Master of Science
Transport & Logistics

DEGREE BY
Technical University of Munich (TUM)

18 - 24 MONTHS FULL TIME PROGRAMME
Coursework in Singapore

PRACTICAL KNOWLEDGE
Compulsory Internship & Thesis

GLOBAL PROSPECTS
Internationally Recognized Degree

3 SPECIALISATIONS
Logistics, Railway Engineering, Transport

INTAKE
August Every Year

TO APPLY
Apply online from 15th October at www.tum-asia.edu.sg

1 TUM is ranked as the #1 University in Germany*

8 TUM ranked #8 in the Global Employability Survey*

13 TUM has produced 13 Nobel Laureates

50 TUM is ranked among the world’s Top 50 Universities¹
TUM Asia

Through TUM’s unwavering commitment to the betterment of society, TUM Asia was set up in 2002 as the first academic venture abroad by a German university. Today, TUM Asia offers standalone and joint Bachelor and Master programmes in Singapore together with partner universities such as National University of Singapore (NUS), Nanyang Technological University (NTU) and Singapore Institute of Technology (SIT).

A close cooperation with key industry players helps to ensure that the curriculum stays relevant and practical to the needs of the industry. Together with the unique combination of German engineering with Asian relevance, TUM Asia’s graduates are equipped to enter both industry and research sectors on a global level. With over a decade of experience, TUM Asia continues to provide quality higher education programmes suited to the needs of the industry in Asia.

In 2015, over one thousand students have come through the doors of TUM Asia and currently ply their trades in top research institutes and companies across the globe.

Technical University of Munich (TUM)

Technical University of Munich (TUM) is one of Europe’s leading research universities, with around 500 professors, 10,000 academic and non-academic staff, and more than 37,000 students. Its focus areas are the engineering sciences, natural sciences, life sciences and medicine, reinforced by schools of management and education.

TUM acts as an entrepreneurial university that promotes talents and creates value for society. In that it profits from having strong partners in science and industry. It is represented worldwide with a campus in Singapore as well as offices in Beijing, Brussels, Cairo, Mumbai, and São Paulo.

Nobel Prize winners and inventors such as Rudolf Diesel and Carl von Linde have done research at TUM. In 2006 and 2012 it won recognition as a German “Excellence University.” In international rankings, TUM regularly places among the best universities in Germany.
Master of Science in Transport & Logistics

TUM Asia's Master of Science in Transport & Logistics (MSc in TL) will provide graduates with the necessary knowledge and skills to employ a diverse range of technologies that leverage on state-of-the-art transport and logistics technologies. One will learn to implement sophisticated and far-reaching solutions to transportation challenges that characterize modern economies.

### COURSE OUTLINE

- **Specialisations to choose from:** Logistics, Railway Engineering, Transport
- **45 Contact hours for every Core and Specialised Module**

### Duration of the Programme: 18 - 24 months

- **July**
  - Arrival in Singapore
- **4 Months**
  - Core Modules
- **2 Months**
  - Internship
- **6 Months**
  - Core Modules
  - Specialised Modules
  - Master Thesis at a company, university or research institute (Supervised by a TUM professor)
- **6 Months**
  - Specialised Modules (Only for students with Railway Engineering specialisation)
- **End of Programme**

* All students may complete an additional semester in TUM, resulting in an addition of a 3 month break and a 6 month semester at TUM prior to the internship. The student can choose any module from all faculties in TUM, subject to the approval from the faculties and registration process via TUM Asia, and visa approval. To find out more, please write to us at graduate@tum-asia.edu.sg.

