

MV0216. Soil Water Processes in Agro-ecosystems, 15 hp

Preliminary schedule, autumn 2020

Course modules: 1-theory (5 hp), 2-modelling exercises (5 hp), 3-mini-projects (5 hp)

Course components

Chapters refer to the course Book *Introduction to Environmental Soil Physics, Daniel Hillel*

1-Theory

- **Course intro** (2h)
- **Lecture 1:** What is soil? Why we care? (2h)
- **Lecture 2:** Soil constituents and phase relations & Water potentials (2h)
- **Lecture 3:** Water Flow part I (2h)
- **Lecture 4:** Water Flow part II (2h)
- **Lecture 5:** Water Flow part III (2h)
- **Lecture 6:** Introduction to simulation models (2h)
- **Lecture 7:** Water/energy balances and potential evapotranspiration (1h)
- **Lecture 8:** Plant water uptake and plant response to drought (2h)
- **Lecture 9:** Solute transport I (2h)
- **Lecture 10:** Solute transport II (2h)
- **In-class calculation** examples with water potentials, phase relations and water contents (4h)
- **7 online Quizzes** (Home work)
- **Mini-workshop** 'Agroecosystems and climate change' (3d):
 - Student homework (2d)
 - Introduction (1h)
 - keynotes (2-4h)
 - Student presentations (2h)
- **Research presentations** by teachers (3h)
- **Exam preparation** (2h)
- **Written Exam** (3h)

2-modelling exercises

- **STELLA intro** (2h)
- **Stella exercise 1:** Capillary rise (5h)
- **Stella exercise 2:** Steady infiltration (3h)
- **Stella exercise 3:** Plant water uptake (7h)
- **Stella exercise 4:** Water balance of a soil profile (6h)
- **Stella exercise 5:** Solute transport I: breakthrough curves (in the laboratory) (6h)
- **Stella exercise 6:** Solute transport II: Transient leaching under field conditions (6h)
- **EXCEL Exercise:** uncertainty and sensitivity analysis (5h)

3-STELLA mini-projects

- **Introduction** (2h)
- **Group work** (8d)
- **Oral Presentation & Opposition** (5h)

Projects:

1. Pesticide leaching to groundwater: comparison with experimental data
2. Irrigation management in the salt-affected soils of the Marismas (SW Spain)
3. Using Salix as a biofilter for trace metals
4. Climate change impacts on pesticide leaching
5. Rain water harvesting

Days with compulsory attendance are marked with *; i.e. you have to be there to pass the course!
We apply the academic quarter; i.e. all lectures & exercises starts a quarter past

Week	Day	Date	Time	Room	Subject	Teachers	
36	Monday	31-Aug	All day		General welcome for all Master students Roll call Master program 'Soil and Environment'		
	Tuesday	1-Sept*	10-12*	U	Introduction to the course	EC, NJ	
		1-Sept	13-14	U	Lecture 1: What is soil? Why we care?	EC	
		1-Sept	14-16	U	Lecture 2: Phase relations & Water potentials (Chaps. 1-6)	NJ	
	Wednesday	2-Sept	9-11	U	Lecture 3: Soil water flow Part 1 (Chaps. 6-8)	NJ	
	Thursday	3-Sept*	9-14*	U	Exercises: In-class calculation examples with water potentials, phase relations and water contents	NJ,	
	Friday	4-Sept	Home study				
37	Monday	7-Sept	9-11	U	Lecture 4: Soil water flow Part 2 (Chap.8)	NJ	
		7-Sept	Home study				
	Tuesday	8-Sept	9-11	U	Lecture 5: Soil water flow Part 3 (Chap.8, 14-15,17)	NJ	
		8-Sept	Home study ** Complete Quiz1 on water potentials and water flows**				
	Wednesday	9-Sept	09-11	U	Lecture 6: Introduction to simulation models	NJ	
	Thursday	10-Sept*	09-11* 11-17*	mD2, mD3 (mvm)	Introduction to Stella modelling software Stella ex. 1: Capillary rise (Chaps. 8, 18)	NJ, KM NJ, JF	
	Friday	11-Sept*	09-12*	D1 (mvm)	Stella ex. 2: Steady infiltration (Chaps. 8, 14)	NJ, FK	
		11-Sept	Home study				
38	Monday	14-Sept	Home study **Complete STELLA quiz 1**				
	Tuesday	15-Sept	9-10	U	Lecture 7: Potential evapotranspiration Water/energy balances and (Chap. 20)	NJ	
		15-Sept	10-12	U	Lecture 8: Plant water uptake and plant response to drought (Chaps. 19- 21)	NJ	
		15-Sept	Home study				
	Wednesday	16-Sept	Home study ** Complete Quiz2 on PET & water and energy balance**				
	Thursday	17-Sept*	09-17*	mD1 (mvm)	Stella ex. 3: Plant water uptake (Chap. 19)	NJ, KM	
	Friday	18-Sept	Home study ** Complete STELLA quiz 2**				

