Model Curriculum of Chemical Engineering MSc Program – University of Debrecen

*Knowledge and their subjects; the responsible people	semesters					ECTS credit points	evaluation (e – oral or witten exam / t - term-grade / p – mid-semester grade / s - signature)
	1.	2.	3.	4.			
	contact hours, types of teaching (l - lectue / s - seminar / p – laboratory practice) / credit points						
Knowledge of curriculum							
Economy and management subject group – responsible person: András István Kun							
1. Advanced Microeconomics **TTKME4011_EN** *Levente Sándor Nádasi*	2+0+0					2	e
2. Management **TTKME4012_EN** *András István Kun*				2+0+0		2	e
3. Advanced quality management **TTKME4014_EN** *Ágnes Kótsis*		2+0+0				2	t
4. Engineering communication **TTKME4013_EN** *Katalin Tóth*		2+0+0				2	e
5. Intellectual property law **TTKME4015_EN** *György Csécsy*		1+0+0				1	t
6. Engineering Informatics **TTKMG4901_EN** *Sándor Misák*	1+2+0					3	p
Chemical industry knowlege subject group – responsible person: Ákos Kuki							
1. Industrial instrumentation and automatization for Chemical Industry **TTKME4605_EN** **TTKMG4605_EN** *Ákos Kuki*	2+2+0					2+2	e, p
2. Safety and health prevention in chemical industry **TTKME4606_EN** *Tibor Nagy*				2+0+0		2	e
3. Industrial technologies **TTKME4607_EN** *Lajos Nagy*		2+0+0				2	t
4. Pilot Plant II. **TTKML4601_EN** *Lajos Nagy*				0+0+4		4	p
Energetics and transport process subject group – responsible person: Lajos Nagy							
1. Energetics in Chemical Industry **TTKME4604_EN** *Lajos Nagy*	2+0+0					2	e
2. Transport processes I. **TTKME4602_EN** **TTKMG4602_EN** *Ákos Kuki*		2+2+0				2+2	e, p

3. Transport processes II.* **TTKME4603_EN** **TTKMG4603_EN** *Ákos Kuki*			2+2+0			2+2	e, p
Basic knowledge subject group – responsible person: István Szabó							
1. Differential equations **TTMME0803_EN** *Ábris Nagy*	2+2+0				4	e	
2. Engineering physics **TTFME2110_EN** *Lajos Daróczi*	2+0+0				3	e	
3. Environmental management **TTKME4016_EN** *Csilla Lakatos*				2+0+0	2	e	
Organic- and biochemical subject group – responsible person: Marietta Vágvölgyiné Tóth							
1. Bioprocess Engineering I. **TTKME4801_EN** *Levente Karaffa*		2+0+0			2	e	
2. Organic synthetic methods I. **TTKME0301_EN** *Marietta Vágvölgyiné Tóth*	2+0+0				3	e	
3. Organic chemistry practice **TTKML4301_EN** *Éva Bokor*		0+0+2			1	p	
4. Biochemistry IV. **TTKME0303_EN** Teréz Barna	2+0+0				2	e	
Physical chemistry and separation techniques subject group – responsible person: Attila Kiss							
1. Down stream processing **TTKME4802_EN** *Gyöngyi Gyémánt*				2+0+0	2	e	
2. Physical chemistry and practical applications **TTKME4401_EN** **TTKML4401_EN** *Attila Bényei, ,Oldamur Hollóczki*		2+1+1			3+1	e, p	
3. Separation techniques III. **TTKME0315_EN** *Attila Kiss*		2+0+0			3	e, p	
4. Separation techniques VI. **TTKML4501_EN** *Attila Gáspár*		0+0+2			1	e, p	
Total credits in curriculum (credit, hourse/week, exams)	15 l 6 s 0 p 23 cr	15 l 3 s 5 p 22 cr	3 l 2 s 0 p 4 cr	8 l 0 s 4 p 12 cr	61 cr	18 e 9 p 3 t	

Colloid and Surface Chemistry *Knowledge and their subjects; the responsible people	semesters				ECTS credit points	evaluation (e – oral or witten exam / t – term-grade / p – mid-semester grade / s - signature)
	1.	2.	3.	4.		
	contact hours, types of teaching (l - lectue / s - seminar / p – laboratory practice) / credit points					
Knowledge of curriculum: **Pharmaceutical specialisation**						
Organic and applied synthetic chemistry subject group – responsible person: Tibor Kurtán						
1. Heterocycles **TTKME0327_EN** *Tibor Kurtán*		2+0+0			3	e
2. Pharmaceutical-industry project I. **TTKML4305_EN** *Tibor Kurtán*		0+0+3			3	t
3. Pharmaceutical-industry project II.* **TTKML4306_EN** *Tibor Kurtán*			0+0+3		3	t
4. High efficiency synthetic methods I. **TTKML0319_EN** *László Juhász*				0+1+3	3	p
Applied pharmaceutical chemistry subject group – responsible person: László Somsák						
1. Instrumental and material analysis **TTKME4502_EN** *Attila Gáspár*		2+0+0			2	e
2. Chemical aspects of drug design **TTKME0314_EN** *László Somsák*	2+0+0				3	e
3. Carbohydrate based drug design **TTKME4303_EN** *László Somsák*			2+0+0		2	e
4. Environment-friendly and catalytic processes **TTKME4402_EN** *Antal Udvardy*			2+0+0		2	e
5. Pharmaceutical and fine chemical technologies **TTKME4304_EN** *László Juhász*			2+1+0		3	e (f)
Total credits in the specialization:	2 l	4 l 0 s 3 p	6 l 1 s 3 p	0 l 1 s 3 p	24 cr	6 e 1 p 2 t
	3 cr	8 cr	10 cr	3 cr		
	15 l 6 s	23 l 3 s 10 p	9 l 3 s 7 p	8 l 1 s 7 p	84 cr	24 e 10 p 5 t
	24 cr	31 cr	14 cr	15 cr		

