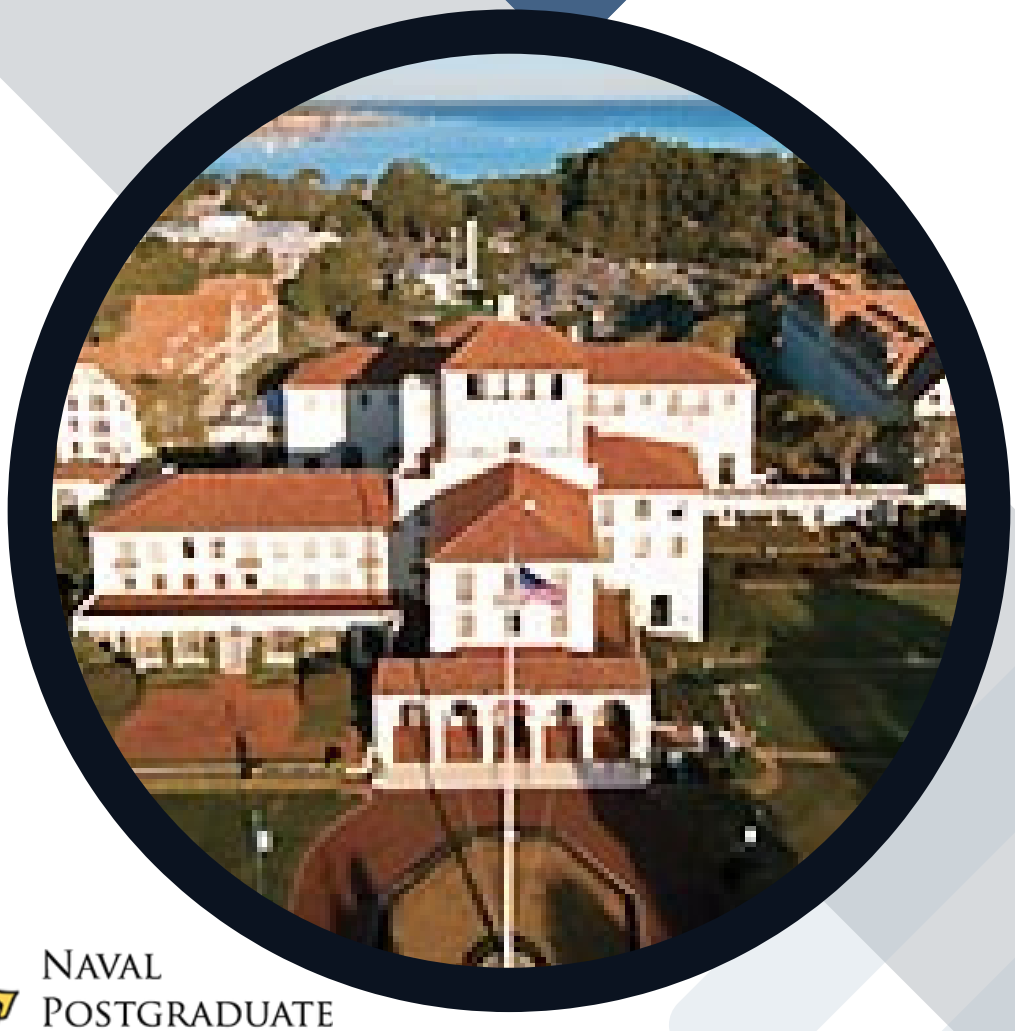
NUS National University of Singapore

TDSI Temasek Defence Systems Institute

JOINT MASTER OF SCIENCE IN DEFENCE SYSTEMS ENGINEERING AND TECHNOLOGY WITH NAVAL POSTGRADUATE SCHOOL

INFORMATION BOOKLET FOR 2026 INTAKE



NPS PRAESTANTIA PER SCIENTIAM

Naval Postgraduate School

DARE TO

DREAM
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DELIVER

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National University of Singapore
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1 Engineering Drive 2
Singapore 117576
Tel: +65 6516 7749
Email: mdts@nus.edu.sg
Website: https://tdsi.nus.edu.sg/

About the Application Kit

Items in the Application Kit

1. MSc. Defence Systems Engineering & Technology Application Booklet.
2. Enclosures include the following:
   a) Application Instruction and Checklist.
   b) Personal Data Notice & Consent.
   c) Application Form for NUS, Temasek Defence Systems Institute.
   d) Application Form for NPS, DD Form 2339.

