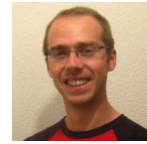


# Computer Networks and Security

**Course level:** Master

**Course code:** MLDM CNS1

**ECTS Credits:** 5.00



**Course instructors:** Rémi Emonet (UJM, Saint- Etienne)

**Education period (Dates):** 2<sup>st</sup> semester

**Language of instruction:** English

**Expected prior-knowledge:** Notion of web programming. Programming in Java, Python or C. Familiarity with the use of the web and peer2peer applications. Git version control system.

Aim and learning outcomes:

This course introduces the main concepts involved in computer networking. A top-down approach is followed, where higher abstraction layers are covered first. This course covers the main concepts of networking and it details some of the most important algorithms involved in networking and security. Technician aspects such as vendor-specific router configurations will not be covered. After this course, the learner have an overall understanding of computer networks architectures and of security mechanisms, knows important algorithms (graph-based, code-based, etc) and have a concrete experience in socket-based, multi-threaded distributed application development.

Topics to be taught (may be modified)~36h+18h:

- [ Overview of networking and the networking stack (4h)
- [ Application layer: distributed applications, peer2peer, socket programming, concurrency (6h)
- [ Transport layer concepts, protocols and algorithms (6h)
- [ Network layer and routing (8h)
- [ Lower layers concepts, algorithms and wireless problematics (4h)
- [ Security and cryptography (4h)
- [ Big Data storage and protocols (4h)
- [ Lab sessions and project (18h)

**Teaching methods:** Lectures, live coding and lab classes.

**Form(s) of Assessment:** written exam(s) (66%), practical projects (34%)

**External/internal examiner:** --

**Examination support:** None

**Literature and study materials:** *Computer Networking: a top-down approach* (Jim Kurose, Keith Ross) + online resources.

**Additional information:**

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