Mikael Rinne					GEO-E1040 ROCK EXCAVATION	
					8.1.2021/ Mri	
Lecture (45 min), Exercise (3h)	**Date**	**Weekday**	**Time**	**Week**	**Lecture contents**	**Lecturer**
1	11.1.2021	Mon	10-12	2	Course introduction and Rock Engineering in Finland	M. Rinne
2					Tunneling and large UG rock caverns	
	12.1.2021	Tue	12-15			
3	13.1.2021	Wed	10-12		Surface excavation	M. Rinne
4					Mechanical rock excavation	
5	18.1.2021	Mon	10-12	3	Underground mining methods	M. Rinne
6					Underground mining methods	
Exercise	19.11.2021	Tue	12-15		Tunnelling cost and timetable estimates Part I	J. Antikainen
7	20.1.2021	Wed	10-12		Shaft sinking and raise boring	M. Rinne
8					Loading and hauling surface excavation & UG	
7	25.1.2021	Mon	10-12	4	Explosives and detonators	T. Hänninen
8					Explosives and detonators	
Exercise	26.1.2021	Tue	12-15		Ignition and blasting simulation. Classroom exercise	T. Hänninen
9	27.1.2021	Wed	10-12		Rock drilling theory	H. Räsänen
10					Rock drilling applications	
11	1.2.2021	Mon	10-12	5	Rock blasting theory: surface	T. Hänninen
12					Rock blasting theory: underground	
Exercise	2.2.2021	Tue	12-15		Blasting exercise	T. Hänninen
					Blasting exercise	
13	3.2.2021	Wed	10-12		Design of rock excavation works	T. Hänninen
14					Rock excavation legislation and safety aspects	
11	8.2.2021	Mon	10-12	6	Environmental impact of blasting: flyrock, vibration, air pressure wave, noise	T. Hänninen
12					Environmental impact of excavation, crushing, traffic, nitrogen and watertable	
Exercise	9.2.2021	Tue	12-15		Tunnelling cost and timetable estimates Part II	J. Antikainen
					Tunnelling cost and timetable estimates Part II	
13	10.2.2021	Wed	10-12		Rock Reinforcement and bolting	M. Rinne
14					Ventilation and dewatering	
15	15.2.2021	Mon	10-12	7	Injection grouting	M. Rinne
16					Sprayed concrete, mesh , scaling.	
Exercise	16.2.2021	Tue	12-15		Ventilation	J. Antikainen
17	17.1.2021	Wed	10-12		Crushing and screening	M.Rinne
18					Crushing and screening	
	23.2.2021	Tue	13-	8	**EXAM**	