Items to Include in Your Application

1. One set of completed National University of Singapore (NUS) Application form, with a recent colour photograph with white background, affixed on the form.
2. Signed Personal Data Notice & Consent.
3. One set of completed DD Form 2339, with a colour photograph, pasted on top right corner of forms.
4. One set of Curriculum Vitae (CV) with details of your working experiences and specific courses attended that might help in your application for the programme.
5. One set of the following supporting documents in A4 size:
   a) Singapore NRIC (for Singaporeans) or Passport (International Applicants).
   b) GCE 'O' level certificate or its equivalent.
   c) GCE 'A' level certificate or its equivalent.
   d) Polytechnic transcript and certificate (if applicable).
   e) Degree scroll / degree certificate / Diploma.
   f) University results (from 1st year to final/honours year), either in original official transcript or its certified true copies. If these are not available, please request for a copy of your transcripts from your University. NUS graduates should request for their transcripts online at: *https://www.nus.edu.sg/registrar/student-records*

Submission of Application

24 October 2025

The completed application forms must be submitted together with all the relevant supporting documents to be considered complete. Completed applications should be submitted to the following address by 24 October 2025:

The Manager (Masters Programme)
Temasek Defence Systems Institute
National University of Singapore
Block E1, # 05 - 05
1 Engineering Drive 2
Singapore 117576.
Or email the soft copy to MDTS@nus.edu.sg

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About Temasek Defence Systems Institute

Vision	A premier educational institute for nurturing systems thinkers and thought-leadership in systems thinking in defence and security
Mission	To nurture systems thinkers and leaders to advance Singapore's defence capabilities

Temasek Defence Systems Institute (TDSI) was established on 11 July 2001 between the National University of Singapore (NUS) and the U.S Naval Postgraduate School (NPS) to provide a platform to bring together military staff and defence technologies in an education and research environment. TDSI aims to produce graduates who understand the complexities of a military force, so as to be able to create maximum leverage by the integration of operations and technology.

About the Programme

Joint Master of Science in Defence Systems Engineering & Technology with Naval Postgraduate School

Objectives

The Joint MSc in Defence Systems Engineering & Tecnology (Msc. DSET) Programme with Naval Postgraguate School provides postgraduate education in Defence Systems Engineering and Technology, Systems engineering plays a crucial role in the development, integration, and management of complex defence systems. It encourages an interdisciplinary approach, equipping students with the ability to collaborate across various engineering domains, which is crucial for tackling complex, multifaceted challenges in the industry. By participating in a joint programme with an international partner, students gain a global perspective, understanding diverse defence strategies and technologies, which enhances their ability to work in international and multicultural environments.

Minimum Admission Requirements

1. Bachelor of Engineering (with good honours), Bachelor of Science in Physics or Mathematics (with good honours), or an equivalent qualification acceptable to NUS and NPS;
2. At least 3 years of relevant working experience; and
3. Sponsorship to this Programme by the candidate's employer.

Application and Enrolment Schedule

There is one intake each year for this programme. All applications for the March 2026 Intake must reach Temasek Defence Systems Institute by 24 October 2025.

Applicants will expect to be informed on the outcome of their application sometime in December 2025 or January 2026.

