Fortifying Knowledge
Empowering Defence

TEMASEK DEFENCE SYSTEMS INSTITUTE

Advance with Confidence,
Defend with Excellence.

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 for bringing together military staff, and defence technologists in an academic environment.

Vision

A premier educational institute for nurturing systems thinkers and thought - leadership in systems thinking in defence and security.

Mission

To nurture system thinkers and leaders to advance Singapore's defence capabilities.

Postgraduate Education

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

Continuing Education

- Short Courses
- Stackable Programmes
- Technology Seminar Series
- Annual Learning Symposium

DARE TO DREAM DO DELIVER

TDSI Masters Degree Education:

Your Gateway to the World

Master of Defence Technology and Systems (MDTS)

What?

The Master of Defence Technology and Systems (MDTS) programme is a collaborative postgraduate dual-degree masters programme launched in 2002 between National University of Singapore and US Naval Postgraduate School.

Specially tailored for the defence community, the unparalleled MDTS programme emphasises systems thinking skills and the applications of systems engineering in defence systems.

Where?

Students study at NUS before pursuing their specialisation in one of our partner universities: US Naval Postgraduate School, the US Air Force Institute of Technology or Cranfield University in the UK.

NUS is ranked among the world's top universities and is the leading institution in Asia. The Naval Postgraduate School and the US Air Force Institute of Technology are highly regarded for their specialised focus on military research and education. Cranfield University, while also renowned for its research in military technology, is a STEM-focused institution with strong industry connections.

Why?

The 18-month MDTS programme provides students with a postgraduate education in defence technology and systems engineering, unmatched elsewhere. The dual Masters programme leads to the award of two master's degrees by prestigious universities:

1) Master of Science (Defence Technology and Systems) degree by National University of Singapore

2) Master of Science in a specialised discipline degree by either Naval Postgraduate School, the US Air Force Institute of Technology or Cranfield University

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

What?

The 18-month Joint Master of Science in Defence Systems Engineering and Technology, in collaboration with Naval Postgraduate School, is designed to equip professionals with advanced systems engineering expertise while allowing them to pursue electives in cutting-edge technology areas. The programme emphasises practical learning, international collaboration, and leadership in complex, technology-driven environments.

Where?

Similar to the MDTS programme, students study at NUS for the 1st phase of the programme followed by NPS for the 2nd phase of the programme.

Why?

Students will gain a unique dual perspective from two world-class institutions, developing deep expertise in systems engineering while customising their learning with specialised electives in Electrical & Computer Engineering, Mechanical Engineering, Combat Systems, and Space Technologies. This programme is ideal for systems engineers who wish to enhance their technical capabilities and leadership potential in emerging technological domains critical to defence and security.

Who?

Some of the qualities TDSI is looking for in students.
Academic excellence.
Tenacity to break barriers.
Courage to embrace challenges.

We are looking for dreamers and doers with the following qualifications:

1) A Bachelor of Engineering degree (with good honours), Bachelor of Science in Physics or Mathematics degree (with good honours) or an equivalent qualification acceptable to National University of Singapore and Naval Postgraduate School, the US Air Force Institute of Technology or Cranfield University;

2) At least 3 years of relevant working experience; and

3) Full sponsorship by the candidate's employer.

Dual Degree Timeline

18 month Full Time Master of Defence Technology & Systems Programme

1st 6 months in NUS

Master of Science (Defence Technology and Systems)

Quarter 1
March to May

Quarter 2
June to August

Next 12 months at ONE of the Partner University

*Master of Science (Specialisation)**

**Specialisation areas include Sensors, Communications, Operations Research, Space Systems, Guided Weapons, Cybersecurity and many more*

Quarter 3
September to December

Quarter 4
January to March

Quarter 5
April to June

Quarter 6
June to September

MDTS Programme - Curriculum Overview

Core Courses (20 units)	
DTS5701 Large Scale Systems Engineering	4 units
DTS5702 C3 Systems	4 units
DTS5732 Artificial Intelligence & Data Analytics	4 units
DTS5735 Cybersecurity	4 units
DTS5737 Cloud Computing	4 units
Elective Courses (Select 12 units)	
DTS5703 Operations Research	4 units
DTS5733 Sensors & Intelligence	4 units
DTS5734 Guided Systems	4 units
DTS5712 Thesis Project (Local)	8 units
EE5112 Human Robot Interaction**	4 units
ME5311 Data-Driven Engineering and Machine Learning**	4 units
ME5418 Machine Learning in Robotics**	4 units
Integration Project done at NPS (compulsory)	
Specialisation track courses at Partner University	

*** Offered by Department of Electrical and Computer Engineering or Department of Mechanical Engineering in NUS Semester 1 (August) or 2 (January)*

What are the 4Cs you should examine in a postgraduate programme?

