Zał. nr 4 do ZW 64/2012

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| **FACULTY OF COMPUTER SCIENCE AND MANAGEMENT**  **SUBJECT CARD**  **Name in Polish …Fizyka Środowiska Pracy**  **Name in English Work Environment Physics**  **Main field of study (if applicable): Management**  **Specialization (if applicable): Business Management**  **Level and form of studies: 1st level, full-time**  **Kind of subject: obligatory**  **Subject code FZZ2502**  **Group of courses NO** |

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|  | Lecture | Classes | Laboratory | Project | Seminar |
| Number of hours of organized classes in University (ZZU) | **30** | **15** | **15** |  |  |
| Number of hours of total student workload (CNPS) | **60** | **30** | **30** |  |  |
| Form of crediting | **crediting with grade** | **crediting with grade** | **crediting with grade** |  |  |
| For group of courses mark (X) final course |  |  |  |  |  |
| Number of ECTS points | **2** | **1** | **1** |  |  |
| including number of ECTS points for practical (P) classes |  | **1** | **1** |  |  |
| including number of ECTS points for direct teacher-student contact (BK) classes | **1** | **0,5** | **0,5** |  |  |

\*delete as applicable

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| **PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**  1. Basic statistical and mathematical skills (maturity exam or higher)  2.  3. |

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| **SUBJECT OBJECTIVES**  C1 Possessing the basic knowledge about parameters of work environment and the work designing with taking into consideration ergonomics rules.  C2: Ability of work organization with taking into consideration ergonomics rules.  C2.1: optimization of work conditions for effective physical and psychological work  C2.2: preventing the harmful physical factors in the form of barriers and the organization of work, in order to maintain optimal conditions for effective physical and mental activity  C3: Acquisition and consolidation of social skills involving the ability to work in a group of students. The training of work habits according to the principles of ergonomics. |

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| **SUBJECT EDUCATIONAL EFFECTS**  The scope of knowledge: basic knowledge about physics, ergonomics and safety.  PEK\_W01: knowing the basic principles of physics with emphasis on the work environment factors, knowing the effects of some environmental factors on the human body work and workload  PEK\_W02: knowing the basic ergonomic principles, tools and methods for the assessment of workload and the legal and normative basis for occupational safety and ergonomics  The scope of skills: able to organize work in accordance with the principles of ergonomics and safety at work, taking into account the physical factors of the work environment  PEK\_U01: assessment the prevailing workload type and applying the basic methods of ergonomics  PEK\_U02: determining the legal and standard conditions of environment factors and ergonomics in Poland and the European Union on the basis of relevant documents  The scope of social competence: Acquisition and consolidation of competence involving the ability to cooperate in a group of students. Education work habits with regard to ergonomic principles.  PEK\_K01: development the skills of team cooperation to the optimal solution of problems assigned  PEK\_K02: preparation to build the capacity of self-determination, decision making and their implementation in the enterprise. |

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| **PROGRAMME CONTENT** | | |
| **Form of classes - lecture** | | **Number of hours** |
| Lec 1 | Introduction. Work environment and work environment physics - definition. Ergonomics - the history, aims and objectives, methods of ergonomic | 4 |
| Lec 2 | Human being in the work environment. Directive 89/391/EEC (minimal requirements for work safety and ergonomics). The reliability of worker. Human-machine-work environment system. Fundamentals of ergonomic design. | 4 |
| Lec 3 | Work environment factors and their impact on human productivity. Microclimate - basic concepts, the impact on the human body. Physical parameters of microclimate. | 4 |
| Lec 4 | Lighting. Eyesight and eye anatomy. Basic lighting and illumination parameters affecting the employee. The impact of lighting on worker productivity. | 4 |
| Lec 5 | Sound - the basic physical parameters. Noise. Structure and function of the organ of hearing. The impact of noise on humans. Prevention of noise. | 4 |
| Lec 6 | Workspace of man. Variability of human anthropometric measurements. Recommendations for ergonomic work space design. Layout of workstation elements. Posture at work. Factors determining the awkward postures. The consequences of awkward posture. | 4 |
| Lec 7 | Working at the computer workstation. The recommended posture. Workspace organization. Requirements and recommendations for computer workstation. Signal and steering devices. The basic principles of human-computer interaction | 4 |
| Lec 8 | Psychological stress and biomechanical workload. Methods for evaluation of workload and workload reduction | 2 |
|  | Total hours | **30** |

