Master's Programme in Water and Environmental Engineering

WAT Orientation Days

Tue 30.8 & Wed 31.8.2022

Please prepare to introduce yourself shortly

What happens today & tomorrow?

- **TUE morning = Introduction + WAT info points**

→ You get to know us at WAT

- **TUE afternoon: group work**

→ You get to know your group

- **WED morning = group work + WAT info**

- **WED afternoon = WAT info + group presentations**

→ You get to know you all

What happ

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- **WED aftern**

WAT ORIENTATION DAYS 30.-31.8.2022

Version 25.8.2022

	Tuesday 30.8 *Lecture Hall 286/287, Water Building (Tietotie 1E)*	Wednesday 31.8 *Lecture Hall 286/287, Water Building (Tietotie 1E)*
Morning	**9.00- GROUPS & STUDY TOUR** **- Welcome to Aalto and WAT!** **- Forming the WAT 2022 Groups** -> Your group stays the same for the entire Master's Programme **- Study tour in Water Building in groups (11-12.30)** 12-minute visits ('rasti') introducing WAT personnel & research activities + AKVA student association	**10.00- GROUP WORK & INTRO TO WAT** **- Finalising your poster** **Coffee break** **Intro to WAT Programme, Part 1**
	Lunch break with your group	**Lunch break**
Afternoon	**GROUP WORK** -> Each group independently in your chosen location; aim to get to know each other and create a Group Poster. **Tasks for group work:** 1) Introductions: each student's background 2) Recognition of your existing knowledge & skills 3) Expectations from the Master's studies + career plans -> These together = Group Poster **Also take a Group Photo and send it to wat-eng@aalto.fi!**	**13.00- INTRO TO WAT & STUDENTS** **Intro to WAT Programme, Part 2** - Personal Learning Portfolio Process **Coffee break** **14.30- Groups' poster presentations, with mentors**
		WAT & AKVA Get-together at 16.00 in Water Building

WAT?

WAT = Water & Environmental Engineering

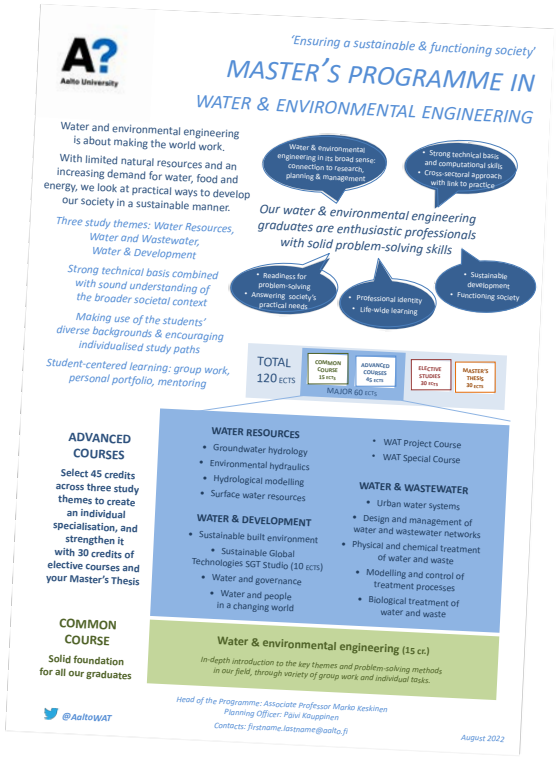
→ Our Master's Programme combines theory with practice, including case studies and project work

Many great things!

- You! Skillful students with diverse backgrounds

  → You will also learn from each other

- Approach: student-centered & problem-oriented
- Programme-focus (not just a set of courses)
- Portfolio process: emphasis on learning (not just on credits)



WAT research and teaching organised through three key themes: what they are?

- Water resources,
- Water & wastewater,
- Water & development

Aalto University

'Ensuring a sustainable & functioning society'

MASTER'S PROGRAMME IN WATER & ENVIRONMENTAL ENGINEERING

Water and environmental engineering is about making the world work.

With limited natural resources and an increasing demand for water, food and energy, we look at practical ways to develop our society in a sustainable manner.

Three study themes: Water Resources, Water and Wastewater, Water & Development

Strong technical basis combined with sound understanding of the broader societal context

Making use of the students' diverse backgrounds & encouraging individualised study paths

Student-centered learning: group work, personal portfolio, mentoring

Water & environmental engineering in its broad sense: connection to research, planning & management

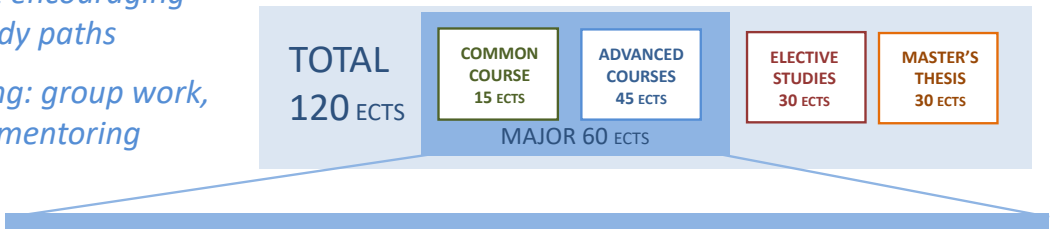
- Strong technical basis and computational skills
- Cross-sectoral approach with link to practice

Our water & environmental engineering graduates are enthusiastic professionals with solid problem-solving skills

- Readiness for problem-solving
- Answering society's practical needs

- Professional identity
- Life-wide learning

- Sustainable development
- Functioning society



You will learn more about our three study themes in today's infopoints!

ADVANCED COURSES

Select 45 credits across three study themes to create an individual specialisation, and strengthen it with 30 credits of elective courses and your Master's Thesis

WATER RESOURCES

- Groundwater hydrology
- Environmental hydraulics
- Hydrological modelling
- Surface water resources

WATER & DEVELOPMENT

- Sustainable built environment
- Sustainable Global Technologies SGT Studio (10 ECTS)
- Water and governance
- Water and people in a changing world
- WAT Project Course
- WAT Special Course

WATER & WASTEWATER

- Urban water systems
- Design and management of water and wastewater networks
- Physical and chemical treatment of water and waste
- Modelling and control of treatment processes
- Biological treatment of water and waste

COMMON COURSE

Solid foundation for all our graduates

Water & environmental engineering (15 cr.)

In-depth introduction to the key themes and problem-solving methods in our field, through variety of group work and individual tasks.

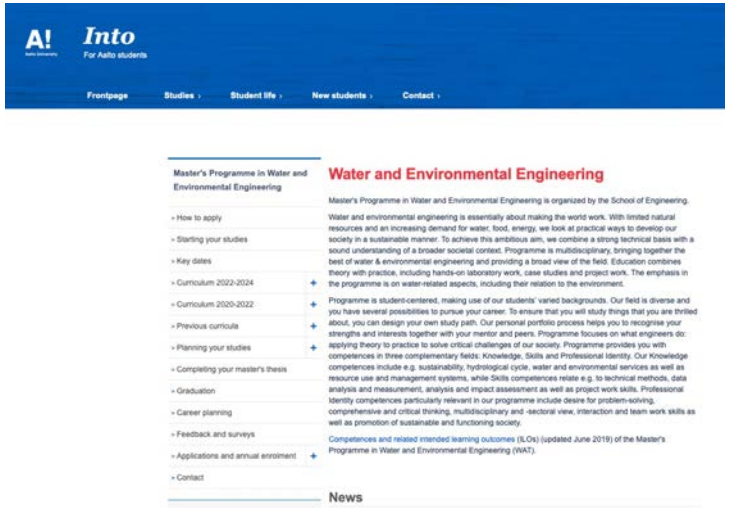
Head of the Programme: Associate Professor Marko Keskinen
Planning Officer: Päivi Kauppinen
Contacts: firstname.lastname@aalto.fi

@AaltoWAT

August 2022

Info on WAT= Into

"Everything is in Into!"
https://into.aalto.fi/display/enwat



CONTACTS:

PÄIVI Kauppinen, Planning Officer

MARKO Keskinen, Programme Director

→ (firstname.lastname@aalto.fi)

Questions?
You can also ask them during today's 'rastit' or tomorrow's session

Questions? Comments?

YOU = GROUP OF EXPERTS

Diverse expertise: different fields, degrees, interests...
→ Three important ways to make use of your diversity

1) **Portfolio & mentoring process** = creating your Personal Learning Portfolio and discussing it with your fellow students
→ Combined with a mentoring process with WAT staff
→Assessing your current levels of expertise in the WAT Course (= our common course),
and reflecting your learning throughout the programme

2) **Group work** = most courses make use of group work activities
→ Be prepared (we'll practice it during WAT Course)

3) **You and your mindset** = be ready to learn from each other!
→ Be active + make your expertise & interests known, to us and to your fellow students
→ It's about learning & expertise, not (just) credits

EXPERTS, GET INTO YOUR GROUPS!

A key set of WAT expertise = **X** (External experts) + **A!** (Aalto experts)

- IDEA: to combine the expertise inside and outside Aalto, to share ideas, knowledge & skills + best practices

HOW: Make your **Expert Hat** based on your background:

Yellow: coming from Aalto

Blue: coming from outside Aalto

Exchange student: white

→ Write your name clearly to your hat!

Some introductions

Before forming the groups, we'll help you to get to know each other a bit using a COCKTAIL PARTY METHOD

→ 3 min chat with your fellow student
(changing the pairs every 3 minutes, for a few times)

With your pair, share 3 things:

1. Your name
2. Background
3. Interests

You have just 3 minutes, so be clear and concise
+ make sure both of you have the time to tell the 3 things!

Expert Hat Market: Forming the groups

TASK: form six WAT groups of 5 experts,
including **experts with both colours**
(yellow, blue)

→ Add max. 1 exchange student (white) per group

HOW: Akva tutors (with yellow hats)
will form the 'seed persons' for the groups,
others can join any group they wish

It's your group!

- This will be your first (but not only) peer-support group during your studies here at WAT:
  WAT-E1100 course group work also done in these groups

- Your task for this afternoon & tomorrow morning:
  get to know each other, and agree on how to present your group to others on Wed afternoon with a Group Presentation

  → Instructions in WAT-E1100 MyCourses: Orientation Days sub-page

Pick poster paper and pens from this room before leaving for lunch

→ Alternatively, you can come back here for the afternoon (and you are anyway here then on Wed morning to finalise the poster)

Group work instructions: Group Presentation

Your group work task for Tue afternoon and Wed morning is simple: get to know each other and then prepare to present your group to others on Wednesday afternoon.

Your presentation will be based on **Group Poster** that you will then present on Wednesday afternoon through Poster Walk in mixed groups: each presentation lasts for 6 minutes. Every group member must thus be prepared to present your Group Poster to a small group of other students.

Discuss together and then document into your poster the following themes in a visually inspiring manner:

1) Introductions

→ Where you come from, what you have studied, why you decided to apply to WAT etc.

→ Decide a name for your group and write it + your group number as a heading to your poster

2) Recognising your existing expertise

→ Discuss what kind of knowledge and skills each of you already has related to our water and environmental engineering field. How do your knowledge and skills differ?
How your expertise is complementary?

3) Expectations from the Master's studies

→ What do you expect from your studies? What kind of knowledge and skills you would like to get during your studies? What are your career plans and general dreams for life?

Also take a group selfie and send it to wat-eng@aalto.fi during Tuesday, with your names listed in the same order than you are in the photo.

Questions? Comments?

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Next: study tour in your groups

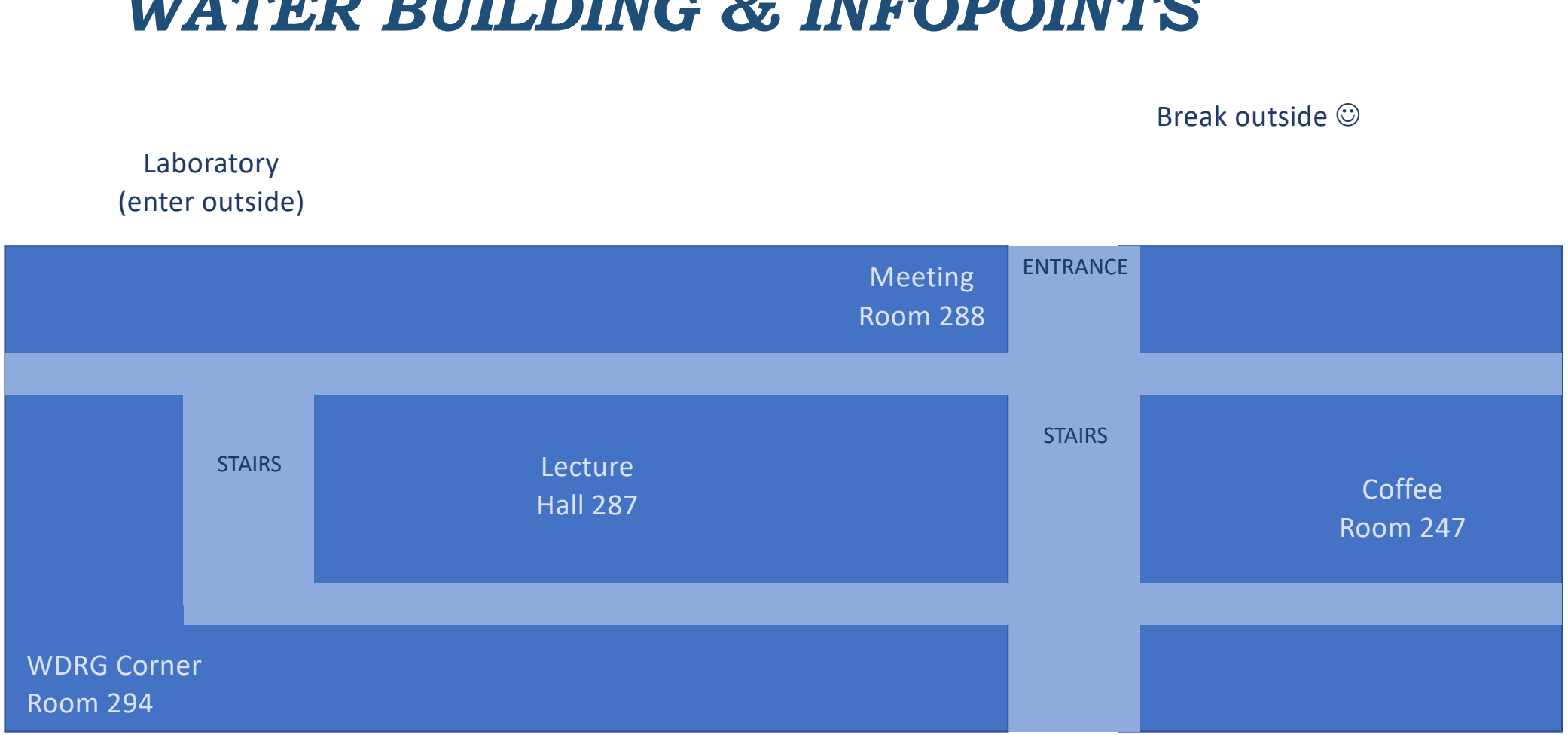
- Done through infopoints i.e. 'rastit', starting at 11.00
- Start with the infopoint that has your group number:
  Group 1 = infopoint 1 etc. Each infopoint lasts around 12 min.
- We'll finish around 12.30: after that lunch & afternoon's group work independently in Water Building or elsewhere

STUDY TOUR INFOPOINTS ('rastit') - Tuesday 30.8 @ 11.00-12.30

Theme + responsible persons	*Location (Water Building @ Tietotie 1E)*
1) Water supply & sanitation (RIKU & ANNA)	Laboratory (downstrairs)
2) WAT? Q&A on WAT (MARKO & MEERI)	Coffee Room 247
3) Water resources (TEEMU & CO)	Lecture Hall 287
4) Akva student association	Meeting Room 280
5) Water & development (MATTI & CO)	WDRG Corner Room 294
6) Break with your group	Your decision :)

WATER BUILDING & INFOPOINTS

Break outside ☺



Questions? Comments?

Master's Programme in Water and Environmental Engineering

WAT Wednesday 31.8.2022

WAT Wednesday

Today's tasks:

1) Talk about WAT

2) Talk about you and your expertise + expectations during Poster Walk

3) Mingle more freely during WAT & Akva Get-together ☺

Wednesday 31.8

Lecture Hall 286/287, Water Building (Tietotie 1E)

10.00- GROUP WORK & INTRO TO WAT

- Finalising your poster

Coffee break

Intro to WAT Programme, Part 1

Lunch break

13.00- INTRO TO WAT & STUDENTS

Intro to WAT Programme, Part 2

- Personal Learning Portfolio Process

Coffee break

14.30- Groups' poster presentations, with mentors

WAT & AKVA Get-together at 16.00 in Water Building

WAT? Introduction to our Master's Programme in Water and Environmental Engineering, Part 1

- Competences & ILOs
- WAT course structure & schedule
- WAT-E1100 course schedule

WAT?

Strong technical basis, combined with understanding of broader societal context.

Three study themes, corresponding our research themes.

Strong emphasis on project and interaction skills.

→ Programme planned with the help of extensive surveys to our alumni and stakeholders on our field's future needs: idea to provide you with right kind of competence

WAT competences

What are these?
Any thoughts?

