

# **Sustainable Water Resources Management**

GEO4-6008

Period 1, 2023-2024

Master Water Science and Management

FACULTY OF GEOSCIENCES  
UTRECHT UNIVERSITY

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The set-up of the course revolves around problem-based learning and case studies, with a view to dissecting – identifying and understanding – the contemporary issues faced by water practitioners. The relevance of the course in professional practice entails a holistic appreciation of sustainability issues in water management, in both developing and developed economies. The course will also explore the targets, indicators, and progress of UN Sustainable Development Goal 6 on Clean Water and Sanitation. Course contents are delivered under three thematic blocks: Water Science, Water Management, and Water Sustainability.

**b) Changes to the course due to evaluation results from previous year**

This is the fifth year that the course is offered. On its first year, the course was offered exclusively to incoming students in Water Science and Management (WSM) master. Beginning on its second year, the course has been offered more broadly within GEO, albeit with remote learning options because of COVID-19. On its third year, in view of easing COVID-19 restrictions, the course reintroduced classroom-based activities such as Workshops and Presentations. On its fourth year, in response to recurring student feedback regarding ‘high workload’, the Report (written and presentation) was dropped. The same is the case this year including some changes in assessment activities. The evolution of assessment activities over the years is summarized below:

Assessment	Number/Type of assessment activities				
	2019-20	2020-21	2021-22	2022-23	2023-24
JiTTs (Just-in-Time-Teaching activities)	10	7	7	7	7
Workshops (Role Play, Case Study)	5	0	2	2	2
Written report	Individual	Group	Group	-	-
Presentation of report	Individual	Group	Group	-	-
Digital Exam	2	0	1	1	1
Modelling Exam	0	1	1	1	1

In response to reasonable feedback from the previous years’ course evaluations, the following changes will be made this year:

**b.1) JiTTs and Workshops**

Critical academic discussions regarding water sustainability issues will continue. These discussions take the form of JiTTs (Just-in-Time-Teaching activities) and Workshops. JiTTs will continue to be implemented via the FeedbackFruits platform, which is integrated on Blackboard. A refinement is made in 1 of 7 JiTTs in that students write a short narrative on the film ‘A World Without Water’; 6 of 7 JiTTs remain unchanged. The Workshops are also changed to cover a Role Play (Water Privatization) and a Case Study presentation (Transboundary Water Issues). Unlike in 2021-22, this year students will be given ample time to prepare for the first Workshop – *Role Play (Water Privatization)*, which takes place on Week 3 of the Period (see Annex 2).

**b.2) Modelling Exam**

Students from the previous years regarded the modelling component of the course generally positively. Unlike the previous year, 5 modelling exercises/tutorials (instead of 6) will be implemented this year: 2 of 5 are spreadsheet-based (MS Excel), 3 of 5 are via an interactive model-building computer environment (RIBASIM, or RIVER BASIN SIMulation by Deltares). One summative assessment in the form of a **proctored, on campus** Modelling Exam will be given (see Annex 2) that evaluates not only your

modelling skills (i.e., the degree to which you correctly implemented the exercises) but also your understanding of the concepts and their relationships with one another.

Unlike the previous year, this year's RIBASIM modelling tutorials will require you to implement the exercises before coming to classroom tutorials. The classroom tutorial times will be spent on (1) addressing any outstanding issues in the implementation of the exercises, and (2) answering water allocation (i.e., planning and management) questions related to the scheduled exercises.

### **Installing RIBASIM (River Basin Simulation)**

Go to the course environment on Blackboard→Course Content→Modelling→RIBASIM INSTALLATION for instructions on how to download and install the software.

Note that with these download instructions, you will not have to need any passwords and licenses [unlike the online, web-based alternative].

### **Important note on PC Requirement**

RIBASIM runs optimally on PC, not on Mac or Chromebook. If you intend to follow this course using a Mac, you will need to take extra steps to run Windows applications such as RIBASIM. There are two solutions as per advice of GEO-ICT:

- Either you purchase software Parallels – available from [www.surfspot.nl](http://www.surfspot.nl)
- Or make your Mac a “dual boot”-machine using Apple's Boot camp.

