Academic Guide Exchange 2026-2027

Faculty of Technology, Innovation & Society

The Hague University of Applied Sciences

let's change
YOU. US. THE WORLD.

THE HAGUE
UNIVERSITY OF
APPLIED SCIENCES

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Foreword

An exchange at The Hague University of Applied Sciences (THUAS) is a truly international experience. THUAS welcomes more than 500 exchange students from around 50 nationalities every academic year. Our academic year is divided into two semesters, which start in September and end of January. Mobilities may last a semester or a full academic year, depending on the Programme.

Our exchange students gain a rich cultural experience by studying alongside our large number of Dutch and international full-time students of English-language bachelor degree programmes. Our high-quality programmes encourage students to explore each other's cultures to become open-minded and independent thinkers – qualities which are essential in the present-day market. Working in a multicultural and cosmopolitan environment becomes second nature to our students.

Exchange students come to The Hague University of Applied Sciences as part of a reciprocal exchange programme with a partner university and must first be nominated by their home institution. Students nominated under our bilateral agreements are not charged tuition fees at THUAS but remain registered with and pay tuition to their home university. Free movers, by contrast, are responsible for paying tuition fees and arranging their admission independently.

The Hague University of Applied Sciences also participates in the Erasmus+ Programme, which enables the mobility of students and staff, the organisation of Blended Intensive Programmes (BIPs), as well as participation in BIPs hosted abroad. In addition to BIPs, blended short-term and long-term mobility is available for studies and traineeships, as well as for staff mobility for teaching and training purposes.

Content

The Hague University of Applied Sciences

Welcome to The Hague University of Applied Sciences (THUAS)!
At THUAS, we encourage our students, lecturers and partners to develop into open-minded global citizens – to stand firm in their own convictions and face the world. We realise that our own professional commitment makes a difference, and we must work together to develop and apply creative solutions.

The Hague is the perfect location to become a global citizen. It is the capital city of the South Holland province and the International City of Peace and Justice – the political heart of the Netherlands. It is home to the Peace Palace, International Court of Justice, Binnenhof (parliament), 115 embassies, multinationals like Shell, Siemens, and ING, and many international NGOs.

These are the values that drive us at THUAS:

- **Curious:** We are curious, ambitious, and enterprising. We are keen to contribute with critical thinking.
- **Caring:** We are dedicated, and we care about your personal growth.
- **Connecting:** We invest significantly in our network in order to develop new insights together.
- **Committed:** Together, we keep moving forward, no matter the challenge.

At THUAS, we constantly need to apply new perspectives and solutions to resolve present and future challenges. We want to empower our students to change and improve the world they live in, but this can only happen if we work together – if we evolve and change.

So, let's change. You. Us. The world.

For the coming Academic Year, The Hague University of Applied Sciences (THUAS) once again opens its doors to you, exchange students, from our hundreds of partners around the world. We are looking forward to welcoming you all.

In this academic guide, you will find general information on everything you need to start your exchange at THUAS, like the ECTS and period of offering of each course, more information on that course, such as assessment type, criteria, learning outcomes, a social guide, contact information, etc.

We here at THUAS hope that you will find the best-suited combination of classes in order to not only complete your studies but also grow as an individual and as part of a group. Furthermore, we hope that after sharing a semester or a year with us, you will return to your home institution as a 'Global Citizen'.

General information

THUAS is a vibrant and international community, home to **24,948 students of 123 nationalities**. Our university spans four campuses across three cities: two in The Hague, one in Zoetermeer, and one in Delft, each offering modern facilities and inspiring learning environments.

1. **Location Main Campus:** Johanna Westerdijkplein 75, 2521 EN The Hague
2. **Location Sportcampus Zuiderpark:** Mr. P. Droogleever Fortuynweg 22, 2533 SR Den Haag
3. **Location Zoetermeer**: Bleiswijkseweg 37, 2712 PB, Zoetermeer
4. **Location Delft:** Rotterdamseweg 137, 2628 AL, Delft

The university has 2,521 employees representing 88 nationalities, all contributing to high-quality education and support for students. With over 100 Bachelor's and Associate Degree programs across seven

Faculties, THUAS equips students with the skills, knowledge, and global perspective needed to succeed in today's world.

Diversity and inclusion are at the heart of who we are. With such multinationalism among our students and staff, we are committed to building an inclusive and supportive learning and working environment where everyone feels welcome, valued, and supported. Read more about what we mean by diversity and inclusion here.

The Dutch Educational System

THUAS is a vibrant and international community, home to **24,948 students of 123 nationalities**. Our university spans four campuses across three cities: two in The Hague, one in Zoetermeer, and one in Delft, each offering modern facilities and inspiring learning environments.
Join us and experience a university where diversity, global perspectives, practical experience, and academic excellence come together!

Higher Education in the Netherlands

The vast majority of higher education institutions in the Netherlands are state-funded. There are around 13 traditional 'research' universities, 1 Open University, and 36 Universities of Applied Sciences.

The higher education system in the Netherlands is based on a three-cycle degree system, consisting of a Bachelor's, Master's, and PhD degree. The Netherlands has a binary higher education system. Binary in this context means there are two types of higher education:

- Research-oriented education, typically provided by research universities
- Higher professional education is offered by the Universities of Applied Sciences

Programmes at research universities focus on theoretical aspects of the field of study and prepare students for undertaking independent research. These also lead to a bachelor's or master's degree. At research universities, you can also pursue a PhD degree.

Programmes at universities of applied sciences prepare students for particular professions and tend to be more practically oriented. They lead to either a bachelor's or a master's degree. There are currently 36 Universities of Applied Sciences in the Netherlands, offering a wide variety of high-quality degree programmes in English. Thematic fields include economics, engineering, agro and food, healthcare, art, social studies, and teacher training (for primary education).

