Faculty of Technology, Policy and Management

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MSc Programme **Engineering and Policy Analysis**

Adaptive delta management

Exploring pathways for sustainable water management

Model-based Decision-making under Deep Uncertainty

Problem definition

The Afsluitdijk, the Delta Works, Room for the River – all of these flood defense projects have been reactive in nature, responding to specific threats. The Netherlands would like to be one step ahead of disasters, implementing measures in a timely fashion. This requires an adaptive delta management plan that embraces uncertainty and lets The Netherlands prepare itself for climate change in the lead up to the year 2100.

Method

To design an adaptive delta management plan the uncertainty space is explored using scenario discovery. This method identifies a cause of uncertainty that has the largest impact on the system based on a specified criteria, in this case the number of casualties that are expected to emerg. The system is represented by a model of the felicitous river 'The Waas' developed by Deltares.

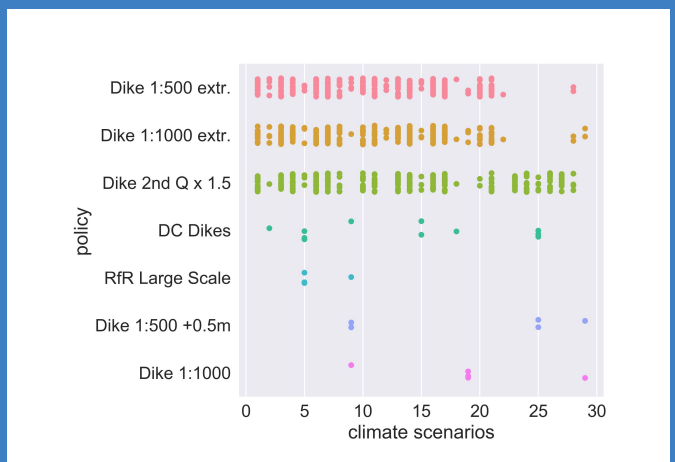
Multi objective decision making is used to find a set of Pareto optimal solutions that should be evaluated in decision making. The robustness of these solutions in different climate scenarios can be visualized.

Results

The displayed figure shows the combined performance of water management policy in different climate scenarios. A policy with multiple dots at one scenario performs well on multiple criteria. The policy options in the higher end of figure perform well on multiple criteria in multiple scenarios, these scenarios are robust.

Conclusion

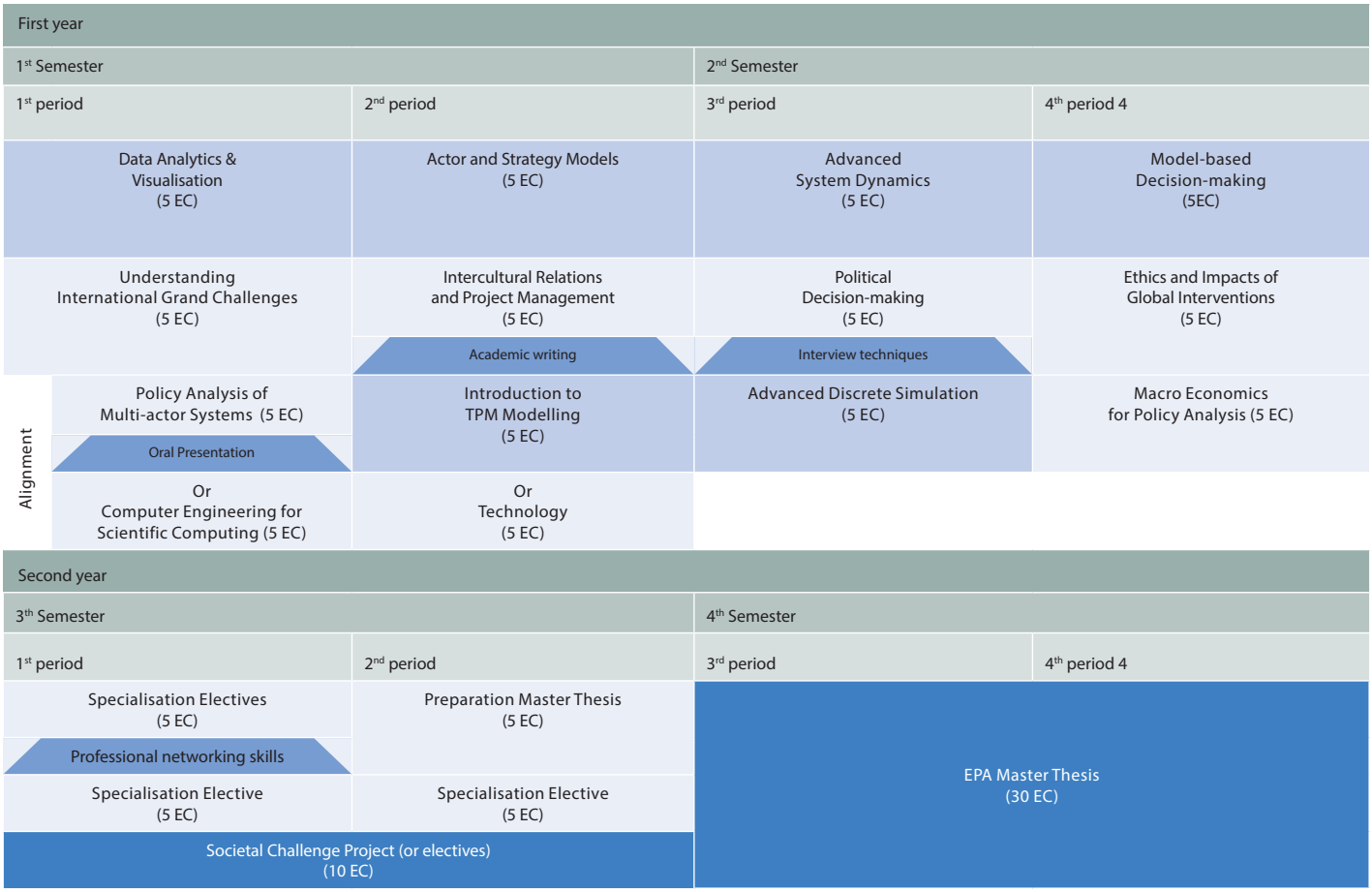
Based on these results .