See <https://support.apple.com/boot-camp>

Otherwise, you will not be able to follow the course in as best a manner as you should expect. There may be an option to borrow a PC laptop from UU-ICT but this may be restricted to only one day. That is, you would have to return the PC laptop on the same day that you borrowed it. I would advise against this option because this means that you would have to install the program every single time. And, you would have to redo each modeling case every time as opposed to progressively building them.

*It is **not** the responsibility of the course coordinator, the program, the Faculty or UU to provide you with a laptop computer that works optimally with RIBASIM.*

### **b.3) Written reports and presentations**

The previous years involved case studies whereby students wrote in-depth reports and presented the salient points of their case studies in class. These activities will not be implemented this year. Rather, the same learning objectives will be achieved in the revised 'JiTTs and Workshops' (see b.1).

### **b.4) Excursion**

The previous years involved one excursion on Urban Water Management in Amsterdam. The same is the case this year. Details will be announced in class and on Blackboard.

### **c) Course aims**

- Identify the key components of the water cycle and their relevance for water resources sustainability
- Understand the concept of Sustainable Development, and how its overarching policy context steers contemporary water management
- Understand the relationship between Water Science and Water Management
- Acquire an overview of the main methodologies used in Sustainable Water Resources Management
- Gain insights on the labour market for graduates of Water Science and Management

### **d) Relationship with career development**

In this course you evaluate the integration of science, technology, culture, policy, ecology, and economics in complex water issues for large- and small-scale management of water systems. You study how water planning and management have been influenced

by cultural dynamics, economic systems, political organization, technological change, and scientific understanding. You critically analyze water project development and contend with differences in water policy, planning, and implementation in a variety of social and technological environments. You apply and evaluate modes of academic inquiry, creative expression, or results of research to problems in historical and contemporary global contexts. You articulate connections among local, national, and international contexts and evaluate the ways that historical and contemporary global influences affect their current situations. These activities will help you gain an appreciation of how local water issues are pertinent in a global sense, and how social/cultural, economic, political, environmental, and technological circumstances affect the implementation of water projects, both domestically and abroad. JiTTs and Workshops will facilitate the partial achievement of these goals. In addition, you learn how to build an integrated approach to water allocation scenarios by simulating water resource systems in an interactive and intuitive model-building environment. All these point to the complex relationships and **trade-offs** that are a characteristic of real-world, water-related problems in your future workplaces – government, non-government, for-profit, non-profit, and civic organizations.

**e) Programme and schedule**

The programme entails lectures, computer tutorials, an excursion, and workshops, in addition to JiTTs. The programme is presented in **Annex 2**.

**f) Study material**

The following reference is mandatory:

- J. Evaristo (2023): Course manual Sustainable Water Resources Management. Faculty of Geosciences, Utrecht University.
- Assigned readings will be made available on Blackboard as are the lists of assignments and other course information. There is no required textbook associated with the course, but considerable course content will make reference to the following, which can be downloaded for free:
  - D.P. Loucks and E. van Beek, Water Resource Systems Planning and Management: An Introduction to Methods, Models, and Applications Download the book here: <https://link.springer.com/book/10.1007/978-3-319-44234-1>

**g) Study load**

Study load in hours	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Total
Lectures	3	2		10	5	6	3				<b>29</b>
Excursions							4				<b>4</b>
JiTTs (Just-in-Time-Teaching activities)			2	4	2	2	2	2	2		<b>16</b>
Tutorial (computer modelling)		4	7			4					<b>15</b>
Workshops (Role Play, Case Study)			4				4				<b>8</b>
Digital Exam								3			<b>3</b>
Modelling Exam								4			<b>4</b>
Self-study	18	16	14	14	14	16	18	22			<b>132</b>
<b>Total study load</b>	<b>21</b>	<b>22</b>	<b>27</b>	<b>28</b>	<b>21</b>	<b>28</b>	<b>31</b>	<b>31</b>	<b>2</b>	<b>0</b>	<b>210</b>

## 4. TESTING AND ASSESSMENT

### a) Testing, deadlines and feedback

Students deliver the following products for grading. All deadlines are presented in the program (Annex 2).

