

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

Preliminary schedule, autumn 2021 (HT2021)

W	Day	Date	Time	Room	Subject	Teachers	
35	Monday	30-Aug			Roll call Master program 'Soil and Environment'		
			13.00-15.00*	zoom	Introduction to the course	NJ	
	Tuesday	31-Aug	10.00-12.00	zoom	Lecture 1: What is soil and why do we care?		
			13.00-15.00	zoom	Lecture 2: Phase relations & Water potentials (Chaps. 1-6)	NJ	
	Wednesday	1-Sept	10.00-12.00	zoom	Lecture 3: Soil water flow Part 1 (Chaps. 6-8)	NJ	
			13.00-14.00*	zoom	Calculation examples with water potentials, phase relations and water contents: introduction	NJ	
	Thursday	2-Sept	10.00-11.00	zoom	Calculation examples with water potentials, phase relations and water contents: questions	NJ	
Friday	3-Sept	Home study ** Complete Quiz 1 on water potentials and water flows** ** Upload calculation examples**					
36	Monday	6-Sept	10.00-12.00	zoom	Lecture 4: Soil water flow Part 2 (Chap.8)	NJ	
			13.00-15.00	zoom	Lecture 5: Soil water flow Part 3 (Chap.8, 14-15,17)	NJ	
	Tuesday	7-Sept	10.00-12.00	zoom	Lecture 6: Introduction to simulation models	NJ	
			13.30-17.30*	D1	Introduction to Stella modelling software	NJ, KM	
	Wednesday	8-Sept	10.30-17.30*	D1	Stella ex. 1: Capillary rise (Chaps. 8, 18)	NJ, JF	
	Thursday	9-Sept	10.30-15.00*	D1	Stella ex. 2: Steady infiltration (Chaps. 8, 14)	NJ, JF	
	Friday	10-Sept	Home study **Complete STELLA quiz 1**				
37	Monday	13-Sept	11.00-12.00	zoom	Lecture 7: Potential evapotranspiration and water/energy balance (Chap. 20)	NJ	
			13.00-15.00	zoom	Lecture 8: Plant water uptake and plant response to drought (Chaps. 19- 21)	NJ	
	Tuesday	14-Sept	10.30-17.30*	D1	Stella ex. 3: Plant water uptake (Chap. 19)	NJ, KM	
	Wednesday	15-Sept	Home study ** Complete Quiz 2 on PET & water and energy balance**				
	Thursday	16-Sept	10.30-17.30*	D1	Stella ex. 4: Water balance of a soil profile (Chaps. 8, 19-20)	NJ, KM	
	Friday	17-Sept	Home study ** Complete STELLA quizzes 2 and 3**				

W	Day	Date	Time	Room	Subject	Teachers	
38	Monday	20-Sept	10.00-12.00	zoom	Lecture 9: Solute transport I (Chap.9)	NJ	
			13.00-15.00	zoom	Lecture 10: Solute transport II (Chap.9)	NJ	
	Tuesday	21-Sept	Home study ** Complete Quiz3 on solute transport**				
	Wednesday	22-Sept	10.30-17.30*	D1	Stella ex. 5: Solute transport I (Chap.9)	NJ, JF	
	Thursday	23-Sept	10.30-17.30*	D1	Stella ex. 6: Solute transport II (Chap.9)	NJ, JF	
	Friday	24-Sept	Home study ** Complete STELLA quiz 4**				
39	Monday	27-Sept	10.30-17.30*	D1	Exercise: model uncertainty and sensitivity analysis	NJ	
	Tuesday	28-Sept	10.00-12.00	zoom	Lecture: water management and sustainable agriculture	JB	
		28-Sept	13.30-15.00*	T	Introduction Mini-workshop on agroecosystems and climate change	KM	
	Wednesday	29-Sept	**Mini-workshop 1- Preparation individual: scientific publication reading **				
	Thursday	30-Sept	**Mini-workshop 1- Preparation individual: scientific publication reading ** Submit individual report at 16.00				
	Friday	1-Oct	**Mini-workshop 2- group discussion and preparation of oral presentation**				
40	Monday	4-Oct	10.30-15.00*	T	Mini-workshop3 - Group presentations	KM, NJ	
	Tuesday	5-Oct	10.30-15.00	T	Teachers presentations on current research	All	
	Wednesday	6-Oct	10.30-12.30*	T	Introduction to mini-projects	NJ, KM, OA, ML, JK	
	Thursday	7-Oct	Mini-projects, continued				
	Friday	8-Oct	“ “				
41	Monday	11-Oct	“ “				
	Tuesday	12-Oct	“ “				
	Wednesday	13-Oct	“ “				
	Thursday	14-Oct	“ “				
	Friday	15-Oct	“ “				
42	Monday	18-Oct	“ “				
	Tuesday	19-Oct	Final version of Mini-project report to supervisors at 15.00				
	Wednesday	20-Oct	**Group Preparation – presentation and opposition Mini-project**				
	Thursday	21-Oct	**Group Preparation – presentation and opposition Mini-project**				
	Friday	22-Oct	10.30-17.30*	T	Presentation of Mini-projects and opposition	NJ, KM, OA, ML, JK	
43	Monday	25-Oct	Home study				
	Tuesday	26-Oct	Home study				
	Wednesday	27-Oct	10.30-12.30	T	Questions to teachers before Exam	NJ	
	Thursday	28-Oct	Home study				
	Friday	29-Oct	13.00-16.00*	“Loftet” Dining room	Written Examination		

