NATIONAL TECHNICAL UNIVERSITY OF ATHENS
SCHOOL OF MINING AND METALLURGICAL ENGINEERING

ERASMUS+ ACADEMIC COMMITTEE
email:secretary@metal.ntua.gr
Tel: +30210-772-2067

ECTS CREDITS ALLOCATION FOR THE ERASMUS+ PROGRAMME-SCHOOL OF MINING AND METALLURGICAL ENGINEERING

ECTS ALLOCATION AS FOLLOWS:

1st Semester

	MODULES **A΄ Compulsory**	**HOURS PER WEEK**		**ECTS UNITS**	
			PRACTICALS		
		LECTURES	**Laboratory Based Practicals**	**Numerical based practicals**	
1. 1.	Mathematics I	4	-	2	**4**
2. 2.	Physics I	2	2	-	**3**
3. 3.	Chemistry	2	3	-	**7**
4. 4.	Mineralogy	2	2	-	**5**
5. 5.	Introduction to Computer Programming	2	2	-	**3**
6. 6.	Geology I	2	-	-	**3**

		14	**9**	**2**	
	Total hours		**25**		25
	B΄Electives				
	(Compulsory selection of one module)				
1. 1.	Philosophy and History of Science and Technology	2	-	-	2
2. 2.	Sociology	2	-	-	2
3. 3.	Evolution of Mining and Metallurgy	2	-	-	2
	C΄Electives				
	Foreign Languages		2		-
	(Compulsory selection of 1 foreign language module)				
				-	-
				-	-
				-	-
				-	-
	Final Total hours per week		**29**		**TOTAL ECTS=27**
	<u>2nd Semester</u>				

	MODULES	**HOURS PER WEEK**			
	A΄ Compulsory		**PRACTICALS**		**ECTS**
		LECTURES	**Laboratory Based Practicals**	**Numerical based Practicals**	
1. 1.	Mathematics II	4	-	2	**4**
2. 2.	Physics II	2	2	-	**3**
3. 3.	Geology II	2	2	-	**5**
4. 4.	Petrography	2	2	-	**5**

5. 5.	Introduction to Computing	2	2	-	**3**
6. 6.	Economics	2	-	-	**2**
7. 7.	Engineering Drawing-Mechanical Design-CAD	2	2		**5**
		16	**10**	**2**	
	Total hours		**28**		**27**
	B'Electives				
	Foreign Languages		**2**		**-**
	(Compulsory Selection of 1 Foreign Language)				
			-	-	**-**
			-	-	**-**
			-	-	**-**
			-	-	**-**
	Final Total hours		**30**		**TOTAL ECTS=27**
	3rd Semester				
	Modules	**Hours**			**ECTS**
			Practicals		
	A' Compulsory	**Lectures**	**Laboratory Based Practicals**	**Numerical based practicals**	
1. 1.	Mathematics III	4	-	2	4
2. 2.	Engineering Mechanics (Statics)	2	-	2	3
3. 3.	Thermodynamics	3	-	1	5
4. 4.	Electric-Circuits-Electronics Technology	2	2	-	5
5. 5.	Design and Development of Information Technology	2	1	-	2
6. 6.	Numerical Analysis	2	-	2	3
		15	**3**	**7**	
	Total hours		**25**		22

	B'Electives				
	Foreign Languages		**2**		**-**
	(Compulsory selection of 1 foreign Language)				
	Final Total Hours		**27**		**Total ECTS=22**
	4th Semester				
	Modules	**Hours**			**ECTS**
			Practicals		
	A' Compulsory	**Lectures**	**Laboratory based Practicals**	**Numerical Based Practicals**	
1. 1.	Economic Geology	2	2	-	**5**
2. 2.	Propability theory and Statistics	2	2	-	**3**
3. 3.	Analytical Chemistry and Physical Methods of Analysis	2	3	-	**4**
4. 4.	Transport Phenomena I	2	1	-	**4**
5. 5.	Energy management-Mass and Energy Balances	2	-	1	**4**
6. 6.	Mineral Exploitation	4	1	-	**7**
		14	**9**	1	
	Total hours		**24**		**27**

