



COURSE DATASHEET

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| Semester: | 2014/15/1 |
| Course: | Process Design III. |
| Code: | VEMKEL3253B |
| Responsible department: | Department of Hydrocarbon and Coal Processing |
| Department code: | MKOL |
| Responsible instructor: | dr. Zoltán Varga |

Course objectives:

Development of awareness of technical and economic aspects in chemical processes, process design and intensification, in retrofitting and utilisation of existing equipment by applying the principles of chemical engineering and design softwares.

Course content:

1. E.: Tray type distillation columns. Principles and practice of design of tray type distillation columns. Tray types: bubble cup, valve, sieve trays. L.: Demonstration of HEXTRAN design software. 2. E.: Design of bubble cup tray I. Principles of sizing. Elements of bubble cup tray, tray balance, flexibility, entrainment, flooding L.: Rigorous heat exchanger model of PRO/II. Example. 3. E.: Design of bubble cup tray II. Liquid height over outlet weir, liquid gradient across tray, pressure drop, slot opening, total pressure drop. L.: Sizing of bubble cup tray column. Example 4. E.: Algorithm of sizing of valve tray. L.: Sizing of valve cup tray column. Example. 5. E.: Design of packed towers I. Packing types (structured and random packing). Design principles. Structured and random packing sizing. L.: Example. 6. E.: Demonstration of sizing and rating softwares. L. Sizing with PRO/II simulation program. 7. E.: Equipment for vapor/liquid separation. Selection. Flash drums, cyclones, mist eliminators. L.: Sizing of flash drums. 8. E.: Parts of pressure vessels. Mechanical design of pressure vessels. L.: Design of pressure vessel. 9. E.: Piping. Determination of optimal pipe diameter. Classification. L.: Example. 10. E.: Pump selection and design. Estimation of head and power requirement. L.: Example 11. E.: Compressor selection and design. Estimation of power requirement. L.: Example. 12. E.: Vacuum production. Vacuum pumps, vacuum ejectors. L.: Sizing of ejectors. 13. E-L.: Detection and elimination of potential failures in chemical equipment. 14. E-L.: Examination paper. 15. E.: Plant layout L.: Example

Requirements, evaluation and grading:

Examination papers (min. 50%)

Required and recommended readings:

1. Fonyó Zsolt és Fábry György: „Vegyipari művelettani alapismeretek”, Nemzeti Tankönyvkiadó, Budapest, 1998. 2. Fábry György szerk.: „Vegyipari gépészek kézikönyve”, Műszaki Könyvkiadó, Budapest, 1987. 3. Carl R. Branan, Editor: „Rules of Thumb for Chemical Engineers”, Gulf Professional Publishing, Amsterdam,



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Required and recommended readings:

2002. 4. J. M. Coulson és J. F. Richardson: „Chemical Engineering Series Vol. 1-6.”, Butterworth-Heinemann, Oxford, 2002. 5. E. E Ludwig,: „Applied Process Design for Chemical and Petrochemical Plants, Volume 1-3”, Gulf Publishing Co. 1983. 6. Walas, S. M.: „Chemical Process Equipment Selection and Design”, Butterworth-Heinemann, Oxford, 1990.