Week	Day	Date	Time	Room	Subject	Teachers	
39	Monday	21-Sept*	9-16*	mD1 (mvm)	Stella ex. 4: Water balance of a soil profile (Chaps. 8, 19-20)	NJ, KM	
	Tuesday	22-Sept	Home study ** Complete STELLA quiz 3**				
	Wednesday	23-Sept	9-11	U	Lecture 9: Solute transport I (Chap.9)	NJ	
	Thursday	24-Sept	9-11	U	Lecture 10: Solute transport II (Chap.9)	NJ	
		24-Sept	Home study ** Complete Quiz3 on solute transport**				
	Friday	25-Sept*	9-16*	bd1, bd2 (library)	Stella ex. 5: Solute transport I (Chap.9)	NJ, JF	
40	Monday	28-Sept	10-12	U	Invited lecture: water management and sustainable agriculture	JB	
	Monday	28-Sept*	13-15*	U	Introduction Mini-workshop on agroecosystems and climate change / keynote(s)	EC / AV	
	Tuesday	29-Sept*	9-16*	Hugin, Munin	Stella ex. 6: Solute transport II (Chap.9)	NJ, JF	
	Wednesday	30-Sept	Home study ** Complete STELLA quiz 4**				
	Thursday	1-Oct	9-15*	D1 (mvm)	Exercise: uncertainty and sensitivity analysis	NJ	
	Friday	2-Oct	**Mini-workshop 1- Preparation individual: scientific publication reading **				
41	Monday	5-Oct*	09-12	**Mini-workshop 1- Preparation individual: scientific publication reading **Submit individual report at 12.0			
			13-17*	**Mini-workshop 2- group discussion and preparation of oral presentation**			
	Tuesday	6-Oct*	09-12*	**Mini-workshop 2- group discussion and preparation of oral presentation**			
	Tuesday		13-15*	U	Mini-workshop 3-Group presentations and discussion	AV, EC	
	Wednesday	7-Oct	09-12	U	Teachers presentations on current research	All (AV)	
	Thursday	8-Oct*	10-12*	U	Introduction to mini-projects and contact with supervisors	NJ, KM, OA, ML, JK	
	Thursday	8-Oct*	Mini-projects start				
	Friday	9-Oct*	Mini-projects, continued				
42	Monday	12-Oct*			“ “		
	Tuesday	13-Oct*			“ “		
	Wednesday	14-Oct*			“ “		
	Thursday	15-Oct*			“ “		
	Friday	16-Oct*			“ “		
43	Monday	19-Oct*			“ “		
	Tuesday	20-Oct*	Final version of Mini-project report to supervisors at 15.00				
	Wednesday	21-Oct*	**Group Preparation – presentation and opposition Mini-project**				
	Thursday	22-Oct*	**Group Preparation – presentation and opposition Mini-project**				
	Friday	23-Oct	09-15*	U	Presentation of Mini-projects and opposition	NJ, KM, OA, ML, JK	
44	Monday	26-Oct	Home study				
	Tuesday	27-Oct	Home study				
	Wednesday	28-Oct	09-11	U	Questions to teachers before Exam	NJ	
	Thursday	29-Oct	Home study				
	Friday	30-Oct*	09-12*	??	Written Examination		