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 do 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)
- **Lecture10:** Solute transport II (2h)
- Calculation examples** on 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)
 - Student presentations (3h)
- **Research presentations** by teachers (3h)
- **Exam preparation** (2h)
- **Written Exam** (3h)

2-Modelling exercises

- **STELLA introduction** (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

MV0216, autumn 2021: student assignments (A)

W	Day	Date	Time	A	Subject	How?
35	Monday	30-aug	13.00-15.00		Introduction to the course	Attend (via Zoom)
	Wednesday	1-sept	13.00-14.00		Introduction to calculation examples	Attend (via Zoom)
	Friday	3-sept	-	1 2 3	Introduce yourself to the class Calculation exercises Complete Lecture-Quiz 1	Upload to CANVAS CANVAS CANVAS
36	Tuesday	7-sept	13.30-17.30	4	Introduction to modelling software (STELLA)	Attend ➤ Upload model
	Wednesday	8-sept	10.30-17.30	5	STELLA exercise 1	Attend ➤ Upload your capillary rise model
	Thursday	9-sept	10.30-15.00	6	STELLA exercise 2	Attend ➤ Upload your infiltration model
	Friday	10-sept	-	7	Complete STELLA-Quiz 1	CANVAS
37	Tuesday	14-sept	-	8	Complete Lecture-Quiz 2	CANVAS
	Wednesday	15-sept	10.30-17.30	9	STELLA exercise 3	Attend ➤ Upload your water uptake model
	Thursday	16-sept	10.30-17.30	11	STELLA exercise 4	Attend ➤ Upload your water balance model
	Friday	17-sept	-	10/12	Complete STELLA-Quiz 2 & 3	CANVAS
38	Tuesday	21-sept	-	13	Complete Lecture-Quiz 3	CANVAS
	Wednesday	22-sept	10.30-17.30	14	STELLA exercise 5	Attend
	Thursday	23-sept	10.30-17.30	15	STELLA exercise 6	Attend ➤ Upload your transient leaching model
	Friday	24-sept	-	16	Complete STELLA-Quiz 4	CANVAS
39	Monday	27-sept	10.30-17.30	17	Exercise on model sensitivity and uncertainty	Attend ➤ Upload EXCEL file
	Tuesday	28-sept	13.30-15.00	18	Intro. to Mini-workshop	Attend
	Thursday	30-sept	-	19	Individual Summary Report Mini-workshop	CANVAS
40	Monday	4-oct	10.30-15.00	20	Group presentation & discussion Mini-workshop	Attend
	Wednesday	6-oct	10.30-12.30	21	Mini-projects introduction	Attend
42	Tuesday	19-oct	15.00	22	Mini-project group report	Submit on CANVAS
	Friday	22-oct	10.30-17.30	23	Group presentation & opposition (Mini-project)	Attend
43	Friday	29-oct	13.00-16.00	24	Final written examination	Attend

Teachers

Department of Soil and Environment, SLU, Uppsala

- **Nicholas Jarvis** (Examiner, NJ): Nicholas.jarvis@slu.se (Soil and Environmental Physics, head)
- **Elsa Coucheney** (on parental leave): elsa.coucheney@slu.se (Soil and Environmental Physics)
- Katharina Meurer (KM): katharina.meurer@slu.se (Soil Nutrient Cycling)
- Jumpei Fukumasu (JF): jumpei.fukumasu@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)

MV0216, autumn 2021

Course starts: Monday 30th August 2020 at 13.00

Course ends: Friday 29th October 2020 at 16.00

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

Friday the 29th of October 2021 (13.00-16.00) in the dining room of “Loftet”

- The **first re-examination** is planned on **Wednesday 24th of November 2021**
(more information to come later about the 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.