Date	Event
24 July 2025	Application Opens
24 October 2025	Application Closes
January to March 2026	Applicants review Engineering Mathematics (Online course)
12 March 2026	Registration of Students at NUS
23 March 2026	Start of MSc. DSET Programme in NUS
13 September 2026	Students report to NPS
24 September 2027	End of Joint MSc. DSET programme at NPS

Academic Dates

The academic programme is based on quarterly cycles. The dates for these quarters are shown in the below table:

Quarter	Dates	Venue
Q1	23 Mar 2026 to 5 Jun 2026	NUS
Q2	8 Jun 2026 to 28 August 2026	NUS
Q3	28 Sep 2026 to 17 Dec 2026	NPS
Q4	4 Jan 2027 to 25 Mar 2027	NPS
Q5	29 Mar 2027 to 17 Jun 2027	NPS
Q6	5 Jul 2027 to 24 Sep 2027	NPS

Structure of Programme

The Programme is structured into two phases:

NUS Curriculum	• Core courses conducted at NUS
NPS Curriculum	• Core courses conducted at NPS • Technology track courses at NPS • Integration Project conducted at NPS

The structure of this programme is illustrated in ANNEX A.

Curriculum

1. Candidates are required to complete a programme of study comprising the NUS Core Courses, NPS Core Courses and a Technology Track of the candidate's choice.
2. A brief description of the course under is shown in ANNEX B.
3. Candidates are expected to take 18 months to complete this programme under normal circumstances.

Examinations

1. Candidates will be examined at the end of each quarter of their study for the coursework.
2. The Board of Examiners of the respective universities will decide the examination results of the modules offered at each university. Each university will issue the examination results to candidates reading their respective modules.
3. The universities will exchange results of the students.

Further Information and Contact

1. Students need to provide for their own meals, lodging, transportation, entertainment, books and stationeries.

2. Please visit TDSI's website for more information and updates at *https://tdsi.nus.edu.sg*

3. If you need further clarification, you may contact:
   Ms Wong Hsiao-Szu
   tdswhs@nus.edu.sg
   Or
   Ms Stephanie Quek
   squek@nus.edu.sg

Annexes

Annex A	Master Joint MSc in Defence Systems Engineering & Technology Structure
Annex B	NUS Core Curriculum Course Description
Annex C	NPS Core Curriculum Course Description

Joint Master of Science in Defence Systems Engineering & Technology Programme Structure

MSc. DSET Programme Structure

The Joint MSc. DSET programme is divided into two phases, the first phase at NUS and the second phase at NPS. Upon completing the programme successfully, students will be awarded the following:

- Master of Science (Defence Systems Engineering & Technology) degree, jointly awarded by NUS and NPS.

MDTS Programme Structure				
Quarter		Venue	NUS Courses	NPS Courses
Q1	Mar to Jun	NUS	Coursework	--
Q2	Jun to Aug	NUS	Coursework	--
Q3	Sep to Dec	NPS		Coursework Integration Project
Q4	Jan to Mar	NPS		Coursework Integration Project
Q5	Apr to Jun	NPS		Coursework Integration Project
Q6	Jul to Sep	NPS		Coursework

Msc. DSET Programme – Curriculum Overview

The core courses are shown in the table below.

NUS	
Pre-Course Modules	
	Engineering Mathematics (refresher course)
	Probability and Statistics (refresher course)
Quarters 1 and 2 (Mar to Aug) at NUS Singapore	
DTS5701	Large Scale Systems Engineering
DTS5702	C3 Systems
DTS5732	Artificial Intelligence & Data Analytics
DTS5735	Cyber Security
DTS5737	Cloud Computing
NPS	
Quarters 3 to 6 (Sept to Sep the following year)	
SE3302	System Suitability
SE3250	Capabilities Engineering
SI3400	Fundamentals of Engineering Project Management
SE4350	System Verification and Validation
SE3011	Engineering Economics and Cost Estimation
8 Technology Track Courses*	
	Integration Project

** Refer to table below*

NPS Technology Track Courses

ME I – Missiles

AE4452 Advanced Missile Propulsion (4-1)
ME4703 Missile Flight and Control (4-1)
ME4704 Missile Design (3-2)
ME4751 Cbt Survivability, Reliability, & Sys Safety Engineering (4-1)