Key knowledge, skill and identity competences and related learning outcomes (ILOs) that our WAT programme aims to provide you with

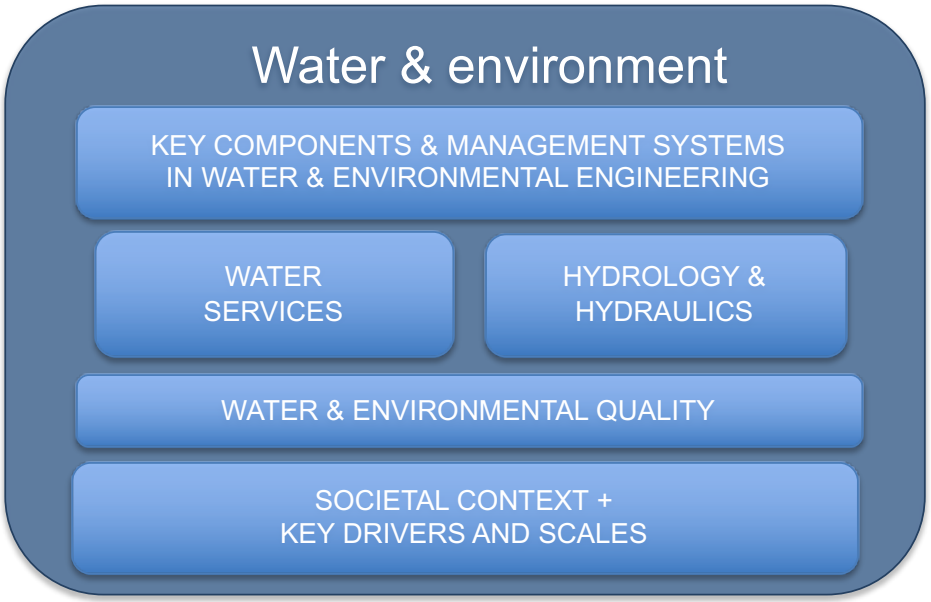
→ Our view on the essence of water & environmental engineering

→ Our 'quality promise', to you and our field

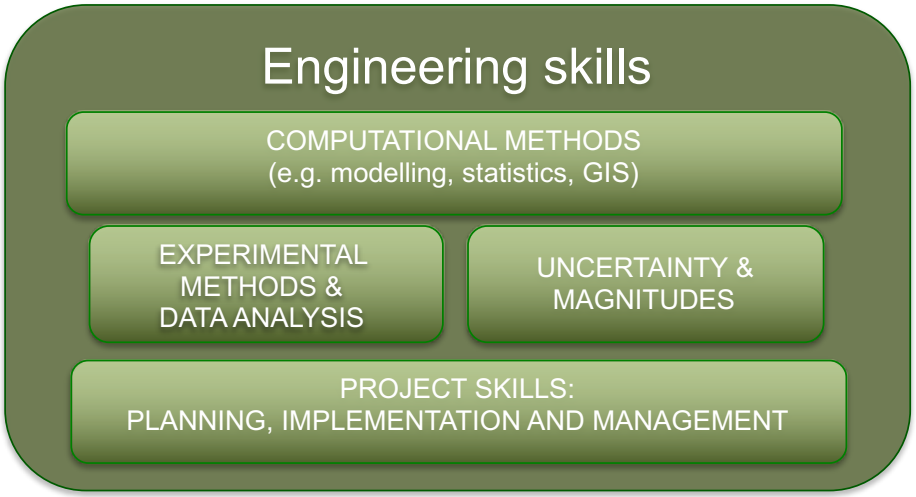
→ Remind you about what the entire programme is about (when e.g. planning your advanced courses)

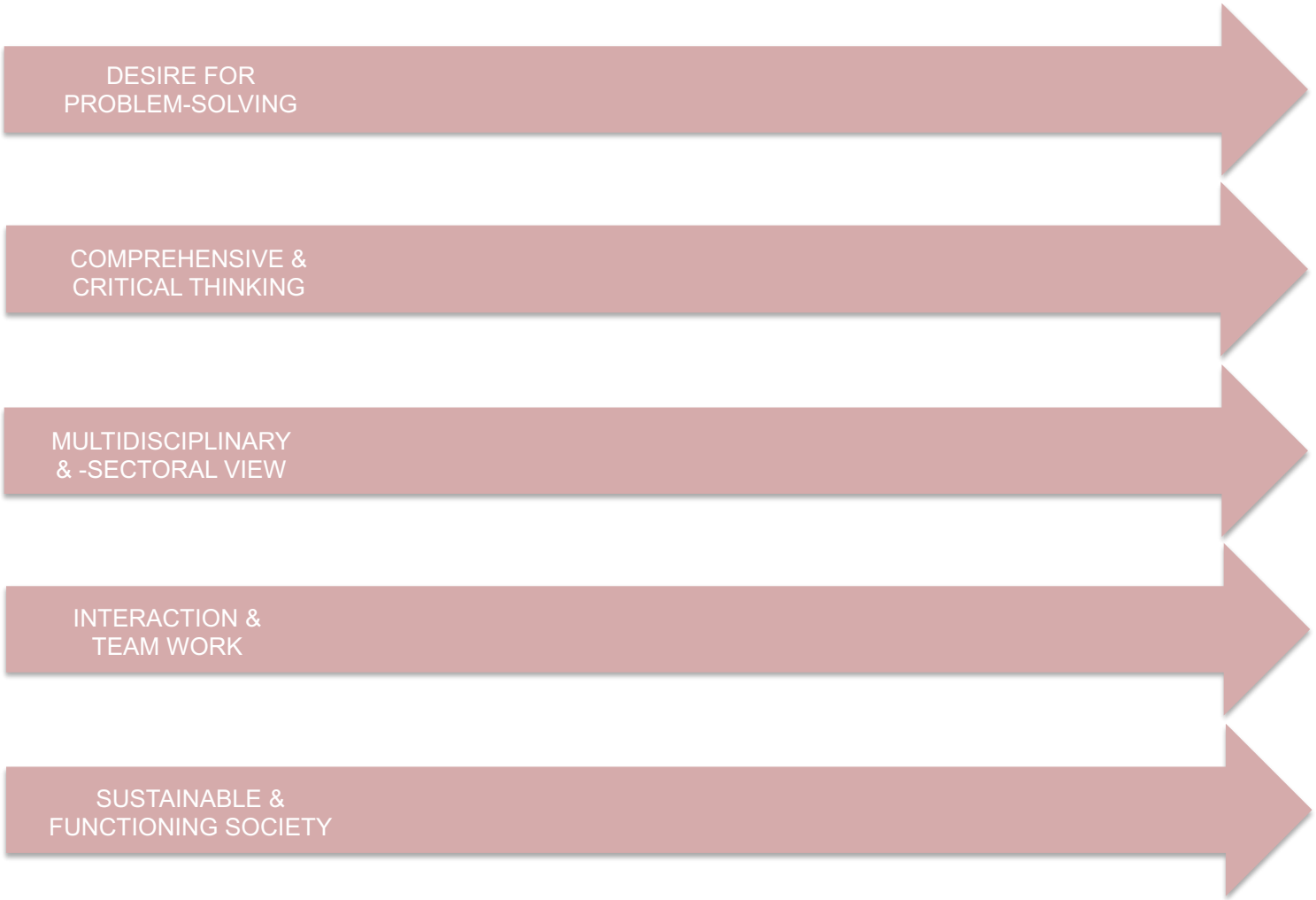
But remember: half of the credits during your studies come from elective courses and Master's Thesis: allows individual specialization also beyond our programme and its competences

WAT competences: knowledge



WAT competences: skills





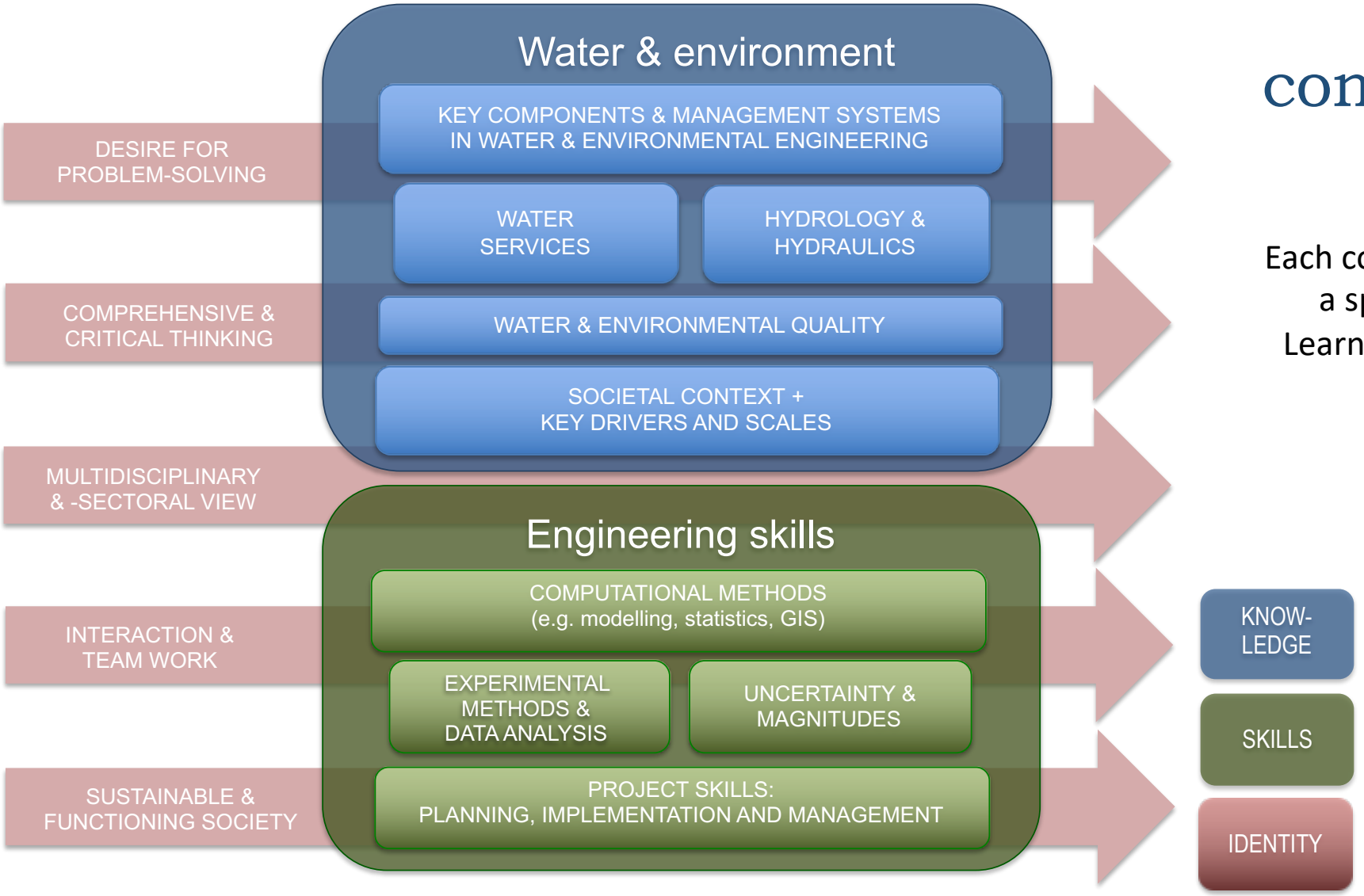
WAT competences: identity

What is the difference between skills & identity (skills)?

→ Skills are specific and come in many forms
(and thus can also be outsourced: not everyone has to be a GIS wizard)

→ But identity skills everyone should have: general working-life skills

WAT competences



Each competence also has a specific Intended Learning Outcome (ILO)

ILOs: knowledge

Our graduate is able to:

KNOW-LEDGE

1) Recognise the key **components and management systems in water and environmental engineering**, and understand the relevance of **sustainability** for the field
2) Understand the principles of the **hydrological cycle** and movements of water in natural and built environments
3) Define and differentiate the main sections of **water services and environmental services**, with focus on the treatment of water and waste water
4) Understand the key principles of **water and environmental quality**
5) Identify the **societal context** relevant to the water and environment, and comprehend the different **scales** and key **drivers** applicable to water and environmental engineering

ILOs: skills

SKILLS

Our graduate is able to:

1) Apply **key computational methods** related to water and environmental engineering
2) Understand relevant **experimental methods and data analysis** processes, including the use of data archives
3) Comprehend **uncertainty and different orders of magnitude** related to the measurements, data analysis and modeling
4) Recognise and analyse the main components of water- and environment-related **planning, implementation and management processes, and use related basic project skills**

ILOs: identity

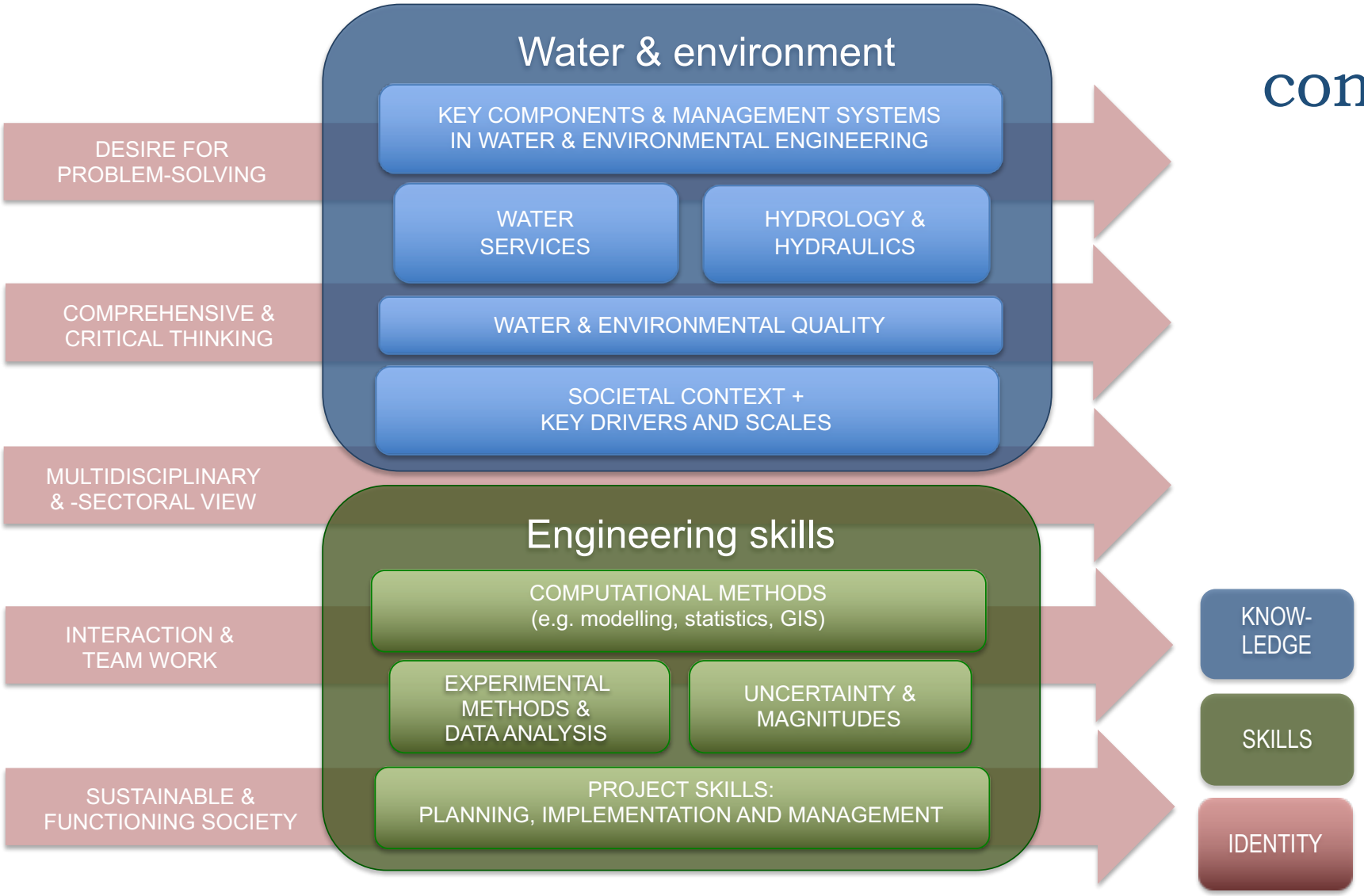
(i.e. general working-life skills)

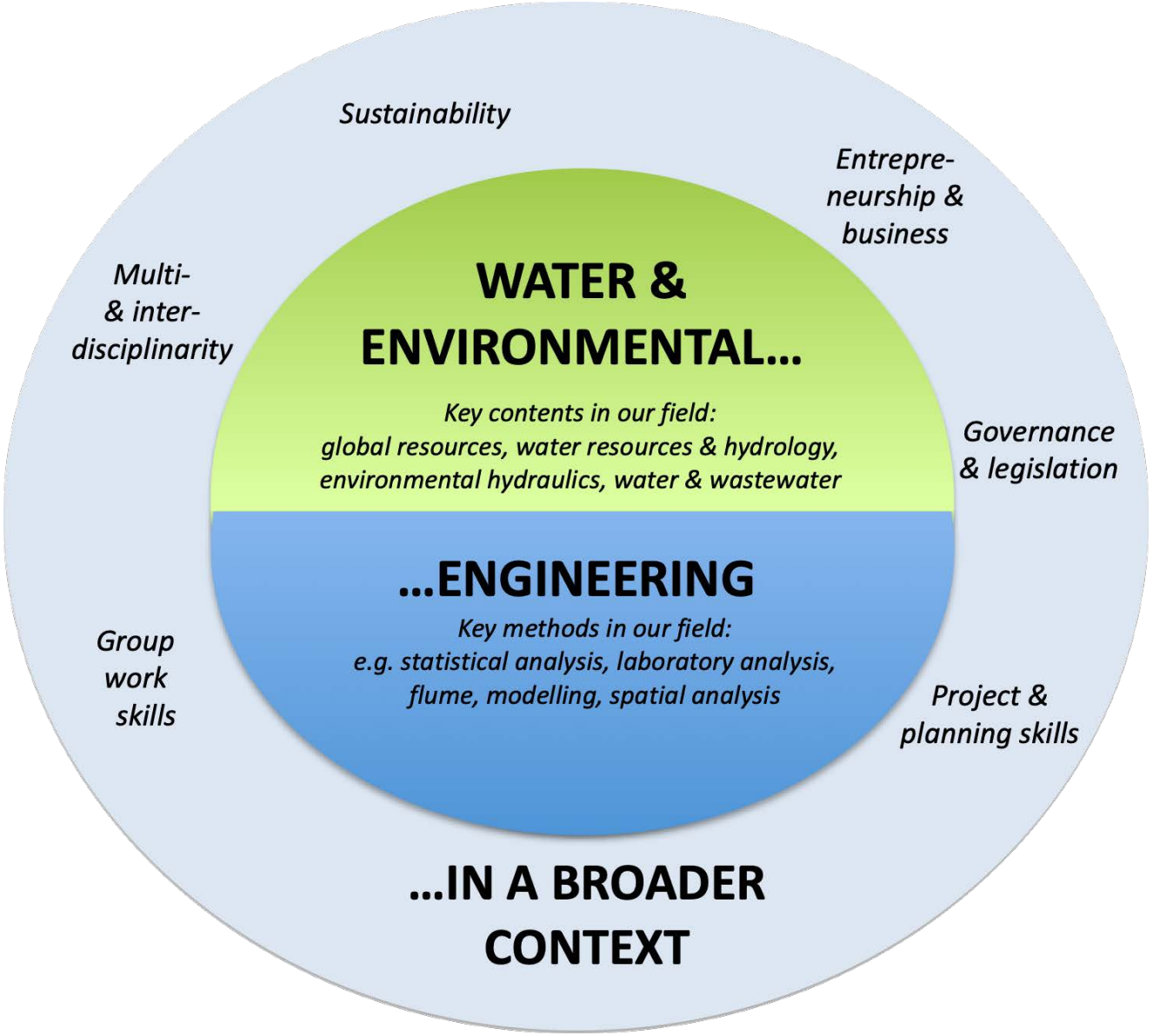
IDENTITY

Our graduate:

1) Is motivated and has a desire for **problem-solving**
2) Thinks in a **comprehensive and critical manner** about his/her work and field
3) Maintains a **multidisciplinary and -sectoral view** related to water and environmental engineering
4) Is able to work as a part of a team and has relevant skills for **interaction and communication**
5) Promotes a **sustainable and functioning society**

WAT competences





WAT?

