Subject programme

1. Subject name / subject module: **Artificial intelligence**
2. Lecture language: **English**
3. The location of the subject in study plans:
   - Area or areas of the studies: **Computer Control Systems Engineering**
   - Degree of the studies: **2nd degree studies**
   - Field or fields (implementation of effects standard): **Mechatronics**
4. Supervision of subject implementation:
   - The Institute / Another unit: **The Institute of Informatics and Mechatronics**
   - The person responsible for the subject: **Shakhovska Nataliya, dr hab. inż.**
   - People cooperating in the development of the programme of the subject:
5. The number of hours and forms of teaching for individual study system and the evaluation method

Teaching activities with the tutor																						Total
Form of classes / Mode of study	Lecture	SOW	ECTS	Classes	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	ECTS
Full-time studies	24	52	3	32	68	4																7
Part-time studies																						
Credit rigor	Exam			Graded assigment																		

6. Student workload – ECTS credits balance
   1 ECTS credit corresponds to 25-30 hours of student work needed to achieve the expected learning outcomes including the student's own work

Activity (please specify relevant work for the subject)	**Hourly student workload (full-time studies/part-time studies)**
Participation in lectures	**24**
Participation in laboratory classes	**32**
Preparing reports	**35**
Preparing homeworks	**33**
Independent study of the subject	**50**
Participation in an exam / graded assignment / final grading	**2**
Total student workload	**175**
ECTS credits	**7**
* Student's workload related to practical forms	**100**
Student's workload in classes requiring direct participation of academic teachers	**55**

7. Implementation notes: recommended duration (semesters), recommended admission requirements, relations between the forms of classes:

   To know the functional and hardware structure of a computer, the concept and classification of software computers. To use computer devices, work in a graphic environment operating system and use the application programs

   Recommended duration of the subject is taken from the course plan.
8. Specific learning outcomes – knowledge, skills and social competence

Specific learning outcomes for the subject		Form	Teaching method	Methods for testing of (checking, assessing) learning outcomes
Outcome symbol	Outcome description			
Knowledge				
K_W07	**To know the methods of data analysis and the methods of knowledge representation. To know the special application of advanced statistical methods and IT tools used to collect, analyze and present data. To know the rules of building and using systems with a knowledge base and has knowledge about their use in the organization.**	**Lecture**	**Expository methods**	**Student learning activities**

Skills				
K_U03	Can make a simple database of facts and rules. Is able to use specialized IT tools to analyze selected problems	Classes	Inquiry methods	Student learning activities

9. Assessment rules / criteria for each form of education and individual grades

0% - 50%	ndst	**81% - 90%**	db
51% - 70%	dst	**91% - 93%**	db+
71% - 80%	dst+	**94% - 100%**	bdb

Activity	Grades	Calculation	To Final
Reports	**bdb(5)**	**5*50%**	**2,5**
Activity during classes	**Example: db, dst, bdb(4,3,5)**	**Avg. (4+3+5)/3=4->4*20%**	**0,8**
Homeworks	**Example: ndst, bd, dst (2, 4, 3)**	**Avg. (2+4+3)/3=3->3*20%**	**0,6**
Attendance	**on 75% classes**	**6/8=0,75*5->3,75*10%**	**0,375**

10. The learning contents with the form of the class activities on which they are carried out

(Lecture, classes)

1. Artificial neural networks: Neuron and its models; Overview of the methods of network learning; Non-linear one-way networks; Radio base functions networks; Resurrection networks; Self-organising networks; stacking networks; Best architecture and learning dataset; Selected uses of neural networks; Implementation of neural networks;

2. Logic is blurred: Collections; Interpretation and designation of functions of belonging; Operations in collections; Model of Mamdai; Model of Takage-Sugeno; Neuronowo-rozmyte; Examples of uses;

3. Genetic algorithms: Genetic algorithms and traditional optimization methods; Basic concepts of genetic algorithms; Classical genetic algorithm; Solution coding; Programming function; genetic operators; Customisation function; genetic operators; Individual selection; Genetic algorithms for multi-criteria optimization; Examples of genetic algorithms; evolutionary algorithms;

4. Expert systems: Types of expert systems; Structure of the expert system; Rerepresentation and coding of knowledge; proposal; Tools of implementation; Examples of use of expert systems

11. Required teaching aids

Lecture - multimedia projector

Laboratory classes - specialist laboratory

12. Literature:

a. Basic literature:

Turban E., Aronson J.,Decision Support Systems and Intelligent Systems. Prentice Hall, 2007.

a. Supplementary literature:

Patridge D., Engineering Artificial Intelligence Software, Intelect Books, 1998.

b. Internet sources:

13. Available educational materials divided into forms of class activities (Author's compilation of didactic materials, e-learning materials, etc.)

14. Teachers implementing particular forms of education

Form of education	Name and surname
1. Lecture	Shakhovska Nataliya, dr hab. inż.
2. Classes	Shakhovska Nataliya, dr hab. inż.