#### a.1) Assignments (*aka* JiTTs)

The reading, audio, and video assignments are critical to learning in this class. These provide background material for productive discussions. Discussions of the complex issues we cover in this class enhance your learning as well as that of your classmates. Participation includes providing comments or a short narrative on the issues before class based on the assigned readings, audio, and video. This assessment activity meets learning goals 1-4 (see goals-assessment alignment matrix below).

All assigned readings, audio, and video (see Annex 2) are available electronically through the FeedbackFruits tool on Blackboard. Check your access to Blackboard and let me know immediately if you are having difficulties getting access to the assigned course readings/audio/video.

#### Quiz question

**6 of 7** JiTTs require you to **post a quiz question and its corresponding answer** on FeedbackFruits **no later than 11am Monday** of each week (see Annex 2). The opportunity to post a quiz question and its corresponding answer opens **Tuesdays 17:00h** and closes the following **Monday 11:00h**. You may read, listen, or watch the assigned materials in advance outside FeedbackFruits *but* interacting with the material (i.e., posting a quiz question) can only be made in FeedbackFruits within the time window in which the material is assigned. It is therefore crucial that you post your quiz question and corresponding answer within this time window. Failure to participate within the time that the FeedbackFruits window is open will automatically result in zero point for that assignment.

#### *What is a quiz question?*

Understanding a reading, audio, or video material evokes mental pictures that are pertinent to the topic at hand. Such mental pictures can take the form of a quiz (i.e., test of understanding) question. A quiz question can either be a knowledge question or an insightful question. A knowledge question is answerable by a piece, or pieces, of information that directly come from the assigned material. For example, the question, *According to Global Water Partnership (GWP 2000), what is the definition of integrated water resources management?* is a knowledge question if it is answerable by the following direct quote from the assigned material:

*IWRM is a process which promotes the coordinated development and management of water, land, and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.*

Conversely, an insightful question is not answerable by a piece, or pieces, of information that directly come from the assigned material, but rather by some thoughtful (i.e., insightful) response that may spark debate, highlight gaps in contemporary understanding, or elicit further thinking. For example, the question, *What is the utility in distinguishing Integrated Water Resources Management from Sustainable Water Resources Management?* is an insightful question because while the question may have been inspired by the assigned material, its answer can vary from one spatial context to another; perhaps, even from one person to the next.

Each quiz-question JiTT counts for 2% of the course grade. That is, all 6 quiz-question JiTTs count for 12% of the course grade.

### Short narrative

**1 of 7** JiTTs – *JiTT2 Video: A World Without Water* – requires you to write a short narrative, central argument, or thoughts on the film. Your answer to this JiTT cannot exceed 75 words. This JiTT counts for 8% of the course grade.

*Assignments (all 7 JiTTs) count for 20% of the course grade.*

### a.2) Modelling Exam

Sustainable water resources planning and management involve impact prediction, which in turn can be aided by conceptual and computer-based mathematical models. This course will introduce you to the following simple, fully guided computer-based exercises:

- measuring flow in a channel (MS Excel based)
- flow duration analysis (MS Excel based)
- water allocation simulation (RIBASIM, RIVER BASIN SIMULATION)

RIBASIM is a model package, developed and supported by Deltares, for basin-scale water allocation problems. You build simple, fully guided water allocation scenarios that are distributed over 3 modelling exercises (tutorials). Full step-by-step documentation, and accompanying video tutorials, will be provided.

One summative assessment (i.e., Modelling Exam) will be given (see [Annex 2](#)) that evaluates your modelling skills (i.e., the degree to which you correctly implemented the exercises) and your understanding of the concepts and their relationships with one another. This assessment activity meets learning goals 1 and 4 (see goals-assessment alignment matrix below).

*The Modelling Exam counts for 30% of the course grade.*

### a.3) Digital (Theory) Exam

The digital exam will cover parts of the lectures from 12 September through to 20 October.

*The Digital Exam counts for 30% of the course grade.*

### a.4) Workshops: Role Play and Case Study

To generate effective critical thinking into some of the pressing contemporary issues in water science and management, you will actively participate in two classroom workshops (see Annex 2):

- (1) Role Play on Water Privatization: Denizli, Turkey
- (2) Case Study on Central Asia's Transboundary Water Issues

The mechanics, rubrics, group/role assignments and other details will be announced on Blackboard.