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| **Form of classes - class** | | **Number of hours** |
| Cl 1 | The physical characteristics of the working environment - microclimate, thermal comfort, thermal stress analysis | 2 |
| Cl 2 | The physical characteristics of the work environment - noise and vibration - Evaluation of the workload. | 2 |
| Cl 3 | The physical characteristics of the work environment - lighting - impact on human eyesight and body. | 2 |
| Cl 4 | Energy and postural workload at different workstations | 2 |
| Cl 5 | The layout of the workstation - anthropometry and optimization | 2 |
| Cl 6 | Computer workstation. Analysis and Design | 2 |
| Cl 7 | Human-computer interaction - the analysis and design | 3 |
|  | Total hours | 15 |

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| **Form of classes - laboratory** | | **Number of hours** |
| Lab 1 | Microclimate - computer simulation of thermal effects on the human environment | 2 |
| Lab 2 | Designing a computer workstation - computer analysis of the geometric parameters of the workstation computer. | 2 |
| Lab 3 | Lighting - Lighting Design Simulation in the workplace. | 3 |
| Lab 4 | The design of layout of work elements. | 2 |
| Lab 5 | Biomechanical workload - methods for assessing | 2 |
| Lab 6 | Human - computer interaction. Laboratory testing of the man – machine system | 2 |
|  | Total hours | 15 |

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| **Form of classes - project** | | **Number of hours** |
| Proj 1 |  |  |
| Proj 2 |  |  |
| Proj 3 |  |  |
|  | Total hours |  |

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| **Form of classes - seminar** | | **Number of hours** |
| Sem 1 |  |  |
| Sem 2 |  |  |
| Sem 3 |  |  |
|  | Total hours |  |

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| **TEACHING TOOLS USED** |
| N1. Traditional lecture with multimedia presentation  N2. Laboratory - computer software, specialized research stations constructed in the Laboratory of Ergonomics  N3. Working in groups during the lecture and classes  N4. Self-presentation of the prepared material during classes  N5. Tutorial  N6. Self access - independent studies, preparing a presentation for classes |

**EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT**

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| **Evaluation** (F – forming (during semester), P – concluding (at semester end) | Educational effect number | Way of evaluating educational effect achievement |
| F1 | PEK\_W01 – PEK\_W02  PEK\_U01 - PEK\_U02  PEK\_K01 – PEK\_K02 | Activity during lectures, classes and laboratories  Group work during lectures and classes  Short tests  Self-prepared presentation  Laboratory exercises conducting |
| F2 | PEK\_W01 – PEK\_W02  PEK\_U01 - PEK\_U02 | Written test for crediting with grade |
| P=F2 | | |

