

Real-time systems

Credits: 5 Semester 1 Compulsory: No

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|---------------|---------------|---------------------|--------------------|
| Format | Lectures 25 h | Guided project 15 h | Private study 85 h |
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Lecturer: (M.Chetto;J-L Bechneck) (ECN), B. Kubica (WUT-UG)

Objectives: To learn about designing real-time systems, specific features of such systems and about real-time operating systems.

Contents:

The program of the lecture:

- Real-time systems, their features, hard and soft variant of a real-time system.
- Production process of a real-time system.
- Real-time operating systems, examples of such systems: VX Works, VERTEX, QNX Neutrino, etc.
- Real-time variants of Linux.
- Specific features of QNX Neutrino (or alternatively of RT Linux, depending on the platform that will be used on project classes) – about four or five lectures.
- Basics of real-time programming languages, programming in ADA.
- Task scheduling in real-time systems.
- Examples of real-time systems.
- Practical Work: project / laboratory classes, where students will design and implement a simple real-time system, e.g. a control program for a simple robot

Abilities: After completing this course the students will be able to specify and implement a simple real-time based system, with:

- Tasks scheduling,
- Process specification,
- Implementation using one of the explained systems.

Assessment: 30% laboratory work, 70% end of semester examination.

Recommended texts:

- 1) Jane W.S. Liu, *Real-Time Systems*, Prentice Hall, 2000.
- 2) Giorgio C. Buttazo, *Hard Real-time Computing Systems*, Kluwer Academic publishers, 1997.
- 3) Documentation on <http://www.qnx.com>.

Further readings:

- W.A.Halang, K.M.Sacha, *Real-time Systems*, World Scientific 1992
- will be provided by lecturer.