



# Syllabus

**ALaRI**

**Master of Engineering in Embedded Systems Design**

**University of Lugano**

ALaRI  
University of Lugano  
Via Giuseppe Buffi 13  
6900 Lugano  
Switzerland

Tel. + 41 91 9124 706  
Fax + 41 91 912 46 47  
E-mail [master@alari.ch](mailto:master@alari.ch)  
URL <http://www.alari.ch>

## DEPENDABLE SYSTEMS

**Miroslaw Malek**

Office address:

Unter den Linden 6  
10099 Berlin  
GERMANY

Phone: +49 302093 3027

Fax: +49 302093 3029

E-mail: [malek@informatik.hu-berlin.de](mailto:malek@informatik.hu-berlin.de)

Personal page: <http://www.informatik.hu-berlin.de/~malek/>

### Dates of the course

Second Quarter, 18hours

### Overview of the course

Fast growth and proliferation of embedded systems forces the increased demand for properties such as dependability, timeliness and security. In this course we focus on dependability but references to other two properties are also included. After introducing the various dependability perspectives on system design as well as the methodology we introduce basic concepts, measures and models used in dependable computing and communication. We then describe testing methods, fault diagnosis, fault recovery and fault tolerance techniques that are essential in the dependable systems design. We conclude the course with case studies, which demonstrate what techniques have been, used for the dependability enhancement in the real life systems.

## Course Syllabus

Monday:

- Introduction
- Project Assignment
- Dependability Concepts and Measures

Tuesday:

- Dependability Models
- Testing Techniques
- Assignments

Wednesday:

- Fault Diagnosis Techniques
- Fault Tolerance Techniques
- Assignments

Thursday:

- Dependable Memories and Networks
- Fault-Tolerant Software
- Case Studies

Friday:

- Project Presentations (3 hours)

Requirements:

Lectures 4 x 3 hours (two 1.5 hour units)

Assignments 2 x 2 hours (lead by a TA)

## Notes on the Instructor

Mirosław Malek received the M.Sc. degree in Electrical Engineering (Electronics) and the Ph.D. degree in Computer Science in 1975, both from the Technical University of Wrocław, Poland.

He is professor and holder of the Chair in Computer Architecture and Communication at Humboldt University in Berlin since 1994. In 1977, he was a visiting scholar at the Department of Systems Design at the University of Waterloo, Waterloo, Ontario, Canada, then Assistant, Associate, and Full Professor at the University of Texas at Austin where he was also a holder of the Bettie Margaret Smith and the Southwestern Bell Professorships in Engineering. Malek's research interests focus on high-performance responsive computing, including parallel architectures, real-time systems, networks and fault tolerance. He has participated in two pioneering parallel computer projects, contributed to the theory and practice of parallel network design, developed the comparison-based method for system diagnosis, co developed comprehensive WSI and networks testing techniques, proposed the consensus-based framework for responsive (fault-tolerant, real-time) computer systems design and has made numerous other contributions, reflected in over 100 publications and a book with G. J. Lipovski entitled "Parallel Computing: Theory and Comparisons".

He has organized, chaired, and been a program committee member of numerous IEEE and ACM international conferences and workshops. Among others, he was program and general chairman of the Real-Time Systems Symposium in 1984 and 1985 respectively, and in 1994 general chairman of the 24th Fault-Tolerant Computing Symposium. He serves on the editorial boards of the Journal of Parallel and Distributed Computing, Real-Time Systems Journal and Journal of Interconnection Networks.

Malek was a Visiting Scientist at Bell Labs in Murray Hill, at IBM's T. J. Watson Research Center, Yorktown Heights, NY and a Visiting Professor at Stanford University. He served as Liaison Scientist at the Office of Naval Research in London and then held the IBM Chair at Keio University in Japan during the period of June 1990 until August 1992.

Malek has been teaching a number of courses on computer architecture, dependability and technical entrepreneurship with emphasis on e-business and Internet technologies. He is a consultant to startup companies and multinational corporations advising on both technical and strategic directions and activities.