**COURSE GUIDE – short form**

Academic year 2014-2015

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| Course name[[1]](#endnote-2) | **Engineering thermodynamics and thermal equipment 2** | | | | | Course code | | | MTC.204. DI. DID | |
| Course type[[2]](#endnote-3) | DID | Category[[3]](#endnote-4) | DI | Year of study | 2 | Semester | 3 | Number of credit points | | 6 |

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| Faculty | Mechanical Engineering | Number of teaching and learning hours[[4]](#endnote-5) | | | | | |
| Field | All | Total | L | T | LB | P | IS |
| Specialization | All | 70 | 28 | 14 | 28 | - | 70 |

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| Pre-requisites from the curriculum[[5]](#endnote-6) | Compulsory | Mathematics (algebra and calculus), Physics |
| Recommended | Chemistry |

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| General objective [[6]](#endnote-7) | Students should acquire knowledge regarding thermal phenomena and shold learn how to apply this knowledge in the case of heat systems and equipment . |
| Specific objectives[[7]](#endnote-8) | * Assimilate basic theoretical knowledge in engineering thermodynamics and heat transfer; * Develop basic abilities (cognitive, applicative, and experimental) regarding the operation of thermal systems and equipment; * Assimilate solid knowledge on analysis methods specific to engineering thermodynamics, processes that occur in thermal machines and equipment, and ways to improve and render more efficient the operation of thermal machines and equipment. |
| Course description[[8]](#endnote-9) | 1. Vapors  Phase transition, phase equilibrium. Properies on the liquid and vapor lines ; saturated and superheated vapor, quality. Phase diagrams. Saturated liquid, saturated vapor and superheated vapor properties. Steam. Thermodynamic processes of vapors. Vapor power and refrigeration cycles. |
| 2. Humid air  Introduction. Properties. Mollier diagram. Air conditioning systems. |
| 3. Thermodynamics of fluid flow  Basic equations. Nozzles and diffusers. Study of nozzles. |
| 4. Combustion  Basics. Fuels composition. Heating value. Combustion stoichiometric equations. Combustion air. Flue gases composition. Excess air. Flue gases temperature. Combustion control. |
| 5. Conduction Heat Transfer  Basics. Fourier’s law. Steady state heat conduction in simple geometries. Extended heat transfer surface area: fins. |
| 6. Convection Heat Transfer Newton’s law. Factors influencing convection. Basic differential equations. Free and forced convection. Similitude theory. |
| 7. Radiation Heat Transfer  Radiation mechanism. Laws. Radiation heat transfer between bodies separated by transparent media. Radiation screens. |
| 8. Heat exchangers  Classification, construction. The mean temperature differential. The NTU method. |

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| Assessment | | | Schedule[[9]](#endnote-10) | Percentage of the final grade (minimum grade)[[10]](#endnote-11) |
| Continuous assessment | Class tests along the semester | |  | % |
| Activity during tutorials/laboratory works/projects/practical work | |  | 50% |
| Assignments | |  | % |
| Final assessment | Final assessment form[[11]](#endnote-12) | Exam | exam period | 50% |
| Examination procedures and conditions:  1. ; Subject development ; written ; 33.33 %  2. ; Subject development ; written ; 33.33 %  3. ; Problem solving; written; tables and diagrams; 33.33 % | | |

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| Course organizer | Professor Bogdan Horbaniuc |  |
| Teaching assistants | Professor Bogdan HorbaniucAssociate Professor Haralambie Vartolomei |  |

1. Course name from the curriculum [↑](#endnote-ref-2)
2. DF – fundamental, DID – in the field, DS – specialty, DC – complementary (from the curriculum) [↑](#endnote-ref-3)
3. DI – imposed, DO –optional, DL – facultative (from the curriculum) [↑](#endnote-ref-4)
4. Points 3.8, 3.5, 3.6a,b,c, 3.7 from the Course guide – extended form (L-lecture, T-tutorial, LB-laboratory works, P-project, IS-individual study) [↑](#endnote-ref-5)
5. According to 4.1 – Pre-requisites - from the Course guide – extended form [↑](#endnote-ref-6)
6. According to 7.1 from the Course guide – extended form [↑](#endnote-ref-7)
7. According to 7.2 from the Course guide – extended form [↑](#endnote-ref-8)
8. Short description of the course, according to point 8 from the Course guide – extended form [↑](#endnote-ref-9)
9. For continuous assessment: weeks 1 – 14, for final assessment – colloquium: week 14, for final assessment-exam: exam period [↑](#endnote-ref-10)
10. A minimum grade might be imposed for some assessment stages [↑](#endnote-ref-11)
11. Exam or colloquium [↑](#endnote-ref-12)