*Workshops count for 20% of the course grade, divided equally between Role Play and Case Study.*

### a.5) Excursion

Nominal 'bonus points' (to be determined by the Instructor) will be given for attending the excursion.

The goals-assessment alignment matrix below presents where the different learning objectives are assessed.



<b>Learning objectives</b>	Excursion  'bonus points'	Assignments (JiTTs)  20%	Workshops  20%	Digital (Theory) Exam  30%	Modeling Exam  30%
1. Identify the key components of the water cycle and their relevance for water resources sustainability		x	x	x	x
2. Understand the concept of Sustainable Development, and how its overarching policy context steers contemporary water management		x	x	x	
3. Understand the fundamentals of Water Science and Water Management, as well as the relations and differences between them		x		x	
4. Acquire an overview of the main methodologies used in Sustainable Water Resources Management	x	x		x	x
5. Gain insights on the labour market for graduates of Water Science and Management	x				

### **b) Rules during an examination**

It is of the utmost importance that you can identify yourself during the exam. This means bringing and showing your **ID card with photo**. If you cannot show this, you may be excluded from the exam. Some additional rules during an exam:

- You may not leave the room during the first 30 minutes of the exam.
- Latecomers will be admitted only until 30 minutes after the start of the exam.
- All electronic equipment needs to be switched off (including phones and smartwatches!), except for equipment which the examiner has allowed.
- Put coats and bags on the floor. Bags need to be closed.
- If you need to use the toilet, inform an invigilator. Someone will escort you there.
- Raise your hand if you have questions, if anything is unclear, or if you need extra paper etc.

You can find further instructions on the examination paper. Always follow these rules.

### **c) Assessment**

When all requirements of the course have been met, the final course grade is calculated as the sum of:

Assignments (JiTTs)	20% - no minimum grade
Modelling Exam	30% - no minimum grade
Digital (Theory) Exam	30% - no minimum grade
Workshops	20% - no minimum grade

Final course grade: The final course grade will be satisfactory (pass) or unsatisfactory (fail) and will be expressed in numbers of 6 or higher and 5 or lower, respectively. The final grade will be rounded off to one decimal place (e.g., 7.4 or 8.7). A final course grade of 5 does not have any decimal places; an average grade of 4.50-5.49 is unsatisfactory, an average grade of 5.50-5.99 becomes a 6.0.

If you have fulfilled all course obligations but failed to obtain a final grade of 6 or higher, you will be given one chance to repair, via a supplementary test (“aanvullende toets”). If the supplementary test has been passed, the final grade of the course will be 6.0.

According to the Teaching and Education Regulations, you also have the right to a supplementary test if you have not fulfilled the minimum grade (5.50) of no more than 1 partial test, even though your final non-rounded grade is 5.50 or higher. If that supplementary test has been passed, it will count as a 5.50 when calculating your new final grade.

This course does not have a minimum grade requirement for a partial test.

A non-rounded-off final grade <4.00 implies a definite fail, i.e. in such cases there is no right to a supplementary test nor to a supplementary partial test.

The character and content of the supplementary (partial) test will be decided upon by the course coordinator.

The table below indicates the cases resulting in a supplementary (partial) test for this course.

Assignments (20%)	Modelling Exam (30%)	Digital (Theory) Exam (30%)	Workshops (20%)	Overall course grade (not rounded off)	Resit
<i>no minimum grade</i>	<i>no minimum grade</i>	<i>no minimum grade</i>	<i>no minimum grade</i>	$\geq 4.00$ and $< 5.50$	REPAIR written exam

Attachment 1 shows the scheme regarding supplementary testing.

Note that a replacement test (“vervangende toets”) is only applicable in demonstrable circumstances beyond your control (such as serious illness). There is only one opportunity to sit a replacement test. If you are not present at the replacement test, or fail to meet the terms of the replacement test in good time, you will not be offered another opportunity. In case of dispute, reference is made to the Teaching and Examination Regulations (OER) of the degree programme and the Regulations of the Board of Examiners.