	B΄Electives				
	Foreign Languages		**2**		**2**
			-	-	**-**
			-	-	**-**
			-	-	**-**
	Final Total hours		**26**		**Total ECTS = 29**
	5th Semester				
	Modules	**Hours**			**ECTS**
			Practicals		
	Compulsory	**Lectures**	**Lab based practicals**	**Numerical based practicals**	
1. 1.	Principles of Physical Metallurgy I	3	2	-	7
2. 2.	Extractive Metallurgy I	3	-	1	5
3. 3.	Mine Exploitation I	3	2	-	7
4. 4.	Mechanical Preparation and Processing of Minerals and Industrial Minerals I	4	-	1	7
5. 5.	Transport Phenomena II	2	1	-	4
6. 6.	Engineering Mechanics (Strength of Materials)	2	-	2	3
		17	**5**	**4**	
	Total hours		**26**		**Total ECTS=33**
	6th Semester				
	ΜΑΘΗΜΑΤΑ	**Hours**			**ECTS**

			Practicals		
	Compulsory	**Lectures**	**Lab based practicals**	**Numerical based practicals**	
1. 1.	Principles of Physical Metallurgy II	3	2	-	7
2. 2.	Operational Research	2	-	1	4
3. 3.	Extractive Metallurgy II	3	-	1	5
4. 4.	Mine Exploitation II	2	2	-	5
5. 5.	Mechanical preparation and processing of minerals and Industrial minerals II	2	2	-	5
6. 6.	Principles of Production Organisation-Business Administration	1	1	-	3
7. 7.	Environment I (Introduction to Environmental Engineering and Science)	2	2	-	5
		15	**9**	**2**	
	Total hours		**26**		**Total ECTS=34**
Total ECTS Credits Semester 1 to 6 (inclusive)=172					
During the summer, following completion of Semester 6, Field Training takes place, a compulsory module of the 7th Semester.					
	7th Semester				
	Module		**Hours**		**ECTS**
			Practicals		
	Compulsory	**Lectures**	**Lab based practicals**	**Numerical based practicals**	
1. 1.	Engineering Geology I	2	2	**-**	**5**

2. 2.	Reinforced Concrete-Steel Structures	2	1	**-**	**4**
3. 3.	Environment II (Environmental Protection in Mining and Metallurgy)	2	-	2	5
4. 4.	Rock Excavation I (Εξόρυξη με Εκρηκτικές Ύλες)	3	2	**-**	**7**
5. 5.	Safety-Health-Legislation	2	-	1	4
6. 6.	Extractive Metallurgy of Iron I	2	2	**-**	**5**
7. 7.	Elements of Mechanical Engineering	2	-	2	5
8. 8.	Field Training I	-	-	**-**	**8**
		16	**7**	**4**	
	Total hours		**27**		**Total ECTS=43**
	8th Semester				
	Streams:				
	I. Mining Engineering	**Hours**		**ECTS**	
			Practicals		
		Lectures	**Lab based practicals**	**Numerical based practicals**	
1. 1.	Underground Excavation Support	2	2	-	4
2. 2.	Rock Mechanics	2	3	-	4
3. 3.	Rock Excavation II (Excavation with mechanical means)	3	1	-	4
4. 4.	Well Technology	3	1	-	4
5. 5.	Materials handling systems in heavy construction and mining	3	1	-	4
6. 6.	Marble and Insustrial Minerals	2	1	-	4
7. Γ	Geostatistics	2	1	-	4
	Total hours	**17**	**10**		
			27		**Total ECTS**

