**Formular për SYLLABUS të Lëndës**

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| **Të dhëna bazike të lëndës** |
| **Academic Unit:**  | **Faculty of Mathematics & Natural Sciences** |
| **Course title:** | **Transport phenomena**  |
| **Level:** | **Bachelor (Bsc)** |
| **Course status:** | **Elective** |
| **Study year:** | **II** |
| **Number of hours per week:** | **2+1** |
| **Credit value – ECTS:** | **3** |
| **Time / location:** |  |
| **Lecturer:** | **Prof.Asoc.Dr. Bashkim Thaçi** |
| **Contact details:**  | **bthaqi75@gmail.com** |
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| **Course description** | This course consists of the principles and lows of transport phenomena (momentum, heat and mass transfers). Apply the basic equations at macroscopic level depending on mechanism of momentum, heat and mass transfer.  |
| **Course objectives:** | This course, provide the students with knowledge to recognize the modern concepts and basis lows of transport phenomena. Understand and apply the basis equations of heat and mass transfer. Explain the mechanisms of fluid transport identify Newton and non-Newton’s fluids. Compare laminar and turbulent flow, calculate fluid velocity. Define influence of hydrodynamic condition on heat transfer coefficient. Analogies between heat, mass and momentum, transfer. |
|  **Learning outcomes:** | After completing this course students will be able to:* Understand the principles and lows of transport phenomena (momentum, heat and mass transfer)
* Understand the principles of transport phenomena applied to fluid motions.
* Understand and apply the basis equations of mechanism heat and mass transfer.
* The ability to use the methodology of dimension analysis.
* Apply analogy between momentum, heat and mass transfer to define transport coefficients.
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| **Contribution on student load (must correspond with learning outcomes)** |
| **Activity**  | **Hours** | **week** | **Total /hours**  |
| Lectures | 2 | 15 |  30 |
| Exercise theoretical/laboratory | 1 | 15 | 15 |
| Practice work |  |  |  |
| Contact with lecturer/consultations | 1 | 5 | 5 |
| Field exercises |  |  |  |
| Mid-terms, seminars | 1 | 2 | 2 |
| Homework | 1 | 5 | 5 |
| Individual time spent studying (at the library or home) | 1 | 10 | 10 |
| Final preparation for the exam |  |  |  |
| Time spent in evaluation (tests, quiz, final exam) | 2 | 2 | 4 |
| Projects, presentations, etc. | 2 | 2 | 4 |
| **Total** |  |  | **75** |
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| **Teaching methods**  | Lectures, discussions, exercises, consultations, homework, colloquies and exams. |
| **Evaluation methods** | The first test is 20%, second test is 20%, attendance 5%, engagements in practical exercises 15% and final exam 40%. |
| **Literature** |
| **Basic Literature:**  | 1. Fundamentals of Momentum, Heat, and Mass Transfer, [James Welty](http://www.amazon.com/s/ref%3Ddp_byline_sr_book_1?ie=UTF8&field-author=James+Welty&search-alias=books&text=James+Welty&sort=relevancerank), [Charles E. Wicks](http://www.amazon.com/s/ref%3Ddp_byline_sr_book_2?ie=UTF8&field-author=Charles+E.+Wicks&search-alias=books&text=Charles+E.+Wicks&sort=relevancerank), [Robert E. Wilson](http://www.amazon.com/s/ref%3Ddp_byline_sr_book_3?ie=UTF8&field-author=Robert+E.+Wilson&search-alias=books&text=Robert+E.+Wilson&sort=relevancerank), [Gregory L. Rorrer](http://www.amazon.com/s/ref%3Ddp_byline_sr_book_4?ie=UTF8&field-author=Gregory+L.+Rorrer&search-alias=books&text=Gregory+L.+Rorrer&sort=relevancerank), New York: John Wiley and Sons. Inc 4th edition 2000. |
| **Additional Literature**  | 2.Transport Phenomena in Materials Processing, [D. R. Poirier](http://www.amazon.com/D.-R.-Poirier/e/B001KILHLC/ref%3Ddp_byline_cont_book_1), [G. H. Geiger](http://www.amazon.com/s/ref%3Ddp_byline_sr_book_2?ie=UTF8&field-author=G.+H.+Geiger&search-alias=books&text=G.+H.+Geiger&sort=relevancerank). New York: John Wiley and Sons. Inc 1998.3.Introduction to Heat and Mass Transfer. Incropera, Frank P., and David P. DeWitt. New York: John Wiley & Sons Inc., July 2000. |

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| **Designed study plan:**  |
| **Week** | **Lectures which will be held** |
| ***First week:*** | Concept and definition |
| ***Second week:*** | Fluid Statics  |
| ***Third week:*** | Description of a fluid in motion  |
| ***Fourth week:*** | Conservation of Mass: Control-Volume Approach. |
| ***Fifth week:*** | Newton’s second law of motion. |
| ***Sixth week:*** | Conservation of energy |
| ***Seventh week:*** | First intermediary test |
| ***Eighth week:*** | Laminar flow  |
| ***Ninth week:*** | Analysis of a differential fluid element in laminar flow |
| ***Tenth week:*** | Viscosity flow |
| ***Eleventh week:*** | Flow in closed conduits |
| ***Twelfth week:*** | Fundamentals of heat transfer |
| ***Thirteenth week:*** | Differential of heat transfer |
| ***Fourteenth week:*** | Fundamentals of mass transfer |
| ***Fifteenth week:*** | Second intermediary test  |
| **Designed study plan:**  |  |
| **Week** | **Lectures which will be held** |

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| Determination of fluid density at a point.  |
| Determination of pressure at a point in a static fluid..  |
| Describe the fluid motion by Lagrangian. |
| Describe the fluid motion by Eulerian. |
| Determination of liquid velocity.  |
| First colloquia |
| Laminar flow in circulate pipes.  |
| Determination of intrinsic viscosity of the liquid. |
| Determination of oil flow rate in horizontal pipes.  |
| Determination of oil flow rate in inclined pipes.  |
| Determination of convective heat transfer coefficient, during fluid in circulate pipes.  |
| Determination of heat transfer coefficient during fluid in natural convection. |
| Determination of oxygen concentration in water at temperature: 10, 25 and 40 oC. |
| Second colloquia |
| **Academic policies and rules of conduct:** |
| Attendance at lectures and exercises should be regular and scheduled time. Students must be in commensurate to the general rules of the university. For specific rules and specifics of organizing lectures and exercises, students are notified by the professor of the course. |