Credit and Grading System

Degree programmes and periods of study are quantified in terms of the European Credit Transfer and Accumulation System (ECTS). In this system, 60 credits represent one year of study, and one credit represents 28 hours of study. The focus of the programmes determines both the number of credits required to complete the programme and the type of degree that is awarded.

In the Netherlands, a ten-point system is used in higher education. A grade of 10 is the highest, and 6 is the minimum pass grade.

Grade meaning

10	Outstanding *	5	Almost satisfactory
9	Very good *	4	Unsatisfactory
8	Good	3	Very unsatisfactory *
7	More than satisfactory	2	Poor *
6	Satisfactory	1	Very Poor *

National Qualification Framework and European Qualifications Framework

The Dutch Higher Education Qualifications Framework is based on the Overarching Frameworks for Qualifications of the European Higher Education Area (QF-EHEA), developed as a part of the Bologna process. The overarching EQF specifies the specific knowledge, skills, degree of independence and responsibility associated with each of the 8 levels, rather than individual qualifications.

The Dutch Higher Education Qualifications Framework consists of 3 stages:

- bachelor's
- master's
- PhD

These 3 stages correspond with EQF levels 6, 7 and 8. The associate degree corresponds to EQF level 5. More information on the level of Dutch Diplomas to be found on Nuffic's webpage.

Academic Calendar

The first semester runs from late August until late January/early February. The second semester runs from early February until July.

Check our website for the THUAS academic calendar and holiday schedule.

International Office

The International Office can assist you with practical, non-academic related matters. For example, we can help you look into arranging accommodation, registration at the municipality, collecting your residence permit, your health insurance, and answering any questions about working while studying.

Accommodation*(accommodation@hhs.nl)*

Need help?
Our staff are here to help you with any questions about our services.

Location: OV1.10, main campus.
Opening hours: Monday to Friday, 9:00 AM – 4:30 PM
Telephone: +31 (0)70 445 85 85

If you are unable to visit us in person, you can also contact us by e-mail.
Visit our website to get informed about all the topics above

THUAS offers a housing service for first-year international degree students and exchange students. Most exchange students are accommodated through our trusted partner DUWO University Housing, a specialist in student accommodation in the Netherlands.
DUWO offers rooms located close to the THUAS campus, giving students the choice between shared accommodation with fellow THUAS students or a self-contained room. Rental contracts are offered in line with the student's exchange period, either one semester or a full academic year.

Because availability is limited, we recommend submitting your housing application as soon as possible; don't wait until you receive your admission offer to start looking. More detailed information about our housing service, accommodation types, and conditions can be found on our housing page.

Exchange (exchange@hhs.nl)
The exchange department handles all administrative matters for incoming exchange students who come to HHS for an exchange (for one semester or an entire academic year). The exchange department liaises with

partner universities, overseeing nominations and the application process. This department also ensures that exchange students have sufficient health insurance and ensures visa applications for incoming exchange students are processed. The Exchange department also liaises with the Immigration and Naturalization Service (IND) for this latter purpose. It ensures that those who need to be reported to the Immigration and Naturalization Service (IND) (these are often international students who are already studying here and have a Dutch residence permit, but are going abroad) are also properly registered.

Resources and Services

Whether you are studying in Delft, Zoetermeer, or at one of our campuses in The Hague, there are always lecture rooms, classrooms, workspaces, restaurants, libraries, and sports facilities available to you.

Library

The library has a diverse collection of books, nearly 900 magazines, Dutch and foreign newspapers, and a large collection of graduation essays. There is a digital library which includes (international) databases, e-journals, standards database, E-books, THUAS theses and publications in digital form etc.

The library provides excellent electronic sources of information to students and staff. It is open to students registered at THUAS and to members of staff. It's located on the first floor (entrance/exit, self-service unit for borrowing and returning items, Study Plaza) and ground floor (books, periodicals). Most library services are free of charge.

Study areas

When working on an assignment, preparing for an exam or meeting with other students, you can use a variety of specially designed work and study areas on all of our campuses. You can also log into 'our' wireless network with your laptop, tablet or smartphone. Of course, we also have 'fixed' computer workstations.

Campus Card

THUAS makes use of an electronic purse system for printing, accessing lockers (during exams), and buying food and drinks. You can pick up your Campus Card by presenting valid ID at the IT Front Office of your THUAS campus. Alternatively, during the Introduction Day, we will assist you with its procurement.

To load money onto the card, you need to have a PayPal account or a Dutch bank account. It is not possible to charge it with foreign bank cards unfortunately. Alternatively, you can also pay by European debit cards on university grounds.

IT Front Office

The FZ & IT Front Office provides integrated accommodation, facilities, and IT support across THUAS, striving to deliver the highest service standards. Its mission is to leverage the latest technologies, offer differentiated services and structures, and maintain an international perspective. The team focuses on relieving users of logistical concerns and ensuring a secure physical and digital environment.

The Front Office is happy to assist you with all IT-related questions. You can also borrow audiovisual equipment, for example, if you need to record a video for a class. Through the iFrontOffice self-service portal, you can find manuals and submit service requests. The Front Office can also assist you with any questions regarding your Campus Card.

Language support

For students who want to develop their Dutch language skills, the Taalpunt is available, while the Language Point offers support in English. To access these resources, you must first be registered at THUAS (via Osiris) to gain access to the Student portal (Studentennet in Dutch).

Social Guide

This guide is designed to help you navigate the social landscape of The Netherlands seamlessly. From language essentials to cultural insights, social outings and important information on laws and healthcare, we've got you covered. Embrace diversity, explore the city's, and make connections that will last a lifetime. It will give some practical and hopefully useful information to survive your time at THUAS. Find it here.