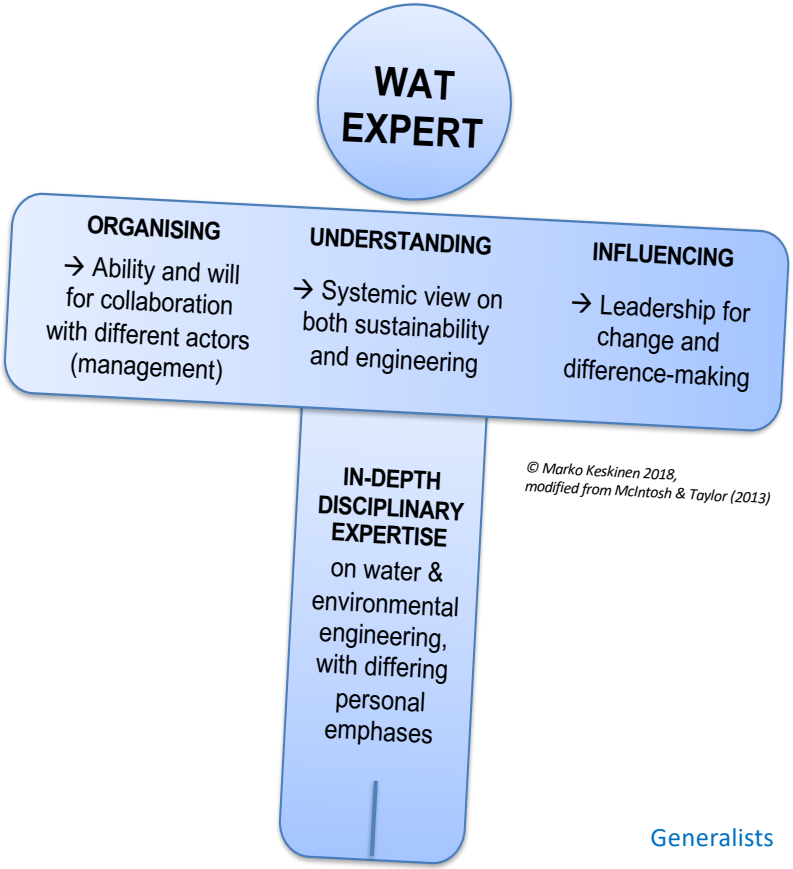
Our ‘WAT doughnut’ seeks to combine our field and its key competences with a broader context that our field is located

WAT EXPERT

What this all means to you?

→Our programme aims to provide you with a T-shaped learning profile

→ Someone know what it is?



Combination of in-dept disciplinary expertise (legs) and capacity for collaboration with other experts (arms)

→ Legs = key contents in our courses

→ Arms = mainly through cross-cutting activities

Questions? Comments?

WAT COURSE STRUCTURE

Unique course structure with only 15 credits for common studies: WAT-E1100 course (i.e. 'WAT course') during Period I

→ But it means intensive studying, then!

Leaves rest of your major i.e. 45 credits to your advanced courses: you can select these courses as you wish from our selection

→ Complement with 30 credits of elective studies & Thesis

→ More freedom and possibilities to study themes you are interested in

WAT COURSES: three themes

Three key study themes, corresponding to our research themes: Water Resources Management and Environmental Hydraulics, Water and Wastewater Engineering, and Water and Development

→ All have courses in Periods II, III, IV and V

→ Two general advanced courses: WAT Project Course (V period, 5 cr.) and WAT Special Course (any period, 1-5 cr.)

Note: different study themes have a bit differing emphases: WAT-E1100 Course, course descriptions and also your mentor help to figure these out

WATER RESOURCES

- Groundwater hydrology
- Environmental hydraulics
- Hydrological modelling
- Surface water resources

WATER & DEVELOPMENT

- Sustainable built environment
- Sustainable Global Technologies SGT Studio (10 ECTS)
- Water and governance
- Water and people in a changing world

- WAT Project Course
- WAT Special Course

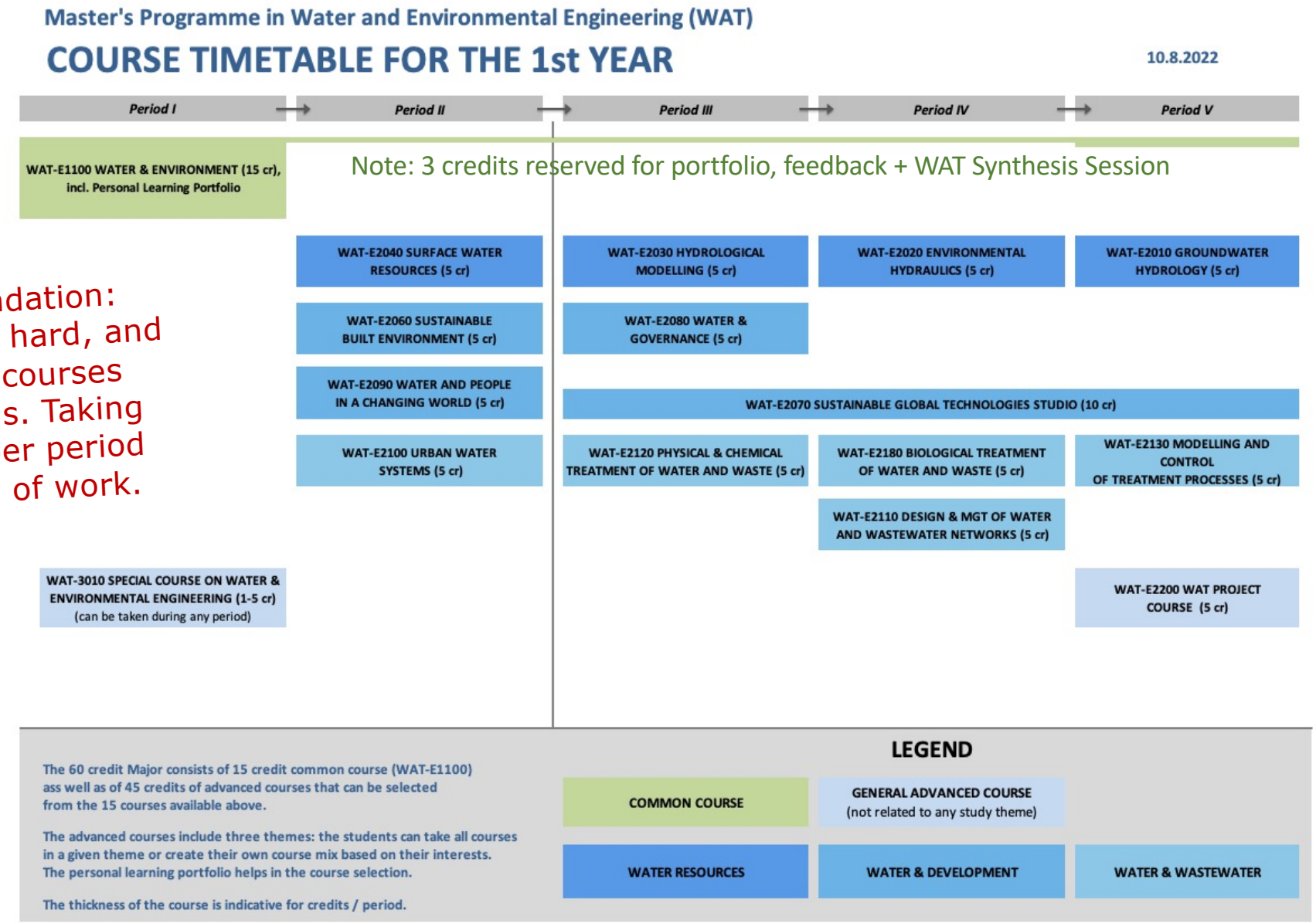
WATER & WASTEWATER

- Urban water systems
- Design and management of water and wastewater networks
- Physical and chemical treatment of water and waste
- Modelling and control of treatment processes
- Biological treatment of water and waste

Water & environmental engineering (15 cr.)

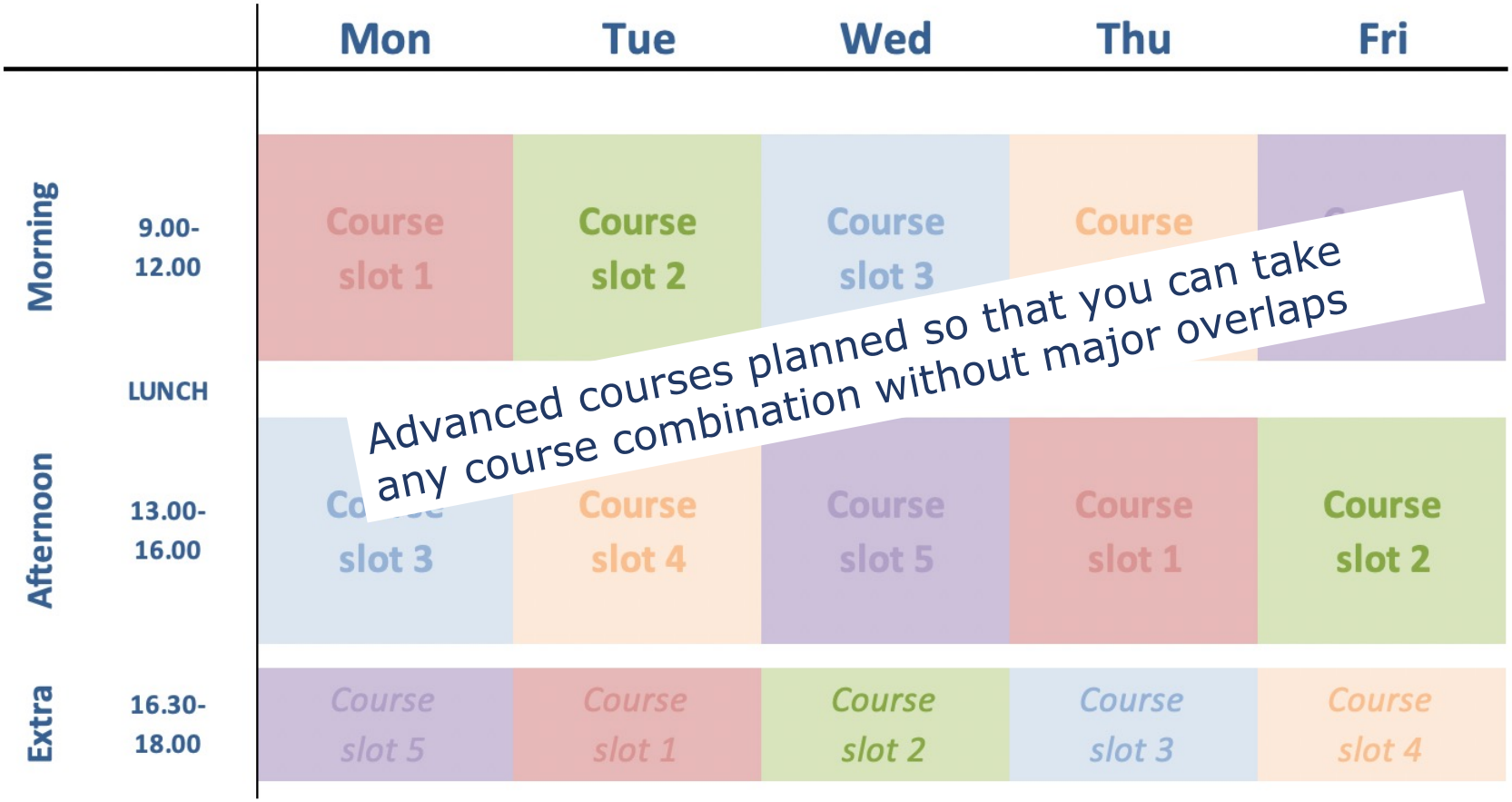
In-depth introduction to the key themes and problem-solving methods in our field, through variety of group work and individual tasks.

Our recommendation: study first period hard, and then take two courses for other periods. Taking three courses per period requires plenty of work.



WAT Master's Programme: Weekly timetable for advanced courses

30.8.2022



Advanced courses planned so that you can take any course combination without major overlaps

The morning sessions can start earlier in some courses

The afternoon sessions can finish later in some courses

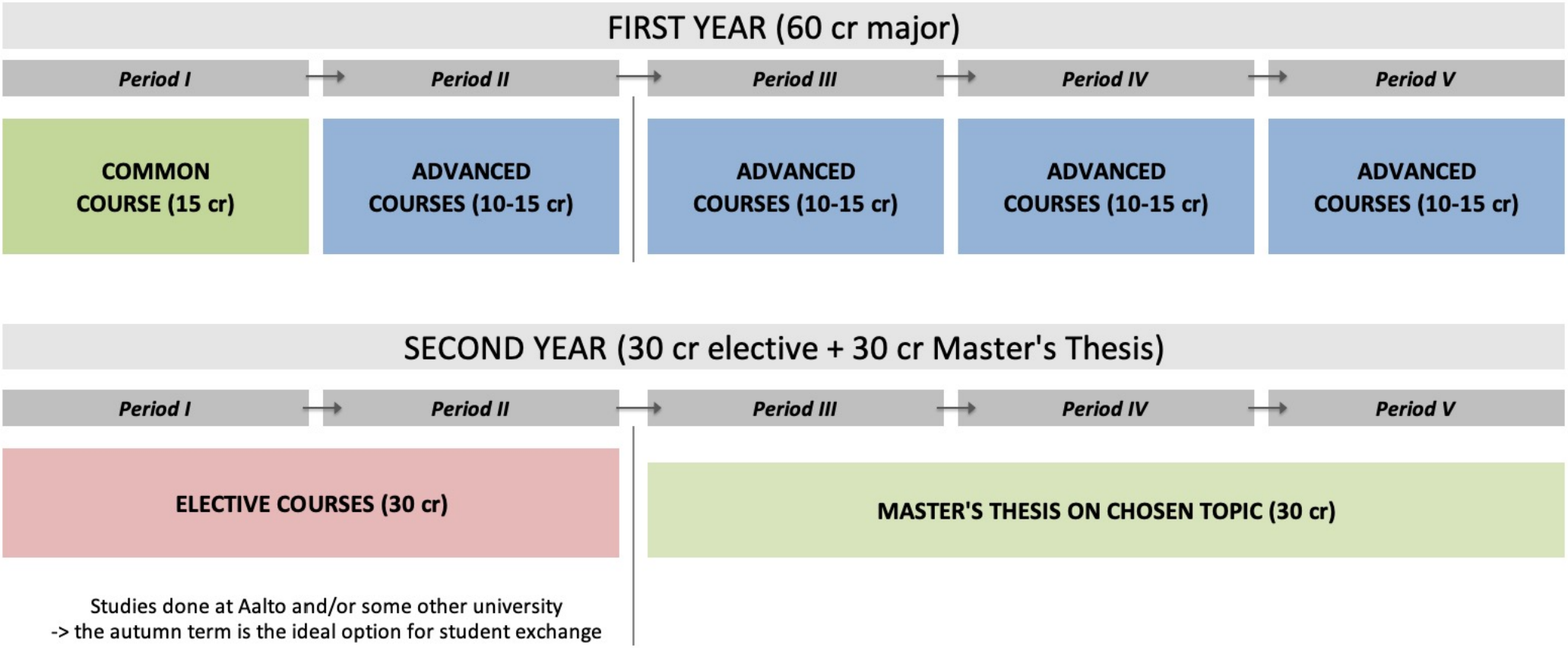
Extra session = support for assignments etc.