** Students who choose the Railway Engineering specialisation are required to complete this additional semester.

Note: This outline is a general reference to the duration of study. A student’s actual duration of study may or may not follow this general reference. This outline is subject to change during the course timetable.
Students are required to complete the following list of compulsory modules, before selecting their specialisation:

**Compulsory Modules**

**Core Modules**
- Statistical Methods for Transportation and Logistic Processes
- Traffic Impacts, Evaluation of Transport and Logistic Processes
- Basics of Traffic Flow and Traffic Control
- Transport and Urban Planning
- Highway Design
- Soft Skills (Excursion Practical Experience in Warehouse & Distribution)

**LOGISTICS**

**Core Modules**
- Introduction to Business Logistics
- Decision Support for Logistics Management
- Introduction to Supply Chain Management
- Cross-Discipline Modules (Business & Technical English, Selected Topics in Business Management, Aspects of European and Asian Relations Today, Selected Topics in Business Administration)

**Specialised Modules**
(Choose 4 modules from the list below and 1 from Transport’s specialised modules)
- Industrial Logistics
- Consumer Industry Supply Chain Management
- Logistics Service Provider (LSP) Management
- Health Care Logistics
- Green Supply Chain and Risk Management
- Design and Application of Material Handling Systems

**TRANSPORT**

**Core Modules**
- Introduction to Business Logistics
- Decision Support for Logistics Management
- Introduction to Supply Chain Management
- Cross-Discipline Modules (Business & Technical English, Selected Topics in Business Management, Aspects of European and Asian Relations Today, Selected Topics in Business Administration)

**Specialised Modules**
(Choose 4 modules from the list below and 1 from Logistics’ specialised modules)
- Traffic Operation and Control (ITS)
- Transportation Modelling and Simulation Tools
- Public Transport Planning
- Airport and Harbour Design
- Rail Transport and Rail Planning
- Urban Road Design

**RAILWAY ENGINEERING**

**Core Modules**
- Traffic Operation and Control (ITS)
- Transportation Modelling and Simulation Tools
- Rail Transport and Rail Planning
- Trackworks I
- Trackworks II (Urban Rail Focus)
- Public Transport Planning
- Train Control and Signalling Systems
- Rolling Stock
- Soft Skills Cross-cutting fundamentals and methods

**Specialised Modules**
(Choose 2 to 4 modules from the list below. Each student must accumulate 11 credits)
- Civil Engineering in Energy Technology
- Energy Systems and Energy Economy
- Power Transmission Systems
- Local Public Transport Strategy and Organization
- Geo Information
- Land Use and Transport (Strategies and Models)
- Road Design
- Computer Aided Traffic Engineering with Matlab
- Urban Infrastructure Design
- Strategies in Megacity Regions and Developing Countries

For module synopsis, please refer to the additional handout, or visit www.tum-asia.edu.sg/admissions/programme-brochures for the online version.

*Disclaimer: Specialisation modules available for selection are subject to availability. Unforeseen circumstances that affect the availability of the module include an insufficient number of students taking up the module and/or the unavailability of the professor. TUM Asia reserves the right to cancel or postpone the module under such circumstances.

*Students who are specialising in Railway Engineering are required to complete these modules at TUM’s main campus in Munich.*
Students who are specialising in Railway Engineering are required to complete the following modules at TUM's main campus in Munich, taking up the module and/or the unavailability of the professor. TUM Asia reserves the right to cancel or postpone the module under such circumstances.

*: Specialisation modules available for selection are subject to availability. Unforeseen circumstances that affect the availability of the module include an insufficient number of students and for increasing risks in Global and local supply chains. Lastly they can operate risk mitigation and avoidance techniques to deepen their understanding from Supply Chain Management.

### Logistics Specialisation

#### Core Modules
- **Introduction to Business Logistics**
  - In-depth knowledge about Evolution of Business Logistics, key definitions, megatrends for the future of Logistics, model of logistical activities, logistical objects, cargo transportation, warehousing, operational, tactical and strategic levels of logistical planning, best practices and principles of logistical systems optimisation, future fields of logistics application.
- **Decision Support for Logistics Management**
  - Principles of management decision support, overview on relevant operations research tools and algorithms. Principles of modelling logistical systems (data collection issues).
- **Introduction to Supply Chain Management**
  - Students are able to interpret and apply: SCM for fully automated processes; transport systems; airport logistics; harbour logistics; courier & express logistics; Third Party logistics; planning methods; design of systems & project management.