1. MSc Thesis I. (pharmaceutical) **TTKML4001_EN** *Tibor Kurtán*			0+0+11		15	p

2. MSc Thesis II. (pharmaceutical)** **TTKML4002_EN** *Tibor Kurtán*				0+0+11	15	p
	15 l 6 s 0 p	23 l 3 s 10 p	9 l 3 s 18 p	8 l 1 s 18 p		
	24 cr	31 cr	29 cr	30 cr		

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	1.	2.	3.	4.		
	contact hours, types of teaching (l - lectue / s - seminar / p – laboratory practice) / credit points					
Knowledge of curriculum: P**lastic industrial and Petrochemical specialisation**						
Plastic industrial subject group – responsible person: Lajos Nagy						
1. Plastics processing technologies **TTKME4610_EN** **TTKML4610_EN** *Sándor Kéki*			2+0+4		2+4	e, p
2. Plastic-industry project I. **TTKML4611_EN** *Csilla Lakatos*		0+0+4			3	t
3. Plastic-industry project II.* **TTKML4612_EN** *Csilla Lakatos*			0+0+4		3	t
Applied material science subject group – responsible person: Sándor Kéki						
1. Instrumental and material analysis **TTKME4502_EN** **TTKML4502_EN** *Attila Gáspár* *Melinda Andrási*	0+0+4	2+0+0			4+2	p, e
2. Materials science **TTKME4608_EN** *Sándor Kéki*			2+0+0		2	e
3. Modern petrochemistry **TTKME4609_EN** *Sándor Kéki*			2+0+1		3	e
Total credits in the specialization:	0 l 0 s 4 p	2 l 0 s 4 p	6 l 0 s 9 p	-	23 cr	4 e 2 p 2 t
	4 cr	5 kr	14 cr	-		
	13 l 6 s 4 p	21 l 3 s 11 p	9 l 2 s 9 p	8 l 0 s 4 p	84 cr	
	25 cr	28 cr	18 cr	12 cr		

1. MSc Thesis I. (Petrochemical and Plastic-industri project) **TTKML4003_EN** *Sándor Kéki*			0+0+11		15	p
2. MSc Thesis II. (Petrochemical and Plastic-industri project) **TTKML4004_EN** *Sándor Kéki*				0+0+11	15	p
	13 l 6 s 4 p	21 l 3 s 11 p	9 l 2 s 20 p	8 l 0 s 15 p		
	27 cr	32 cr	18 cr	12 cr		

Optional Courses						
1. Chemical plant **TTKME4612_EN** *Lajos Nagy*		2+0+0			2	e
2. Formulation of bioactive compounds **TTKME4803_EN** *Miklós Vecsernyés*				2+0+0	2	e
3.Nanosystems – Colloids **TTKME4403_EN** *István Bányai*		2+0+0			2	e
4. Nuclear Analysis I. **TTKME0523_EN** *Noémi Nagy*		2+0+0 (fall)			3	e
5. Environmental risk assessment and bioremediation **TTKME4807_EN** *Magdolna Kaszáné Kiss*	2+0+0				2	e
6. Inorganic Chemistry V. **TTKME0203_EN** *Péter Buglyó*	3+0+0				4	e
7. Computational quantum chemistry [a] **TTKMG0902_EN** *Odamur Hollóczki*		0+2+0 (spring)			3	t
8. Complexes of macrocyclic ligands **TTKME0212_EN** *Gyula Tircsó*	2+0+0(fall)				3	e
9. Dangerous and special materials [a] **TTKME0206_EN** *István Lázár*	2+0+0				3	e
10. Biological colloid science [a] **TTKME0411_EN** *Levente Novák*		2+0+0 (spring)			3	e
11. Dosimetry, radiation health effects **TTKME0432_EN** *István Hajdu*			2+0+0		3	e
12. Physical chemistry of living systems **TTKME0417_EN** *Henrietta Győrváriné Horváth*				2+0+0	3	e
13. Metal complex catalyzed organic syntheses **TTKME0420_EN** *Gábor Papp*				2+0+0	3	e
14. Environmental chemistry II. **TTKME0414_EN** *Mónika Kéri*				2+1+1	4	e
15. Structure determination by X-ray diffraction **TTKME0423_EN** *Attila Bényei*	2+0+0				3	e
16. Chemistry of secondary metabolites I. **TTKME0331_EN** *László Juhász*	2+0+0				3	e
17. Chemistry of secondary metabolites II. **TTKML0332_EN** *László Juhász*	0+0+4				3	p
18. Enzyme Biotechnology **TTKME0334_EN** *Teréz Barna*	2+0+0				3	e
19. NMR operator practice I.a **TTKML0004_EN** *Gyula Batta*	0+0+2				2	p

20. Reaction Kinetics/Catalysis **TTKME0437_EN** *Gyula Tírcsó/Csaba Gábor Papp*				2+0+2	4	e
Internship						
10. Internship **TTKMX4601_EN** *Ákos Kuki*		4 weeks (summer)				s
Optional couses total	**6 cr**					**6 cr**
Total credits in the major	**120 cr**					**120 cr**