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| **Course code** | CC1 |
| **Type and description** | CC – core curriculum |
| **ECTS credit** | 4 |
| **Course name** | **Transport phenomena** |
| **Course name in Polish** | **Zjawiska przenoszenia** |
| **Language of instruction** | English |
| **Course level** | 8 PRK |
| **Course coordinator** | Prof. Dr. Rajendra Prasad Chhabra - Indian Institute of Technology, Kanpur, India |
| **Course instructors** |  |
| **Delivery methods and course duration** | **Lecture Tutorials Laboratory Project Seminar Other Total**  Contact hours 30 30 0 60 60  E-learning No No No No No No  Assessment criteria 50% 50% |
| **Course objective** | Provide the knowledge on the fundamental principles (three pillars: momentum, heat and mass transfer) of chemical engineering. |
| **Learning outcomes** | The doctoral candidate can:  1. describe the momentum, heat and transfer phenomena with the use of valid mathematical tools (***W1, U2, K1)***  2. discuss the analogies between momentum, heat and transfer phenomena (***U2, K1)***  3. apply the knowledge of transfer processes to describe the unite operation in chemical engineering (***U1, U3, K1)*** |
| **Assessment methods** | The final grade consists of:  Exam - 100% |
| **Prerequisites** | None |
| **Course content with delivery methods** | Lecture:  1. Momentum transfer, basic laws of fluid mechanics, balance of energy in the flow, flow in the tube and other systems  2. Mechanisms of heat transfer: conduction, convection radiation for various geometries  3. Mechanism of mass transfer: diffusion convection  Tutorials:  - performing calculations connected with momentum, heat, and mass transfer |
| **Basic reference materials** | Robert H. Perry (ed.) “PERRY’S CHEMICAL ENGINEERS’ HANDBOOK” McGraw and Hill, New York |
| **Other reference materials** | Materials of the lecturer |
| **Average student workload outside classroom** | 15h |
| **Comments** |  |
| **Last update** |  |