MV0216, autumn 2020: student assignments (A)

Week	Day	Date	Time	A	Subject	How?
36	Wednesday	2-sept	-	1	Introduce yourself to the classroom	CANVAS
	Thursday	3-sept	09-14	2	Calculation exercises	Attend
37	Tuesday	8-sept	-	3	Complete Lecture - Quiz 1	CANVAS
	Thursday	10-sept	09-11	4	Introduction to STELLA software	Attend ➤ Upload your Lokta-Volterra model
	Thursday	10-sept	11-17	5	STELLA exercise 1	Attend ➤ Upload your capillary rise model
	Friday	11-sept	09-12	6	STELLA exercise 2	Attend ➤ Upload your infiltration model
38	Monday	14-sept	-	7	Complete STELLA - Quiz 1	CANVAS
	Wednesday	16-sept	-	8	Complete Lecture - Quiz 1	CANVAS
	Thursday	17-sept	09-17	9	STELLA exercise 3	Attend ➤ Upload your water uptake model
	Friday	18-sept	-	10	Complete STELLA - Quiz 2	CANVAS
39	Monday	21-sept	09-16	11	STELLA exercise 4	Attend ➤ Upload your water balance model
	Tuesday	22-sept	-	12	Complete STELLA - Quiz 3	CANVAS
	Thursday	24-sept	-	13	Complete Lecture - Quiz 3	CANVAS
	Friday	25-sept	09-16	14	STELLA exercise 5	Attend ➤ Upload your modelled curves below
41	Monday	28-sept	09-10	15	Intro to Mini-workshop	Attend
	Tuesday	29-sept	09-16	16	STELLA exercise 6	Attend ➤ Upload your transient leaching model below
	Wednesday	30-sept	-	17	Complete STELLA - Quiz 4	CANVAS
	Thursday	1-oct	09-17	18	Model sensitivity analysis	Attend
42	Monday	5-oct	12	19	Individual Report Mini-workshop	CANVAS
	Tuesday	6-oct	13-15	20	Group presentation & discussion Mini-workshop	Attend
	Thursday	8-oct	10-12	21	Mini-projects introduction	Attend
44	Tuesday	20-oct	15	22	Submit mini-project report (group)	CANVAS
	Friday	23-oct	9-15	23	Group presentation & opposition Mini-project	Attend
45	Friday	30-oct	9-12	24	Final written examination	Attend

MV0216, autumn 2020

Course starts: Monday 31st of August 2020 at 10.00

Course ends: Friday 30st of October 2020 at 17.00

The course has **one written examination**; it will take place on

Friday the 30th of October 2020 (9-12) in XXXXX

- The **first re-examination** is planned on **Wednesday 25th of November 2020** afternoon (more info to come about time and room)
- The **second re-examination** is planned on **xxxx 2021** (more info to come about time and room)

All participants in an examination organized by the Department of Soil and Environment should register at least 10 days before the date of the exam. The registration to the examination is possible from the start of the course and the registration to a re-examination is possible from four weeks before the examination date.

Registration should be done via Studentwebb / LADOK student. If you have any question or request about this registration, please contact the course secretariat mark-kurssektariat@slu.se