Canteen

Forgot your lunch box? No problem! There are various food providers and vending machines at THUAS. All of our campuses have one or more restaurants where you can buy hot and cold food and drinks. The main campus also has the West 75 café, a coffee corner and a cafeteria with a wide selection of fruit, dairy products, meals, halal dishes and more.

Please note that the university does not accept cash or credit cards. Payments can be made only via the Campus Card or a Dutch (European) Maestro bank card.

There is also a small grocery store outside the main building called "Albert Heijn To Go", which sells a selection of meals and snacks and drinks. There are also various vending machines with drinks and snacks on multiple floors of the university.

Studying with a disability or special circumstances

THUAS offers customized facilities that can help make studying easier for you. At our four locations we take your (im)possibilities into account as much as possible. We can help you as much as possible right from the start of your studies if you let us know. Read more here.

Sports Centre, Gym & Student life

The main campus of THUAS has a Fitness Centre where you can work out and a gym for group classes (yoga, boxing, Zumba, bodypump). In the sportshalls at Zuiderpark campus, you can play various indoor sports (basketball, football, volleyball, badminton). A sports & fitness pass gives you unlimited access to all these studentsports activities. More information here.

The main campus is also home to various sports clubs (rowing, korfball, lacrosse, rugby, tennis, football, volleyball, hockey, basketball, athletics etc.) and organises events, activities, and parties for international students from time to time. The Hague, Delft and Zoetermeer offer lots of different opportunities to make your student days as epic as you want!
Campus Student Life and Sports is located across from the main entrance of THUAS at Johanna Westerdijkplein 66. You can also reach out via email at campus@hhs.nl or follow them on Instagram and to stay up to date with the latest news on communities and associations, events and student sports.

Student counselling and supervision

We have a counselling system in place to help students facing problems that may affect their study results. The student counsellor advises students on all kinds of matters ranging from study grants and housing to other study programmes inside and outside THUAS. They can also help students with any appeals against decisions judged to be unfair or incorrect. The central student counsellor may also be approached when students have more personal problems affecting their studies and to apply for exam facilities in case students need extra exam time, etc.

THUAS also has a student psychologist. Students are confronted with a diverse range of problems: from losing the motivation to continue their studies or suffering from fear of failure to very serious situations such as psychiatric disorders. The psychologist can then provide short term care. The student counsellor will refer you to the student psychologist if deemed necessary.

Any conversations with the faculty staff, counsellors and/or psychologists are strictly confidential. Want to know more? Visit our page for details.

Medical care

Physician / General Practitioner (GP)
In case of illness, you should contact a general practitioner (in Dutch: 'huisarts') first. They are your main link to any specialist or hospital. Most GP's speak English, but it is important to check if they participate in your health care system. The Hague International Centre can assist you in finding a general practitioner in The Hague. The website contains a wealth of useful information on health, and their staff speak various foreign languages. We recommend you find a GP as soon as you have arrived.

Medical emergencies
- For life threatening situations call: 112 (ambulance, fire department or police department) or visit the emergency room at the nearest hospital.
- If you are not feeling well and your symptoms are not life threatening, you can contact your general practitioner and make an appointment.
- For emergencies after 17.00 hrs and during weekends, you can contact the hadoks (in Dutch: 'huisartsenpost' via telephone number +31 (0) 70 34 69 669.

Payment
Make sure to bring proof of your health insurance to the appointment, otherwise you'll have to pay for the consult directly after you've visited the doctor. A regular consult costs around € 30 - € 50. Blood tests, psychological support e.g. cost a lot more. Do not forget to ask for a receipt, as after your visit you can declare these costs at your insurance company.

Pharmacies
In the Netherlands, you will need a prescription for most medication. With a prescription you can go to a pharmacy (apotheek) to collect your medication. You pay for it when it's ready, and if you have medical insurance, you can usually claim the expenses from the insurer. Certain medicines are available over the counter, either in a pharmacy or at a chemist (drogist). Pharmacies and chemists usually have the same opening hours as shops. There is always a pharmacy open, even on weekends.

Dentists
Dental treatment is not included in a standard medical insurance. If you need a dentist you should make an appointment first. After treatment the bill is usually sent to your address in the Netherlands. The cost of the consultation varies by type. Once again be sure to ask for a receipt in order to receive compensation from your insurance.

Bring along your passport or identity card, insurance papers and your address in The Hague.

Contact information

TIS Global Office, SL1.66, Tis-international@hhs.nl
For any questions related to the courses, academics and cultural inquiries.

THUAS International Office, OV1.10, exchange@hhs.nl
For any questions on your general application at THUAS, housing service through THUAS, residence permits and visas, health insurance, registration at the municipality, etc.

THUAS Front Office FZ IT, OV1.69 frontoffice@hhs.nl
For IT related questions and issues (such as your Campus card of Wi-Fi login details), borrowing audio/visual equipment

Faculty of Technology, Innovation & Society

About the Faculty/Programme/Vision/Mission

Technology plays a role in every change, and that's a good thing because the world is changing faster than ever. Sometimes it's the driving force, other times, it's the solution."

The world faces big challenges, and we are looking for new answers and technical innovations to solve them. We need to be critical and look ahead to make improvements to the world we live in, from harnessing renew-able energy supplies for sprawling cities to using robots to improve quality of life. At the Faculty of Technology, Innovation and Society (TIS), students work on real life commissions from businesses and government organisations to help make a better world, working alongside multidisciplinary students in an international setting

Information on the Academic Programme

Attendance

In some modules, the final result is partly dependent on a student's active contribution during classes. If a student fails to attend the minimum number of times, they will not be awarded any credits for the module. Students are expected to be on time for classes. If a student comes to class late, the lecturer concerned may refuse their entry.