	Period II	Period III	Period IV	Period V	EXCEEPTIONS TO THE SLOTS
Course slot 1	-	**WAT-E2030 Hydrological Modelling, HARRI**	**WAT-E2110 Design & Management of..., RIKU**	**WAT-E2010 Groundwater hydrology, TEEMU**	
Course slot 2	**WAT-E2040 Surface Water Resources, ELIISA ***	**WAT-E2080 Water & Governance, MARKO ***	-	-	** WAT-E2040 sessions: Tue morning & Thu afternoon* ** WAT-E2080 sessions: Tue morning & Thu morning* ** WAT-E2010 sessions: Tue morning & Thu afternoon*
Course slot 3	**WAT-E2060 Sustainable Built Environment, OLLI ***	**WAT-E2070 SGT studio, MATLEENA ***	**WAT-E2070 SGT studio, MATLEENA ***	**WAT-E2070 SGT studio, MATLEENA ***	** WAT-E2060: sessions on Mon morning & Wed morning* ** WAT-E2070: some sessions in other course slots*
Course slot 4	**WAT-E2090 Water & people in a changing world, MATTI**	- *(WAT-2080 on Thu morning)*	**WAT-E2180 Biological Treatment..., ANNA**	**WAT-E2200 WAT Project Course, MEERI**	
Course slot 5	**WAT-E2100 Urban Water Systems, RIKU**	**WAT-E2120 Physical & Chemical Treatment..., ANNA**	**WAT-E2020 Environmental hydraulics, JUHA**	**WAT-E2130 Modelling and control..., ANNA**	

Note that these are general slots for key Contact Sessions: courses will include also assignments etc. Also note that the times are indicative only: check actual Contact Session times for each course from SISU & MyCourses!

Master Programme on Water and Environmental Engineering

INDICATIVE COURSE TIMETABLE FOR 1st & 2nd YEAR



Pair discussion

- How does WAT and its courses sound?
- Do you already have some ideas on what advanced courses to take?
- Anything unclear?

...and yes: we start with a bang!

- WAT-E1100 course requires full-time studying from Monday morning till Friday afternoon
  → Not all of it Contact Sessions, but part of it group work and part individual studying

AIMS:

1) Learning to know each other + our field & staff
2) Helps you to plan your advanced courses, too!

WAT-E1100 course

Organised through 6 thematic weeks + a synthesis week

→ Each week has a specific theme that links to both our research and teaching

→ Each week has also a specific skill (but note that skill is general to our field, and not only linked to the weekly theme)

→ Some weeks have also broader context sessions

WAT-E1100 course

WEEKLY THEMES

1) Global natural resources MATTI & OLLI
2) Water resources management & hydrology HARRI
3) Environmental hydraulics JUHA
4) Water & wastewater engineering ANNA
5) Environmental mgt and sustainability MEERI
6) Water and environmental quality RIKU
7) Synthesis MARKO

WEEKLY METHODS

1) Statistical analysis
2) Simulation modelling
3) Hydraulic flume: measurement & uncertainty
4) Spatial analysis
5) Life Cycle Assessment LCA
6) Laboratory analysis

WAT CONTEXTS

- Team roles & group work (Week 1)
- Entrepreneurship & business (Week 4)
- Governance & science (Week 7)

WAT-E1100 course

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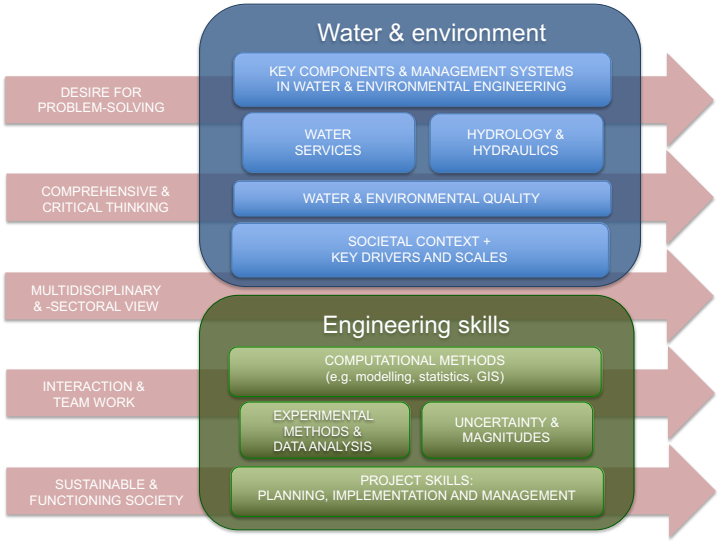
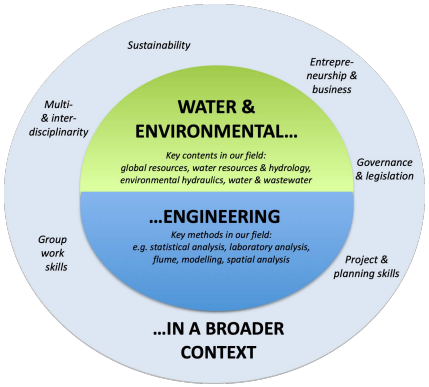


There is a link! ☺

→ More on Monday



Weekly timetable for WAT-E1100 course available in MyCourses under ‘Course structure and practicalities’ sub-page

→ But remember to check the weekly sub-page for final, detailed timetable

WAT course: weekly timetable

Version 30.8.2022

WHAT? Weekly timetable for the common course of WAT Master's Programme. Large part of learning activities are done in groups: students are divided into the groups at the beginning of the course.

WAT COURSE? WAT-E1100 is a 15-credit course. It introduces the key themes and broader context related to water and environmental engineering, and focuses also on the key computational methods and problem-solving approaches related to water and environmental engineering.

ASSIGNMENTS? WAT Course includes Contact Sessions as well as two types of assignments: **Tasks** are related to the key themes and broader context, and **Weekly Exercises** to the methods and problem-solving approaches. Tasks are mainly done in groups or pairs, while Weekly Exercises are usually done individually.

WEEKLY TIMETABLE: WAT-E1100 Water and Environmental Engineering

1st WEEK — Global natural resources (Matti, Olli, Matleena) + Intro (Marko)

	Mon 5.9.	Tue 6.9	Wed 7.9	Thu 8.9	Fri 9.9
Morning (9.00-)	CONTEXT SESSION: Intro + group work practices [Marko]	CONTACT SESSION: sustainability, global resources + SGT cases [Olli & co]	THEMATIC TASK: individual / group work	WEEKLY EXERCISE: statistical analysis	WEEKLY EXERCISE: individual / group work
	DRAFT SHOWING THE OVERALL STRUCTURE: FINAL SCHEDULE IN MYCOURSES' WEEKLY SUB-PAGE				
Afternoon (-4pm)	CONTACT SESSION: global water issues [Matti]	CONTACT SESSION: sustainability, global resources + SGT cases [Olli & co]	THEMATIC TASK: SWOT wrap-up [Matti & co]	WEEKLY EXERCISE: individual / group work	WEEKLY EXERCISE: statistical analysis

2nd WEEK — Water resources management & hydrology (Harri & co)

	Mon 12.9.	Tue 13.9.	Wed 14.9.	Thu 15.9.	Fri 16.9.
Morning (9.00-)	CONTACT SESSION: water resources management & hydrology [Harri & co]	THEMATIC TASK: HBV modelling [Harri]	WEEKLY EXERCISE: modelling	WEEKLY EXERCISE: individual / group work	THEMATIC TASK: individual / group work
	DRAFT SHOWING THE OVERALL STRUCTURE: FINAL SCHEDULE IN MYCOURSES' WEEKLY SUB-PAGE				
Afternoon (-4pm)	CONTACT SESSION: water resources management & hydrology [Harri & co]	THEMATIC TASK: individual / group work	WEEKLY EXERCISE: modelling	WEEKLY EXERCISE: modelling	THEMATIC TASK: HBV wrap-up [Harri]

3rd WEEK — Environmental hydraulics (Juha)

	Mon 19.9.	Tue 20.9.	Wed 21.9.	Thu 22.9.	Fri 23.9.
	DRAFT SHOWING THE OVERALL STRUCTURE: FINAL SCHEDULE IN MYCOURSES' WEEKLY SUB-PAGE				
Morning (9.00-)	CONTACT SESSION: Environmental hydraulics & hydro-environmental engineering solutions [Juha]	Flume group 1 @ 9:00-10:00 Flume group 2 @ 10:30-11:30 Flume group 3 @ 13:00-14:00	Flume group 4 @ 9:00-10:00 Flume group 5 @ 10:30-11:30 Flume group 6 @ 13:00-14:00	Online helpdesk 10:00-12:00 for flume assignment (optional attendance) Individual / group work	CONTACT SESSION: flume assignment wrap-up
Afternoon (-4pm)	CONTACT SESSION: Experimental methods and data analyses; intro to flume assignment	When your group is not attending a teaching session, you should work independently	When your group is not attending a teaching session, you should work independently		CONTACT SESSION: scientific communication task

4th WEEK — Water & wastewater engineering (Anna)

	Mon 26.9.	Tue 27.9.	Wed 28.9.	Thu 29.9.	Fri 30.9.
Morning (9.00-)	CONTACT SESSION: water & wastewater engineering [Anna]	CONTEXT SESSION + TASK: ENTREPRENEURSHIP by Aalto Ventures Programme AVP	WEEKLY EXERCISE: spatial analysis & GIS	WEEKLY EXERCISE: individual / group work	THEMATIC TASK on ENTREPRENEURSHIP: pitch clinic
	DRAFT SHOWING THE OVERALL STRUCTURE: FINAL SCHEDULE IN MYCOURSES' WEEKLY SUB-PAGE				
Afternoon (-4pm)	CONTACT SESSION: water and wastewater engineering [Harri M.] + GIS intro [Teemu]	THEMATIC TASK on ENTREPRENEURSHIP: group work / interviews	ENTREPRENEURSHIP SESSION by AVP	ENTREPRENEURSHIP: introduction to pitching	ENTREPRENEURSHIP PRESENTATIONS + WRAP-UP with AVP

5th WEEK — Environmental management (Meeri)

	Mon 3.10.	Tue 4.10.	Wed 5.10.	Thu 6.10.	Fri 7.10.
Morning (9.00-)	WEEKLY EXERCISE: Life Cycle Assessment	WEEKLY EXERCISE: individual / group work	WEEKLY EXERCISE WRAP-UP	THEMATIC TASK: individual / group work	CONTACT SESSION: Dilemma board game [Meeri]
	DRAFT SHOWING THE OVERALL STRUCTURE: FINAL SCHEDULE IN MYCOURSES' WEEKLY SUB-PAGE				
Afternoon (9.00-)	WEEKLY EXERCISE: individual / group work	WEEKLY EXERCISE: individual / group work	CONTACT SESSION: environmental and sustainability management [Meeri]	THEMATIC TASK: individual / group work	THEMATIC TASK: wrap-up [Meeri]

6th WEEK — Water & environmental quality (Riku)

	Mon 10.10.	Tue 11.10.	Wed 12.10.	Thu 13.10.	Fri 14.10.
Morning (9.00-)	CONTACT SESSION + TASK: water & enviromental quality [Riku & co]	WEEKLY EXERCISE: introduction to laboratory work	*Starting at 8.00* WEEKLY EXERCISE: laboratory work & analysis *(Groups 2-4)*	*Starting at 8.00* WEEKLY EXERCISE: laboratory work & analysis *(Groups 5-6)*	WEEKLY EXERCISE time to prepare the presentations
	DRAFT SHOWING THE OVERALL STRUCTURE: FINAL SCHEDULE IN MYCOURSES' WEEKLY SUB-PAGE				
Afternoon (-4pm)	Time to read for the home exam: individual work	WEEKLY EXERCISE: laboratory work & analysis *(group 1)*	WEEKLY EXERCISE: laboratory work & analysis *(Groups 2-4)*	WEEKLY EXERCISE: laboratory work & analysis *(Groups 5-6)*	TASK & WEEKLY EXERCISE WRAP-UP

7th WEEK — Synthesis (Marko)

	Mon 17.10.	Tue 18.10.	Wed 19.10.	Thu 20.10.	Fri 21.10.
	DRAFT SHOWING THE OVERALL STRUCTURE: FINAL SCHEDULE IN MYCOURSES' WEEKLY SUB-PAGE				
Morning (9.00-)	TIME FOR FINALISING YOUR ASSIGNMENTS	CONTEXT SESSION: Science + Governance & legislation [Marko]	SYNTHESIS DAY: presenting & synthesising the key themes and learning outcomes of WAT Course [Meeri & Marko]	REFLECTION & FEEDBACK DAY [Marko] LUNCH TOGETHER!	PHEEW, FREE TIME FROM WAT COURSE!
Afternoon (-4pm)		SYNTHESIS WORK: Instructions + individual synthesis		Individual work on your portfolio + mentor meetings	*(possibility for mentor meetings + planning your studies and preparing your Personal Learning Portfolio)*

WEEKLY THEMES

1) Global natural resources MATTI & OLLI
2) Water resources management & hydrology HARRI
3) Environmental hydraulics JUHA
4) Water & wastewater engineering ANNA
5) Environmental mgt and sustainability MEERI
6) Water and environmental quality RIKU
7) Synthesis MARKO

WEEKLY METHODS

1) Statistical analysis
2) Simulation modelling
3) Hydraulic flume: measurement & uncertainty
4) Spatial analysis
5) Life Cycle Assessment LCA
6) Laboratory analysis

WAT CONTEXTS

- Team roles & group work (Week 1)
- Entrepreneurship & business (Week 4)
- Governance & legislation + science (Week 7)

LEGEND FOR COLOURS

WATER & ENVIRONMENT: session on context
WATER & ENVIRONMENT: session on weekly theme
WATER & ENVIRONMENT: individual / group work
COMPUTATIONAL METHODS: session on weekly method
COMPUTATIONAL METHODS: individual / group work

LUNCH BREAK

Let’s continue here at 13.00 sharp!

WAT Wednesday

Today's tasks:

1) Talk about WAT

2) Talk about you and your expertise + expectations during Poster Wal

3) Mingle more freely during WAT & Akva Get-together ☺

Wednesday 31.8

Lecture Hall 286/287, Water Building (Tietotie 1E)

10.00- GROUP WORK & INTRO TO WAT

- Finalising your poster

Coffee break

Intro to WAT Programme, Part 1

Lunch break

13.00- INTRO TO WAT & STUDENTS

Intro to WAT Programme, Part 2

- Personal Learning Portfolio Process

Coffee break

14.30- Groups' poster presentations, with mentors

WAT & AKVA Get-together at 16.00 in Water Building

WAT? Introduction to our Master's Programme in Water and Environmental Engineering, Part 2

- WAT research: alumni & stakeholder surveys
- Personal Learning Portfolio

WAT surveys

We develop the WAT programme in a research-based manner, mainly through surveys

→ Aim to understand how you students but also our alumni and stakeholders view our field and its future needs

- *WAT Student Feedback Surveys (at the end of first year)*
- *WAT Teacher Surveys*
- *WAT Alumni Survey in 2017*
- *WAT Stakeholder Survey in 2020*

WAT surveys

English summary slides of the stakeholder and **WAT Alumni Survey** 2017 available in WAT-E1100 MyCourses' Orientation week sub-page:
https://mycourses.aalto.fi/course/view.php?id=35667&section=2

WAT Stakeholder Survey report (in Finnish): http://urn.fi/URN:ISBN:978-952-60-3785-1

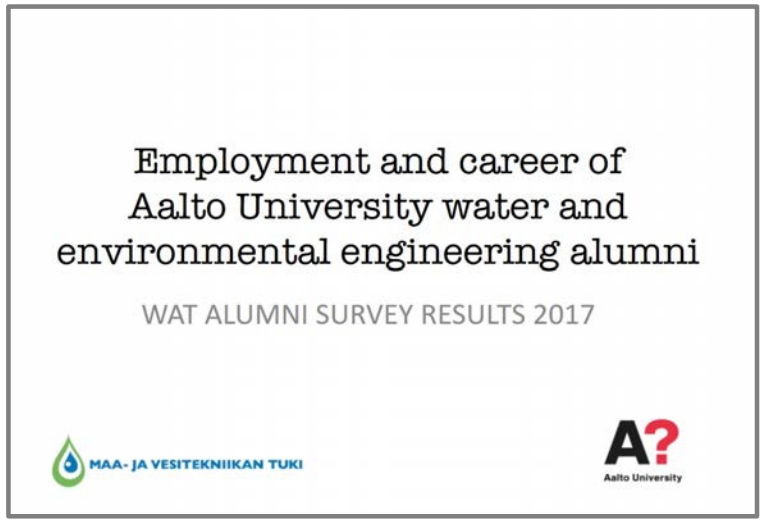
Also check alumni survey -related Master's Thesis + two articles:
https://aaltodoc.aalto.fi/handle/123456789/31604
https://www.mdpi.com/2071-1050/10/8/2605
http://bit.ly/KarvinenVehmasKeskinen

