



## COURSE DATASHEET

<b>Semester:</b>	2015/16/1
<b>Course:</b>	Hydrocarbons and petrochemical technologies
<b>Code:</b>	VEMKOLB143A
<b>Responsible department:</b>	Department of Hydrocarbon and Coal Processing
<b>Department code:</b>	MKOL
<b>Responsible instructor:</b>	Dr. Jenő Hancsók

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### Course objectives:

To give an overall view of the hydrocarbon industry its products and calculation methods

### Course content:

1. E.: Hydrocarbon industry. Overall view of a refinery. Products of the hydrocarbon industry. Motor fuels.  
Gy.: Comparison of the hydrocarbon mixtures with simple mixtures. Property estimation of hydrocarbon mixtures (empirical, semiempirical methods; nomograms, computer simulation packages).
2. E.: Formation of the petroleum and natural gas. Exploration, drilling, production. Classification of crude oils.  
Gy.: ASTM distillation, densities of petroleum products.
3. E.: Energy sources, reserves, exploration.  
Gy.: True boiling point distillation, mid-yield curves, property-yield curves, iso-curves.
4. E.: Separation processes of crude oil processing (Distillation, extraction, ...).  
Gy.: Average boiling points. Characterization factor. Molecular weight of petroleum fractions. API density. Estimation of these parameters.
5. E.: Conversion technologies and their classification in the hydrocarbon industry. Thermal conversion technologies.  
Gy.: Phase envelope of defined mixtures. Phase diagram of petroleum fractions. Retrograde phenomena. Critical and pseudocritical properties. Corresponding state.
6. E.: Catalytic conversion technologies I. Heteroatom removing.  
Gy.: Equilibrium flash vaporization curves. Relations among the distillation curves, their application.
7. E.: Catalytic conversion technologies II. Oligomerization, alkylation.  
Gy.: Estimation of distillation curves
8. E.: Catalytic conversion technologies III. Isomerization, ether production.  
Gy.: Equilibrium flash vaporization curves at sub- and superatmospheric pressures.
9. E.: Catalytic conversion technologies IV. Naphtha reforming, HVGO FCC.  
Gy.: Estimation of liquid and vapour densities
10. E.: Catalytic conversion technologies V. Hydrocracking.  
Gy.: Calculation of vapour-liquid equilibrium
11. E.: Base oils and additives  
Gy.: Calculation of vapour-liquid equilibrium
12. E.: Product blending



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### Course content:

Gy.: Enthalpy and heat of vaporisation of hydrocarbon mixtures. Enthalpy diagrams.  
13. E.: Raw materials and feedstocks of petrochemical industry. Intermediers and monomers and polymers.  
Production of olefins (dehydrogenation, steam cracking, ...).  
Gy.: Enthalpy and heat of vaporisation of hydrocarbon mixtures. Enthalpy diagrams.  
14. E.: Polimers I.-II.  
Gy.: Blending of petroleum products

### Requirements, evaluation and grading:

#### Requirements:

Participation on the lectures is not compulsory . The participation on the practical courses is compulsory. One exam paper writing during the semester. Scoring based on the following method: exam (theoretical part) 80%, exam (pactical part) 12%, exam during the semester 8%.

#### Possibilities for repeating the subject:

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### Required and recommended readings:

Kötelező és ajánlott irodalom: Hancsók, J., Baladincz, J., Magyar, J. (szerkesztők): „Mobilitás és környezet”, gyűjteményes kiadvány, 2008, Pannon Egyetemi Kiadó, Veszprém (ISBN: 978-963-9696-50-1), 240 oldal Hancsók, J.: „Korszerű motor és sugárhajtómű üzemanyagok I. Motorbenzinek”, Tankönyv, 1997, Veszprémi Egyetemi Kiadó, Veszprém (ISBN 963 7332 74 X), 219 oldal Hancsók, J.: „Korszerű motor és sugárhajtómű üzemanyagok II. Dízelgázolajok”, Tankönyv, 1999, Veszprémi Egyetemi Kiadó, Veszprém (ISBN 963 9220 27 2) 363 oldal Auer, J, Borsi, Z., Hancsók, J., Lakics, L-né., Lenti, M., Nemesnyik, Á., Valasek, I.: „Tribológia 2. Kenőanyagok és vizsgálataik”, 2003, Tribotechnik Kft., Budapest, (ISBN 963 00 8689 1), 152 oldal Varga Zoltán, Marton Zsuzsanna, Deák Gyula: Kőolajipari számítások, 2005, (Tanszéki kiadvány) Speight, J.G.: The chemistry and technology of petroleum. Marcell Dekker, 1991. Gary, J.H.: Petroleum refining technology and economics. Marcell Dekker, 1984. Chauvel, A, Lefebvre, G.: Petrochemical processes I-II. Gulf. 1989. Edmister, W.C., Lee, B.I.: Applied hydrocarbon thermodynamics, Gulf, 1985 API Technical Data Book – Petroleum Refining, 1997 PRO/II Input Manual, Pro/II Reference Manual, 2006 Reid, R.C., Prausnitz, J.M., Poling, B.E.: The Properties of gases and liquids, McGraw-Hill, 1987