How students contact lecturers

If students wish to contact staff outside class hours or want to hand in an essay or paper, there are the following rules:

- Handing in essays is normally through staff pigeonholes or via email/" Brightspace".
- Staff have certain office hours reserved to see students. During term-time students can see staff then. In weeks in which there is no teaching, they can make appointments directly with the lecturer they wish to speak to or via e-mail.
- Members of staff can be asked brief questions through e-mail. Students can normally expect to get an answer to e-mail questions within 3 working days.

How staff contact students

If a member of staff wishes to contact a student, the following methods are used:

- Through e-mail. All students have their own THUAS e-mail address. The Digital Learning environment Brightspace is also commonly used, as is MS Teams.
- Through study-related announcements published on the university portal.
- If necessary, for reasons of confidentiality, THUAS will try to contact a student through other methods, for instance by phone or by post. For that reason, it is necessary that THUAS has up-to-date information about a student's address and phone number. Should any changes occur in the course of the academic year, please inform the International Office (internationaloffice@hhs.nl).

Semester structure

Timetable

Exchange students will have access to the exchange programme timetable at the beginning of each semester. More information about the timetable will be provided during the introduction week.

Classes are allotted by slots. Some classes last 45 minutes, and others 90 minutes. The slots are as follows:
1. 08.45 am – 09.30 am
2. 09.30 am – 10.15 am
3. 10.30 am – 11.15 am
4. 11.15 am – 12.00 pm
5. 12.15 pm – 13.00 pm
6. 13.00 pm – 13.45 pm
7. 13.45 pm – 14.30 pm
8. 14.45 pm – 15.30 pm
9. 15.30 pm – 16.15 pm
10. 16.30 pm – 17.15 pm
11. 17.15 pm – 18.00 pm

Registering for a course

If students are interested, they should email a letter of motivation (and, for EPS, a resume as well) to tis-international@hhs.nl. If approved, the TIS Global Office will process the registration for the course.

Study workload

Each course offered is worth 30 ECTS credits. One ECTS credit represents 28 hours of work, so each course requires 840 hours of work. This is spread over one semester and is structured differently for each course; please refer to the course description for details.

Exchange students

An introductionday is organized for exchange students prior to the start of the programs. This day is for everyone who is from abroad, participating in an exchange program at the faculty, with the aim of getting to know one another and introducing The Hague University of Applied Sciences and the Netherlands, along with its customs. The exchange programs then hold their own introduction during the first week of classes.

Course offer

Overview

Course code	Course name	Field (if applicable)	ECTS	Semester	Block/Term	Location
TBK-HMVT26-SIA	EPS- Sustainable Impact in Action	Technology Management	30	Semester 1 or 2	Block 1&2 or Block 3&4	Den Haag – Spui Campus
RO-HMVT24-SSIC	EPS- SMART Sustainable Inclusive Cities	Spatial Development	30	Semester 1	Block 1&2	The Hague
W-HMVT18-SMR	EPS- Smart Manufacturing & Robotics	Mechanical Engineering	30	Semester 1 or 2	Block 1&2 or Block 3&4	Delft
IPO-HMVT16-PDI, IPO-HMVT16-SPDI	EPS (Sustainable) Packaging Design and Innovation	Industrial Design Engineering	30	Semester 1 or 2	Block 1&2 or Block 3&4	The Hague
Mech-HMVT26-CMSM	Circular Manufacturing and Smart Maintenance	Mechatronics	30	Semester 1 or 2	Block 1&2 or Block 3&4	Delft
IDE-HMVT18-DWN	Design with Nature	Industrial Design Engineering	30	Semester 2	Block 3 & $	The Hague

Course descriptions

EPS Sustainable Impact in Action	
ECTS credits	30
Code	TBK-HMVT26-SIA
Year / Semester / Block / Term	Semester 1 or 2
Duration	20 weeks
Mode of delivery	Face-to-face
Lecturer(s)	Sioe Wen Hegberg - Go
Language of instruction	English
Type	Compulsory
Prerequisites and co-requisites	• You have passed your propaedeutic exam. In other words, you have basic knowledge and skills of your own discipline. • You have basic knowledge and skills of project-based (collaboration) work. • Both the subject-related and your personal learning objectives meet the objectives of the project and can be realized in the context of the project.
Course content / outline	**Make a Small Step, Create a Big Impact** What if your student project could spark something much greater? Imagine not just talking about a sustainable future but actively shaping it. That's exactly what you'll do in a learning community. You'll join forces with other passionate students and dedicated professionals to work on projects that matter. Choose the project that excites you the most and explore how you can best contribute to addressing authentic challenges. This minor takes place in the context of one of the existing Even Groene Vrienden learning community clusters. These are learning ecosystems in which students co-create, work, and innovate together with other learning partners on authentic challenges. Finding solutions for complex, wicked problems must include gathering expertise from the quintuple helix; i.e. students from other knowledge institutions (Delft University of Technology primarily), public sector, private sector, civil society/individual citizens, and environmental organisations. This is a full time minor. You are expected to be present and committed to the learning community, which includes attending weekly sprints, as well as various co-creation sessions. **What will you be doing?** This minor offers a variety of learning communities, each with different focal areas and sub-tracks for students to join, depending on the urgencies and problems expressed by the community. The five main focal areas consist of: (1) health, (2) circularity, (3) climate, (4) resilience, and (5) sustainable energy.