Curriculum

The coursework in Singapore for the first six months of the programme is structured to help you develop a helicopter vision of real - life situations. Besides learning from experienced professors, you also get to learn first hand from industry experts who have implemented and managed large - scale systems.

For the next 12 months, you will head to your chosen university to complete studies focused on more operational and technical subject matter. You will deepen your knowledge base by taking courses in your chosen specialisaton and get an opportunity to work with world class faculty on actual military and defence problems.

The ability to assess the big picture with an overarching view of military systems, combined with your superior domain knowledge will equip you to design and develop solutions that are holistic and optimal.

Classroom

We conduct lessons in a small-class size that is conducive to learning. We encourage you to stay well-informed by engaging in meaningful dialogues with your classmates. You will be challenged to present your arguments in a clear and concise manner and to provide well thought-out and well integrated solutions in your numerous projects.

We create a stimulating learning environment that brings out the best in you so that you emerge as a well-rounded individual capable of leading and thriving in the fast changing world.

Cross Boundary

TDSI combines the best resources of NUS and our renowned overseas partner universities to produce MDTS graduates who are well-equipped to deal with the challenges confronting the 21st century defence force. You will learn first-hand from defence and industry experts who have implemented and managed complex large-scale systems.

Our lecturers will inculcate in you valuable multidisciplinary knowledge and skillsets, generously share with you case studies, their cross-boundary perspectives and real-life experiences so that you can devise and implement system-based solutions to tackle complex challenges at your workplace. Through the MDTS programme, you will get the best of both a premium military technology education and an international networking experience to build camaraderie with fellow course mates.

Cross Disciplinary

The MDTS curriculum focuses on inculcating systems thinking in you and help you develop critical skills to integrate operations and technologies at the systems levels. You will gain a helicopter view of the military systems and be equipped with the know-how on emerging technologies and their applications in military operations.

You will have the opportunity to experiment in an environment that induces multi-disciplinary interactions encounter in the real world. You will work in a multi-disciplinary team and embark on hands-on learning through collaborative project coached by leading military technologist and experts in systems engineering. All students will learn to think critically beyond technology to include strategies, processes and organisation towards a formidable defence force.

Partner University Phase

Naval Postgraduate School

20 specialisation tracks

1. Autonomous Systems Engineering
2. Communication Systems and Sensor Engineering
3. Communication Systems and Network Engineering
4. Cyber Security and Defence
5. Electrical & Computing Engineering
6. Free Electron Lasers
7. Modelling, Virtual Environments and Simulation
8. Network Engineering and Sensor Engineering
9. Network Engineering and Cyber Engineering
10. Network Science
11. Operational Oceanography
12. Operations Research, Modelling & Simulation
13. Secure Communications
14. Sensor Systems Engineering - General Sensors
15. Space Systems Engineering
16. Space Systems Operations
17. Systems Engineering
18. Systems Engineering Analysis
19. Undersea Warfare
20. Weapon Systems Engineering

Partner University Phase

Cranfield University

Specialisation tracks

1. Aerodynamics and Flight Dynamics
2. Aerospace Vehicle Design
3. Astronautics and Space Engineering
4. Autonomous Vehicle Dynamics and Control
5. Defence Simulation and Modelling
6. Design of Rotating Machine
7. Energy Systems and Thermal Processes
8. Logistics and Supply Chain Management
9. Military Vehicle Technology
10. Military Electronic Systems Engineering
11. Systems Engineering for Defence Capability
12. Thermal Power

Air Force Institute of Technology (AFIT)

Specialisation tracks

1. Aeronautical Engineering
2. Artificial Intelligence
3. Computer Networks
4. Electronic Warfare Technology
5. Guidance, Navigation & Control
6. Logistics & Supply Chain Management
7. Operations Research
8. Remote Sensing (Applied Physics)
9. Remote Sensing (Electrical Engineering)
10. Space Systems
11. Synthetic Aperture Radar
12. Systems Engineering

