The list of courses offered by the Faculty of Computer Science and Management W8

BASIC COURSES

Knowledge integration and collective intelligence 15h

Prof. dr hab. inż. Ngoc Than Nguyen

The basic course for PhD students from different faculties contains lectures about advanced methods for knowledge integration and collective intelligence. The following topics will be presented: Consensus theory; algorithms for integrating knowledge using different representations; ontology integration and allignment; prediction markets; intelligence parameters for a collective; impacts of cardinality and diversity on collective knowledge accuracy.

FACULTY COURSES: FIELD OF STUDY

Research Methodology in Information Systems and Computing W-15h, EX-15h

Dr hab. inż. Urszula Markowska-Kaczmar

The course is a kind of workshop, where theory given in the lecture is supported by practical exercises performed by students. It is a guide in essential areas starting from choosing a research topic to investigating it using appropriate methods, to presenting the findings and demonstrating results. It shows good practices in writing papers from the current research project and surveys. It also describes the evaluation cycle in case of conference and journal papers. The course teaches how to exchange ideas about research projects and evaluate them. It also aims at acquiring practical skills in writing research proposals for a grant application.

Methods of Systems Engineering W-30h

Prof. dr hab. inż. Jerzy Józefczyk

Systems engineering provides a variety of methods and algorithms suitable for systems (processes) of different nature. The lecture aims at revealing for students performing research in various fields of engineering the possibility to use selected systems engineering-based methods and techniques for the determination of mathematical models of systems as well as for solving different problems of analysis and synthesis (decision making) for such systems. It will be possible for a student to apply acquired knowledge for systems relevant to his/her research discipline. Main topics of the lecture are as follows:
1. The review of selected mathematical models of systems, in particular for cause-effect systems, comprising static (functional as well as relational ones), dynamic, and logic models.
2. Methods for quantitative analysis, foundations of computer simulation, and chosen problems of pattern recognition.
3. Selected problems and methods of decision making, e.g., optimal and satisfactory decision making, multi-stage decision making, multi-criteria decision making, and uncertain cases of decision making.

Market behavior of companies W-30h (summer semester)

Prof. dr hab. inż. Zbigniew Malara

The aim of the course is to discuss the management of organizations in a turbulent environment (social, institutional, economic, etc.). Students gain knowledge in the field of searching for and implementing solutions that intend to obtain an entrepreneurial organization model, which is a productive, creative, efficient, flexible and competitive organization in all strategic areas of its functioning.

Optimization in decision making W-30h

Prof. dr hab. inż. Dorota Kuchta

The aim of the course is to present basic notions, models and algorithms of optimisation to beginners, together with their practical applications in decision making. The course comprises: linear mathematical programming model, scheduling problems (flow shop, job shop, open shop), the knapsack problem, the graph coloring problem, the shortest and longest path problem, the travelling salesman problem, the cheapest coverage problem, the assignment problem, the maximal flow problem, project scheduling problems. Practical applications cover production scheduling, personnel selection, marketing strategy selection, project planning, university courses scheduling. The course discusses the problem of computational complexity and presents both exact and approximate algorithms. The students will do a lot of exercises, manually and using the EXCEL addition, SOLVER.

Foundations of accounting W-30 h

Prof. dr hab. inż. Dorota Kuchta

The aim of the course is to present basic notions of bookkeeping and accounting to beginners, so that they will be able to communicate with accountants and financial services. Both financial and managerial accounting will be covered. As far as financial accounting is concerned, bookkeeping accounts will be presented together with their role in the accounting process. Then financial statement will be discussed (balance sheet, loss and profit statement and cash flow statement), as well as elements of their analysis. As far as managerial accounting is concerned, the course will discuss fixed and variable cost, the breakeven point, the direct and indirect cost, the make-or-buy problem, the problem of indirect cost allocation (the Activity Based Costing will be presented in detail), budgeting approaches, as well as capital budgeting. The students will do a lot of exercises, manually and using EXCEL.

Project management W-30h

Prof. dr hab. inż. Dorota Kuchta

The aim of the course is to present basic notions of project management to beginners. The whole project lifecycle will be discussed, starting with the formulation of the project objective, through the project charter, coming to the project detailed plan (schedule, budget, personnel assignment, risk management plan, communication plan). Then methods of controlling the project implementation will be discussed, with a special emphasis of the Earned Value Method. Finally, project closing and lessons learned register will be presented. The student will be made acquainted both with the traditional and agile approaches to project management. They will work using case studies of real

world projects, above all social and research projects. They will elaborate project plans and simulate the control of project implementation for the case studies, using EXCEL and Microsoft Project or similar tools.

Group decisions W-15h

Prof. dr hab. inż. Jacek Mercik

Basic Methods for Preferences Representation: profiles of decisions makers, classification, voting techniques. Arithmetic of Collective Choice. Elements of cooperative and non-cooperative Game Theory . Calculus of Power. Spatial Analysis and Multidimensional Classification. Taxonomy of Objects in Multidimensional Space. Classification Trees: dichotomous and continuous variables. Logit, Probit and Discriminant functions. Econometrics Models and Analysis of Variance Technique in Decisions Making.

Linear Programming W-30h (winter semester)

Dr hab. inż. Adam Kasperski

The course is devoted to mixed integer linear programming (MIP), which is one of the most popular class of optimization problems, having a lot of applications in various areas of science and engineering. Both, theory and some modeling techniques will be shown. In particular, the following topic will be presented: the simplex algorithm, duality and sensitivity analysis, elements of theory of polyhedra, cutting planes and branch and bound algorithms, decomposition techniques for large-scale problems, Lagrangian relaxation, network problems and computational complexity of linear programming. During the course a modern software for solving MIP problems will be also presented.

INTERDISCIPLINARY COURSES

Science meets Social Science, S-30

Prof. dr hab. inż. Rafał Weron

The *Science meets Social Science (S3)* seminar is focused on applications of statistical, stochastic and numerical methods in social sciences. It is interdisciplinary, both in the selection of topics and the use of expert knowledge from diverse areas of science. Seminar webpage: http://www.ioz.pwr.wroc.pl/pracownicy/weron/S3.htm

Faculty interdisciplinary seminar S-15 h (summer semester)

Prof. dr hab. inż. Halina Kwaśnicka and prof. dr hab. inż. Jerzy Józefczyk

This seminar is aimed to discuss the research fields of all attended students. Students should present the area of their research, main topic of their PhD, and proposed approaches together with obtained results. The recent scientific journal papers, influenced the research of presenters, are also presented. The goal of this seminar is to improve the skill of presentation own research to the

audience, do contribute in a discussion on particular PhD topics and discuss the published research connected with realized PhD thesis.

Knowledge management, S-15 h

Prof. dr hab. inż. Ngoc Than Nguyen

This is an interdisciplinary course and is a series of seminars prepared and presented by PhD students. The subject of the seminars concerns different topics of knowledge management such as methods for integrating knowledge from different sources, risk management in enterprises, knowledge management in information systems and human systems.