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| **PRIMARY AND SECONDARY LITERATURE** |
| **PRIMARY LITERATURE:**   1. Materiały dostępne na stronie [www.ergonomia.ioz.pwr.wroc.pl](http://www.ergonomia.ioz.pwr.wroc.pl/) 2. Górska E., Ergonomia : projektowanie, diagnoza, eksperymenty, Warszawa : Oficyna Wydawnicza Politechniki Warszawskiej, 2007. 3. Horst W., Ryzyko zawodowe na stanowisku pracy. Cz. 1 i 2, Poznań : Wydawnictwo Politechniki Poznańskiej, 2004. 4. Jabłoński J. [red.], Ergonomia produktu: ergonomiczne zasady projektowania produktów, Wydawnictwo Politechniki Poznańskiej, 2006 5. Kasperski M., Projektowanie stron WWW: użyteczność w praktyce, Gliwice: Wydawnictwo Helion, 2008. 6. Nielsen J., Optymalizacja funkcjonalności serwisów internetowych, Gliwice: Helion, 2007. 7. Salvendy, Gavriel (red), Handbook of Human Factors and Ergonomics, John Wiley & Sons, 2006; dostępny w wersji elektronicznej 8. Wykowska M., Ergonomia : jako nauka stosowana, Kraków: AGH Uczelniane Wydawnictwa Naukowo-Dydaktyczne, 2009.   **SECONDARY LITERATURE:**   1. Grobelny J., Jach K., Kuliński M., Michalski R., Śledzenie wzroku w badaniach jakości użytkowej oprogramowania : Historia i mierniki. W: Interfejs użytkownika. Kansei w praktyce. Red. nauk. K. Marasek, M. Sikorski. Warszawa : Wydaw. Polsko-Japońskiej Wyższej Szkoły Technik Komputerowych, 2006 2. Grobelny J., Jach K., Ergonomics and usability of information systems. W: Ergonomics and work safety in information community. Education and researches. Eds Leszek M. Pacholski, Jerzy S. Marcinkowski, Wiesława M. Horst. Poznań : Institute of Management Engineering. Poznan University of Technology, 2005 3. Koradecka D., [red.], Bezpieczeństwo pracy i ergonomia, Centralny Instytut ochrony Pracy, Warszawa, 1999 4. Michalski R., Grobelny J., Jach K., Kuliński M., Wykorzystanie okulografii w analizie użyteczności serwisów internetowych. W: Interfejs użytkownika. Kansei w praktyce. Red. nauk. K. Marasek, M. Sikorski. Warszawa : Wydaw. Polsko-Japońskiej Wyższej Szkoły Technik Komputerowych, 2006 5. Nielsen J., Projektowanie funkcjonalnych serwisów internetowych, Wydawnictwo Helion, Gliwice, 2003 6. Norman D., The design of everyday things, Currency and Doubleday, 1990 7. Nowak E., Atlas antropometryczny populacji polskiej - dane do projektowania. The Anthropometric Atlas of Polish Population - Data for Design, IWP Warszawa, 2001 8. Pacholski L., [red.], Ergonomia, Wydawnictwo Politechniki Poznańskiej, 1986 9. Proctor R.W., van Zandt T., Human factors in simple and complex systems, Allyn and Bacon, 1994 10. Śliwowski L., Mikroklimat wnętrz i komfort cieplny ludzi w pomieszczeniach, Oficyna Wydawnicza Politechniki Wrocławskiej, 2000 11. Tytyk E., Projektowanie ergonomiczne, Wydawnictwo Naukowe PWN, 2001 |
| **SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)** |
| **dr hab. inż. Jerzy Grobelny, prof.PWr** [**jerzy.grobelny@pwr.wroc.pl**](mailto:jerzy.grobelny@pwr.wroc.pl)**, tel. 71 348 5050** |

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

**WORK ENVIRONMENT PHYSICS**

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **MANAGEMENT**

AND SPECIALIZATION **Business Management**

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| **Subject educational effect** | **Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)\*\*** | **Subject objectives\*\*\*** | **Programme content\*\*\*** | **Teaching tool number\*\*\*** |
| **PEK\_W01** | K1\_ZARZ\_W22 | **C1** | **Lec1-Lec8; C1-C6; La1-La5** | N1 – N6 |
| **PEK\_W02** | K1\_ZARZ\_W04  K1\_ZARZ\_W06  K1\_ZARZ\_W22 | C2 | **Lec1-Lec8; C1-C7; La1-La7** | N1 – N6 |
| **PEK\_U01** | K1\_ZARZ\_U13 | **C2.1** | **Lec1-Lec8; C1-C7; La1-La7** | N1 – N6 |
| **PEK\_U02** | K1\_ZARZ\_U06  K1\_ZARZ\_U15 | **C2.2** | **Lec1-Lec8; C1-C7; La1-La7** | N1 – N6 |
| **PEK\_K01** | K1\_ZARZ\_K02 | **C3** | **C1-C7; La1-La7** | N1 – N6 |
| **PEK\_K02** | K1\_ZARZ\_K04 | **C3** | **Lec1 – Lec8; C1-C7; La1-La6** | N1 – N6 |

\*\* - enter symbols for main-field-of-study/specialization educational effects

\*\*\* - from table above