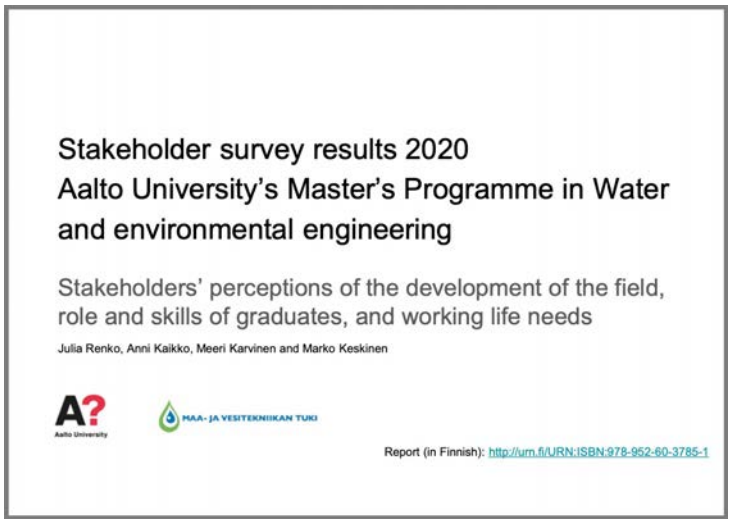
Main messages: employment situation in our field is good; its societal relevance is increasing; both the tasks & employees diverse

→ But new kinds of challenges emerging, requiring new kinds of competences

WAT alumni & stakeholder surveys

English summary slides of the stakeholder and **WAT Alumni Survey** 2017 available in WAT-E1100 MyCourses' Orientation week sub-page:
https://mycourses.aalto.fi/course/view.php?id=35667&section=2



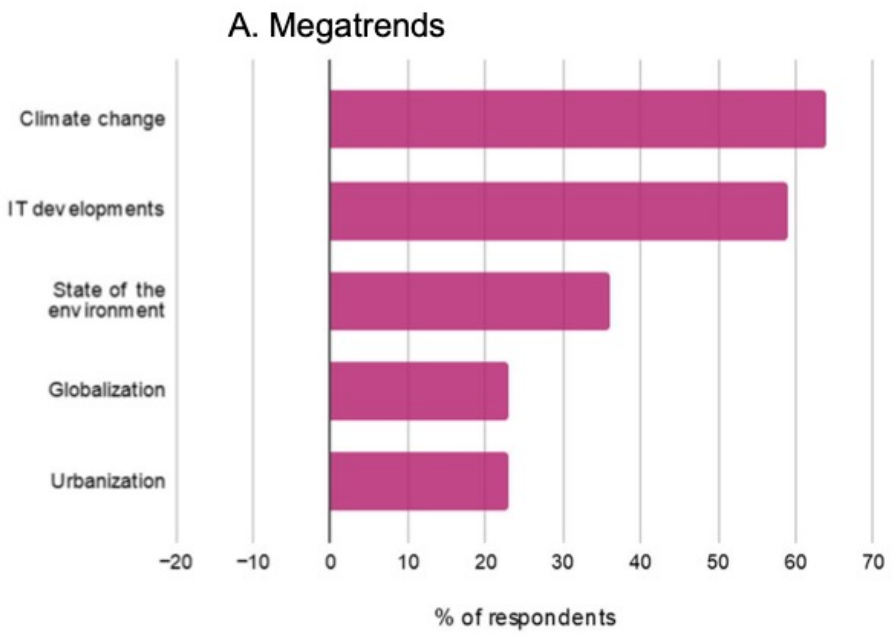


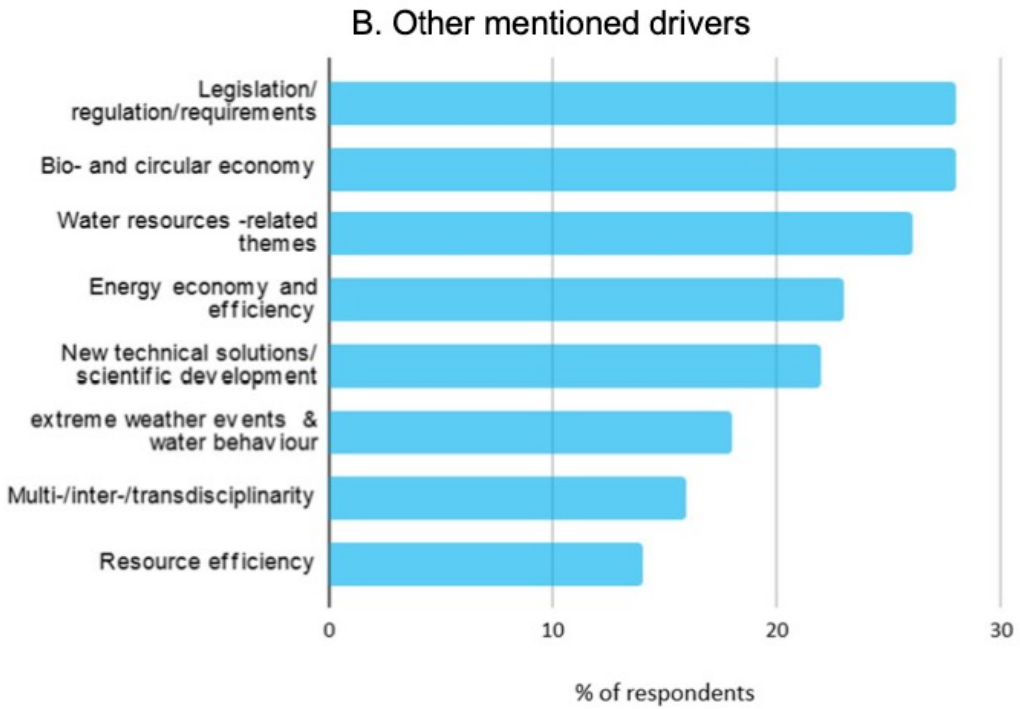
Next some selected results from both surveys

WAT Stakeholder Survey

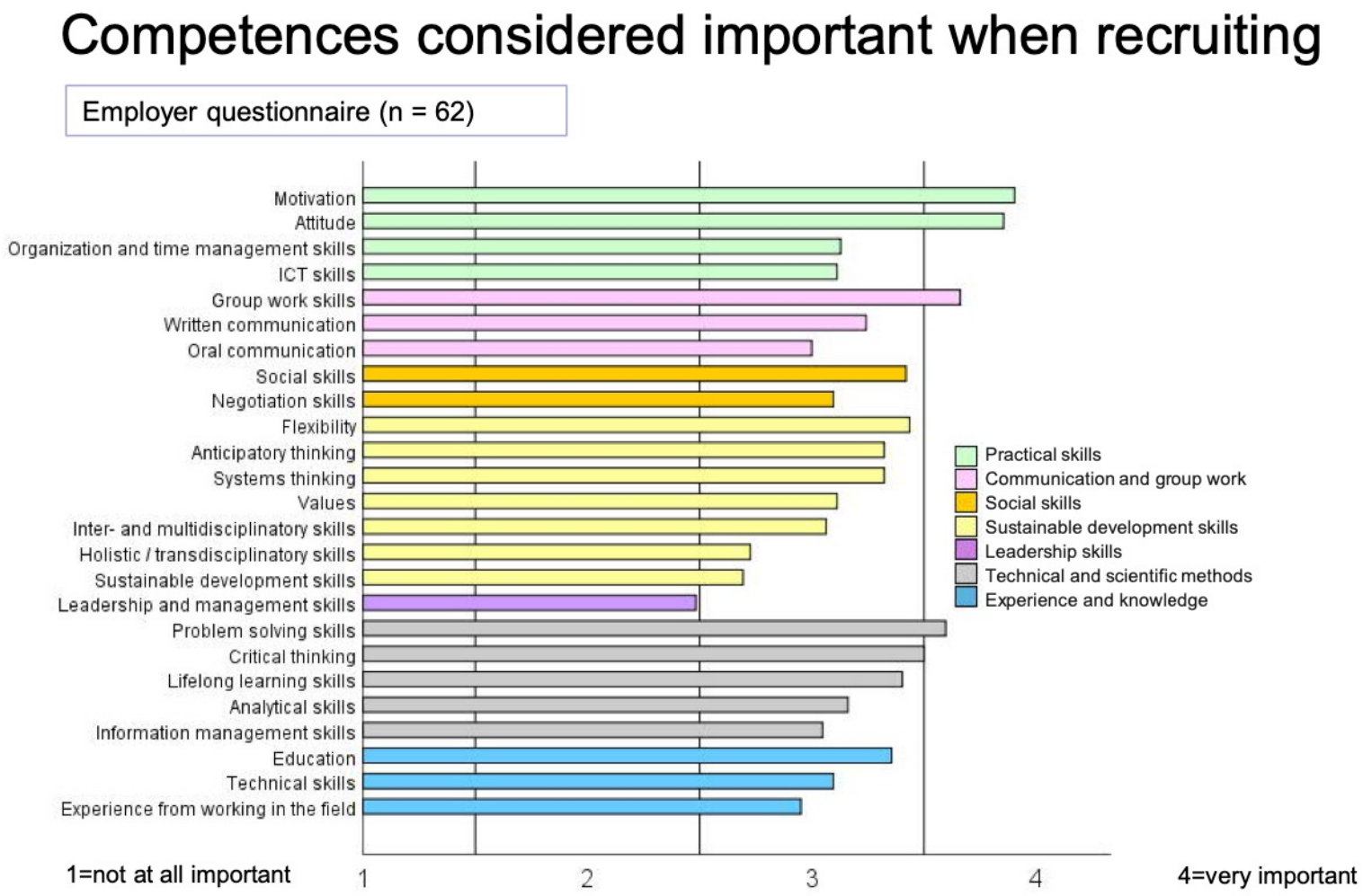
Most important global drivers affecting the field

Open text answers of both questionnaires + interviews
(n = 72)





WAT Stakeholder Survey



It is a mix of many competences!

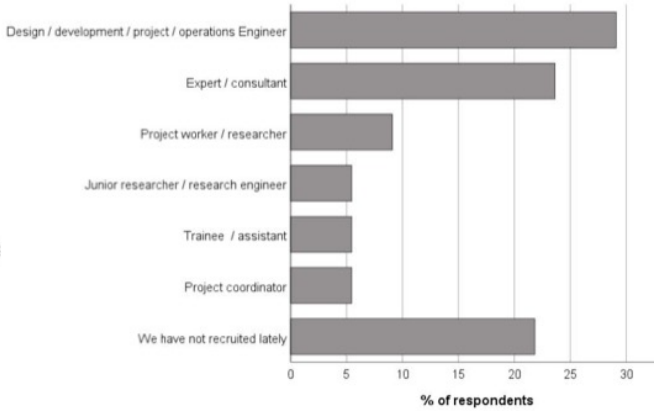
→ You cannot naturally have them all, but can build your own mix based on your interests

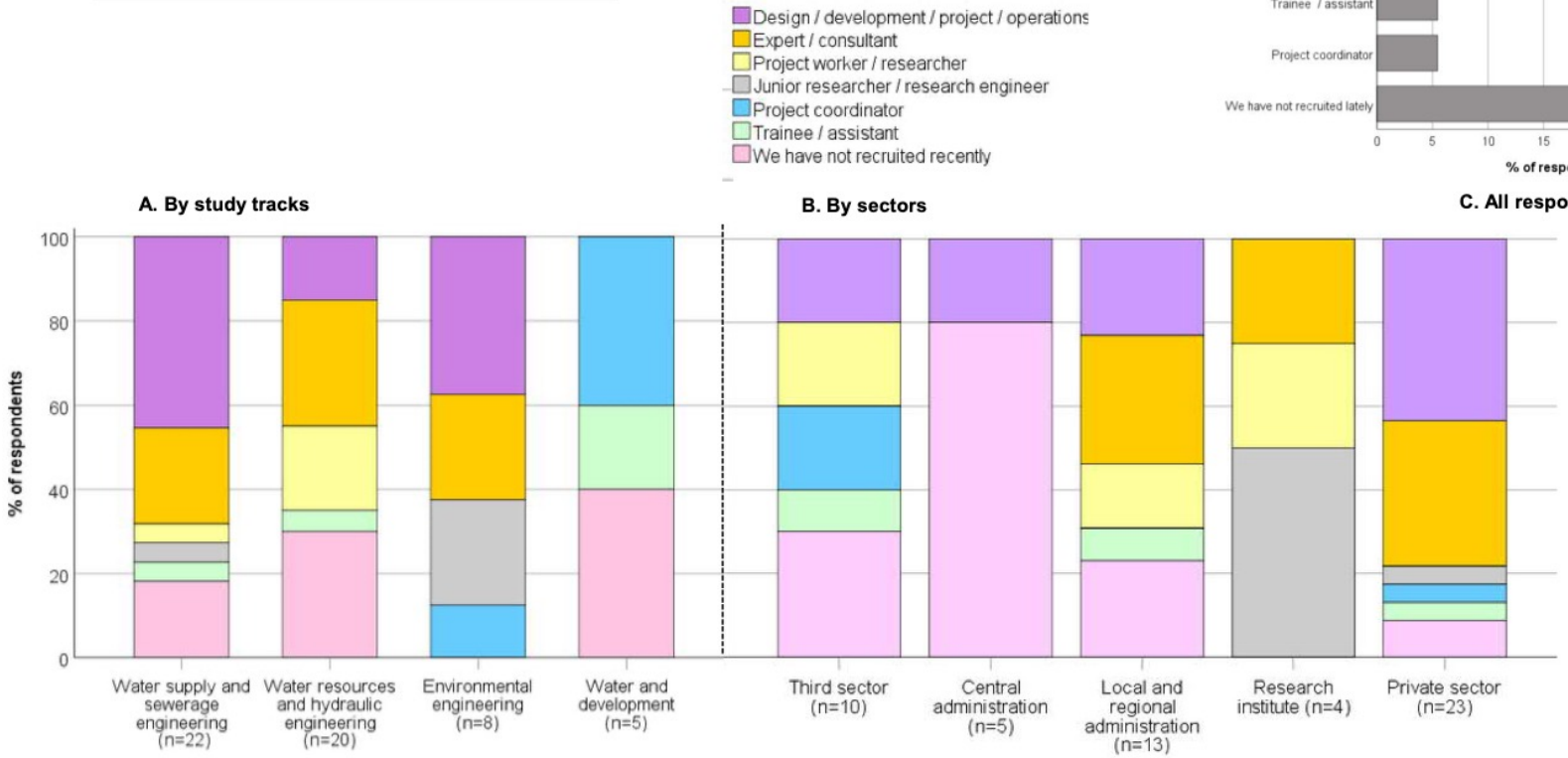
→ Portfolio one way to think about this

WAT Stakeholder Survey

Graduates' positions in recruitment

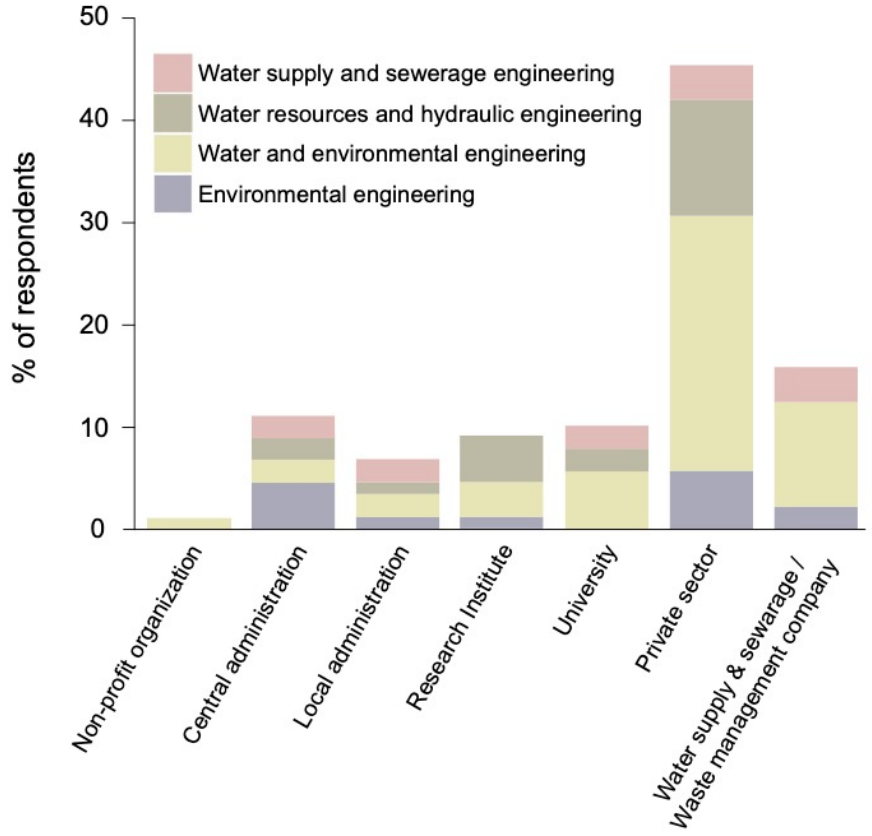
Employer questionnaire (n = 55)





WAT Alumni Survey

Employer sectors

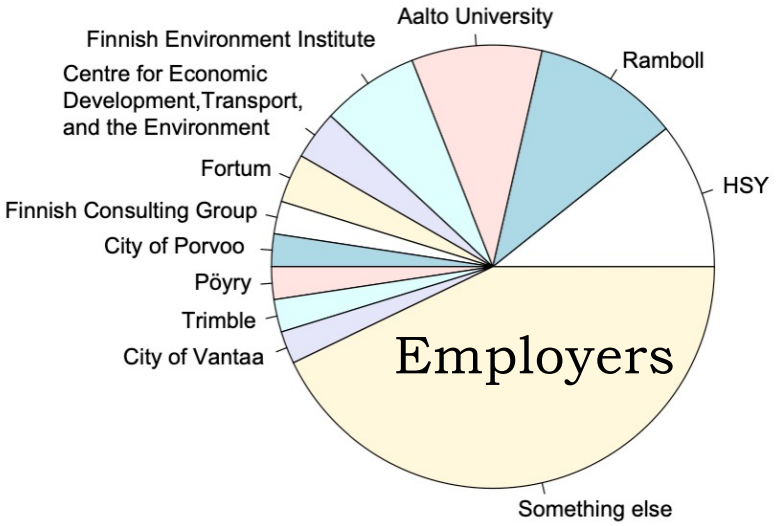


In 2007-2016, 191 water and environmental engineers graduated from Aalto University or Helsinki University of Technology