Joint Degree Timeline

18 month Full Time Joint MSc in Defence Systems Engineering and Technology

1st 6 months in NUS

Quarter 1
March to May

Quarter 2
June to August

Next 12 months at Naval Postgraduate School

Quarter 3
September to December

Quarter 4
January to March

Quarter 5
April to June

Quarter 6
June to September

Joint Master of Science in Defence Systems Engineering & Technology

NEW

Quarters 1 and 2 (Mar to Sep) at NUS Singapore	
Core Courses (20 units)	
DTS5701 Large Scale Systems Engineering	4 units
DTS5702 C3 Systems	4 units
DTS5732 Artificial Intelligence & Data Analytics	4 units
DTS5735 Cybersecurity	4 units
DTS5737 Cloud Computing	4 units
Quarters 3 to 5 (Sep to Sep) at NPS, United States	
SE3302 System Suitability	2.5 units
SE3250 Capabilities Engineering	2.5 units
SI3400 Fundamentals of Engineering Project Management	2.5 units
SE4354 System Verification and Validation	2.5 units
SE3011 Engineering Economics and Cost Estimation	2 units
Integration Project at NPS (SE3201, SE3202, SE3203)	8 units
Select any 2 Technology Track Courses at NPS at the next table (must complete 8 courses)	20 units

Technology Courses Combination

Combat Systems Engineering	ME I - Missiles	ME II - Robotics	ECE I - Signals	ECE II - Info Ops/ Comms
SE3112 Combat SE1 - Sensor Fundamentals	AE-4452 Advanced Missile Propulsion	ME3801 Dynamics & Control of Autonomous Vehicles I	EC3400 Digital Signal Processing	EC3710 Computer Communications Methods
SE4112 Combat SE II - Sensor Systems	ME4703 Missile Flight and Control	ME3240 Marine Power & Propulsion	EC3600 Antennas and Propagation	EC3760 Information Operations Systems
SE3113 Combat SE III - Weapons	ME4704 Missile Design	ME4800 Machine Learning for Autonomous Operations	EC4685 Principles of Electronic Warfare	EC3730 Cyber Network & Physical Infrastructures
SE4115 Combat Systems Integration	ME4751 Cbt Survivability Reliability, & Sys Safety Engineering	ME4828 GNC Algorithms of Autonomous Robotics	EC3615 Radar Fundamentals	EO3502 Telecommunication Systems Technology

Combat Systems Science	Space Fundamentals	Spacecraft Design (M&S)	Space Comms/ Payload Design
PC2911 Intro to Computational Physics	SS3011 Space Technology & Applications	SS3011 Space Technology & Applications	SS3011 Space Technology & Applications
PC3200 Survey of EM Sensors & Detection	PH3052 Physics of Space and Airborne Sensor Systems	SS3400 Orbital Mechanics, Launch and Space Operations	SS3610 Space Communication. Systems
PC3400 Survey of Underwater Acoustics	SS3610 Space Communication Systems	SS3600 Space Systems Modeling & Simulation	SS3600 Space Systems Modeling & Simulation
PC3800 Survey of Weapons and their Effects	PH2514 Introduction to the Space Environment	AE4830 Spacecraft Systems I	SS3861 Spacecraft Payload Design I

Graduation Requirements

NEW! Joint Master of Science in Defence Systems Engineering & Technology		Units
NUS	Complete 5 NUS Core courses	20 units
	Obtain GPA of 3.0 at NUS	
NPS	Complete 5 NPS Core courses	12 units
	Complete 8 Technology Track courses	20 units
	Obtain GPA of 3.0 at NPS	
	Obtain Satisfactory grade for Integration Project	8 units
Total		60 units

Master of Defence Technology and Systems		Units
NUS	Complete 5 NUS Core courses	20 Units
	Complete NUS Elective courses	12 Units
	Obtain minimum GPA of 3.0 at NUS	
AFIT/ NPS/ CU	Obtain Satisfactory grade for Integration Project	8 units
	Complete respective specialisation courses	~ 32 units
	Obtain minimum GPA of 3.0 at Partner University	
	Obtain Satisfactory grade for Individual Thesis	
Total		72 units

