course and receiving MOE Subsidy • Must not concurrently hold other bursaries or scholarships • Not eligible if taking only repeat modules for that semester • Gross monthly per capita household income (PCI) of less than or equal to $2,500 or Gross Monthly Household Income (GHI) of less than or equal to $10,000

	• Awarded depending on your financial situation and criteria set down by MOE

Details of the above financial schemes are posted in the Office of Admissions and Financial Aid website.

MOE Tuition Fee Subsidy

With effect from Academic Year 2011 onwards, eligible students enrolled in NTU part-time degree programmes can pay subsidized tuition fees funded by Ministry of Education (MOE):

Students must meet the following criteria in order to qualify for the subsidy:

i) Singapore Citizen (SC) or Singapore Permanent Resident (SPR) who has not previously received government subsidy/sponsorship for a first degree;

(Students who change their SC / SPR status after the admission period must update Office of Academic Services before they submit their application)

ii) Be at least 21 years of age;

iii) Has 2 years of full-time work experience or has fully discharged his full-time national service liability or is currently employed on a full-time basis.

Applications for MOE fee subsidy are submitted online when students accept an NTU Offer of Admission. Students who become eligible in their subsequent years of study may apply at the beginning of each new semester. For enquiry, students may email askMAE.

School of Mechanical and Aerospace Engineering

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www.ntu.edu.sg/mae