- Majors: water resources & hydraulic engineering, water supply & sewerage engineering, environmental engineering, water & environmental engineering
- 176 questionnaire invitations were sent, 88 replied

Response rate 50

- 64 women and 24 men replied
- 32 respondents had studied water & environmental engineering, 28 water resources & hydraulic engineering, 15 water supply & sewerage engineering, 13 environmental engineering as their major

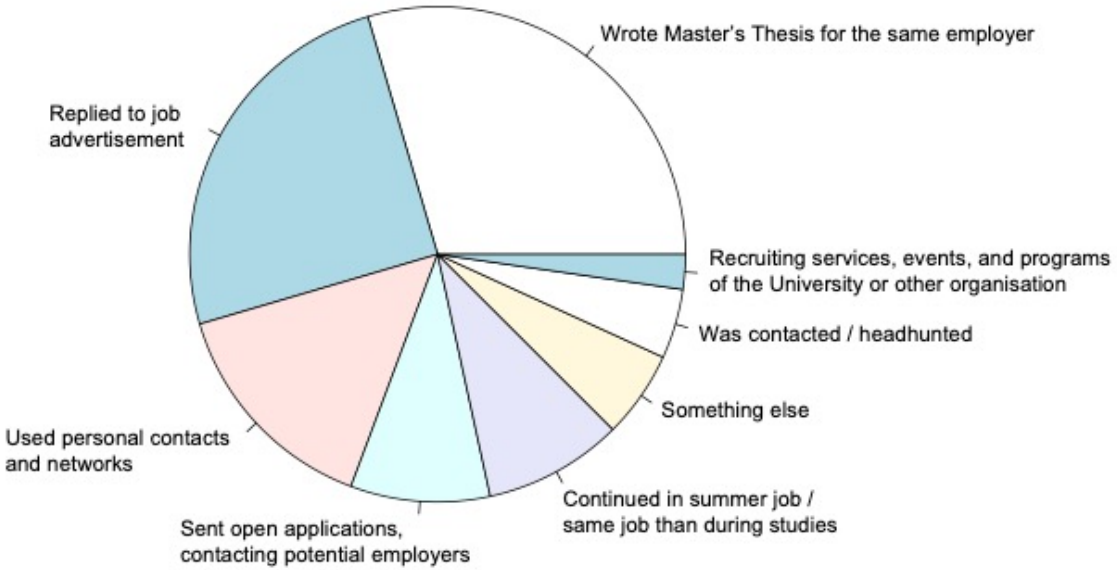


Note: Alumni Survey was done for those alumnis who had graduated before our current WAT Master's Programme started
→ Slightly different themes, and mainly in Finnish

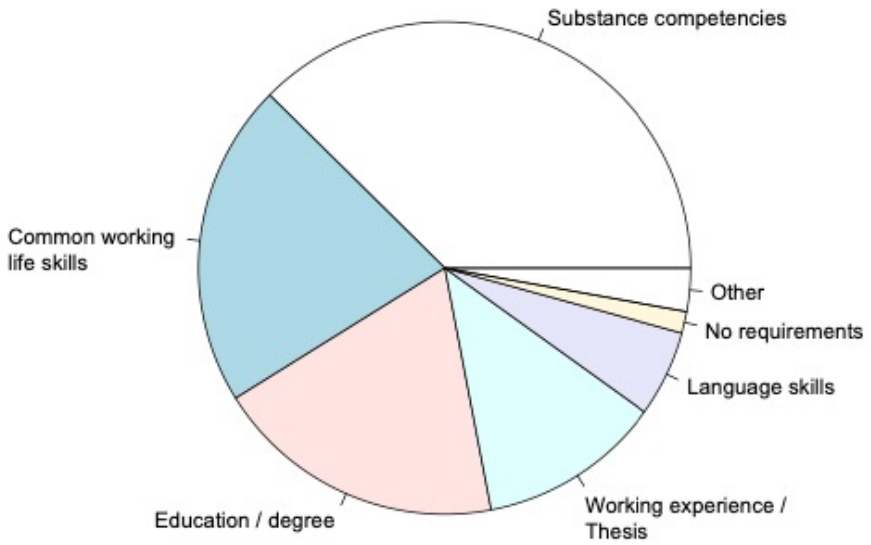
WAT Alumni Survey

First job

How did you get your first job after graduation?

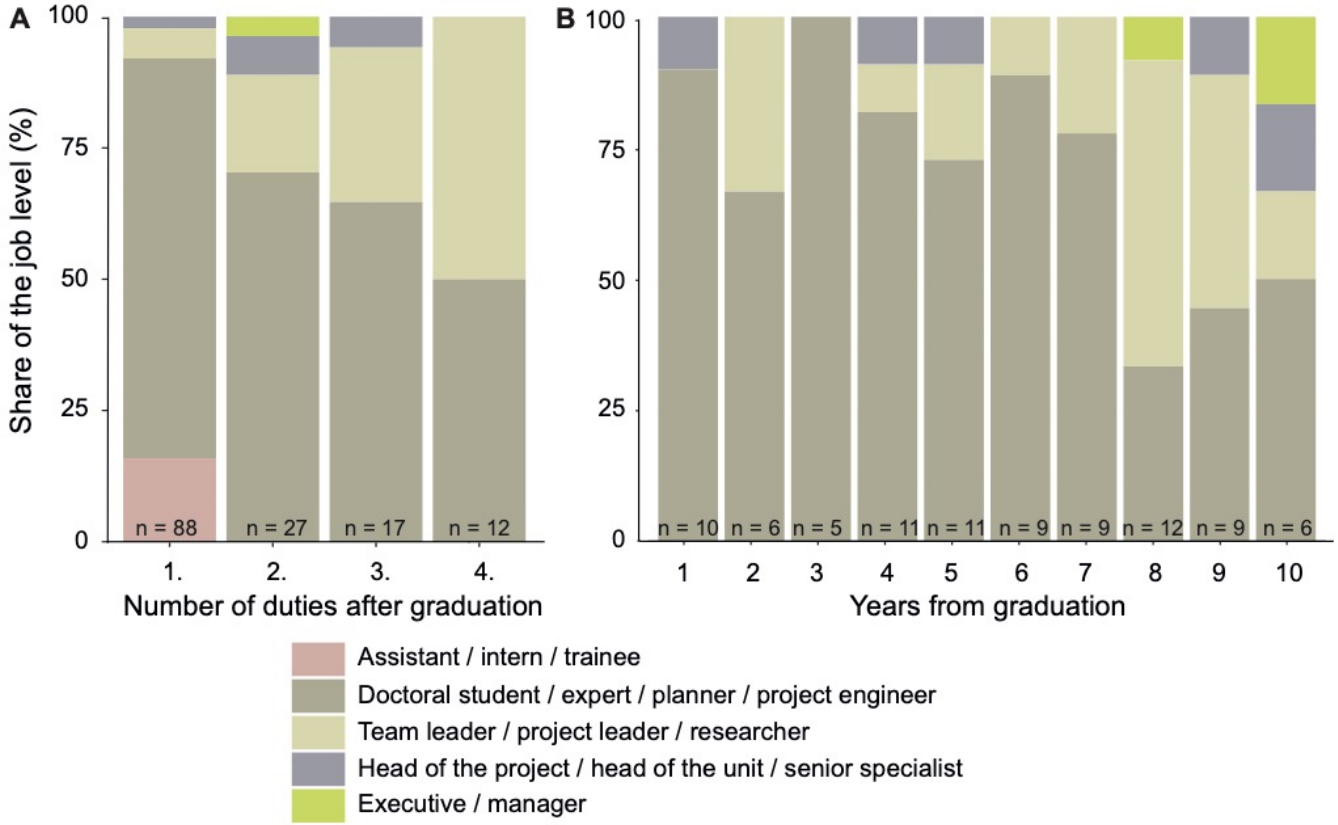


Requirements for the first job

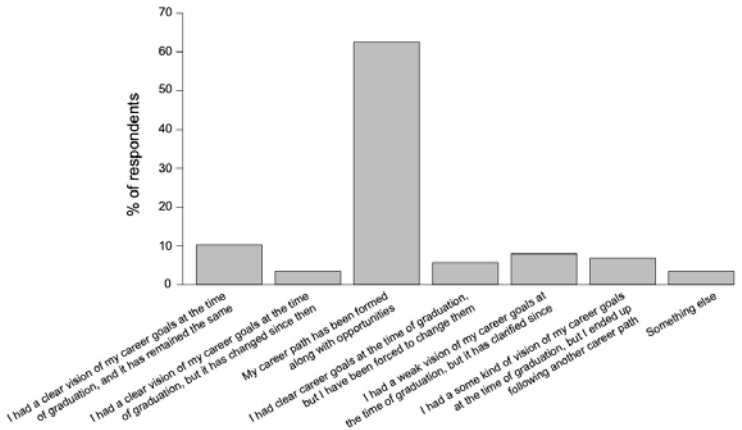


WAT Alumni Survey

Career path



Career development



WAT Alumni Survey

The central working life skills at different levels

Practical skills
Arrangement & coordination skills
Initiative & self-direction
Time management & prioritization

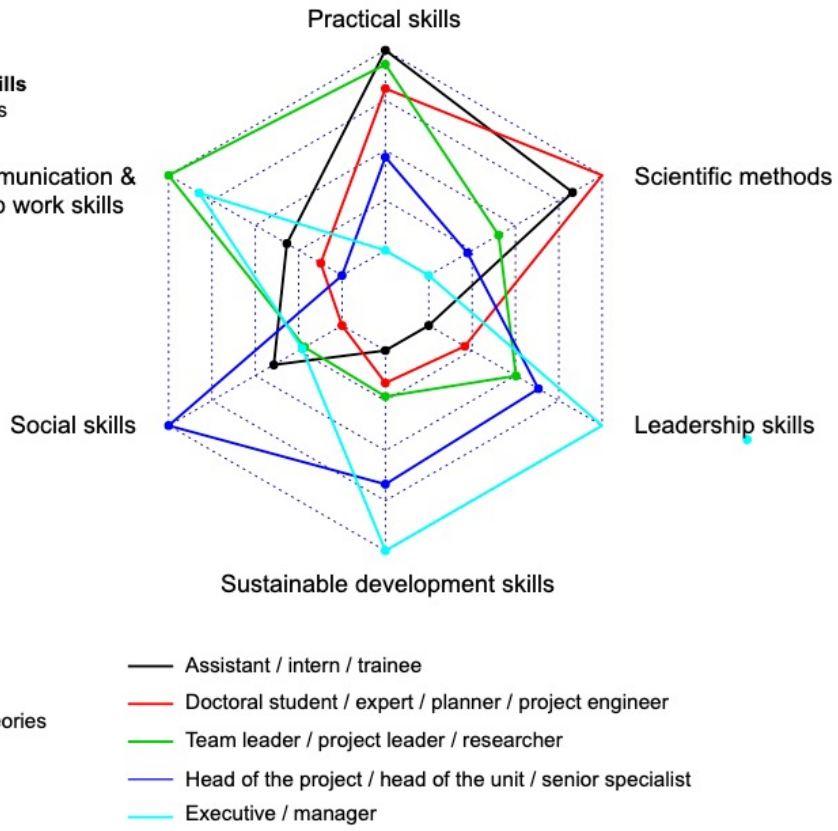
Communication & group work skills
Communication & presentation skills
Group work skills
Scientific writing

Social skills
Negotiation skills
Social skills

Sustainable development skills
Ability to make & execute changes
Creativity & flexibility
Ethical & value-based thinking
Future orientation & forethought
Systemic, wide-ranging, connective thinking
Transdiciplinarity, acting in multidiciplinary environments

Leadership skills
Leadership
Decision making & responsibility
Teaching & supervision

Scientific methods
Analytical & critical thinking
Comprehension & application of theories
Computational skills
Problem solving
Searching & updating information, active learning



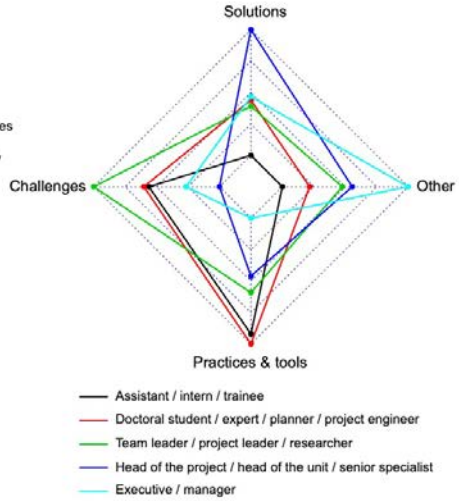
The central knowledge at different levels

Solutions
Circular economy & waste management
Governance & legislation of own field
Life cycle thinking
Principles of business & economy
Social responsibility
Theories of own field

Challenges
Climate change
Cycling of phosphorus & nitrogen
Eutrophication & pollution
Global sustainable development challenges
Land-use change
Understanding significance of biodiversity

Practices & tools
Engineering knowledge (e.g. IT, Excel, GIS, programming)
Hydrology & hydraulics
Knowledge of environmental engineering practices
Knowledge of water supply & sewerage practices
Risk assessment

Other knowledge
Entrepreneurship
Knowledge of construction engineering pratices
Leadership
Knowledge of other fields (forestry, energy technology, understanding how society works)



Questions? Comments?

Pair discussion (with a new pair)

- How do these results sound?
- Anything surprising? Anything unclear?

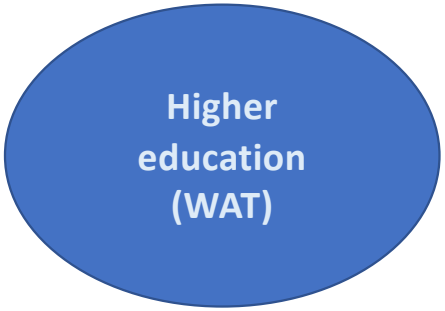
Portfolio and mentoring process

AIMS:

- Helping you to recognise your existing competences
- Facilitating you to recognise and visualise your learning
- Supporting your career planning

What kind of experiences affect your identity and competence as a WAT graduate?

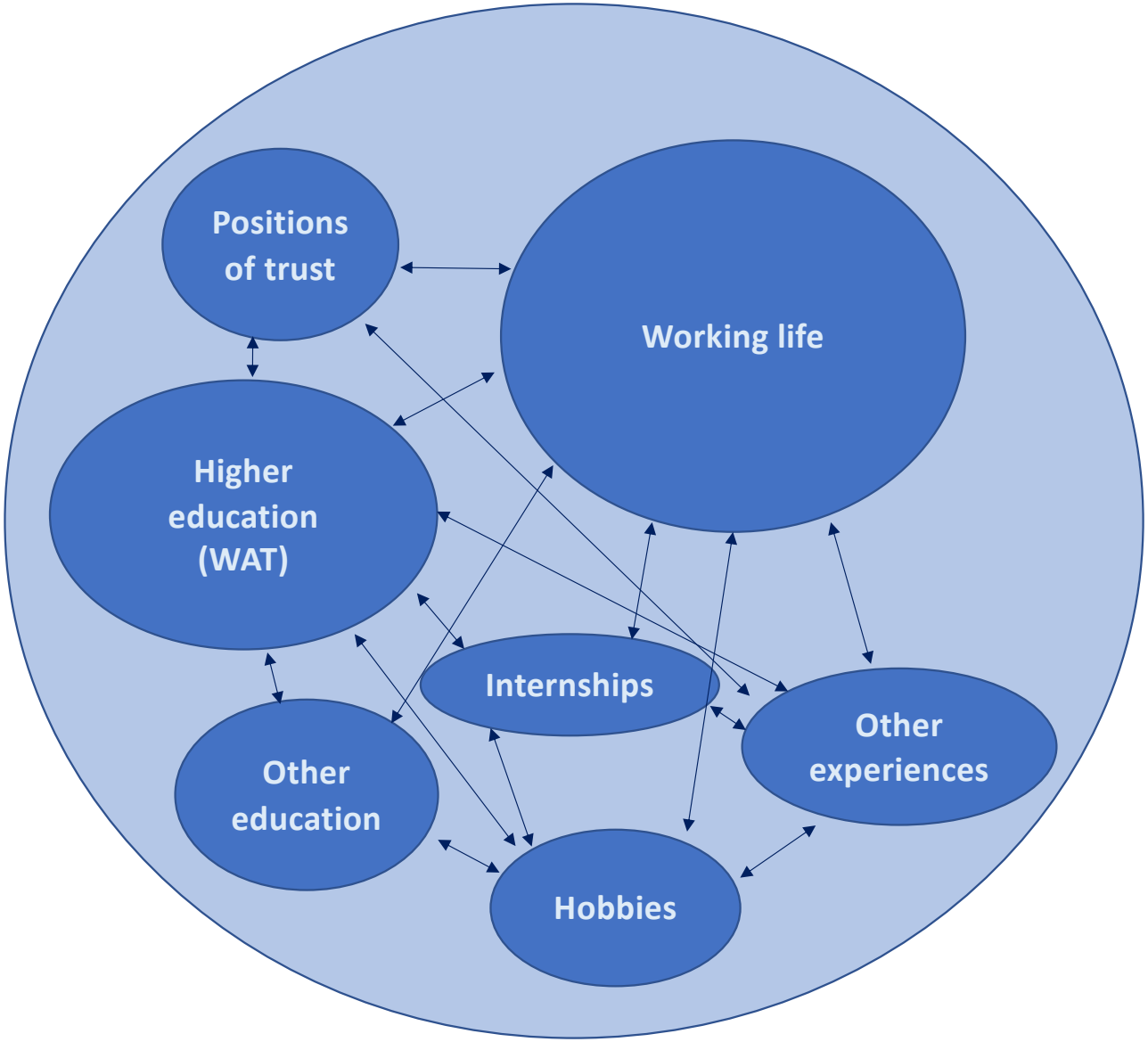
Our Master's programme offers methods and scientific background from our field and means to apply them in practice.



