Subject programme

1. Subject name / subject module: **Advanced Computer Networks**
2. Lecture language: **English**
3. **The location of the subject in study plans:**
   - Area or areas of the studies: Computer Engineering and Mechatronics
   - Degree of the studies: **1st degree studies**
   - Field or fields (implementation of effects standard): **Mechatronics**
4. Supervision of subject implementation:
   - The Institute / Another unit: **Institute of Informatics and Mechatronics**
   - The person responsible for the subject: **Piechowiak Maciej, dr 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																					
Mode of study	Form of classes																				Total
		SOW	ECTS	Laboratory work	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	ECTS
Full-time studies				22	28	2																2
Part-time studies																						
Credit rigor	...			graded assignment																		

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 laboratory classes	**22**
Preparation of reports	**6**
Final project	**20**
Participation in an exam / graded assignment / final grading	**2**
Total student workload (TSW)	**50**
ECTS credits	**2**
* Student's workload related to practical forms	**50**
Student's workload in classes requiring direct participation of academic teachers	**22**

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

   Computer networks

   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_W04	**Student has basic knowledge in the field of communication networks and telecommunications, necessary to understand at an advanced level the switching and routing mechanisms in networks and to apply this knowledge in practice through the use of appr**	**Laboratory work**	**inquiry methods**	**Activity during classes, programming projects**
K_W06	**Student knows and understands selected specific issues in the field of technical computer science related to switching and routing problems in computer networks as well as practical applications of this knowledge.**			

K_W10	Student has detailed knowledge related to the application of the following in mechatronics: computer networks and information security.			
K_W11	Student has basic knowledge of technical standards and norms commonly used in computer networks as well as the life cycle of network systems.			
Skills				
K_U02	Student is able to use their knowledge - to formulate and solve problems and perform tasks typical for professional activity in the field of computer network issues.	Laboratory work	inquiry methods	Activity during classes, programming projects
K_U05	Student has experience and skills to use the norms and standards applicable in the computer networks.			
K_U14	Student is able to see problems, imperfections in functioning or newly designed computer networks, identify the problem and formulate a specification of simple solutions for the perceived simple problems in computer networks projects.			

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**
Project	**bdb (5)**	**4*50%**	**2**
Atendance	**75%**	**1*50%**	**0,5**

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

(Laboratory work)

1. Introduction: Router construction and operation, static routing, distance vector routing protocols, link-state routing protocols, summarized routes, and default routes;

2. Configuring RIPv2: Methods to Prevent Routing Loops RIP timers. Protocol limitations for discontiguous networks. Propagate default route in the RIP domain. Protocol configuration;

3. RIPv2: Routing Protocol Behavior with CIDR and VLSM Redistribute directly connected networks and static routes. Configure the protocol;

4. Routing Table Analysis: Hierarchical routing table structure. Classful and classless routing table lookup;

5. EIGRP: Configure the protocol. EIGRP metric;

6. OSPF: Configure OSPF in one area. OSPF metric.

11. Required teaching aids

Laboratory classes - specialist laboratory

12. Literature:

a. Basic literature:

Alan Holt, Chi-Yu Huang: 802.11 Wireless Networks, Springer-Verlag, London, 2010.

Chris C., William W., Richard B., Noel R.: Cisco Networks, Apress, Berkeley, 2015.

Neumann J. C.: Cisco Routers for the Small Business, Apress, New York, 2009.

a. Supplementary literature:

Tanenbaum A.S., „Computer Networks”.

Dordal P. L.: An Introduction to Computer Networks, Loyola University, Chicago, 2020.

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. Laboratory classes	Piechowiak Maciej, dr inż.