

Mikael Rinne					GEO-E1040 ROCK EXCAVATION	
					28.1.2019	
Lecture (45 min), Exercise (3h)	Date	Weekday	Time	Week	Lecture contents (12 x 2h)	Lecturer
1	7.1	Mon	10-12	2	Course introduction and study goals.	M. Rinne
1	7.1	Mon		2	Underground excavation methods: tunnelling cycle, excavation of large caverns	M. Rinne
2	9.1	Wed	10-12	2	Surface excavation	M. Rinne
2	9.1	Wed		2	Surface excavation	M. Rinne
Exercise	9.1	Wed	13-16	2	Tunnelling cost and timetable estimates Part I	M. Penttala
3	14.1	Mon	10-12	3	Underground mining methods (room and pillar, sublevel stoping etc.)	M. Rinne
3	14.1	Mon		3	UG methods. cont. Shaft sinking and raise boring	M. Rinne
Tunnel exercise	14.1	Mon	13-16	3	Rock drilling (Group 1)	O. Hedström
4	16.1	Wed	10-12	3	Explosives and detonators	T. Hänninen
4	16.1	Wed		3	Explosives and detonators	T. Hänninen
Tunnel exercise	16.1	Wed	13-16	3	Rock drilling (Group 2)	O. Hedström
Tunnel exercise	18.1	Fri	13-16	3	Rock drilling (Group 3)	O. Hedström
5	21.1	Mon	10-12	4	Rock blasting theory: surface	T. Hänninen
5	21.1	Mon		4	Rock blasting theory: underground	T. Hänninen
6	23.1	Wed	10-12	4	Rock drilling theory	H. Räsänen
6	23.1	Wed		4	Rock drilling applications	H. Räsänen
Exercise	23.1	Wed	13-16	4	Ignition and blasting simulation. Classroom exercise	T. Hänninen
Tunnel exercise	25.1	Fri	13-16	4	Rock drilling (Group 4)	O. Hedström
7	28.1	Mon	10-12	5	Loading and hauling surface excavation	M. Rinne
7	28.1	Mon		5	Loading and hauling uderground excavation	M. Rinne
8	30.1	Wed	10-12	5	Excavation without explosives	M. Rinne
8	30.1	Wed		5	Bolting, shotcrete, mesh	M. Rinne
Tunnel exercise	30.1	Wed	13-16	5	Charging exercise in tunnel (Group 1)	T. Hänninen
Tunnel exercise	1.2	Fri	13-16	5	Charging exercise in tunnel (Group 2)	T. Hänninen
9	4.2	Mon	10-12	6	Shotcrete, Grouting	M. Rinne
9	4.2	Mon		6	Scaling, Crushing and screening	M. Rinne
10	6.2	Wed	10-12	6	Design of rock excavation works	T. Hänninen
10	6.2	Wed		6	Rock excavation legislation and safety aspects	T. Hänninen
Exercise	6.2	Wed	13-16	6	Tunnelling cost and timetable estimates Part II	M. Penttala
11	11.2	Mon	10-12	7	Environmental impact of blasting: flyrock, vibration, air pressure wave, noise	T. Hänninen
11	11.2	Mon		7	Environmental impact of excavation, crushing, traffic, nitrogen and watertable	T. Hänninen
12	13.2	Wed	10-12	7	Rock Engineering and mining in Finland	M. Rinne
12	13.2	Wed		7	Discussion and preparation for the exam	M. Rinne
Exercise	13.2	Wed	13-16	7	Ventilation (Ventilation and dewatering pre-lecture reading material)	M. Penttala
	19.2	Tue	13-16	8	EXAM	