	All students enrolled in the minor will choose a learning community and sub-track that suits their interests and skills. The first stage of the minor will focus on identifying the knowledge and expertise of everyone, after which students enter the second stage of developing cross-boundary competencies and joint problem framing. This will lead them to the third stage of identifying the overarching systems in which the problem needs to be addressed, and finally towards co-creating a project plan on which the students will then work for the remainder of the minor. Throughout the minor, students are asked to participate in weekly sprint sessions with their core team members. Next to that, every four weeks a session is held with the wider learning community that involves external stakeholders as well. These are co-creation sessions in which students can reflect and collaborate together on their project, and benefit from the knowledge, expertise and skillset that these stakeholders bring to the table. Lastly, all students are expected to – aside from their assessment on possible solution pathways – also provide a tangible artefact that allows for knowledge to be transferred and accessed easily by all learning community stakeholders. Examples of the projects: *Sustainable Environments Curacao, Semicon, Green Campus, Sustainable Healthcare*
Course material	• Handouts, readers, project archive • Confluence
Assessment methods & criteria	• Midterm assessment 50% • Final assessment 50%
Learning outcomes	After completing this minor, students will be able to • View complex problems from various perspectives and reformulate the problem with various stakeholders • Integrate knowledge from various academic disciplines and non-academic sources • Implement co-creation methods with external stakeholders The minor supports the development of the following competencies: reflection, teamwork, tolerating uncertainty and ambiguity. Students and external stakeholders can choose from the predefined subject-specific and personal learning objectives, (such as resilience and adaptability, integrity and ethical awareness, self-direction and self-management, reflection and proactivity; taking risks and experimenting) and personalize these. These personal learning goals are approved by the minor coordinator. Regarding project-based collaboration, a critical success factor is being able to cope with the high degree of personal freedom and the associated responsibility. This also includes being resilient when things go unexpectedly and being able to deal with uncertainty. The goal is for the student to grow in these areas. The ultimate goal on a personal level is developing an adaptive and flexible mindset that allows students to balance both self-interest and the common goals of the project. This requires that the student is aware of and able to identify their own talents, as well as their knowledge gaps. They are open to learn from and able to appreciate other knowledge domains. Moreover, the student can reflect on their motives, and make informed choices on what value systems they apply as a professional.

EPS SMART Sustainable Inclusive Cities	
ECTS credits	30
Code	RO-HMVT24-SSIC
Year / Semester / Block / Term	Semester 1
Duration	20 weeks
Mode of delivery	face-to-face
Lecturer(s)	Stephan van Berkel & Anton Hanemaaijer
Language of instruction	English
Type	compulsory
Prerequisites and co-requisites	1. Having finished 2 years of studies at BSc level. 2. Having an adequate proficiency in English to be able to cooperate with international colleagues and stakeholders. 3. Having a basic understanding of mathematics and statistics in order to be able to participate in analyzing statistical data and systems behavior. 4. Having a big affinity for the course topics.
Course content / outline	Are you interested in sustainability, urban wellness and inclusivity? Are you creative? Do you want to create change in cities? BE SMART! Learn how to make sense of the city using several forms of data analysis and modelling. And activate your insights to make cities of the future SMART, Sustainable and Inclusive. You will be active in a hands-on project so if you have a proactive attitude and you enjoy learning from other disciplines and countries, this minor is for you. *“It has surely not escaped your notice: we find ourselves in a systemic crisis. Humanity is exceeding the social and ecological boundaries of what Earth can handle, and we see this all around us. [...] This results in too much emphasis on individualism and monetary prosperity, at the expense of collective well-being. So, it's time for a different paradigm. We need to shift our thinking away from a destructive, linear, and anthropocentric way of life towards a regenerative, circular, and ecological balance between humans and the rest of the planet.”* This is the challenge formulated by Bas van den Berg PhD. Being the basis for this minor, it is a complex question with an uncertain outcome (wicked) that requires transitions in many aspects of our lives. In this reality, we cannot rely on traditional educational methods where the teacher has knowledge and experience, and the student imitates and reproduces. We must learn to deal with this complexity and uncertainty together. That is the foundation of this minor. Therefore, you will be invited as cocreator in a group of (young) professionals and researchers, sharing knowledge on several aspects of inclusive design, sustainability and SMART technologies And, moreover, ways to deal with the complexity of the city. You are invited to contribute in research, design and shape this minor based on your own mission, ambitions, fascinations and abilities in several design sprints laid out in the 16 week span of the minor. During this period, the coaching team will help you to form your personal learning trajectory to their best abilities. Students in the minor develop a key competency: applying the insights gained from their study program in a multidisciplinary team for planning and designing urban interventions. This involves addressing design, environmental, energy, economic, and social issues related to impactful urban interventions. They

demonstrate the capability to translate complex professional problems into clear requirements within their discipline, considering the needs of other disciplines. Additionally, students exhibit problem-solving skills within their discipline and integrate solutions using research, systems thinking, and modeling. They justify and explain principles and results to the design team, combining knowledge from various disciplines to create added value. Furthermore, they acquire the skills to use geographic information tools and define change strategies.

The minor consists of 3 parts:

- Part 1 is an introductory week emphasizing the main challenges and getting acquainted with how things work within the minor.
- Part 2 is a period of cumulative two-week design sprints, every time with another part of the challenge as focus point resulting in the midterm presentation.
- Part 3 is a period in which students individually dig into a subject of their choice, relating to the work in the first half of the minor, deepening out their research and design.

Different teaching modules will be offered during the first half of the semester to gain a basic understanding and knowledge on various disciplines:

- Smart Design
- Future Urban Systems
- Sustainable Exploitation and Governance.

Two extra subjects are being offered during the semester. Both are important as part of the European Project Semester (EPS), focusing on the process of collaboration in interdisciplinary and international teams:

- Project Management
- Intercultural Sensitivity

Course material	• Course notes in each discipline • Open digital resources • Subscription digital resources freely available for HHS students • Software simulations (to be determined)
Assessment methods & criteria	1. (individual) knowledge part - 20% of total, min. grade 5,5 (several individual assignments): vlog 2. (group) project part 1 - 30% of total, min. grade 5,5: research poster / mockup 3. (individual) project part 2 - 50% of total, min. grade 5,5: research article / prototype Minimum of 80% attendance of lectures and group sessions. If absent, you can redo by writing a summary of the lecture missed. **Planning of the testing** (per partial test if applicable): • Regular test: midterm and final presentation week 7 to 18 • Resit: individual assessment week 19/20 (this will account for the 100% of the module score) • Individual assignment: week 7 • Midterm design and research assignment: week 7 • Final design and literature review: final week
Learning outcomes	• Obtain knowledge regarding the wicked urban problems* and challenge a broad set of Sustainable Development Goals regarding urban development.