Dike: 1:500 extr.	Dike height rise to cope with a 1:500 discharge
Dike: 1:1000 extr.	Dike height rise to cope with a 1:100 discharge
Dike: 2nd Q x 1.5	Dike height rise: adapting to 1.5 times the second highest discharge ever measured

TU Delft

Programme chart Engineering and Policy Analysis



Analytics, Modelling & Simulation

Policy and Politics

Societal Challenge & Thesis

Skills & Techniques

1 EC = 28 hours of study, according to the European Credit Transfer System (ECTS). Total number of credits in the MSc Engineering and Policy Analysis programme = 120 ECTS

For more information on all courses: studyguide.tudelft.nl

Programme

Studying technology and society and their interrelations is typical for the analytical approach central to EPA. The programme is characterised by its unique blended, case-based approach to teaching and its focus on modelling and simulation. These case studies are provided by ministries, multinationals and NGO's, which are all located close to the EPA location and all contribute to the programme.

So EPA equips you with more than just the technical skills you would expect in a standard engineering curriculum. EPA is interactive, international and interdisciplinary. You will be working on technological challenges in a context where political, moral, cultural and socioeconomic considerations are crucial to decision-making processes and must be factored into the solutions. The complexity of these problems requires collaboration across the disciplines of natural and social sciences, and across international and cultural boundaries. We call this Comprehensive Engineering

Curriculum

The programme chart depicts the way the courses are organized throughout the year. Most courses are offered in a blended learning fashion with materials for self-study offered online in combination with intensive projects, inclass training and intensive interaction with the staff. The first two semesters you will follow a compulsory programme. For EPA students the objective is to acquire a good understanding of the political and strategic decision-making environment policy analysts operate in. It will also bring you up to speed with advanced data analytics, modelling and simulation techniques.

Consequently the first year programme has been designed along two lines; a 'policy and politics' line with courses focusing on analysis, politics, ethics and intercultural relations, and a 'modelling and simulation' line with courses focusing on data analytics and advanced dynamic modelling techniques. The two lines are interwoven in its application to practical real-world problems.

The third semester can be filled in according to your own choice. You can study abroad or follow one or more specialisation programmes and participate in the 10 ects Societal Challenge Project, during which you work on a project for a real client organisation like an NGO or government agency. You can also follow a number of optional TU Delft courses or follow some courses at Leiden University, which is at the proximity of The Hague.

Specialisations

In the third semester EPA students may choose one of the following specialisations:

- Cyber Security
- ICT Management and Design
- Emerging Technology-based Innovation & Entrepreneurship (+annotation)
- Infrastructure and Environmental Governance (+annotation)
- Modelling, Simulations and Gaming
- Economics & Finance
- Supply Chain Management

Two of the specialisations offer an annotation, implying that the graduation project has a related theme and is carried out in an external organization related to the specialisation. Specialisations are subject to change, please visit the website for up to date information.

During the fourth semester you will perform your 30 ects thesis research project executed in one of our thesis labs or with a client organization.

Career prospects
Typically EPA graduates start their career as a strategy advisor or consultant and rapidly grow to managerial positions in the public and private sector. Many graduates find employment with multinational engineering, consulting and banking firms or as strategic advisors to national governments, regulatory bodies and international organisations. About 90% of our graduates find a suitable position within three months after graduation. Most of them start as junior consultants, assistant analysts or project managers, progressing rapidly to positions of greater prominence as strategy analysts, senior consultants, senior project managers or management officials. Other graduates have pursued advanced degrees or remained in academia. Some international firms that have hired EPA graduates include PwC, Accenture, ING, Deltares, Cofely-GDF Suez, Vattenfall, E-ON, AMPC, SFR and Royal HaskoningDHV.

