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| Óbudai EgyetemBánki Donát Gépész és Biztonságtechnikai Mérnöki Kar |  |
| **Mérnöki fizika-** **Engineering Physics** BGRFM11NEC **Kreditérték: 4** |
| Dr. Ruszinkó E. |
| Designed to develop an understanding of the phenomena of our everyday life via the laws of physics. Includes topics in mechanics, flow- and thermodynamics and other physics subfields.  |
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|  | **Topics** |
| 1. | Fluid properties: density and specific weight, viscosity, compressibility, surface tension, capillarity, vapor pressure. |
| 2. | Conservation laws. Properties of an ideal gas. First law of thermodynamics. Thermodynamics quantities: enthalpy, ratio of specific heats. Isotropic, isochoric, isobar, and adiabatic processes. |
| 3. | Fluid statics: a general equation to predict the pressure variation. Pressure in liquid at rest. Pressures in the atmosphere. Manometers. |
| 4. | Buoyancy: buoyant force, Archimedes’ principle, prove the law of buoyancy, hydrometer; stability, metacentric height. |
| 5. | Pressure in liquid contained in a linearly accelerating container. Pressure in liquid contained in a rotating container. |
| 6. | Fluids in motion: Lagrangian and Eulerian description of motion. Fluids in motion: pathline, streamline, streamtube, streakline, the acceleration of a fluid particle (substantial and material derivative). |
| 7. | *-* |
| 8. | Fluids in motion: angular velocity and vorticity. Fluids in motion: the deformation of a particle; rate-of-strain tensor. |
| 9. | Classification of fluid flows: one-, two-, and three-dimensional flows. Viscous and inviscid flows. Laminar and turbulent flows, Reynolds number. Incompressible and compressible flows. |
| 10. | Derive the Bernoulli equation (along a streamline). Total head, static pressure, total pressure. |
| 11. | *-* |
| 12. | Piezometer, Pitot probe, Pitot static probe |
| 13. | Test |
| 14. | Test |
| **Literature:** Pijush K. Kundu, Ira M. Cohen, David R. Dowling, *Fluig Mechanics*, 2012. Elsevier. |
| **Recommended literature:**Merle C. Potter, David C. Wiggert, Bassem Ramadan, *Mechanics of Fluids,* 2012, Cengage Learning.John R. Howell, Richaed O. Buckius, *Fundamentals of Engineering Thermodynamics*, 1992, McGraw-Hill, Inc. |