But is that enough for your future career as a WAT graduate?

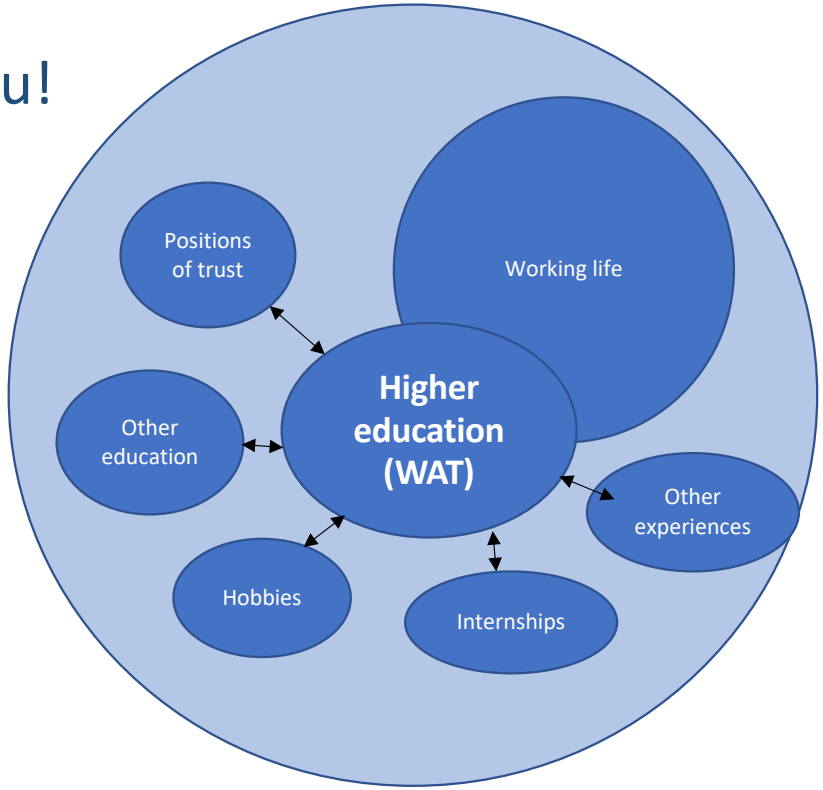
→How to make good use of all your experiences in life?

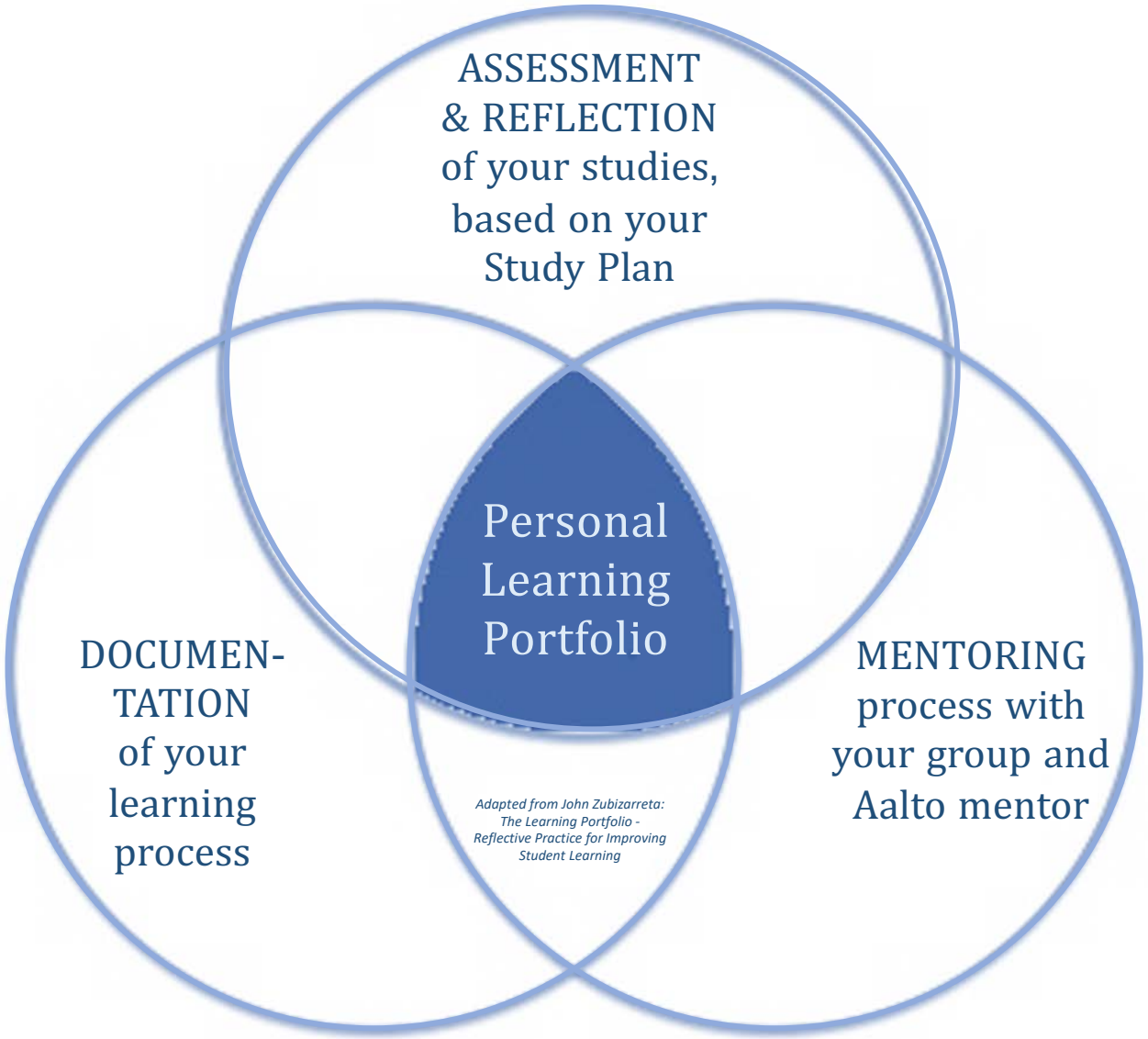
Your personal identity and competence builds through a combination of different activities and experience, inside and outside the university



Personal Learning Portfolio

- Aims to combine your previous skills, knowledge and values with the new competences you gain during your Master's education: you do it for you!
- Format of the portfolio is free, but MyCourses has an example for the Word Template




ASSESSMENT
& REFLECTION
of your studies,
based on your
Study Plan
DOCUMEN-
TATION
of your
learning
process
MENTORING
process with
your group and
Aalto mentor
Personal
Learning
Portfolio
Adapted from John Zubizarreta:
The Learning Portfolio -
Reflective Practice for Improving
Student Learning

Personal Learning Portfolio

- Consists of compulsory parts:
  - Creating your own Personal Learning Portfolio & submissions to MyCourses
  - Meetings with your mentor-group for peer support
  - Meetings with your Aalto-Mentor (autumn + spring)
  - Attending WAT Synthesis session in May 2022
  - Attending the Master's thesis process 2023-2024
- Also optional parts highly recommendable
  - Attending the Aalto Career Services activities
  - Making use of Aalto PDPP-course & other courses

Portfolio schedule

We have own WAT Portfolio MyCourses page: more information there.

Portfolio is a process, so start working on it immediately and update during your studies: the format is free.

1. Submit your portfolio to MyCourses twice
   - End of March 2023 + final version before your graduation
2. Self-organised session with your Mentor Group before the 1st portfolio submission (Feb-March 2023)
   → Include short report of the session into your portfolio
3. Discuss your portfolio with your WAT-mentor during your spring meeting 2023

This requires work, so we have reserved 2 credits (54 hours) for it from this course

WAT feedback & Synthesis session

We also collect general feedback on your first year of WAT studies (i.e. major studies) during spring 2023 through a Webropol survey: survey is sent to you in April-May 2023

→*The survey helps you to reflect and synthesise your learning, and provides us feedback on how the WAT programme works as a whole*

→ *This way also complements the portfolio process*

We will discuss the survey results and your first year together at the end of first year: last Thursday of Period V i.e. **Thu 8.6.2023 at 14.00**

→*Mark it already now to your calendar!*

Master's Thesis process

Consists of:

1. Listening to at least one Master's Theses Seminar before you start your own thesis
    - Recommended to attend the seminars anytime during your studies to learn from other's work
2. Attending a pre-seminar: presenting the research plan of your thesis
3. Attending a finalising session to review your almost-ready-thesis
4. Presenting your thesis in a Master's Thesis Seminar

Seminars arranged monthly, see schedule in MyCourses:
https://mycourses.aalto.fi/course/view.php?id=30301

Questions? Comments?

Essential elements

...for 'ensuring a functioning and sustainable society'

Essential elements

...for 'ensuring a functioning and sustainable society'

Three critical elements for our WAT Master's Programme

→Hint: all start with S!

- Sustainability (the aim & crosscutter)
- Society (the context)
- Systems (the way to think)

SUSTAINABILITY

Sustainability = a state of a **system** (where system maintains its critical functions under change)

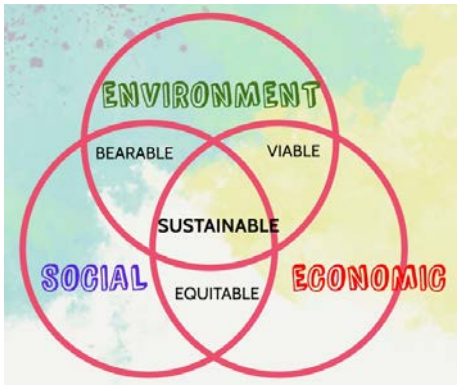
Sustainability is the ability of a human, natural or mixed system to withstand or adapt to endogenous or exogenous change indefinitely.

Sustainable development is therefore a pathway of deliberate change and improvement which maintains or enhances this attribute of the system, while answering the needs of the present population.

Dovers & Handmer 1992

”Sustainable development …
meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Our Common Future i.e. Brundtland Report 1997



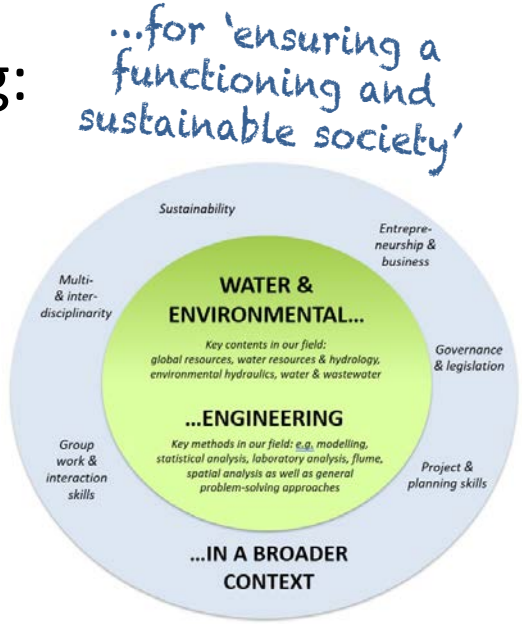
SOCIETY

”A large group of people who live together in an organized way, making decisions about how to do things and sharing the work that needs to be done.”

Cambridge Dictionary

Society forms the main **system** for water and environmental engineering: we are at the society’s service!

→ Yet, society has different scales: sometimes it’s about a city, sometimes about a nation, sometimes about entire globe



Light blue doughnut = society

SYSTEMS

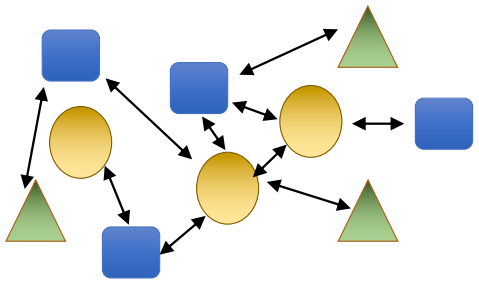
A system is a set of things – people, cells, molecules, or whatever – interconnected in such a way that they produce their own pattern of behavior over time.

Meadows, D.: Thinking in Systems, a Primer. 2008.

→ System includes but also excludes: **system boundaries** therefore very critical to understand and describe

Confusion and disagreement often because we talk about different systems (or their scales)

SYSTEM ELEMENTS + THEIR INTERACTION = SYSTEM'S PURPOSE



(e.g. functioning water supply, designing new area, national security, sustainability)

SYSTEMS

http://glancesideways.com/2012/10/progression-and-conceptual-adjustment/

Man at the top, world as a resource

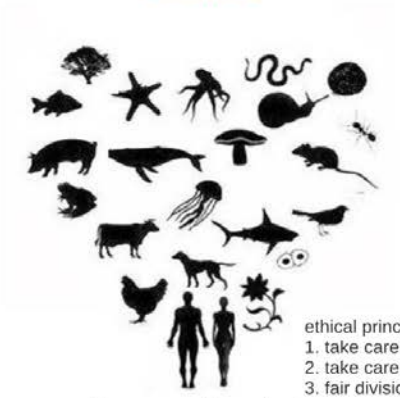
The dominant culture of our time

Food production: industrial scale, with aim to maximum economical profit

Complex, connected web of life - mutualism

Many indogenous cultures

Food production: interconnected web – energy and nutrition cycles



Regenerative worldview

ethical principles:
1. take care of the planet
2. take care of people
3. fair division of surplus

Regenerative design, e.g. Permaculture

Food production: while producing food for humans, we should heel damaged natural systems

CHECK: great introduction!

Available in MyCourses

Also differing views on how systems work and interact, and what is their purpose

Feew, lot of information - you need a BREAK!

Task for the break:
talk at least to
2 fellow students
you don't know yet

BREAK!

Let's continue at 14.30

Soon we'll start the presentations, but before...

Let's get you a Mentor!

Akva Seed Person picks a letter from A-E (starting from Group 1)

→ Now your group has a mentor; get into groups and introduce yourselves to each other (~12 min)!

Mentor: who you are and what you do at WAT

Students: who you are and why you came to WAT

You can also discuss about our courses
(particularly those that your mentor is involved in)

Group Presentations

~8 min per group

→ Introduce your own group in 6 minutes;
after questions & comments from the audience!

- Names & background of your group members
- Your existing expertise from our field
- Your expectations for WAT Master's Programme

HOW & WHO ARE YOU?

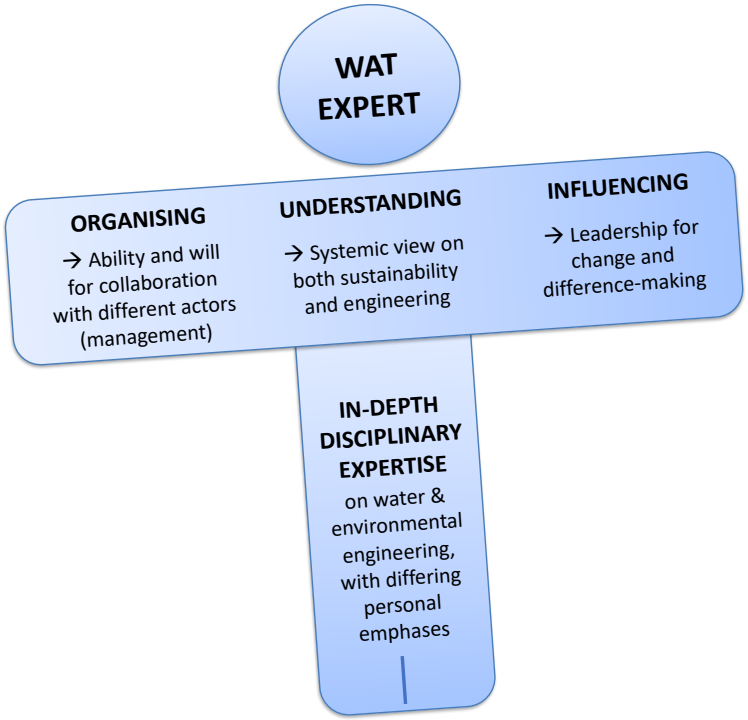
With your group:
discuss three key points you have learned about yourselves today

→ *About your existing expertise*

→*About your expectations for WAT*

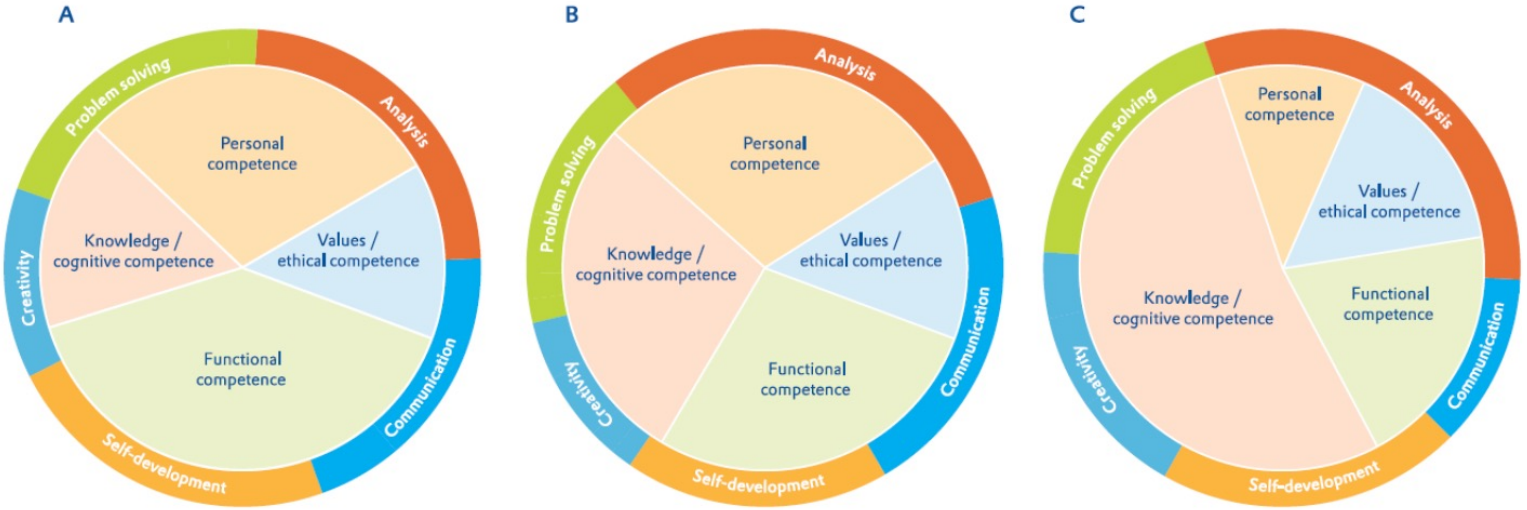
That’s all: now you all are invited
for Akva & WAT Get-Together!