#### Cross-Discipline Modules
- **Selected Topics in Business Management, Aspects of European and Asian Relations Today**, Selected Topics in Business Administration

#### Soft Skills
- **Business & Technical English, Excursion Practical Experience in Warehouse & Distribution**

**“Specialised Modules” (Choose 4 modules from the list below and 1 from Transport’s specialised modules)**

#### Industrial Logistics
- The lecture covers the issues of logistics and supply chain management from the perspective of global industrial producers and suppliers, such as from the electronics, electrical appliances, automotive, machinery industries (“assembly industries”).

#### Consumer Industry Supply Chain Management
- This lecture addresses the issues of logistics and supply chain management from the perspective of national and international consumer goods producers, wholesalers, retail chains and direct marketers, such as from the food and non-food branded goods industries, fashion and luxury goods, home supplies etc.

### Logistics Service Provider (LSP) Management
- This lecture focuses on the “life cycle” issues of logistics service provider. Management such as market selection and analysis, as well as transport mode choices. Overview of the important LSP markets, such as parcel/express, LTL, truckload, air and sea forwarding, container shipping, etc.

### Health Care Logistics
- Aim and scope of this course are the special aspects of logistics and supply chain management in the health care industry. This course offers an introduction to the fundamentals of health care management. Furthermore students learn to understand the basic mechanisms of the health care value chain, develop a sound knowledge of appropriate tools and techniques, management of supply chain, management activities and learn how to evaluate logistic processes in this special field of application.

### Green Supply Chain and Risk Management
- Students are able to understand the business model of Green Supply Chains and are able to implement green techniques for company short and long term. In addition, students are able to evaluate the threats and for increasing risks in Global and local supply chains. Lastly they can operate risk mitigation and avoidance techniques to deepen their understanding from Supply Chain Management.

### Design and Application of Material Handling Systems
- Material Handling is shown in many business areas and business cases (logistics processes in transport modes like Air traffic, Harbour logistics, Warehouse and Distribution, Express logistics, LSP-business and production logistics). Furthermore an overview about general contractor business and Project Management is given.

### Transport Specialisation

#### Core Modules
- **Introduction to Business Logistics**
  - In-depth knowledge about Evolution of Business Logistics, key definitions, megatrends for the future of Logistics, model of logistical activities, logistical objects, cargo transportation, warehousing, operational, tactical and strategic levels of logistical planning, best practices and principles of logistical systems optimisation, future fields of logistics application.
- **Decision Support for Logistics Management**
  - Principles of management decision support, overview on relevant operations research tools and algorithms. Principles of modelling logistical systems (data collection issues).
- **Introduction to Supply Chain Management**
  - Students are able to interpret and apply: SCM for fully automated processes; transport systems; airport logistics; harbour logistics; courier & express logistics; Third Party logistics; planning methods; design of systems & project management.

#### Cross-Discipline Modules
- **Selected Topics in Business Management, Aspects of European and Asian Relations Today**, Selected Topics in Business Administration

#### Soft Skills
- **Business & Technical English, Excursion Practical Experience in Warehouse & Distribution**

**“Specialised Modules” (Choose 4 modules from the list below and 1 from Logistics’ specialised modules)**

### Traffic Operation and Control (ITS)
- The module provides insights into the state-of-the-art control measures for optimising traffic flows. The main topics are: the principles of urban, extra-urban and integrated systems, the objectives, measures, methods and algorithms, systems and technologies used in intelligent transportation systems, etc.

---

**Disclaimer:** Specialisation modules available for selection are subject to availability. Unforeseen circumstances that affect the availability of the module include an insufficient number of students taking up the module and/or the unavailability of the professor. TUM Asia reserves the right to cancel or postpone the module under such circumstances.

**Students who are specialising in Railway Engineering are required to complete the following modules at TUM’s main campus in Munich.**
Module Synopsis

Transportation Modelling and Simulation Tools
The module provides detailed knowledge about software tools for traffic and system simulation. Microscopic and macroscopic simulation will be dealt with in this lecture.

Public Transport Planning
The students will learn how to plan and operate different public transport modes. The main topics are: the geometry of transit lines, transit network types and their characteristics, public transport scheduling, transit fares, etc.