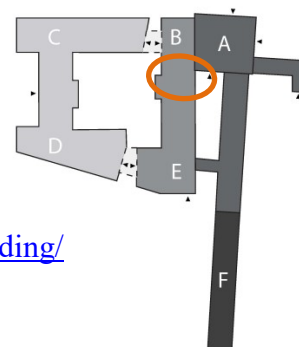
Registration should be done via Studentwebb/LADOK student. If you have any question or request about this registration, please contact the course secretariat mark-kurssektariat@slu.se

Room finder

❖ Ulls-Hus:

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

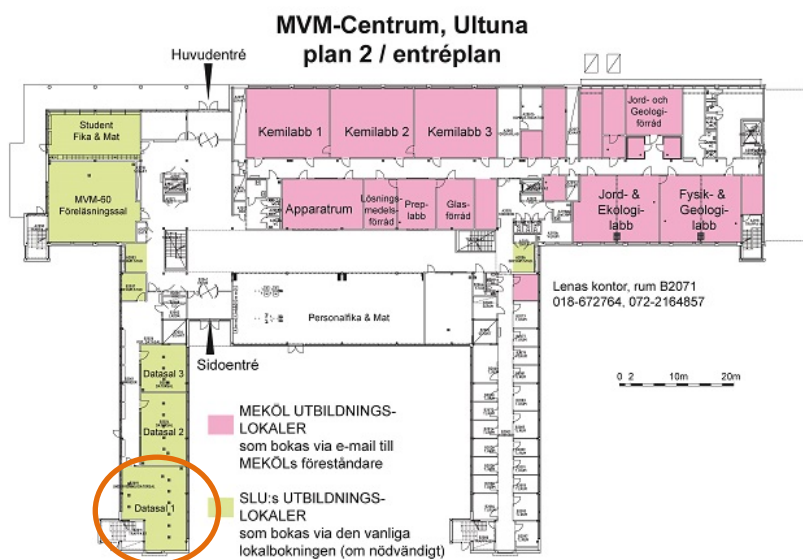
- Lecture room T in section B of level 2 (Entrance level)



❖ MVM-huset:

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

- Computer room D1 (Datarsal 1; B2019; Entrance level)



❖ Library/Bibliotek (Undervisningshuset)

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

❖ Service center (Ulls Hus)

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

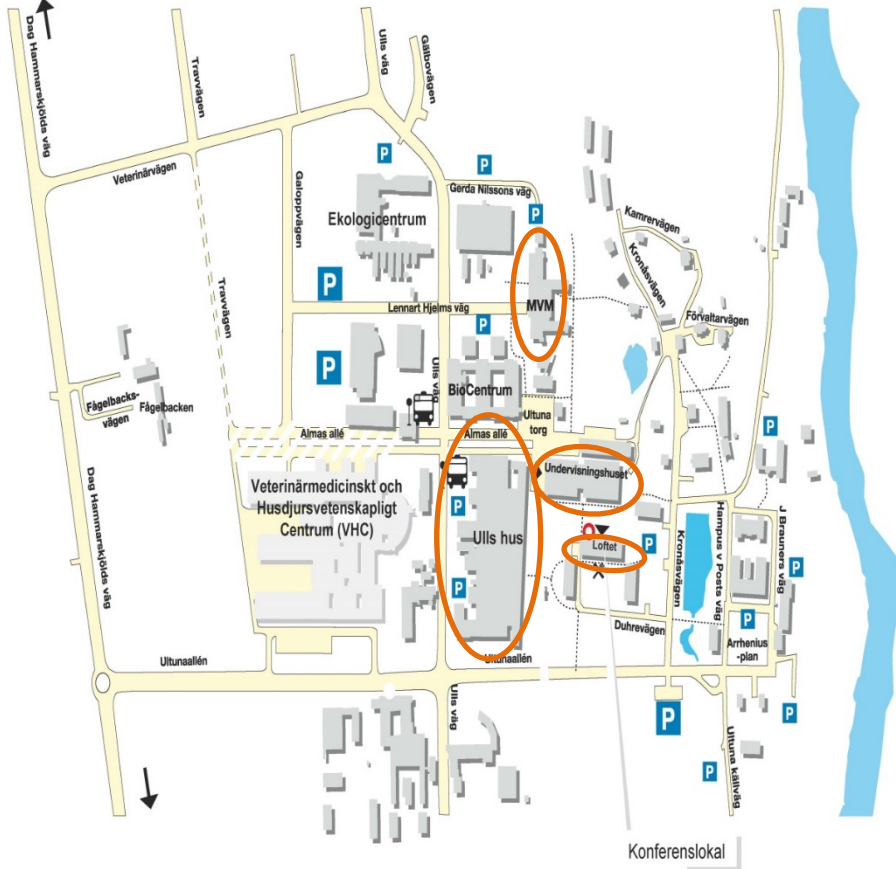
Phone: +46(0)18-67 10 00

E-mail: servicecenter@slu.se



Campus Ultuna

Från centrala Uppsala och E4:an



Från Sunnersta och väg 255

- Konferenslokal
- Parkering
- Restaurang
- Busstopp

0 100 200 300 m