#### **d) Attendance and effort requirements**

This part of the course manual describes which attendance and effort requirements are applicable. It also includes *how often* students may be absent and what consequences are applicable if they are absent more often than permitted. Effort requirements are also indicated; these may consist of obligatory attendance for certain course meetings. Exceptions to mandatory attendance may only be made if students can prove that their absence is due to reasons beyond their control (e.g. special circumstances due to illness or family circumstances). If in doubt or in case of extensive absence, you can refer the student to the study advisor.

If you cannot attend a mandatory exam due to serious illness or other reasons beyond your control, mandatory attendance will not apply. You must be able to prove that the reason for absence was beyond your control, if the course coordinator asks you to do this. Ultimately, the course coordinator will decide and approve this.

Absence must be announced via the webform: (<https://fd21.formdesk.com/universiteitutrecht-geo/AbsenceForm>) which can be found on the students’ website or via the link on the Blackboard community of your programme.

Absence or illness does not relieve you of your obligation to perform to the best of your ability. In other words, if you have not been able to complete a paper or give a presentation, contact the course coordinator to find out whether it may be rescheduled to another date.

If the quality or quantity of your attendance has been insufficient, the course coordinator may decide that you no longer have the right to sit a supplementary test ('repair exam'), and/or impose other sanctions.

#### Group work

There is an effort requirement for group work (i.e., Workshops). Insufficient contribution to the group work (or 'free-riding') can result in a lower grade than that of your groupmates. Making no contribution to the group work at all can result in a grade of zero for the activity in question. In case a group member does not contribute sufficiently or does not contribute at all, it is the responsibility of the group members to address this within the group **and** to inform the course coordinator using the Individual Reflection Form (more on this in the workshop Mechanics). Whether a student has sufficiently contributed will be decided ultimately by the course coordinator.

#### **e) Studying with disabilities, physical and/or mental impairment**

The Copernicus Institute of Sustainable Development tries to meet the needs of students with a disability, physical and/or mental impairment as much as possible by offering facilities for their studies. However, students play an active part in this as well. Only students who have a contract with the department are eligible for facilities and special regulations. Students with a contract will be registered in OSIRIS. The lecturer will see which students have special facilities (and what kind of facility) when they receive the attendance list of their course. If you think you are entitled to a facility which is not yet mentioned in OSIRIS, please contact the study advisor. Do this well in time, well before the first test takes place.

## **5. FRAUD AND PLAGIARISM**

You are always expected to hand in your own authentic work. Discussion with others can be enriching but the final product always has to be your own. All scientific research, including that of students, builds on the results of the work of other researchers, either in a positive or in a negative sense. Those other researchers deserve the credits for their work, in the form of a correct acknowledgement.

In short, quoting is allowed (and even necessary), but copying other researchers' work (including that of AI software such as ChatGPT) and presenting it as if it were one's own is plagiarism: unacceptable behaviour in the world of science. Lecturers have software to check texts for plagiarism and they will apply this software. Students who plagiarise run tremendous risks: in the worst-case scenario they will be expelled from the programme for a year. More details about the sanctions involved in plagiarizing can be found in the Teaching and Examination Regulations of the programme:

<http://students.uu.nl/en/practical-information/academic-policies-and-procedures/regulations>

More information about fraud and plagiarism can be found here:

<http://students.uu.nl/en/practical-information/academic-policies-and-procedures/fraud-and-plagiarism>.

On the website <https://www.wix.com/wordsmatter/blog/2020/02/ways-to-avoid-plagiarism/> you can find tips on how to avoid plagiarism.

Fraud and plagiarism are defined as an action or failure to act on the part of a student, as a result of which a correct assessment of his knowledge, understanding and skills is made impossible, in full or in part.

Fraud includes:

- cheating during tests. The person offering the opportunity to cheat is an accessory to fraud;
- share answers with others while taking a test;
- seeking the help of third parties during a test;
- having within reach tools and resources during tests, such as a pre-programmed calculator, mobile phone, smartwatch, smart glasses, books, course readers, notes, etc., unless consultation is explicitly permitted;
- having others carry out all or part of an assignment and passing this off as own work;
- gaining access to questions, assignments or answers of a test prior to the date or time that the test takes place;
- perform (or try to perform) technical changes that undermine the online testing system;
- fabricating survey or interview answers or research data.

