Subject programme

1. Subject name / subject module: **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

Mode of study		SOW	ECTS	Laboratory work	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	Total ECTS
Full-time studies				43	57	4																4
Part-time studies																						
Credit rigor	...			graded assignment																		

Teaching activities with the tutor — Form of classes

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	43
Preparation of reports	20
Final project	35
Participation in an exam / graded assignment / final grading	2
Total student workload (TSW)	100
ECTS credits	4
* Student's workload related to practical forms	100
Student's workload in classes requiring direct participation of academic teachers	43

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

   None

   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	Activities during classes, tasks during classes, project
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	Activities during classes, tasks during classes, project
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

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 architectures issues.	Laboratory work	inquiry methods	Activities in classroom, programming projects

11. 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
Programming projects	bdb (5)	4*50%	2
Attendance	On 75% of all classes	1*50%	0,5

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

(Laboratory work)

1. **Working with modern network devices: Building a router and a switch; Operating System (e.g., IOS); The command line and basic router and switch instructions;**

2. **Eouting: Configure static routing; Types of dynamic routing protocols; Configure selected dynamic routing protocols (RIP, EIGRP, OSPF); Backup routes; Routing optimization;**

3. **Switching: Packet switching concept - CAM table; Concept of Virtual LANs (VLANs); Trunking and inter-VLAN routing; Spanning tree Protocol**

4. **Wireless Networks: Radio Protocols; Wireless Security; Wireless Access Point Configuration**

5. **Additional Network Device Services: DHCP Server; IP Address Translation (NAT); Network Traffic Filtering (ACL).**

13. Required teaching aids

Laboratory classes - specialist laboratory

14. 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:
   Dordal P. L.: An Introduction to Computer Networks, Loyola University, Chicago, 2020.
   b. Internet sources:

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

16. Teachers implementing particular forms of education

Form of education	Name and surname
1. Laboratory classes	Piechowiak Maciej, dr inż.