					=24 (6 modules)
	II. Geo-engineering	**Hours**			**ECTS**
			Practicals		
		Lectures	**Lab based practicals**	**Numerical based practicals**	
1. 1.	Underground Excavation Support	2	2	-	4
2. 2.	Rock Mechanics	2	3	-	4
3. 3.	Rock Excavation II (Excavation with Mechanical means)	3	1	-	4
4. 4.	Well Technology	3	1	-	4
5. 5.	Engineering Geology II	3	1	-	4
6. 6	Soil Mechanics and Foundation Engineering	2	2	-	4
7. 7	Geostatistcs	2	1	-	4
	Total hours	**17**	**11**		
			28		**Total ECTS 24 (for 6 modules)**
	III. Metallurgical Processes	**Hours**			**ECTS**
			Practicals		
		Lectures	**Lab based practicals**	**Numerical based practicals**	
1. 1.	Extractive Metallurgy of Iron II	3	-	1	4
2. 2.	Hydrometallurgy	1	3	-	4
3. 3.	Technology of Cement and Concrete Production	2	1	-	4
4. 4.	Chemical Kinetics	3	-	1	4
5. 5.	Laboratory training in Basic Metallurgical Unit Operations	-	3	-	4
		9	**7**	**2**	

	Total hours		**18**		**Total ECTS 20 (for 5 modules)**
	IV. Materials Science and Engineering	**Hours**			**ECTS**
			Practicals		
		Lectures	**Lab based practicals**	**Numerical based practicals**	
1. 1.	Metallurgy of Welding and Control of Weldments	2	2	-	4
2. 2.	Ceramics	3	1	-	4
3. 3.	Polymers and Composites	2	1	-	4
4. 4.	Solidification Casting and non-Destructive Testing	2	1	-	4
5. 5.	Electronic Materials	2	2	-	4
6. 6.	Solid-Solid State Phase Transformations	2	2	-	4
		13	**9**		
	Total hours		**22**		**Total ECTS 24 (for 6 modules**
	V. Environmental Engineering and Geo-Engineering				
		Hours			**ECTS**
			Practicals		
		Lectures	**Lab based practicals**	**Numerical based practicals**	
1. 1.	Environmental Hydrogeology	2	2	-	4
2. 2.	Environmental Geochemistry	2	1	-	4
3. 3.	Environmental Mining and Quarry Engineering (Selected Topics)	2	2	-	4
4. 4.	Soil Remediation Techniques	2	2	-	4

5. 5.	Methods of Air Waste Treatment	2	-	1	4
6.	Geostatistics	2	1	-	4
	Total hours	**12**	**8**	**1**	
			21		**Total ECTS 24 (for 6 moduloes)**
	Pool Courses				**ECTS**
1. 1.	Science and Technology of Geothermal Fields	2	1	-	4
2. 3.	Mineral Economics	2	1	-	4
3. 4.	Environment and Growth	3	-	-	4
4. 5.	Automatic Process Control	3	-	-	4
5. 6.	Industrial Minerals and Rocks	2	1	-	4
6. 7.	Geodesy and Mine Surveying	2	-	1	4
7. 8.	Solid State Physics	2	-	-	4
8. 9.	Environment and Growth	3	-	-	4
9. 10.	Elements of Machining	1	2	-	4

During the summer time following conclusion of 8th Semester and the beginning of the 9th Semester, **Field Training II** takes place, a compulsory module of the 9th Semester, carried out in topics related to the specific Stream each student is following.

	9th Semester					
	Streams:					
	I. Mining Engineering	**Hours**				**ECTS**
			Practicals			
		Lectures	**Lan Based Practicals**	**Numerical based Practicals**		
1. 1.	Applied Geophysics	2	2	-		4
2. 2.	Open Pit Planning	2	1	-		4
3. 3.	Tunelling Engineering	2	2	-		4
4. 4.	Underground Mining	3	1	-		4
5. 5.	Petroleum Engineering	2	1	-		4
6. 6.	Geological Mapping and Tectonic Analysis	2	1	-		4
7. 7.	Field Training II *	-	-	-		11
		13	**8**			
	Total hours		**21**			**ECTS 20 (for 5 modules) Totel ECTS 31 (for 5 modules+ Field Training II)**
	II. Geo-Engineering	**Hours**				**ECTS**
			Practicals			
		Lectures	**Lab based Practicals**	**Numerical based**		