Airport and Harbour Design
This module gives an insight into the necessary components of airports and harbours and the planning processes for developing these sites. Besides that it offers several methods for operating airports and harbours.

Rail Transport and Rail Planning
The module covers freight and passenger rail-transport systems focusing on infrastructure planning. The required track alignment tools are introduced based on the kinematic and dynamic features of rail vehicles, the specific train-track interactions, the passenger comfort and the safety requirements. This includes turnouts, junctions and other track configurations for rail network and station design. The students will learn the design, construction and maintenance of rail infrastructure as well as the subsystems and components for conventional and high-speed lines.

Urban Road Design
Provides in-depth knowledge on planning, designing and organizing urban streets as spaces for living, furthermore looking at different ways to organise transportation in an efficient way for various transport modes and mobility needs.

Railway Engineering Specialisation

Core Modules

Rail Transport and Rail Planning
The module covers freight and passenger rail-transport systems focusing on infrastructure planning. The required track alignment tools are introduced based on the kinematic and dynamic features of rail vehicles, the specific train-track interactions, the passenger comfort and the safety requirements. This includes turnouts, junctions and other track configurations for rail network and station design. The students will learn the design, construction and maintenance of rail infrastructure as well as the subsystems and components for conventional and high-speed lines.

Trackworks I
This module provides in-depth knowledge of the forces acting between vehicle and track and of the environmental actions. Students learn the strategies and the tools to design track systems, to analyse and to evaluate track performance with respect to maintenance and safety requirements. Beside track stability, the track quality and track stiffness are of significant importance for high-speed railway lines. Conceptual design of upgraded conventional and ballastless track systems will be discussed too.

Trackworks II (Urban Rail Focus)
This module covers the special features of urban rail systems, especially metro and tram. The specific train-track interactions, track layout and infrastructure design will be discussed. Noise and vibration requirements rule the rail infrastructure and track design in the urban environment. Students will learn the design of floating slab tracks and the application of other measures to minimise the negative effects of urban rail infrastructure. Acceptance and attractiveness of surface rail transport can be enhanced by an integrated infrastructure design (e.g. by green tracks).

Public Transport Planning
The students will learn how to plan and operate different public transport modes. The main topics are: the geometry of transit lines, transit network types and their characteristics, public transport scheduling, transit fares, etc.

Train Control and Signalling Systems
This module introduces to the students the train control and signalling systems. The benefits and challenges of techniques used will be analysed. Turnout, signals, and all track based equipment, facilities, electronic interlocking and train control systems will be covered too. Risk analysis and assessment of electronic systems and management of train scheduling and transport risk will be discussed.

Rolling Stock
This lecture covers the wheel-rail interaction, running behaviour in curves and straight track, propulsion systems diesel, electricity AC and DC, energy efficiency including regenerative braking, running gear and vehicle construction, including primary and secondary suspension devices, wheelsets, bogie frames and body shells relevant norms and design rules, tendering procedure and homologation process, safety issues as collision safety derailment safety, fire safety, environmental aspects as external and internal noise, particle emission, space consumption, reliability, availability, maintainability, diagnosis systems and their environment and benefit.

Traffic Operation and Control (ITS)
The module provides insights into the state-of-the-art control measures for optimising traffic flows. The main topics are: the principles of urban, extra-urban and integrated systems, the objectives, measures, methods and algorithms, systems and technologies used in intelligent transportation systems, etc.

Transportation Modelling and Simulation Tools
The module provides detailed knowledge about software tools for traffic and system simulation. Microscopic and macroscopic simulation will be dealt with in this lecture

Soft Skills
Cross-cutting fundamentals and methods

*Specialised Modules** (Choose 2 to 4 modules from the list below. Each student must accumulate 11 credits)

- Civil Engineering in Energy Technology
- Energy Systems and Energy Economy
- Power Transmission Systems
- Local Public Transport Strategy and Organization
- Geo Information
- Land Use and Transport (Strategies and Models)
- Road Design
- Computer Aided Traffic Engineering with Matlab
- Urban Infrastructure Design
- Strategies in Megacity Regions and Developing Countries

*Disclaimer: Specialisation modules available for selection are subject to availability. Unforeseen circumstances that affect the availability of the module include an insufficient number of students taking up the module and/or the unavailability of the professor. TUM Asia reserves the right to cancel or postpone the module under such circumstances.