- Learn analysis, design and intervention methods to stimulate and manage urban transitions.
- Apply these methods in a hands-on project regarding an urban area transition. Examples are the Double Diamond Design Process, Systems thinking and Design thinking.
- The minor aims to offer the basic knowledge and tools for teamwork between students of various disciplines and countries. The group composition is highly of influence on the way groups will engage the challenges formulated. To facilitate this, students learn a method to deal with complexity and will be coached in their group work. Groups are composed based on results of personal leadership tests executed from the start of the minor.

* Wicked problems are that class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing (Churchman, 1967, B-141)

Planned learning activities and teaching methods	Surftrip and Photo workshop

EPS Smart Manufacturing and Robotics	
ECTS credits	30
Code	W-HMVT18-SMR
Year / Semester / Block / Term	Semester 1 or 2
Duration	20 weeks
Mode of delivery	Face to face
Lecturer(s)	Thijs Brilleman
Language of instruction	English
Type	Compulsory
Prerequisites and co-requisites	• you have a basic knowledge of production technology • you are a student in Electrical Engineering, Mechatronics, Applied Physics, Robotics, Technical Business Administration, HBO-ICT, Applied Mathematics, Mechanical Engineering or similar • you have completed your propedeutic phase (60 ECTS) and have obtained 60 ECTS in your main phase at the start • your English is good enough to be able to participate in group work, understand lectures and written materials
Course content / outline	Become an automation ninja! Go hands-on with the latest industrial robots and other advanced equipment. In twenty weeks time you'll create two actual solutions for the industry on the factory floor or in our own lab. You'll also employ machine vision to give your robot arm eyes, and machine learning to make it smart! Don't have any prior programming experience? No problem! You'll learn how to program at the start of the minor. If you can already program, we'll help you get into advanced tech straight away. Smart manufacturing combines the advantages of mass production and piecewise production to bring about a fundamental change in the way production processes are designed, built and executed. This industrial robot automation focused minor prepares you – by hands-on practice and theory – for this change. You will learn to design and simulate an entire factory. In addition, you will deploy robots in manufacturing environments. You will gain practical knowledge and skills in programming production robot setups and implementing the use of vision, external sensors, actuators and machine learning in these setups. The minor consists of two projects of 10 weeks. In the first 2-3 weeks of each project, courses and practicums are taught to get you quickly acquainted with hardware and software skills in order to successfully finish the projects. There will be various practicums and tutorials on state-of-the-art robot control, vision, programming, designing and intercultural teambuilding. In the remaining weeks, you will be working on your project with your group members. • EPS cluster project 1 "Implement a real robot in a real production line" • EPS cluster project 2: "Implement a real robot in a real, more advanced production line" More information on the course and examples of the projects can be found on: https://www.robotminor.nl/
Course material	• Practicum materials set (approximately EUR 85)

	• All our teaching materials are digital and will be delivered to you free of charge
Assessment methods & criteria	Courses in the minor are examined in the following manner. Project (1 and 2): • Project documentation • Presentation • Demonstration • Interrogation • Collaboration with fellow students • Intercultural and English abilities • Hard- and software practicums Automation & robotics subjects*, e.g.: • Robot practicum (pass/fail) • Vision practicum (pass/fail) • Sensors and mechatronics (pass/fail) • Machine learning and programming workshops (pass/fail) • Internet of Things (pass/fail) • Intercultural communication and excursions (pass/fail) **Subject names may be subject to change* For all parts of the project and all courses at least a result of 5.5 out of 10 needs to be obtained after re-examination, or a 'Pass' in case of a Pass/Fail examination scheme. Practical work can be passed by active participation. If all parts are passed on these terms, the minor is completed. Project product demonstration will be expected in the 9th (project 1) and 19th week (project 2) of the term.
Learning outcomes	At the end of this minor you will have met the Bachelor end standards of the following competencies: • Programming industrial robots (implementation) • Programming machine vision solutions (implementation) • Implement part of a production system (implementation) • Executing a feasibility study of a factory automation project (research) • Creating a conceptual factory automation design (design) • Drawing up of factory automation project plan (planned operation) • Self-management (individual/group) All competencies except professionalization are expected to be available (previously proven) at the level that is required for the major of Mechanical Engineering, which is coupled to the Bachelor of Engineering standard.
Planned learning activities and teaching methods	The programme allows both experienced and inexperienced students to enter. All students will receive education at the level they need.