ME II – Robotics

ME3801 Dynamics & Control of Autonomous Vehicles I (3-2)
ME3240 Marine Power & Propulsion (4-2)
ME4800 Machine Learning for Autonomous Operations (3-2)
ME4828 GNC Algorithms of Autonomous Robotics (3-2)

ECE I – Signals

EC3400 Digital Signal Processing (3-2)
EC3600 Antennas and Propagation (3-2)
EC4685 Principles of Electronic Warfare (3-2)
EC3615 Radar Fundamentals (3-2)

ECE II – Info Ops/ Comms

EC3710 Computer Communications Methods (3-2)
EC3760 Information Operations Systems (3-2)
EC3730 Cyber Network & Physical Infrastructures (3-2)
EO3502 Telecommunication Systems Technology (4-0)

Combat Systems Engineering

SE3112 Combat SE I – Sensor Fundamentals (4-2)
SE4112 Combat SE II – Sensor Systems (4-2)
SE3113 Combat SE III – Weapons (4-2)
SE4115 Combat Systems Integration (4-2)

Combat Systems Science

PC2911 Intro to Computational Physics (4-0)
PC3200 Survey of EM Sensors & Detection (4-0)
PC3400 Survey of Underwater Acoustics (4-0)
PC3800 Survey of Weapons and their Effects (4-0)

Space Fundamentals

SS3011 Space Technology & Applications (3-0)
PH3052 Physics of Space and Airborne Sensor Systems (4-0)
SS3610 Space Communication. Systems (4-2)
PH2514 Introduction to the Space Environment (4-0)

Spacecraft Design (M&S)

SS3011 Space Technology & Applications (3-0)
SS3400 Orbital Mechanics, Launch and Space Operations (4-2)
SS3600 Space Systems Modeling & Simulation (2-3)
AE4830 Spacecraft Systems I (3-2)

Space Comms/ Payload Design

SS3011 Space Technology & Applications (3-0)
SS3610 Space Communication. Systems (4-2)
SS3600 Space Systems Modeling & Simulation (2-3)
SS3861 Spacecraft Payload Design I (3-2)

NUS Core Curriculum
Course Description

Engineering Mathematics (Online Refresher Module)

- Introduction to vector fields, vector algebra and partial derivatives of vector and scalar fields.
- Gradient, divergence and curl.
- Introduction to line, surface and volume integrals; Green's Divergence.
- ODE classification and general solutions.
- First and second-order homogeneous and non-homogeneous ODEs.
- Introduction to error and sensitivity analyses.
- Matrix algebra: introduction and notation; rank, determinants, transpose and inverse; simple elementary row operations and linear independence; eigenvalues and eigenvectors.
- Complex numbers: introduction and geometrical representation; Argand diagram; complex algebra; Euler's representation and De Moivre's theorem.
- Fourier analysis: concept of transforms; Fourier series and orthogonality relations; Fourier transforms and applications.
- Probability axioms and event probability.
- Random variables and their probability distributions.
- Hypothesis testing, conditional probability and expectation.

Probability & Statistics (Online Refresher Module)

Topics include:

- Descriptive Statistics
- Probability Concepts
- Conditional Probability
- Discrete Distribution
- Continuous Distribution, Non-normal, Multivariate

DTS5701 Large Scale Systems Engineering

Large Scale Systems Engineering deals with the complexities of large-scale systems. The Systems Approach and Systems Engineering methodologies are used to understand and conceptualize the key issues in the planning, design and management of large scale systems.

The module aims to help students learn about Large Scale Systems Engineering (LSSE) with theories, stories and case studies on how systems are planned and implemented.

By the end of the module, students are expected to be able to analyse and synthesise systems and design large-scale projects using the LSSE framework taking into consideration their goals, boundaries, stakeholders, complexities, trade-offs, risks and unintended consequences.

DTS5702 C3 Systems

This module provides the key underlying principles and concepts of C3 engineering and their application in the design, development and integration of C3 systems in modern armed forces.