*Students who are specialising in Railway Engineering may be able to complete these modules at TUM’s main campus in Munich, Germany.
## Admissions Information

### ADMISSION CRITERIA*

- Hold a minimum 3-year Bachelor Degree in Electrical, Electronics Engineering, or equivalent degree in other relevant disciplines
- Submit **one (1) notarised copy of Official or Provisional Bachelor Degree Certificate** and **one (1) notarised copy of Official or Provisional Academic Transcript**
- Submit **two (2) Recommendation Letters** from two (2) different Professors or Employers
- Submit **one (1) Letter of Motivation** that indicates the reason(s) you are interested in the programme you applied for
- Submit **one (1) Curriculum Vitae / Resume**
- Submit **TOEFL / IELTS test score** (Required for applicants whose native tongue or medium of instruction from previous studies is not in English)
- Submit **Akademische Prüfstelle (APS) certificate** (Required for applicants who hold a degree from China, Vietnam, or Mongolia)

<table>
<thead>
<tr>
<th>TOEFL test score requirements: At least 88 for the Internet-Based Test (TOEFL code: 7368)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IELTS test score requirements: Overall IELTS results of at least 6.5</td>
</tr>
</tbody>
</table>

* The full application process is available on [www.tum-asia.edu.sg/application-process](http://www.tum-asia.edu.sg/application-process).

** Documents which are not in English must be translated by a certified translator. All applicants are also required to submit an additional of three (3) notarised copies of Official or Provisional Bachelor Degree Certificate, three (3) notarised copies of full, Official Academic Transcript, and three (3) passport-sized photographs when you have accepted the offer of admissions and are being matriculated into our programme.

## TO APPLY

Applications open 15 October every year. Apply online at [www.tum-asia.edu.sg](http://www.tum-asia.edu.sg)

## FEES

<table>
<thead>
<tr>
<th>APPLICATION FEE</th>
<th>TUITION FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGD 79 is payable for each application per programme</td>
<td>A Total of Euro 19,000+</td>
</tr>
</tbody>
</table>

- The tuition fee will be divided into 3 installments for payment and may be further divided into SGD and EURO amounts.
- The tuition fee includes teaching fees, laboratory expenses and cost of mandatory events.
- The tuition fee does not include airfare, accommodation, living expenses, and miscellaneous fees (inclusive of registration, IT facilities, matriculation, examination, amenities, copy right, sports, insurance and medical). These fees will be separately paid by the student.

* The tuition fee stated is accurate as of 1 November 2017. All fees are subject to revision due to currency fluctuations, at the discretion of TUM Asia. All fees quoted are inclusive of 7% Singapore’s Government Goods & Services Tax. Please refer to our website for fee updates.
Entrepreneurial Thinking and Engagement
Globalization is now an inevitable force that is here to stay. At TUM Asia, our classroom reflects this diversity with an enrolment of over 28 nationalities. This means that we foster a vibrant learning environment where the student learns not only from the textbook but also through the lives of their counterparts. Classroom ideas are synthesized across the diverse economic realities and students learn to see from multiple vantage points, creating a capacity to solve problems in creative ways. The unique degree programme not only equips the student with technical and scientific knowledge, but with an enriched curriculum consisting of business and cultural modules.

TUMCREATE
TUM is known for its research capabilities and strength in innovation. As such, TUM Asia spearheaded the set up of TUMCREATE as a base of research in Singapore. TUMCREATE is a joint programme between Technical University of Munich (TUM) and Nanyang Technological University (NTU). The electromobility institute brings together the expertise and innovation of Germany and Singapore, to drive innovation to shape the future of sustainable mobility by tackling issues ranging from the molecules to the megacity. Graduates from the TUM Asia Master programmes have the opportunity to apply for positions at TUMCreate, especially if your interest lies in the area of transportation and mobility research.

