**Table 5.1** Course specification to doctoral study programs

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| **Course name: Selected chapters in hydraulics** |
| **Teacher or teachers:** [**Aranđelović S. Dragan**](../P%209.3%20Knjiga%20Nastavnika%20DOS%20He/1.%20Dragan%20S.%20Arandjelovic%2C%20redovni%20profesor.xlsx)**,** [**Blagojević S. Borislava**](../P%209.3%20Knjiga%20Nastavnika%20DOS%20He/48.%20Borislava%20D.%20Blagojevic%2C%20docent.xlsx) |
| **Course status:** Elective |
| **Number of ECTS:** 10 |
| **Precondition courses:** None |
| **Educational goal**Mastering of basic conversation equations in laminar and turbulent flow of incompressible fluids and non-steady flow in open courses. |
| **Educational outcomes** The subject builds student capacity in application of contemporary methods of analysis of non-steady flow in open courses. |
| **Course content**Fundamental equation of mass conversation (integral and differential). Fundamental equation of conservation of momentum (integral and differential, inertia). Fundamental equation of conservation of total energy and mechanical energy. Stress and strain relationship: Navier-Stokes’ equation. Turbulence. Laminar and turbulent flow. Averaging of parameters in turbulent flow. Reynolds’ equation. Turbulence models.Steady and unsteady open course flow. Simulation models. Unsteady flow. Numerical methods for solving of unsteady flow equation. Initial and contour conditions. Stability of numerical calculation patterns for the calculation of unsteady flow. |
| **Literature**1. Georgije Hajdin (2002): Mehanika fluida, knjiga prva, osnove. Građevinski fakultet Belgrade; 2. Georgije Hajdin (2002): Mehanika fluida, knjiga druga, uvođenje u hidrauliku. Građevinski fakultet Belgrade;3.Regulacija reka, Rečna hidraulika i morfologija, Miodrag B.Jovanović, Građevinski fakultet Belgrade, 2002.4. Knudsen, J.G. i D.L. Katz (1958): Fluid Dynamics and Heat Transfer. McGraw-Hill; Liggett, J.A. (1994): 5. Fluid Mechanics. McGraw-Hill; Munson, B.R., D.F. Young and T.H. Okiishi (2006): 6. Fundamentals of Fluid Mechanics, fifth edition, John Wiley and Sons. |
| **Number of active teaching classes (weekly)** | Lectures: 4 | Study research work: 0 |
| **Teaching methods**Lectures, term paper (produced using the given references).  |
| **Knowledge evaluation (maximum 100 points)****Pre-examination obligations Points Final exam Points**Lecture attendance **10**  Oral part of the exam **50**Term paper **40**  |