**Nazwa przedmiotu:**

Computer Networks

**Koordynator przedmiotu:**

Jacek Wytrębowicz

**Status przedmiotu:**

Obowiązkowy

**Poziom kształcenia:**

Studia I stopnia

**Program:**

Computer Science

**Grupa przedmiotów:**

Technical Courses

**Kod przedmiotu:**

ECONE

**Semestr nominalny:**

6 / rok ak. 2015/2016

**Liczba punktów ECTS:**

6

**Liczba godzin pracy studenta związanych z osiągnięciem efektów uczenia się:**

• Lecture attendance: 15 x 2 h = 30 h.
• Preparation to lectures (reviewing notes, reading of recommended literature, completing facultative homework): 14 x 1 h = 14 h.
• Preparation to written class tests (including participation in consultations): 2 x 12 h. + 2 h = 26 h.
• Preparation to exam (including participation in consultations): 24 h + 1 h = 25 h.
• Exam attendance: 3 h.
• Preparation to laboratory exercises: 10 x 2 h = 20 h.
• Laboratory attendance: 10 x 3 h = 30 h.
Total is 148 h.

**Liczba punktów ECTS na zajęciach wymagających bezpośredniego udziału nauczycieli akademickich:**

 Lecture attendance: 15 x 2 h = 30 h.
• Exam attendance: 3 h.
• Participation in consultations: 3 h.
• Laboratory attendance: 10 x 3 h = 30 h.
Total is 66 h, that makes 3 ECTS points.

**Język prowadzenia zajęć:**

angielski

**Liczba punktów ECTS, którą student uzyskuje w ramach zajęć o charakterze praktycznym:**

• Preparation to laboratory exercises: 10 x 2 h = 20 h.
• Laboratory attendance: 10 x 3 h = 30 h.
Total is 50 h, that makes 2 ECTS points.

**Formy zajęć i ich wymiar w semestrze:**

|  |  |
| --- | --- |
| Wykład:  | 30h |
| Ćwiczenia:  | 0h |
| Laboratorium:  | 30h |
| Projekt:  | 0h |
| Lekcje komputerowe:  | 0h |

**Wymagania wstępne:**

**Limit liczby studentów:**

30

**Cel przedmiotu:**

Objective: to make student familiar with usage and administration of computer networks. The lecture is an introduction to a domain that is very wide and that quickly progresses. It discusses the 7 layered OSI ISO model, and TCP/IP network model. Students can learn the most important protocols belonging to TCP/IP protocol stack, as well as BSD socket interface. The lecture presents Ethernet networks. Students can learn network configuration of hosts, switches and routers. They can learn also basis of virtual local networks and virtual private networks.

**Treści kształcenia:**

Lecture contents: • History of computer networks and the Internet. • ISO/OSI model and TCP/IP model. • Addressing in IP networks (address classes. subnetting. CIDR). • IP and auxiliary protocols (ARP, RARP, BOOTP, DHCP, ICMP). • Routing - static and dynamic. Distance-vector and Link-state routing. • Routing protocols. • Asynchronous and synchronous transmission. Serial Line IP and Point - to - Point Protocol. Modem configuration in Unix. UNIX-to-UNIX Copy Program. • Local & Metropolitan Area Reference Model. CSMA/CD basis. History of Ethernet. Differences between Ethernet varieties. Industrial Ethernet. Ethernet Passive Optical Network. Virtual local networks. • Datagram and stream protocols. Transmission Control Protocol internals (slow start, sliding window, handshakes, timers, congestion control). • Transport Layer programming interfaces : X/Open Transport Interface concepts, Berkeley sockets details. • Internet Application Layer Protocols: DNS, SNMP, FTP, HTTP, and SMTP. • Threads and security services. Characteristic of cipher algorithms. Public Key Infrastructure basis. • Internet Protocol version 6. • MPLS technology. • Virtual private network (VPN) protocols: PPTP, L2TP, IPSec. • IP multicast.

Laboratory subjects: • Networking media, network monitoring. • Basic router configuration, RIP. • EIGRP, DHCP. • OSPF. • BGP. • Access Control Lists. • Network Address Translation. • Virtual LANs. • STP, MSTP. • IPv6.

**Metody oceny:**

The end mark comes from scores a student can reach from: 14 homework questions, 2 tests, 10 laboratory exercises and 1 exam. There are 100 points to reach during semester:
\* from 0 to 7 points – for homework (0.5 point for each correct response sent by email);
\* from 0 to 17 points – for 1st test;
\* from 0 to 16 points – for 2nd test;
\* from 0 to 60 points – for the activity during 10 laboratory exercises (max. 6 point for every exercise).
Everybody who reaches more than 90 points can classify ECONE without writing the exam.
One can reach from 0 to 50 points on the exam.
The final score is: exam\_points + 0.5 \* semester\_points.
To classify ECONE: a student has to reach more than 50 points.

**Egzamin:**

tak

**Literatura:**

1. M.J.Castelli, LAN Switching First-Step, Ciscopress (2004).
2. D.U.Comer, Internetworking with TCP/IP, 6th Edition, Prentice Hall (2013).
3. D.U.Comer, Computer Networks and Internets, 6th Edition, Prentice Hall (20014).
4. J.F.Kurose, K.W.Ross, Computer Networking: A top-Down Approach, 6th Edition, Addison Wesley (2012).
5. N.Olifer, V.Olifer, Computer Networks: Principles, Technologies and Protocols for Network Design, Wiley (2005).
6. L.Peterson, B.Davie, Computer Networks: A Systems Approach, 5th Edition, Elsevier (2011).
 http://booksite.elsevier.com/9780123850591/index.php
7. M.Sportack, Networking Essentials Unleashed, SAMS (2006).
8. A.S.Tanenbaum, D.J.Wetherall, Computer Networks, 5th Edition. Prentice Hall (2010).

**Witryna www przedmiotu:**

http://staff.ii.pw.edu.pl/~jwt/econe\_info.html

**Uwagi:**

## Efekty przedmiotowe

### Profil ogólnoakademicki - wiedza

**Efekt ECONE\_W01:**

The student has systematic knowledge of computer networks, ISO / OSI model, TCP / IP and network software.

Weryfikacja:

Two tests and exam.

**Powiązane efekty kierunkowe:** K\_W12

**Powiązane efekty obszarowe:** T1A\_W03, T1A\_W04, T1A\_W07

**Efekt ECONE\_W02:**

The student has systematic knowledge of the structure and operation of the Internet, and of the protocols that support the main Internet services; he has a basic understanding of the role of standardization, and of the techniques ensuring networks security.

Weryfikacja:

Two tests and exam.

**Powiązane efekty kierunkowe:** K\_W16

**Powiązane efekty obszarowe:** T1A\_W03, T1A\_W07

### Profil ogólnoakademicki - umiejętności

**Efekt ECONE\_U01:**

He can administer the network switches.

Weryfikacja:

Evaluation of 10 lab exercisies.

**Powiązane efekty kierunkowe:** K\_U07, K\_U09, K\_U14

**Powiązane efekty obszarowe:** T1A\_U07, T1A\_U08, T1A\_U09, T1A\_U11