Plagiarism is defined as including data or sections of text from others/own work in a thesis or other paper without quoting the source. Plagiarism includes the following:

- cutting and pasting text from digital sources such as encyclopedias and digital magazines without using quotation marks and referring to the source;
- cutting and pasting text from the internet without using quotation marks and referring to the source;
- using excerpts from texts of printed material such as books, magazines and encyclopedias without using quotation marks and referring to the source;
- using a translation of the abovementioned texts without using quotation marks and referring to the source;
- paraphrasing of the abovementioned texts without clearly referring to the source: paraphrasing must be marked as such (by explicitly linking the text with the original author, either in text or a footnote), so that the impression is not created that the ideas expressed are those of the student;
- using visual, audio or test material from others without referring to the source and presenting this as own work;
- resubmission of the student's own earlier work without referring to the source, and allowing this to pass for work originally produced for the purpose of the course, unless this is expressly permitted in the course or by the lecturer;
- using the work of other students and passing this off as own work. If this happens with the permission of the other student, the latter is also guilty of plagiarism;
- in the event that, in a joint paper, one of the authors commits plagiarism, the other authors are also guilty of plagiarism, if they could or should have known that the other was committing plagiarism;
- submitting papers obtained from a commercial institution (such as an internet site offering excerpts or papers) or having such written by someone else whether or not in return for payment.<sup>1</sup>

### **Fraud and plagiarism in groupwork**

In case of group work, the group as a whole is responsible for the work that is handed in. If one of the group members commits fraud or plagiarism, the work cannot be assessed and the whole group will be called in front of the Board of Examiners. If the Board of Examiners determines that fraud or plagiarism has been committed, an appropriate sanction will be determined for each group member separately and the work will be declared invalid. If group members not guilty of the fraud or plagiarism want to receive a grade, the product will have to be re-written in such a way that a plagiarism-free work

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<sup>1</sup> Education and Examination Regulations 2023-2024 Faculty of Geosciences, Utrecht University, 2 May 2023

can be assessed. Make sure you are aware of your team members' work. Check each other's work and call attention to someone's work if necessary. Naturally, you can also inform the course coordinator or another lecturer in the course.

## **6. QUALITY ASSURANCE: COURSE EVALUATIONS AND COURSE FEEDBACK GROUP**

### **a) Course evaluation**

Each course is evaluated afterwards by the students. The lecturer proposes measures for improvement based on the evaluation results. It is important to fill in the evaluation questionnaire seriously because the evaluation results and lecturer's recommendations are discussed in the education committee and the management team. The evaluation results will be published in the Blackboard community 'Course evaluations Geosciences'. If you cannot log on to that community, and you would like to know the results, you can ask the lecturer for a copy of the evaluation results.

### **b) Course feedback group**

A course feedback group (CFG) consists of a group of students in a course and serves as a point of contact for fellow students and the lecturer during the course. Its purpose is to find out during the course what is appreciated, what is going well and what practical issues can be improved. Please remember that this does not concern aspects which have already been determined, such as the choice of literature, set-up of tutorials or class times. Course feedback groups are about fine-tuning, for example, are the slides readable, can everyone hear the lecturer, and has information been put on Blackboard on time. *The CFG should not be confused with the regular end-of-course evaluation.*

Examples of questions for discussion:

- What is going well in the course? What do you like about the course?
- How can the quality of the lectures/tutorials be improved further?
- How can the organisation of the lectures/tutorials be improved further?
- How can the quality of the slides and/or the information on Blackboard be improved further?
- Does the lecturer explain the literature well enough? Both content and presentation.
- Is it possible to communicate with the lecturer outside class hours?
- Any other issues you may have.

