

SUBJECT DETAILS AND SYLLABUS
2021/2022. II. SEMESTER

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| <i>Subject name</i> | <i>Communication Systems.</i> |
| <i>Subject code</i> | IVB002ANVM |
| <i>Classes per week: L/P/Lab</i> | 3/0/1 |
| <i>Number of Credits</i> | 5 |
| <i>Division/ type</i> | Electrical Engineering (BSc) / mandatory |
| <i>Program</i> | full time |
| <i>Requirement type</i> | grade |
| <i>Semester</i> | 4. |
| <i>Preliminary requirements</i> | Foundations of Informatics |
| <i>Organization name</i> | Department of Automation |
| <i>Responsible Lecturer(s)</i> | Peter Megyeri |

GOAL OF INSTRUCTION

The course introduces to students the structure, characteristics, operation and application possibilities of communication systems in engineering practice. It presents the tools, solutions, and rules applied for communication in these systems. Describes the architecture, and structure of message used in communication, as well as the solutions used for identifying the participants and the characteristics of these. Outlines the practical applications of communication systems and solutions and connections of these to other areas of expertise.

SUBJECT CONTENT

Brief Syllabus:

Schedule:

Lecture:

1. Network Basics. The concept of protocol, and application of it in communication process.
2. Presentation the features of communication architectures and protocol sets: OSI model TCP / IP protocol set.
3. Topology concept. Meaning of physical and logical topology and applying it in communication systems. Widespread used practical network topologies.
4. Circuit-, packet-, and cell switched systems. Grouping of networks: concept, and properties of LAN, MAN, WAN.

5. Data link- and network layer of communication systems. Data link- and network level connection of communication systems.
6. Characteristics of network active devices (repeaters, hubs, bridges, switches, routers), and application possibilities of these in system design. Effect of different network active devices on data flow.
7. Understanding the characteristics and areas of application of different network standards: IEEE 802.2, 802.3 (Ethernet), IEEE 802.5, 802.11, FDDI, ATM, PPP.
8. Network-level protocols: the role and function of addressing solutions in network design. Introducing widespread used addressing solutions (IPv4, IPv6, wired and mobile calling numbers).
9. Concept and characteristics of routed and routing protocols.
10. Protocols of connection based and connectionless (IP) networks.
11. Transport Layer Protocols: features and application of TCP, UDP for end-to-end communications. Real-time data transfer.
12. The concept and use of QoS in the development of communication services.
13. Telecommunication technologies. Telecommunication networks and systems.
14. Presentation of cable television systems.

Practice/Labs:

1. Concept and consequences of encapsulation, application of it in the communication process.
2. Presentation of protocols and protocol sets widespread used in practice.
3. Comparison of typical computer network topologies.
4. Features of wired- and wireless networking solutions: network coverage, applied modulation solutions, typical data rates.
5. Features of wired- and wireless networking solutions: network coverage, applied modulation solutions, typical data rates.
6. Segmentation of data traffic in networks. LAN development. Effect of different network active devices on data flow.
7. IP address classes. Fixed- and variable length IP addressing. Concept and design aspects of subnets. Public and private IP addresses.
8. IP address classes. Fixed- and variable length IP addressing. Concept and design aspects of subnets. Public and private IP addresses.
9. Types of data traffic. Traffic classes. Features of RTP, RTCP protocols.
10. Types of data traffic. Traffic classes. Features of RTP, RTCP protocols.
11. Speech transmission on packet switched networks.
12. Structure and characteristics of telephone exchange points.
13. Design Aspects of QoS, CoS. System design, bandwidth planning.
14. Characteristics and measurement techniques of mobile networks.

EXAMINATION AND EVALUATION SYSTEM

Attendance:

Regarding participation in exercises and lectures, appropriate points of The Code of Studies and Examinations of the University of Pécs are authoritative. According to this, the student cannot obtain the credit point of the subject, if the absence of the relevant classes exceeds 30% of the total number of practices or lectures.

Criterion of Signiture / Semester rating:

Forms of controlling under the semester: written exam, homework, and project. During the semester, students write an exam, which is written on practice. The topic of the

exam is the material of the practices and lectures given till a given week. The exact time of the exam will be announced in the given class of the subject. The topic of the project must be relevant to the subject, and must be agreed in advance with the lecturer of the subject. The homework will be released on practice, at the latest until the 10th week. The condition for obtaining the signature is to write the exam and to submit an acceptable (minimum grade 2) homework, and project during the semester. Besides these, the students must be present on more than 70% of contact classes and/or consultations. Having more than 30% absence results in signature refusal.

Exam:

Written exam, minimum of 51% is required to pass.

Grading:

The written and the practical exams are evaluated with grades. The weighting used to create the semester rating:

- Homework: 40 %,
- Written exam: 20 %,
- Project: 40 %.
- Written exam in the exam period: 50 %.

Grading scale:

| Numeric Grade | 5 | 4 | 3 | 2 | 1 |
|----------------------|---------|--------|--------|--------|-------|
| Evaluation interval: | 90–100% | 76–89% | 63–75% | 51–62% | 0–50% |

Failing the requirements:

The Code of Studies and Examinations of the University of Pécs is applicable in general.

- Students have one midterm test retake opportunity before the exam period.
 - Schedule: 15th week's lecture
 - Format: same as the test
- Students without signature have one opportunity to earn a passing midterm grade and signature in the exam period.
 - Schedule: 1st week of the exam period, lecture time
 - Format: written test and a new homework with oral presentation

Consultation options:

At the time agreed in advance with the responsible instructor.

LITERATURE

- [1.] Tannenbaum, Andrew S.: Computer Networks, Prentice Hall, 2011
- [2.] Stallings, William: Data and Computer Communication, Macmillan Publishing Company.
- [3.] Jeff Doyle, Jennifer DeHaven Carroll: Routing TCP/IP, Volume II, ISBN: 1578700892 Publisher: Cisco Press
- [4.] Kennedy Clark, Kevin Hamilton: Cisco LAN Switching, ISBN: 1578700949 Publisher: Cisco Press
- [5.] Presentations on lectures and practices, and written lecture notes

SCHEDULE

| | | STUDY PERIOD, STUDY WEEKS | | | | | | | | | | | | | | | EXAM PERIODK | | | | |
|----------------------------|------------|---------------------------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|--------------|----|----|----|----|
| 2021/2022. II. SEMESTER | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. | 15. | 1. | 2. | 3. | 4. | 5. |
| Lecture number | | | | | | | | | | | | | | | | | | | | | |
| Partice/Labs number | | | | | | | | | | | | | | | | | | | | | |
| Midterm test | | | | | | | | | | | | | | | X | | | | | | |
| Homework | publishing | | | | | X | | | | | | | | | | | | | | | |
| | submitting | | | | | | | | | | | | | | | X | | | | | |
| Signiture/ Semester rating | | | | | | | | | | | | | | | | | X | | | | |
| Exam | | | | | | | | | | | | | | | | | | | | | |

07/02/2022.

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Peter Megyeri responsible lecturer