Highest International Standards
You will be studying with the world’s best professors from TUM, as well as experts from the industry. Not only will the student benefit from professors who are actively involved in research, one will also receive a holistic learning experience with the engagement of local lecturers from academia and industry. Majority of our modules are covered by professors who fly in from Germany on an exclusive teaching basis, to ensure that students get the undivided attention of their lecturers.

TUM Asia’s Transport & Logistics programme, with its multi-cultural atmosphere, prepares students for international careers in the wide field of transport and logistics. Focusing on strategies, topic-interactions and creativity, the students are able to develop skills to successfully lead multi-disciplinary projects.

Dr. Bernhard Lechner
Senior Researcher & Lecturer, Technical University of Munich
Collaborating Scientist at TUM CREATE

“Talents Are Our Assets, Reputation Is Our Return”
DID YOU KNOW THAT SINGAPORE IS THE PREFERRED LOGISTICS & SUPPLY CHAIN MANAGEMENT HUB FOR LEADING MANUFACTURERS DUE TO EXCELLENT GLOBAL CONNECTIVITY?

Heart of Southeast Asia: Singapore’s Strategic Location

Singapore’s strategic position on the crossroads of the world and at the nexus of major shipping lanes has earned it the reputation of being a important logistics hub and conduit for world trade. Singapore is well-positioned to help logistics companies build on their manufacturing leadership and develop higher value adding services. More than 178 kilometers of track span across the island, connecting 128 stations on 5 Mass Rapid Transit (MRT) and 3 Light Rail Transit (LRT) lines. Together, over 2.8 million trips are made daily across Singapore’s rail network. Furthermore, Singapore is the leading aviation hub, a world class integrated chemical hub, and has a robust electronics industry. Therefore, Singapore’s demand for an efficiently structured and managed transportation and logistics system will only continue to grow.

The Transport & Logistics Industry in Singapore

Singapore is the leading Transportation & Logistics hub in the world. Singapore’s global connectivity and its secure and business-friendly import/export procedures provides companies greater efficiencies in conducting business. Singapore provides world class infrastructure to help support the growth of the logistics industry, such as the Airport Logistics Park of Singapore (ALPS) in the airport’s free-trade zone, the Changi International LogisPark, which facilitates regional distribution, and the Banyan LogisPark on Jurong Island that caters to chemical and oil companies.

Our Graduates

Our graduates in Transport & Logistics are employed all over the world, such as in Singapore (95.2%), Europe (4.8%).

The most commonly accepted positions are Air Freight Analyst, Logistics Analyst, Transport Analyst, and Import & Export Coordinator.

Our graduates are expected to to be able to find job opportunities with DHL, Pan Asia Logistics, RedMart. In the past year, Pan Asia Logistics hired 23.8% of our total graduates.

1 The World Bank ranked Singapore as the #1 Logistics Hub amongst 155 countries globally in the 2012 Logistics Performance Index

2 Singapore’s Changi Airport is one of Asia’s largest cargo airports and handles close to 2 million tonnes of cargo annually

7 Singapore’s location is also proximate to the world’s major markets as it is situated within a 7-hour flight radius to half the world's population

20 Singapore is a prime location for major logistics firms, with 20 of the top 25 global logistics players conducting operations in Singapore

31 Singapore is one of the world’s busiest transhipment hub, handling about 1 out of 7 of the world’s container transhipments; more than 31 million TEUs of containers in 2012

123 Singapore is connected by 200 shipping lines to 600 ports in 123 countries

TUM Asia, combining the tradition in education and the dynamics of one of the most important hubs in Asia, does provide students with the skills and exposure needed for the successful realization of their dreams and ambitions!

Kalin Stoyanov
Alumni, Master of Science in Transport & Logistics Planning and Control, Rolls-Royce

Ambitious, motivated, open-minded & hardworking - this is how the TUM Asia graduates are excellently contributing to live up to Pan Asia Logistics’ core values: Knowledge driven, Integrity, Personal Relationship and Service Excellence.

Pan Asia Logistics Singapore Pte Ltd