

WELLCOME to

**TIES327 – Network Security (3-7 ECTS)
Autumn - 2023**

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Hacking

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Goals of the TIES327

- ❑ This is a hands-on course related to the network security issues and learning different networking security things by self-doing
- ❑ Students understand what the term "security" keep inside in the networks point of view
- ❑ ...are capable to apply the various tools in auditing and protecting networks
- ❑ ... learn to look for a new knowledge about this area
- ❑ The feeling of safety can not to be **ignorance !**
- ❑ **Remember: Use of the presented tools/methods are illegal in the public networks ! You'll lose your study rights, and if a bad luck, they'll put you in a jail !**

Prerequisites

- ❑ Basic knowledge about networks, TCP/IP- protocols and programming
- ❑ For example courses (or similar skills)
 - ❑ ITKP101- Tietokone ja tietoverkot työvälineenä (computers and networks)
 - ❑ ITKP104 – Tietoverkot (TCP/IP networking)
 - ❑ ITKP102 - Ohjelmointi 1 (programming)

How to complete course ?

❑ Complete assignments

- ❑ Group of 1-3 students
- ❑ **You should get at least 50% of total points and at least the same 50% of the each individual assignments (8-16 pcs).** Answer in depth to the all questions presented in the assignments in order to get the course completed.
- ❑ We encourage you to install and complete these exercises with your own devices. If it is not possible, send email to timo.t.hamalainen@jyu.fi and ask server capacity and complete assignments with the course's server. **Read assignments carefully and answer to the preliminary questions before starting the assignments.**
- ❑ The course can be completed 3-7 ECTS wide
 - ❑ 3 ECTS fulfilment: complete assignments 1-4
 - ❑ 4 ECTS fulfilment: complete assignments 1-4 + any 1 from the rest
 - ❑ 5 ECTS fulfilment: complete assignments 1-4 + any 2 from the rest
 - ❑ 6 ECTS fulfilment: complete assignments 1-7 + any 3 from the rest
 - ❑ 7 ECTS fulfilment: complete assignments 1-8

Course grading

3ECTS Total points (max. 40p.)	4ECTS Total points (max. 50p.)	5ECTS Total points (max. 60p.)	GRADE
38	45	55	5
34	40	50	4
30	35	45	3
25	30	37	2
20	25	30	1

6 ECTS Total points (max. 70p.)	7 ECTS Total points (max. 80p.)	GRADE
65	5	75
58	4	66
50	3	57
42	2	48
35	1	40

Workload:

Course's workload is estimated to be 80-180 hours. It is challenging to exactly evaluate as it is mainly depending on your background skills ie. if you are familiar with Linux, networking, virtualization etc. you can complete the assignments on much less time.

UNIVERSITY OF JYVÄSKYLÄ **About the course**

- The course focuses on hands-on making of the security issues and learning by doing !!
- All the course material will be put to the course's web- site at TIM:
<https://tim.jyu.fi/view/kurssit/tie/ties327/2022/index>
- There is a “demo clinic” on Tuesdays and Thursdays at Zoom between 12:15-14:00 where assignments can do together, and possible issues related to the assignments can be checked.
 - <https://jyufi.zoom.us/j/61760583520>
 - Meeting ID: 617 6058 3520
 - Passcode: 882090
- If you have problems with the assignments use course’s chat at:
<https://tim.jyu.fi/view/kurssit/tie/ties327/2022/chat/chat> and fastest will answer ;). In TIM you can also comment the assignments (right side of the instructions).
- Answering some questions in the assignments requires you read scientific papers. If you are in JYU-net 130.234.X.X, you can access those directly. Otherwise, you should first make a [VPN](#) connection to JYU-net. Due to Covid-19 pandemic, there can still be some [restrictions](#) on VPN connections. You can also use [JYKDOK](#) service to find and read articles.. See VPN configurations at here: <https://www.jyu.fi/digipalvelut/en/guides/wlan-and-vpn>.
- Some literature: a lot of research papers, eg. keywords **network security anomaly detection**: IEEE Explore, <https://ieeexplore.ieee.org/Xplore/home.jsp>
ACM, <https://www.acm.org/publications/digital-library>
Google scholar, <http://scholar.google.com/>
JYKDOK, <https://jyu.finna.fi/>

Tools used in assignments

- ❑ Kali Linux: <https://www.kali.org/>
 - ❑ <https://www.kali.org/penetration-testing-with-kali-linux/>
- ❑ Wireshark: <https://www.wireshark.org/>
- ❑ pfSense: <https://www.pfsense.org/>
- ❑ OpenVPN: <https://openvpn.net/>
- ❑ Snort: <https://www.snort.org/>
- ❑ Zeek: <https://www.zeek.org/>
- ❑ GNU Privacy Guard (GPG): <https://www.gnupg.org/>
- ❑ Python: <https://www.python.org/>
 - ❑ Scapy: <https://scapy.net/>

Some links

- Jyu's data security rules:

<https://www.jyu.fi/digipalvelut/en/guides/data-security>

- Finnish communication regulator authority:

<https://www.kyberturvallisuuskeskus.fi/en/>

Study and work possibilities in our projects

Our projects are looking for students to participate different activities related to the network security, IoT and AI things, data mining with machine learning, Tensorflow etc.

We have companies involved (eg. Metsä Group, Valtra, Mevea, Digita, Moventas, city of Jyväskylä) to these activities and they provide us use cases related to the different networking and data analysis tasks.

Based on your duties we will offer credits and in some cases salary (part-time research assistant). Also special assignments, practical training, master thesis can be done related to these topics.

If you are interested in these kind of topics and learn more about IoT, security, AI etc., just email to: **timo.t.hamalainen@jyu.fi**