Ainhoa Villar (Spain)

Back in Spain, when I was studying the last year of my Mechanical Engineering degree I decided that, after having gained a very technical background, I was still willing to broaden my knowledge in less technical fields but as relevant for today's worldwide engineers. I knew that in the future I didn't want to work in a very technical job but rather handle engineering projects from a more managerial and economical perspective. For this, I still had to fill in some knowledge gaps in fields like economics, policy analyses, decisionmaking and management skills. Moreover, I wanted to experience studying abroad. That is how I decided to look for a Master which would combine all of these elements.

As an Erasmus Mundus MSc student I combined studying EPA with one semester at Comillas University in my hometown Madrid. It combined all the elements I was looking for: an international environment, a blend between "hard" and "soft" science and the necessary tools to grasp the bigger picture in real-world socio-technical problems.

Besides the demanding courses I remember enjoying the young and happy environment in the cozy student town of Delft. Many fun events took place: from playing team sports in the sports centre to music and dance events in pubs in the city centre. Getting to know so many people from everywhere in the world and coming across any of them in any corner in town was something I really appreciated; life was comfortable and cheerful there.

My best memory is the special connection my EPA cohort had as a group. Despite the very different cultures, we all rapidly bonded together. The unforgettable introduction week at the very beginning in Zeeland and the long hours of teamwork projects we shared undoubtedly helped in achieving that. We would often organise big potluck dinners and learn from each other's cultures.

Among the most relevant things I learned during my EPA studies is the importance of, and often underestimated, a good framing for effective communication, whether it was in the real-life world problems as taught in the courses or in the multicultural project teams we often had to work in. All in all, it was a very enriching experience.

Now my future plan is to work as a consultant in the energy industry, apply the skills learned during these two great years and enjoy working in a multicultural environment if possible.

About The Hague
The EPA programme is taught in the city of The Hague. The Hague is home to many multinationals, government agencies, international consulting companies and non-governmental organizations less than 10 miles from the Delft University Campus.

The Hague is an ideal student city. Home to roughly 28,000 students, it offers plenty of educational services, a bustling nightlife and several beaches only a tram- or bikeride away. It is the base of many international organisations, tribunals and corporations. The city of Delft is only 10 minutes by train, while a 20-minute trip takes you to Leiden and Amsterdam is a mere 40 minutes away.

The Hague is the only city outside of New York that is home to a main UN organ: the International Court of Justice. Tens of thousands of people work in more than 150 international organisations to pursue a more peaceful, just and secure world.

Over 300 international companies are based in The Hague and the city enjoys the particular interest of companies in the energy, IT and security sectors. The biggest of these are Shell, AEGON and KPN, all of which have their head offices in the city. In addition, some 135 NGOs are located in The Hague, such as the Red Cross, Amnesty International and UNICEF, which makes The Hague, more than many others, a true international city.

Dutch BSc degree
If you hold a Dutch BSc degree closely related to the Master's programme, you will be admitted directly. However, if your undergraduate programme is not closely related to the Master's programme you will be required to take additional courses in what is called a bridging programme. This may be a standard programme or it may be tailored to your specific situation.

To see which Master's programmes are open to you on completion of your Bachelor's degree from a non-technical Dutch university go to studychoice.nl
If you completed your Bachelor's at a technical university, go to doorstroommatrix.nl

Dutch HBO degree
An HBO Bachelor's degree does not qualify you for direct admission to a TU Delft Master's programme. You will first need to complete a supplementary programme in order to bring your knowledge to the required level. You can do this during your HBO programme by completing a bridging minor, or by means of a bridging programme after completing your HBO diploma. Entrance requirements for mathematics and English (some exceptions) apply for both the bridging minor and the bridging programme. See hbodoorstroom.tudelft.nl for detailed information. Applications through Studielink: tudelft.studielink.nl

International applicants
For international students, the application period starts October 1 and closes at May

1. To start an MSc application, please complete the online application and pay the refundable application fee of € 100. After that, you will receive an email with the link to upload the required documents. To be considered for admission to an MSc programme you will need to meet TU Delft's general admission requirements.
1. A University Bachelor's degree (or proof that you have nearly completed a Bachelor's programme) in a main subject closely related to the MSc programme to which you are applying, with good grades on the key courses. 2. A BSc Cumulative Grade Point Average (CGPA) of at least 75% of the scale maximum
3. Proof of English language proficiency: A score of at least 90 on the TOEFL or an overall Band score of at least 6.5 on the IELTS (academic version)

For more information about the application procedure and studying at TU Delft in general, go to admissions.tudelft.nl

More information

Please visit the webpage for all details, complete requirements, deadlines and contact information:
epa.tudelft.nl

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