Hear what our graduates have to say about the MDTS programme

The TDSI-MDTS programme gave me an irreplicable journey to learn from and together with other stakeholders of the Defence Technology community including DSTA, DSO, ST Engineering and SAF. I was privileged to have learnt from distinguished lecturers and professors who have amassed a wealth of experience from their careers. Collaborating with my peers on real-world challenges during the local phase at NUS honed our System Thinking skills—teaching us to view everything as interconnected and to anticipate interdependencies and unintended consequences. The opportunity to study in a premier military institute like Naval Postgraduate School also allowed me to pursue graduate education with a strong focus in military technology and operations. The flexibility and autonomy to take on additional elective modules allowed me to pursue Certificate courses, such as in Human-System Integration, to deepen my understanding of how Human Factors Engineering contributes to Systems Engineering and Design, thereby expanding my professional capabilities. Beyond the academic growth, I deeply value the strong friendships forged during our academic and social exchanges.

Mr Tan He Jiang
Member of Technical Staff
DSO National Laboratories
MDTS2023

The MDTS programme offered by TDSI has been a transformative journey for me - bringing me out of my comfort zone and pushing to learn beyond my expectations. The diverse curriculum, ranging from large-scale systems engineering to defence technologies to cybersecurity and artificial intelligence, provided me with a broad and practical education in defense technology. One of the most outstanding features of MDTS is the opportunity to collaborate with and learn from officers from across the globe, from different defence organisations and different services, each bringing with them valuable perspectives and insights. This experience provided me with lifelong friendships, new knowledge and insights to embrace new challenges, and a undying desire to learn.

Thank you TDSI for the opportunity and friendships!

Su Juncun
Student (Republic of Singapore Airforce)
Goh Keng Swee Command and Staff College
MDTS2022

Hear what our graduates have to say about the MDTS programme

The MDTS program provided me with a once-in-a-lifetime opportunity, not only in terms of education but also for networking and expanding my understanding of both the defense and cybersecurity sectors. The program equipped me with valuable technical skills and enhanced my critical problem-solving abilities, which have significantly transformed my approach to analyzing and addressing complex issues.

The collaboration with the global defense community during the Naval Postgraduate School period further enriched the experience, creating a comprehensive learning environment. It provided an opportunity to build friendships, engage with the global defense network, and exchange insights on cybersecurity topics was an invaluable aspect of the program. That year spent in the United States has broadened my perspective on cybersecurity, offering a deeper and more nuanced understanding of the field.

Beyond academics, the program also fostered meaningful relationships across various branches of the defense community. Whether through road trips, birthday celebrations, or hiking excursions, these experiences remain some of the most memorable and rewarding, shared with remarkable individuals

Mr Song Meng Wee
Manager
ST Engineering
MDTS2019

The technical knowledge and overarching view of military systems I have acquired from the MDTS programme is applicable to my work. The programme has made me more observant and to think more critically about not just technology but also processes, organisation and strategies for a more effective defence force. I was also able to draw on the different skill sets of my classmates, who were from the defence community, to complement my own research.

Regine Oh
Senior Programme Manager
Defence Science and Technology Agency
MDTS 2006

TDSI Continuing Education

TDSI serves as the training arm in upskilling the dynamic defence workforce in Singapore with executive short courses, technology seminars, and the annual learning symposium. The full-time executive short courses aim to deepen domain-specific knowledge in defence systems and emerging technologies, as well as in systems and project management.

TDSI Technology Seminar Series provides a platform for domain experts to share trending technology topics with the defence community. The annual TDSI Learning Symposium invites thought leaders to provide insights to latest technological advancements and any global topics that may impacts the evolving Singapore defence eco-system.

Innovation in Defence Starts with Knowledge!

TDSI Continuing Education

SHORT COURSES

Knowledge and skillset capacity building

Executive courses curated in domain - specific topics, such as emerging technologies, aim to strengthen defence personnel's knowledge and skillsets, including learning best practices, in specific domain areas to value add to their job roles and work function.

Defence organisations with any particular or special training needs for staff development can also approach TDSI to organise customised courses for in-house learning.

Military Navigation Systems Workshop

Course participants in the "Military Navigation Systems Workshop" reviewed the course content to be applicable to their work and gained a better understanding about the various techniques to detect and mitigate jamming and spoofing as well as countering principles.