Teachers and guest lecturers

Department of Soil and Environment, SLU, Uppsala

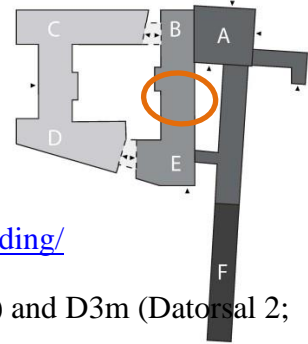
- **Nicholas Jarvis** (Examiner, NJ): Nicholas.jarvis@slu.se (Soil and Environmental Physics, head)
- **Elsa Coucheney** (Course leader, EC): elsa.coucheney@slu.se (Soil and Environmental Physics)
- **Katharina Meurer** (KM): katharina.meurer@slu.se (Soil and Environmental Physics & Soil Mechanics and Soil Management)
- **Jumpei Fukumasu** (JF): jumpei.fukumasu@slu.se (Soil and Environmental Physics)
- **Ana Villa Solis** (AV): ana.villa@slu.se (Soil and Environmental Physics)
- **Omran Alshihabi** (OA): omran.alshihabi@slu.se (Precision Agriculture)
- **Johannes Koestel** (JK): john.koestel@slu.se (Soil and Environmental Physics)
- **Mats Larsbo** (ML): mats.larsbo@slu.se (Soil and Environmental Physics & Soil Mechanics and Soil Management)
- **Jennie Barron** (JB): jennie.barron@slu.se (Agricultural Water Management, head)
- **Elisabet Lewan** (LL): Lisbet.lewan@slu.se (Soil and Environmental Physics)

Room finder

❖ Ulls-Hus:

<https://internt.slu.se/en/support-services/campus-and-buildings/ulls-hus/>

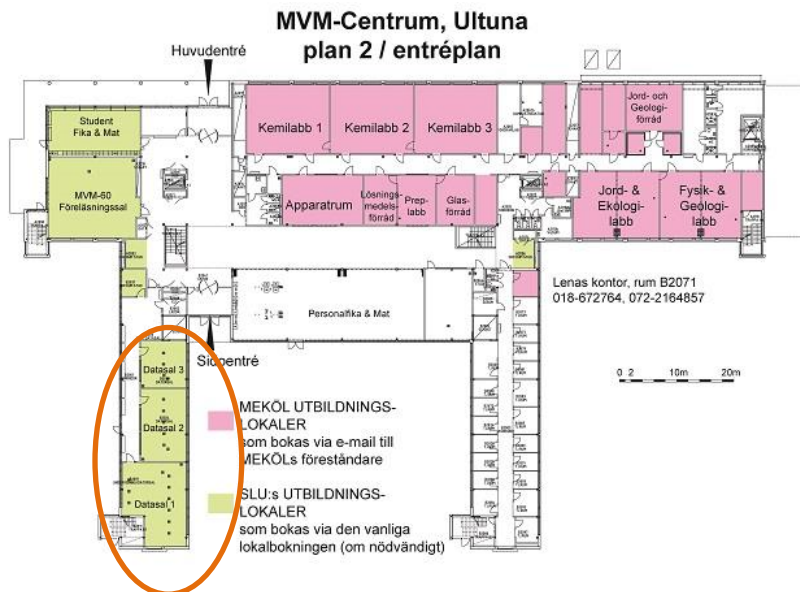
- Room U in part B of level 2 (Entrance level)



❖ MVM-huset:

<https://internt.slu.se/en/support-services/campus-and-buildings/mvm-building/>

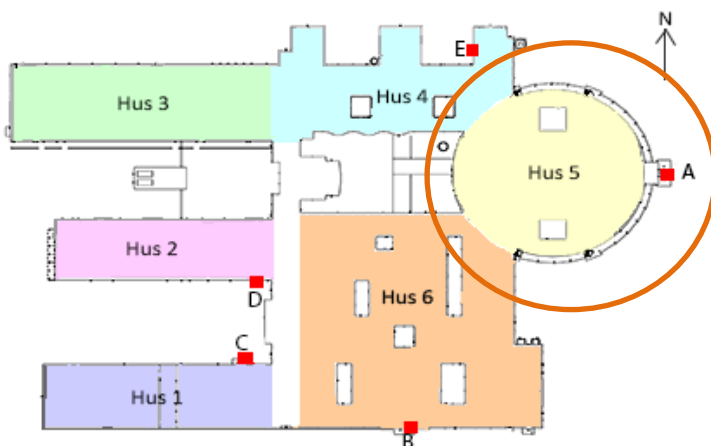
- Computer rooms D1m (Datorsal 1; B2019), D2m (Datorsal 2; B2024) and D3m (Datorsal 2; B2023) in Level 2 (Entrance level)