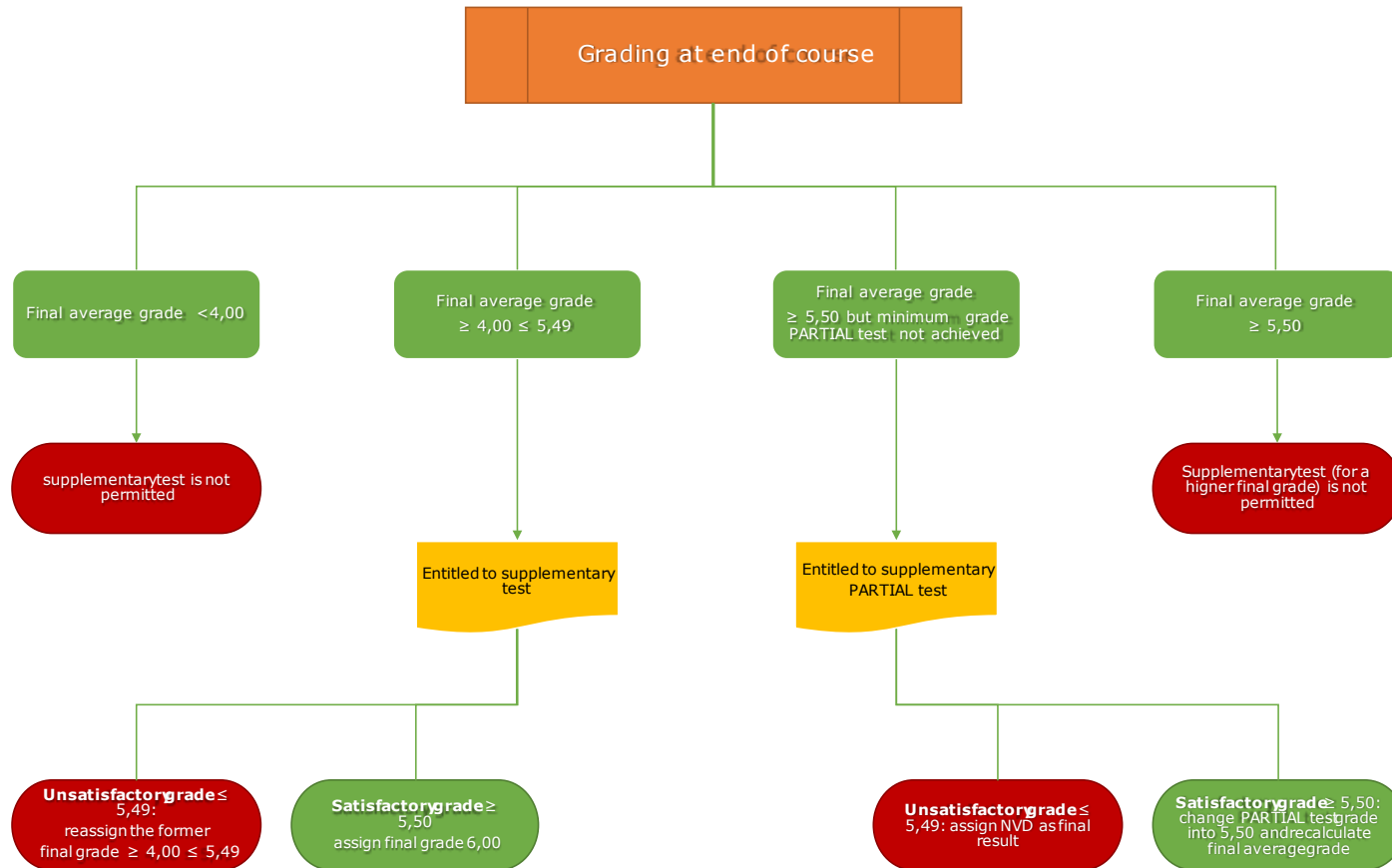
Such a group consists of 4-5 students per course who discuss with the lecturer during the break how the course is going. The names of the students in the course feedback group of this course will be posted on Blackboard.