TECHNOLOGY SEMINAR SERIES

Empowering knowledge to create ideas

TDSI techology seminar series provides a platform for the defence community to learn trending topics and technology innovations from domain experts, thereby enriching knowledge in systems and technology arena.

From ChatGPT to Deepseek

Participants learnt Large Language Models such as ChatGPT and DeepSeek that are trending and becoming important for the defence workforce to learn and leverage for operational efficiency.

ANNUAL LEARNING SYMPOSIUM

Embrace innovation and transformation

TDSI learning symposium is an annual event that enables the defence community to learn from distinguished speakers who are thought leaders in their own technology domain who typically share their insights and perspectives on trending technology topics. The latest offerings of TDSI will also be announced or updated at the learning symposium.

Stackable towards Master of Defence Technology and Systems

Executive Certificate Courses

1. DTS5701 Large Scale Systems Engineering (4u)
2. DTS5702 C3 Systems (4u)
3. DTS5703 Operations Research (4u)
4. DTS5732 Artificial Intelligence & Data Analytics (4u)
5. DTS5733 Sensors & Intelligence (4u)
6. DTS5734 Guided Systems (4u)
7. DTS5735 Cybersecurity (4u)

Graduate Certificate Programmes

Graduate Certificate in Digital Technologies (12u)

- DTS5732 Artificial Intelligence & Data Analytics (4u)
- DTS5735 Cybersecurity (4u)
- *Choose one course from the elective courses list**

Graduate Certificate in Systems Engineering (12u)

- DTS5701 Large Scale Systems Engineering (4u)
- DTS5703 Operations Research (4u)
- *Choose one course from the elective courses list**

Elective Courses

- DTS5701 Large Scale Systems Engineering (4u)
- DTS5703 Operations Research (4u)
- DTS5732 Artificial Intelligence & Data Analytics (4u)
- DTS5733 Sensors & Intelligence (4u)
- DTS5734 Guided Systems (4u)
- DTS5735 Cybersecurity (4u)
- EE5112 Human Robot Interaction (4u)
- ME5311 Data-Driven Engineering and Machine Learning (4u)
- ME5418 Machine Learning in Robotics (4u)

Are you Adding New Value?

1

Add value to self

Be better than you were yesterday. Gain insights on how things are systematically categorised and related, and how to view things in its entirety. As you apply newly acquired skills and adopt best practices, you make consistently better business decisions that lead to productivity and improved results.

As you contribute to the greater good, by the privilege of the positions you are holding, the tough decisions that you will make, and the solutions that you will create, TDSI supports you by imparting vital skills to overcome everyday challenges with greater confidence and proficiency.

2

Add value to customers

Innovative ideas can sometimes be obscured by extensive operational details and occupations with tools and processes. Step out, go beyond conventional premises and question routine approaches. Why are things done this way? What are the motivations for doing it this way? Are there any other ways?

Gain in-depth perceptions from practitioners on how to assess situations from different perspectives and to provide well-thought-out solutions for your customers.

3

Add value to organisation

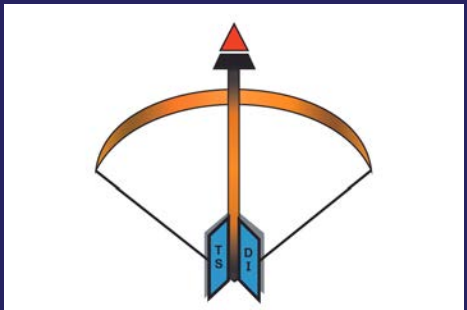
Increase productivity in all phases of project cycles by preventing ineffective habits that cause delay and frustrations. TDSI engages industry experts and invites you to find answers from them on how to mitigate risks, identify uncertainties and its effects early in the development cycle. As you eliminate rectification cost and prevent bottlenecks in projects, you deliver greater value with less waste and reduced time

4

Add value to others

Expand your knowledge base by exchanging viewpoints and best practices with others. You can avoid some common pitfalls by learning from those who have travelled the paths. Be a mentor and pass on your knowledge to your colleagues and peers. Contribute by letting others benefit from your experiences, and in the process form new friendships and long-term business relationships.

UNLOCK POTENTIAL: ENHANCE SKILLS, ELEVATE CAREERS



Your Journey Begins Here

Embark on your learning journey today

https://tdsi.nus.edu.sg