❖ VHC centrum (Veterinary house)

<https://internt.slu.se/en/support-services/campus-and-buildings/vhc/>

- Computer rooms Hugin and Munin in part 5 of the building and Level 2 (Entrance level)



❖ Library / Bibliotek (Undervisningshuset)

<https://www.slu.se/en/subweb/library/>

- Computer rooms Datorsal 1 (bd1) and Datorsal 2 (bd2) inside the library located in 'Undervisningshuset', level 2 (entrance level)

❖ Service center (Ulls Hus)

<https://internt.slu.se/en/support-services/basic-services/servicecenter/>

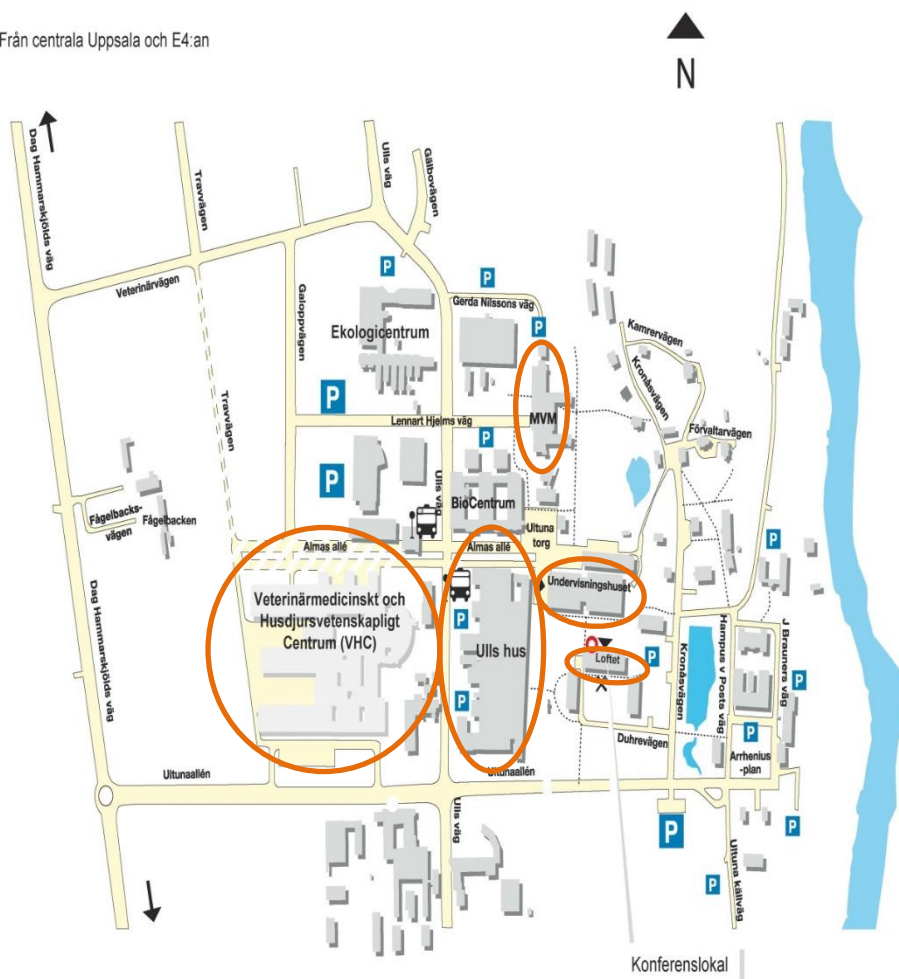
Phone: +46(0)18-67 10 00

E-mail: servicecenter@slu.se



Campus Ultuna

Från centrala Uppsala och E4:an



Från Sunnersta och väg 255



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