The course feedback group and the lecturer will meet on the following days and times to discuss the course:

21 September 2023, 12.45-13.00  
09 October 2023, 17.00-17.15  
19 October 2023, 12.45-13.00

## Annex 1: Determining supplementary testing

### (Supplementary) tests inscheme



## Annex 2: Program course Sustainable Water Resources Management

Date	Time		Instruction	Location	In-charge	Class Plan	Resources and remarks	Assignment
04-Sep	-	-	-	-		Introduction Week		
05-Sep	-	-	-	-		Introduction Week		
07-Sep	9.30	12.00	Lecture	RUPPERT - C	Evaristo	Course intro (Outline, Syllabus)	Course Manual; Hydrology video clips	
11-Sep	13.15	15.00	Lecture	RUPPERT - B	Evaristo	Hydro processes recap; River Basin Modelling; Planning and Management Approaches/Characteristics	Hydrology video clips; Install RIBASIM software	
12-Sep	13.15	17.00	Tutorial	RUPPERT - 033	Evaristo	Flow measurement and FDC exercises	Hydrology video clips	
14-Sep	-	-	No class	-	-	Groups prepare for 19/9 Role Play	See Role Play Mechanics and Rubric	
18-Sep	13.15	17.00	Tutorial	RUPPERT - B	Evaristo	RIBASIM 1	RIBASIM video clips and Guide Questions	WWDR2022_ExecSum
19-Sep	13.15	17.00	Workshop	RUPPERT - 033	Evaristo / Toth	[Role Play] Water Privatization (Denizli, Turkey)	See Role Play Mechanics and Rubric	
21-Sep	9.30	12.45	Tutorial*	BBG - 205	Evaristo	RIBASIM 2	RIBASIM video clips and Guide Questions	
25-Sep	13.15	16.00	Lecture	RUPPERT - B	Toth	Groundwater Use and Its Challenges	Assorted (see Blackboard)	A World Without Water
26-Sep	13.15	17.00	Lecture	RUPPERT - 033	Swart	Water Economics	Assorted (see Blackboard)	
28-Sep	9.30	12.45	Lecture	RUPPERT - C	van Leeuwen	City Blueprint Approach (method); Results CBA; NBF; ERMF	Assorted (see Blackboard)	
02-Oct	13.15	16.30	Lecture	RUPPERT - B	van Wielink / Verwij	Urban Water Management (Waternet Amsterdam)	Assorted (see Blackboard)	Koop & van Leeuwen (2015)
03-Oct	13.15	15.00	Lecture	RUPPERT - C	Evaristo	Transboundary issues; IWRM and Adaptive Management	Assorted (see Blackboard)	
05-Oct	-	-	No class	-	-	Students work on RIBASIM on their own	RIBASIM video clips and Guide Questions	
09-Oct	13.15	17.00	Tutorial*	RUPPERT - B	Evaristo	RIBASIM 3 (wrap-up)	RIBASIM video clips and Guide Questions	Schuerhoff and Hellegers (2015)

Date	Time	Instruction	Location	In-charge	Class Plan	Resources and remarks	Assignment	
10-Oct	13.15	16.00	Lecture	RUPPERT - 116	Toth	Managed Aquifer Recharge	-	
12-Oct	9.30	12.45	Lecture	RUPPERT - B	Pokharel	Water Pollution: Analysis and Policy	Assorted (see Blackboard)	
16-Oct	13.00	17.30	Excursion	Amsterdam	Evaristo / Toth	Amsterdam excursion (Waternet)	Assorted (see Blackboard)	Sadoff et al. (2017) WorldBankCh3
17-Oct	13.15	17.00	Workshop	RUPPERT - 033	Evaristo / Toth	[Case Study] Central Asia's Transboundary Issues	See Case Study Mechanics and Rubric	
19-Oct	9.30	12.45	Lecture	RUPPERT - B	Evaristo	Water Security and SDG 6	Assorted (see Blackboard)	
23-Oct			No class		-	Study day for exams week	-	Zhupankan2017
24-Oct	13.30	16.30	Exam	EDUC - BETA	Evaristo	DIGITAL EXAM	-	
26-Oct	9.00	12.45	Exam	MEINESZA - 1.12, 1.14 GIS	Evaristo / Toth	MODELING EXAM (RIBASIM)	-	
30-Oct				-				Audio:KWR Podcast

Labour market orientation (Learning Objective 5) activity

\*CFG meetings