				Practicals		
1. 1.	Applied Geophysics	2	2	-		4
2. 2.	Underground works	1	**-**	1		4
3. 3.	Tunnelling Engineering	2	2	-		4
4. 4.	Applied Hydrogeology	2	1	-		4
5. 5.	Enhancement of geotechnical behaviour of geological formations	**2**	**1**	-		4
6. 6.	Geological Mapping and Tectonic Analysis	2	1	-		4
7. **7.**	Field Training II *****	-	-	-		11
		12	**6**	**1**		
	Total hours		**19**			**ECTS 20 (for 5 modules) Totel ECTS 31 (for 5 modules+ Field Training II)**
	III. Metallurgical Engineering	**Hours**				**ECTS**
			Practicals			
		Lectures	**Lab based practicals**	**Numerical based practicals**		
1. 1.	Metallurgical Reactor Design	2	1	-		4
2. 2.	Plant Design of Metallurgical Plants	2	2	-		4
3. 3.	Design and Construction of Mineral Processing Plants	2	2	-		4
4. 4.	Metallurgy of Non-Ferrous Metals	2	**-**	1		4
5. 5.	Refractories	2	1	-		4

6. 6.	Field Training II *	-	-	-	11
		10	**6**	**1**	
	Total hours		**17**		**ECTS 20 (for 5 modules) Totel ECTS 31 (for 5 modules+ Field Training II)**

*** Field Training is compulsory for all Streams**

	IV. Materials Science and Engineering	**Hours**			**ECTS**
			Practicals		
		Lectures	**Lab based practicals.**	**Numerical Based Practicals**	
1. 1.	Refractories	2	1	-	4
2. 2.	Surface Technology	2	2	-	4
3. 3.	Metal Forming	3	1	-	4
4. 4.	Polymer and Composite Processing	2	1	-	4
5. 5.	Ferrous Physical Metallurgy	2	2	-	4
6. 6.	Industrial Alloys	2	1	-	4
7. 7.	Field Training II *	-	-	-	11
		13	**8**		
	Total hours		**21**		**ECTS 20 (for 5 modules) Totel ECTS 31**

					(for 5 modules+ Field Training II)μαθήματα+ ΠΡΑΚΤΙΚΗ 2)
	V. Environmental Engineering and Geo-Engineering	**Hours**			**ECTS**
			Practicals		
		Lectures	**Lab based practicals.**	**Numerical based practicals**	
1. 1.	Waste Water Treatment Engineering	2	1	-	4
2. 2.	Solid Waste Treatment-Materials Recycling	1	1	-	4
3. 3.	Environmental Chemistry and Mechanisms of Pollutants Mobility	2	2	-	4
4. 4.	Environmental Management-Legislation	2	-	-	4
5. 5.	Field Training II *	-	-	-	11
		7	**4**		
	Total hours		**11**		**ECTS 20 (for 5 modules) Totel ECTS 31 (for 5 modules+ Field**

					Training II)
	Pool modules				
		Hours			**ECTS**
			Practicals		
		Lectures	**Lab based Practicals**	**Numerical based practicals**	
1. 1.	Project Management	2	1	-	4
2. 2.	Geographical Information Systems	2	2	-	4
3. 3.	Simulation of Mining Systems	2	1	-	4
4. 4.	Computer Applications in Geology	1	2	-	4
5. 5.	Statistical Methods in Research and Production	2	1	-	4
6. 6.	Applied Mineralogy	1	2	-	4
7. 7.	Powder Metallurgy	2	1	-	4
8. 8.	Quality Assurance-Certification	2	2	-	4
9. 9.	Economic Evaluation of Investment	2	1	-	4
10.	Entrepreneurship and Innovation	2	-	-	4
				ECTS	
	<u>10th Semester</u> Diploma Thesis			30	