Using a systems engineering approach, the module will also enable participants to have a good appreciation of the key considerations and challenges as well as good engineering practices associated with C3 design and integration with sensor and weapon systems.
Topics related to emerging trends, concepts and technologies will also be covered.

DTS5732 Artificial Intelligence and Data Analytics

This is an introductory module to artificial intelligence (AI) and data analytics (DA). It covers various topics of AI and DA.

The AI topics include heuristic search, constraint satisfaction, logic and inference, and natural language processing. The DA topics include data pre-processing, data visualization, classification, model evaluation, decision trees, neural networks, deep learning, association analysis, and clustering.

DTS5735 Cybersecurity

This module introduces cybersecurity concepts and their applications. It aims to illustrate how systems can fail under malicious activities, and how the threats can be mitigated and managed.

Topics include cryptography, communication channel security, system security, trusted computing, policy making, human factors, etc. Applications such as cloud security, IOT security, security operations centre, AI in cybersecurity, and case studies on well-known attacks will be used to reinforce the learning of various foundational concepts.

DTS5737 Cloud Computing

This course is designed to provide students with the knowledge and skills necessary to manage modern hybrid multi-cloud IT infrastructures, which serve as the backbone of systems and processes that support a company's business strategy, technological innovation, and digital capabilities. Additionally, students will learn about the key components and requirements of modern cloud infrastructure, enabling them to design, deploy, and manage cloud services and enterprise solutions effectively.

NPS Core Curriculum
Course Description

SE3202 Systems Suitability
This course presents basic considerations and techniques for the assess-ment of system suitability, including producibility, reliability, maintainabil-ity, availability, supportability, survivability, usability, and interoperability. Software suitability concepts are also briefly presented. In this course, you will learn how to apply these concepts to system configurations. The lec-tures, homeworks, labs, and course project are structured to develop your ability to understand these principles and to analyze system suitability.

SE3250 Capabilities Engineering
This course examines the top level of systems engineering in the Navy, mapping missions to capabilities. Capability portfolios are defined, studied, and compared against specific mission sets. Methods for aggregating capa-bilities are discussed. Techniques are presented for assessing and selecting among alternative capabilities portfolios using low and high resolution mod-els, including parametric exploration of suites of scenarios. You will build low-resolution simulations to understand the general behavior of the system. You will also build high-resolution simulations to determine specific system requirements. Topics covered include current DoD and Naval practices for capabilities engineering, design and assessment of capability portfolios, and the use of commercial and custom simulations to analyze capability portfolio performance.

SI3400 Fundamentals of Engineering Project Management
Why do so many Department of Defense projects end up over budget?Why do so many of them end up behind schedule? Undoubtedly, the in-creased complexity and integration of modern systems is a factor. However, I believe that another contributing factor is that many project managers lack the knowledge and tools to understand and mathematically capture the un-certain, or probabilistic, nature of the time and cost it will take to complete a task and how each task impacts the project overall. In this course, you will practice the fundamentals of engineering project management with an em-phasis on understanding and dealing with the uncertainty in task duration and cost.

SE4350 Systems Verification and Validation
The course will emphasize the application of V&V through all phases of system development to include modeling and simulation (M&S) activities for enhancing the T&E process, developmental test and evaluation (DT&E), live fire test and evaluation (LFT&E), and operational test and evaluation (OT&E). Principles of experiment design and statistical analysis of test results will be reviewed. The course content will be consistent with DoD requirements and guidelines and will include case studies and lessons learned from actual defense system tests.

SE3011 Engineering Economics and Cost Estimation
This course is an introduction to the cost aspects of systems engineering. It explores cost from a decision-making perspective. It examines how cost is used to select alternatives and how the cost of systems can be measured. Concepts covered include economic analysis, cost behavior, cost allocation, system cost, life-cycle costs, cost over time, cost estimating techniques, cost uncertainty and cost risk management. The use of cost concepts in defense problems is emphasized.
udents will apply their learnt knowledge on a robotic task.