EPS (Sustainable) Packaging Design and Innovation	
ECTS credits	30
Code	IPO-HMVT16-PDI, IPO-HMVT16-SPDI
Year / Semester / Block / Term	Semester 1 or 2
Duration	20 weeks
Mode of delivery	Face to face
Lecturer(s)	W.H. Colenbrander, G.J. de Koning
Language of instruction	English
Type	Compulsory
Prerequisites and co-requisites	Packaging Design & Innovation: Student must have completed their first year. Sustainable Packaging Design & Innovation: the minor Packaging Design & Innovation (PDI) has to be successfully completed.
Course content / outline	**Packaging Design & Innovation**: Designing good packaging is not an easy job. Not only the end user (usually the consumer) but many other parties use packages for short or long periods. They all set their own specific demands on packaging. A good packaging designer is trying to develop talents to unite all these requirements together in an effective, attractive, responsible and environmentally conscious packaging. What will you be doing? The overall objective of this minor is to get acquainted with the process of designing packaging. You will combine creativity, knowledge of production, design, ergonomics and marketing. This minor is an introduction - in 10 weeks - to another area of expertise. The goal is not only to gain knowledge about the complexity of packaging design but also to work on relevant skills, such as doing research, presentations (oral and written), designs, generating ideas, different alternatives and assessing the suitability of solutions. It's not just theory. Our collaboration with a company or an organisation provides guest lectures and an excursion. The supporting lectures cover topics in the field of: packaging materials (production and properties), food and packaging, printing, logistics, transport packaging, environmental and marketing aspects. Also, the practical part gets a lot of attention by means of a design assignment. Based upon the lectures 3 home assignments are provided (approximately 20 hours of study each): 1. Marketing & environment

	2. Packaging related methods of optimisation & logistics 3. Materials, production and packaging lines **Sustainable Packaging Design & Innovation**: Sustainable Packaging stands for the integration of environmental aspects in the design of a product/packaging combinations. This means that, in addition to marketing, economic and technical criteria also take into account environmental criteria. Sustainable packaging improves the quality perception of products, leads to cost savings, helps to meet legislation and provides environmental benefits. This minor is part 2 of the Packaging Design & Innovation minor. What will you be doing? Subject of this minor is redesign of an existing packaging concept centered around sustainability as explained in the text above. The actual assignment, the design project, will be formulated in cooperation with a company. Examples of design projects are industrial packaging, consumer packaging or last-minute-packaging (packaging which is applied at the very last moment of sale). Research skills are being trained by so-called student lectures. You will prepare these lectures by doing research about a selected theme and writing a detailed report. Eventually you will present the outcome in a lecture to be concluded by a question and debating round. Examples of selected themes are environmental management systems, recycling, sustainability, biomimicry, ecodesign, globalization, corporate social responsibility (CSR), CSR of small and medium enterprises and CSR of emerging economies.
Course material	We use Brightspace for all relevant information and documentation. An extensive literature list is provided. The following books are recommended: • Rob Thompson: The Manufacturing Guides – Sustainable Materials, Processes and Production (Thames & Hudson) • Rob Thompson: The Manufacturing Guides – Graphics and Packaging Production (Thames & Hudson)
Assessment methods & criteria	Project work and written report
Learning outcomes	• Obtaining insight into the role of a packaging designer in the packaging development process. • Learning the design method of Industrial Product Design (IPO). • Learning to analyze context and environment of product and packaging. • Obtaining knowledge of packaging materials and processes. • Obtaining knowledge of relevant marketing trends. • Learning to make a process tree for packaging. • Obtaining research skills (including desk research, use of library, internet and patent database).

- Learning about aspects of sustainability like cradle-to-cradle, Life Cycle Analysis (LCA).
- Obtaining knowledge about business economic aspects.
- Training of writing process and design assignment reports.

Planned learning activities and teaching methods	Design education, lectures, company visits / excursions, Self-tuition

Circular Manufacturing and Smart Maintenance	
ECTS credits	30
Code	Mech-HMVT26-CMSM
Year / Semester / Block / Term	Semester 1 and Semester 2
Duration	20 weeks
Mode of delivery	Face to face
Lecturer(s)	P.R. Fraanje, E. Sikma
Language of instruction	English
Type	Compulsory
Prerequisites and co-requisites	Students need to demonstrate -based on a concise motivation statement that contains short course descriptions or project descriptions of earlier work-, that they have a command of the technical competencies “Analyse” and “Design” (see HBO-Engineering-domeinprofiel-2022-Engels-defweb-1.pdf) at level 2, implying ->being able to execute complex tasks in a team, adapting familiar methods to changing situations, in practice, independently within specified actions, but under supervision. Such course work should be finished at the time the minor starts. The programme coordinators will evaluate eligibility of the students based on the motivation statement and can ask for further explanation or examples preceding the course.
Course content / outline	Are you ready to engineer smarter, more sustainable industrial systems? This minor challenges you to extend the lifespan of industrial products using cutting-edge technologies like smart sensors, cobots, worker assistance systems, predictive maintenance, and digital twins. Because AI deeply influences these technologies, you will learn also the application of AI within smart sensors, worker assistance systems, etc. You’ll work in multidisciplinary teams on real-world projects with companies like Siemens and Sensing360, applying your skills in data analysis, robotics, and lifecycle modelling. Through hands-on lab work, masterclasses, and collaboration with research groups, you’ll design and prototype solutions that make manufacturing more sustainable and future-proof. Examples cases the monitoring and reduction of wastes in manufacturing, automatic disassembly for remanufacturing, extend lifecycle by predictive and just-in-time maintenance. This minor deepens your current engineering expertise and connects you to innovation networks. Plus, you’ll build a professional portfolio and contribute to an open-source repository—perfect for showcasing your skills. If you want to combine engineering with impact, this is your chance to make a difference What will you be doing? The minor consists of: • Project [20 EC] • Two additional (deepening) courses [2 x 5 EC]

For the deepening courses, you choose at least 2 from the 3 courses given in this minor*:

- Remanufacturing [5 EC] (CMSM-RM) In this course you will learn about the relevance of circular manufacturing and the concept of digitally supported remanufacturing. Remanufacturing is one of the R-ladder processes that restores a product to like-new or better-than-new condition. Relevant processes discussed are inspection, disassembly, cleaning, component remanufactured, reassembly, testing and finishing. Assessment of economic and ecological benefits of remanufacturing are introduced, as well as the aspect of trust in 'as-good-as-new-or-better' parts and products.
- Smart Asset Management [5 EC] (CMSM-AM) Maintenance and asset management are important processes to safeguard a long lifespan for equipment. In this course you learn the basics of maintenance strategies, and how to improve these by means of data-based condition-based monitoring. You will learn to evaluate the cost and benefits of such improvements, based on practical examples.
- Industrial Dashboards [5 EC] (CMSM-ID) In this course, you will learn how to design and implement the steps from data measurement to meaningful display on dashboards, for use in e.g. digital supported (re)manufacturing, smart asset management, etc. In the course you learn among others: 1) data sensing and acquisition, 2) data processing and data communication, 3) data storage in (time-series) databases, 4) data-analysis (including AI), 5) display and user interaction through dashboard technology. You will learn technology necessary for digital shadow or digital twin development

Course material

Laptop
Practicum materials set (approximately EUR 85)
All our teaching materials are digital and will be delivered to you free of charge!
Materials distributed through Brightspace including:

- basics of data science for engineers
- research methods in engineering problems
- the basics of circularity in manufacturing
- asset management and reliability engineering intro
- smart manufacturing (ROS, python for robots, aspects of interoperability)
- principles of digital twinning.

Assessment methods & criteria

Exam Code	Type of Exam	Exam	Resit	Weighing	Pass criterion	
Technical Group Portfolio	CMSM-Port	Portfolio	Wk 19 in semester 1, Wk 18 in semster 2	Within 2 weeks after end minor	-	Sufficient
Individual participation and reflection	CMSM-Refl	Portfolio + assessment	Wk 19 in semester 1, Wk 18 in semster 2	Within 2 weeks after end minor	-	Sufficient
Competency Based	CMSM-Ass	Assessment	Wk 20 in semester 1, Wk 19	Within 2 weeks	2/3	5.5

Assessment (20 EC)			in semester 2	after end minor		
Elective 1 (5 EC)	CMSM-El1	See below			1/6	5.5
Elective 2 (5 EC)	CMSM-El2	See below			1/6	5.5

Learning outcomes

Upon completion of this minor, the student:

· Has demonstrable knowledge and understanding of (re)manufacturing and/or smart maintenance that builds on and exceeds the level achieved in the first two years of the bachelor programme; usually operates at a level where, with the support of specialised manuals, there are some aspects that require knowledge of the latest developments in the field of expertise.

· Is able to apply knowledge and insights on remanufacturing and/or smart maintenance in such a way that it shows a professional approach to his work or profession, and also has competencies for drawing up and deepening arguments, and for solving problems in the field of expertise

· Student is able to collect and interpret and visualize/communicate relevant data (in field of reman/smart maintenance) with the aim of forming an opinion that is partly based on weighing relevant social, scientific or ethical aspects.

· Is able to communicate information (e.g. based on the collected data), ideas and solutions (for instance on innovations developed) to an audience consisting of specialists or non-specialists

Planned learning activities and teaching methods

For the project (~27 hours/week on average)

- Lectures/Guestlectures/excursions: average 6 hour / week
- Individual coaching: average 0,25 hour / week
- Project coaching: average 1 hour / week
- Projectwork: average 20 hour / week

For the two electives (~13 hours/week on average)

- Per elective (total ~6,5 hours/week):
  - Lecture: ~2 hours/week,
- self-study and assignment: ~4,5 hours/week)

Flexibility will be provided on how to spread the workload of the electives over the semester.

Design with Nature	
ECTS credits	30
Code	IDE-HMVT18-DWN
Year / Semester / Block / Term	Semester 2
Duration	20 weeks
Mode of delivery	Face to face
Lecturer(s)	Luciana Dos Santos Duarte, Jacco Bruil
Language of instruction	English
Type	Compulsory
Prerequisites and co-requisites	Students should submit a Letter of Motivation (500 words in English) that explains their interest in the field of design with nature, what they would like to learn and achieve by taking this minor. Letter of motivation should be sent to Luciana Dos Santos Duarte(l.dossantosduarte@hhs.nl) (with tis-international@hhs.nl in the cc) at the time of online enrolment..
Course content / outline	Nature is probably the world's most effective designer, having solved many big and small challenges in the course of evolution and adaptation. Do you want to learn how to create solutions by taking inspiration from nature (biomimicry) or even participate in design (biodesign)? This is your chance! During this minor you will be trained to seek solutions for a wide of range of challenges and to design products by learning about strategies and mechanisms from nature. Understanding the basics of life sciences, applying biomimicry methods and using open source tools to implement in your design are at the center of attention during this semester. The course includes weekly lectures and hands-on workshops on diverse topics that support the project you and your (multidisciplinary) group are conducting. More specifically you will: • Learn to use tools/techniques learned from nature (biomimicry) • Learn about the Sustainable Development Goals of the United Nations • Work together with students and professionals of different disciplines such as Software Engineering, Biology and Life Sciences and Industrial Design to form and implement product concepts • Use rapid prototyping tools and techniques to test your ideas • Be urged to participate in the Biomimicry Global Design Challenge Reflect on your role as an open innovator on the cutting edge of design and as a biomimicry designer (practitioner).

Course material	The Biomimicry Resource Handbook is handy, not mandatory, reading
Assessment methods & criteria	The assessment is divided between an oral exam supported by project materials that you bring as evidence, group presentations and written assignments
Learning outcomes	1. Learn to use tools/techniques learned from nature (Biomimicry) 2. Learn about the Global Goals of the United Nations (also known as Sustainable Development Goals) 3. Work together with students and professionals of different disciplines such as software engineering, biology and life sciences and Industrial design to form and implement product concepts 4. Use rapid prototyping tools and techniques to test your ideas 5. Be urged to participate in the Biomimicry Global Design Challenge 6. Reflect on your role as an open innovator in the edge of design and as a Biomimicry designer (practitioner).
Planned learning activities and teaching methods	Lectures, workshops, teamwork