ADDITIONAL SLIDES



WAT T-SHAPED LEARNING PROFILE?

T-SHAPED LEARNING PROFILE?

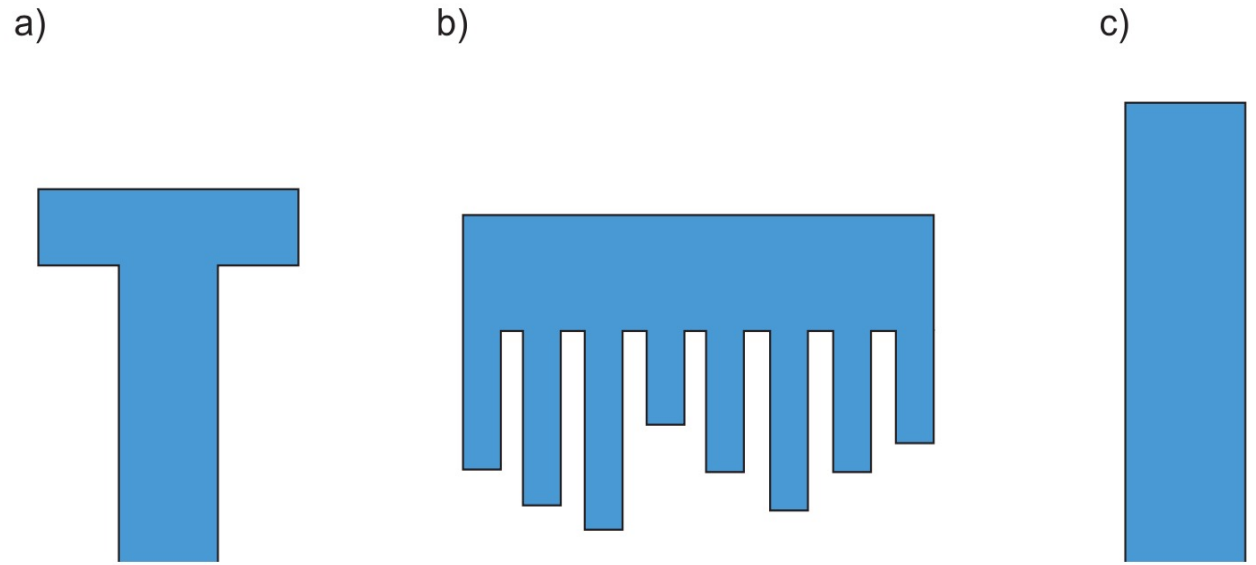


Uhlenbrook & de Jong 2012

Fig. 1. Comparison of possible occupational competence mixes of different water professionals: **(A)** director of a catchment agency interacting with various stakeholders and managing various resources (human resources, finances, facilities and infrastructure etc.), **(B)** water engineering consultant who specialized in hydraulic structures, and **(C)** research water chemist specialist in processes related to transport of micro-pollutants.

Sources: McIntosh & Taylor 2013 + Uhlenbrook & de Jong 2012: https://www.hydrol-earth-syst-sci.net/16/3475/2012/

T-SHAPED LEARNING PROFILE?



Uhlenbrook & de Jong 2012

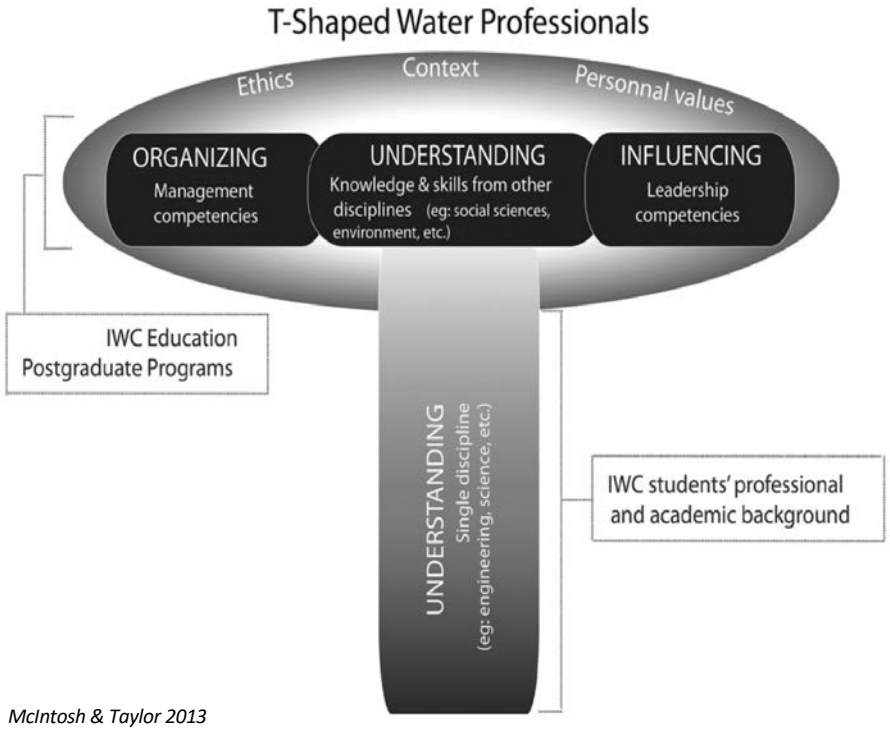
Fig. 2. Schematic sketch of the competency profiles of **(a)** T-shaped professionals, **(b)** generalists, and **(c)** I-shaped professionals (adapted from Oskam, 2009, modified).

Sources: McIntosh & Taylor 2013 + Uhlenbrook & de Jong 2012: https://www.hydrol-earth-syst-sci.net/16/3475/2012/

T-SHAPED LEARNING PROFILE?

Uhlenbrook & de Jong 2012:

It is not enough to be trained as a generalist, somebody who knows a little bit of everything. To tackle the global changes, a T-shaped competencies profile is required for the graduates of future (Fig. 1a). The vertical leg of the T stands for the solid knowledge in one discipline such as hydraulic engineering, hydrology, aquatic ecology, economics, (water) chemistry, microbiology, informatics, sanitary engineering, environmental policy and law, agronomy etc (mainly knowledge and cognitive competence, cf. Sect. 2). However, this is not enough for an effective professional. The horizontal bar of the T stands, on the one hand, for knowledge and cognitive competence outside the own discipline, on the other hand, for functional, personal and values/ethical competencies as introduced by Cheetham and Chivers (1996). A basic understanding of adjacent disciplines and other professional knowledge and skills in complementary fields such as general business, entrepreneurship and selected soft skills (e.g. project management, leadership, negotiation skills, people skills, right-brain skills, conflict resolution, networking skills) are needed (e.g. Mollinga, 2009; Oskam, 2009; Kaspersma et al., 2012). Having an appropriate mix of all these competencies (usually achieved through complementary team members) is necessary to tackle novel complex challenges, to analyze multiple components, to identify emerging properties, systems and patterns, and to synthesize the big picture.



McIntosh & Taylor 2013

Figure 2. Conceptual model of a T-shaped water professional (used with permission from the International WaterCentre).

Sources: McIntosh & Taylor 2013 + Uhlenbrook & de Jong 2012: https://www.hydrol-earth-syst-sci.net/16/3475/2012/

OUR RESEARCH ON WAT

We also carry own research on the competences required in our field + their link to our teaching

- *WAT Feedback Surveys*
- *WAT Teacher Surveys*
- *WAT Alumni Survey in 2017*
- *WAT Stakeholder Survey in 2019*

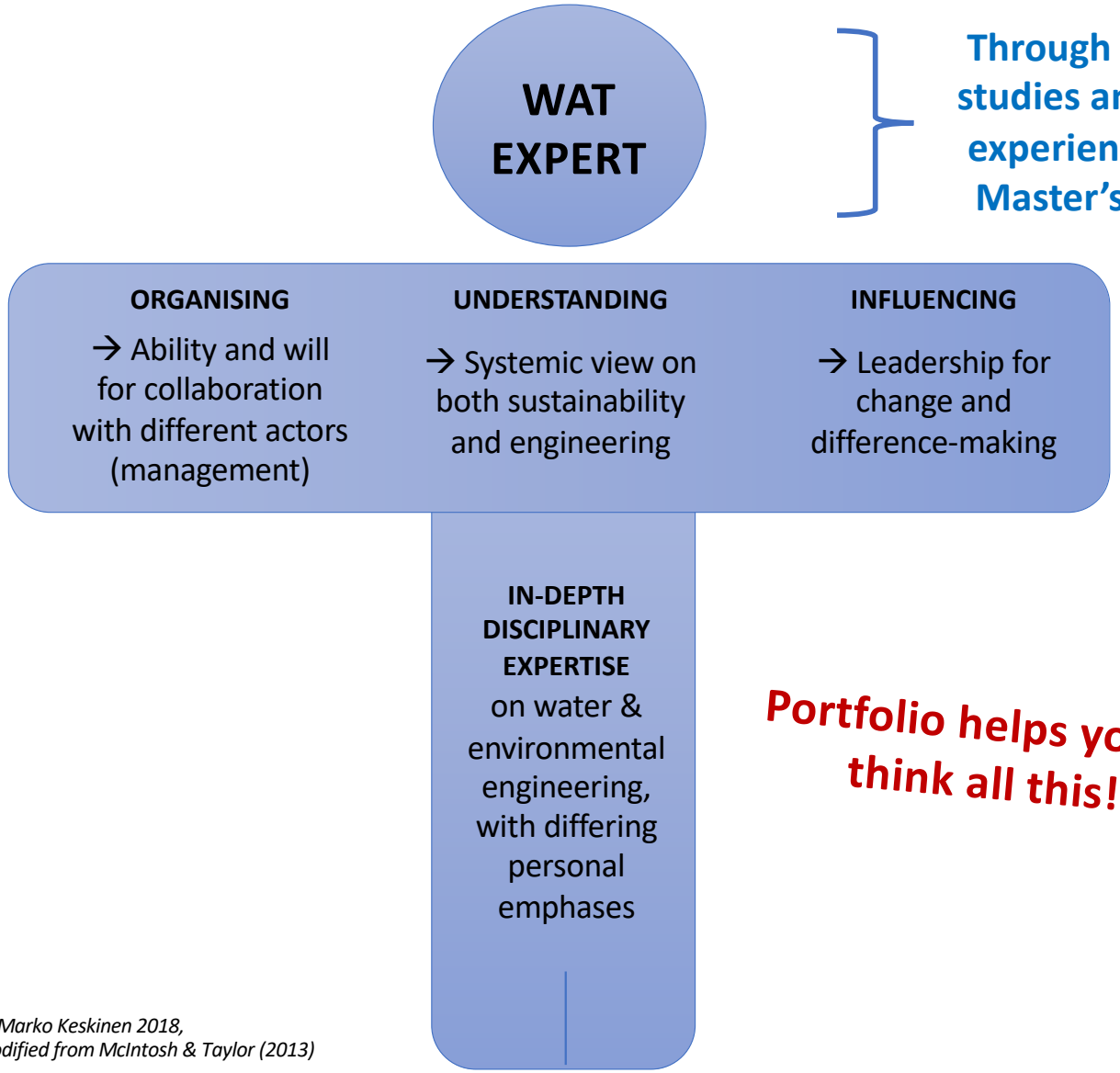
→ Stakeholder Survey Report:
http://urn.fi/URN:ISBN:978-952-60-3785-1

→ Anu Vehmaa's Master's Thesis:
https://aaltodoc.aalto.fi/handle/123456789/31604

→ Scientific articles:
https://www.mdpi.com/2071-1050/10/8/2605
https://lehti.yliopistopedagogiikka.fi/yliopistopedagogiikka-1-2019

Conclusion: T-shaped learning profile works!

WAT T-PROFILE?



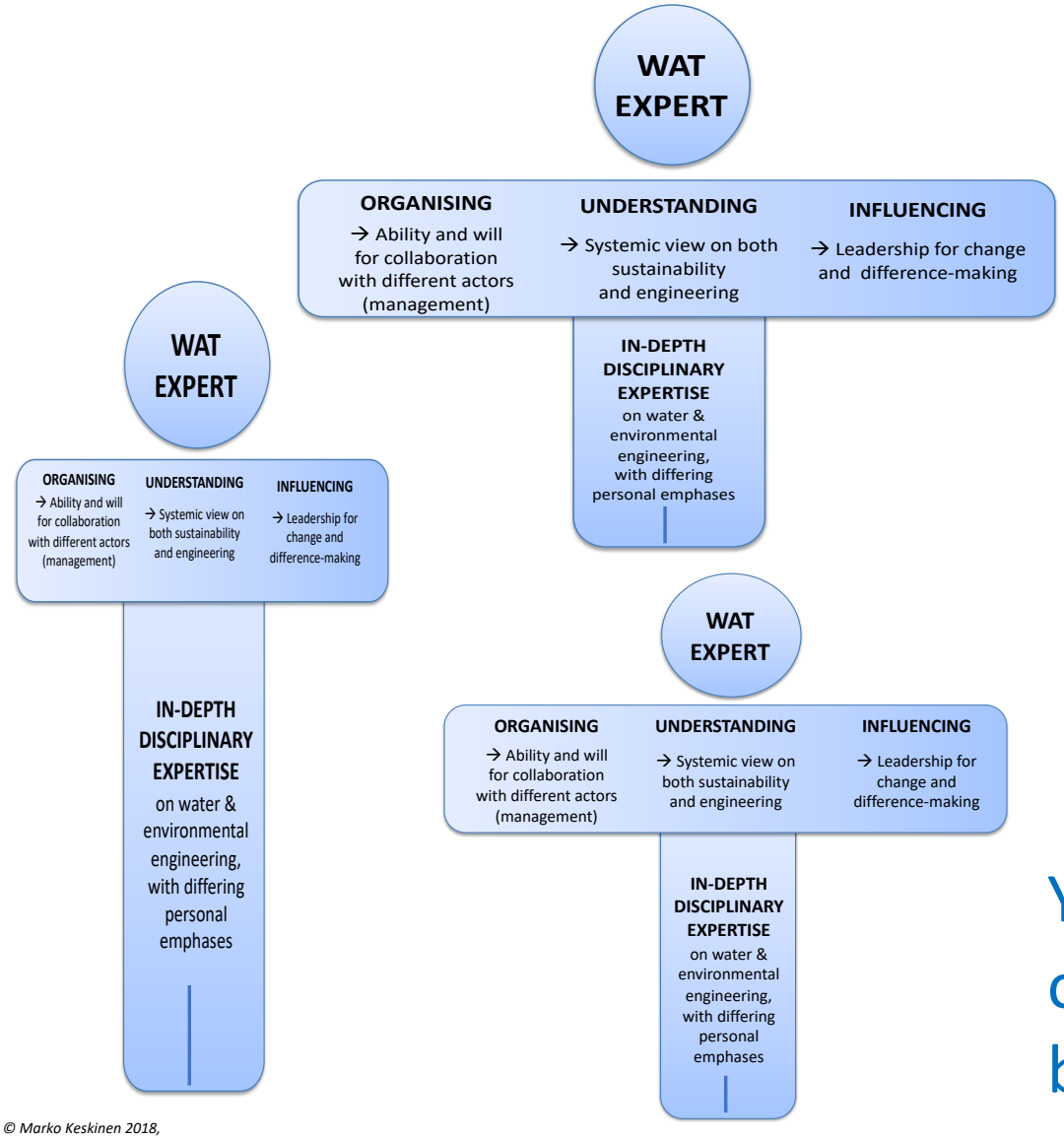
Through all your studies and other experience, incl. Master's Thesis

Through your WAT studies + other experience

Through your WAT major (common & advanced studies), possibly also elective studies

Portfolio helps you to think all this!

WAT T-PROFILE?



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modified from McIntosh & Taylor (2013)

You will all still be different: others will have longer legs, others longer arms – it is ok!

→ Main point: everyone should have both legs and arms…

Your Personal Learning Portfolio is one way to think what you want to become: make use of it!