MSc Curriculum in Resilient Computing

Courseware availability

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Curriculum rationale

To move from the usual application-driven MSc curricola (like MSc in embedded systems or web-based systems, etc.)

To identify a MSc curriculum where, in the first year, the focus is on **advanced fundamental invariants** (application independent) that can provide students with a solid updated theoretical knowledge for dealing with resilience

To specialize, in the second year, on applications of such knowledge on real projects in selected application tracks with strong connection with productive world

To remove the gap between what is *known* and what is *used*:

From **Best Practices** ⟶ to **Methical Scientific Approach**

ReSIST NoE

Resilience for Survivability in IST

Curriculum aims

➢ **To equip students with the skills and knowledge required to develop and assess secure and dependable computer-based systems**

➢ **To provide a qualification enhancing employment prospects in resilient computing**

➢ **To develop research skills**

➢ **To develop and improve key skills in written and oral communication and in teamwork**

➢ **To develop and improve skills in using the literature and information technology resources relevant to resilient computing**

➢ **To encourage the development of creativity skills**

➢ **To develop skills in critical assessment, analysis and storage of information**

➢ **To provide a curriculum which meets the requirements of appropriate professional bodies, thus providing a basis for further professional development and lifelong learning**

➢ **To address the relevant professional, legal and ethical issues relevant to the development, assessment and maintenance of resilient systems**

➢ **To provide an international perspective on developments in computer resilience.**

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Curriculum organization

1st Year

- **1st semester: Basics and Fundamentals (30 ECTS)**

  Courses:

  - **Advanced Probability and Statistics** (6 ECTS)
  - **Cryptology and Information Security** (6 ECTS)
  - **Logic in Computer Science** (6 ECTS)
  - **Advanced Graph Theory** (3 ECTS)
  - **Human Factors, Human and Organizational Behavior** (3 ECTS)
  - **Fundamentals of Real-Time Systems** (3 ECTS)
  - **Fundamentals of Dependability** (3 ECTS)

- **2nd semester: Methods, Techniques and Tools (30 ECTS)**

  Courses:

  - **Computer Networks Security** (6 ECTS)
  - **Fault and Intrusion-Tolerant Distributed Systems and Algorithms** (6 ECTS)
  - **Dependability Evaluation of Computer Systems** (6 ECTS)
  - **Testing, Verification and Validation** (6 ECTS)
  - **Usability and User Centered Design for Dependable and Usable Socio-technical Systems** (6 ECTS)

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1st semester scheduling

Advanced Probability and Statistics	
Cryptology and Information Security	
Logic in Computer Science	
Advanced Graph Theory	Human Factors, Human and Organizational Behavior
Fundamentals of Real-Time Systems	Fundamentals of Dependability

2nd semester scheduling

Computer Networks Security
Fault and Intrusion-Tolerant Distributed Systems and Algorithms
Dependability Evaluation of Computer Systems
Testing, Verification and Validation
Usability and User Centered Design for Dependable and Usable Socio-technical Systems

3rd semester: Projects (in cooperation with industry on specific appl. fields) (30 ECTS)

Courses (common to all application tracks)

- **Management of Projects** (3 ECTS)
- **Fault Tolerant Middleware- based Systems** (3 ECTS)
- **Software Reliability Engineering** (3 ECTS)

Application track: **Telecom.**

Courses (specific for this track):

- **Resilience of Protocols and Architecture** (3 ECTS)
- **Resilience of Mobile Applications** (3 ECTS)

Application track: **Safety critical Systems**

Courses (specific for this track):

- **Development Process and Standards for Safety critical Applications** (3 ECTS)
- **Architectural Issues and Examples of Systems** (3 ECTS)

Application track: **e-Business**

Courses (specific for this track):

- **Resilience of SOA and Web-based Applications** (3 ECTS)
- **Damage Tolerance in Large scale Systems** (3 ECTS)

Common to all Application tracks:

- **Project in cooperation with Industry** (9 ECTS)
- **Space for additional Courses** (6 ECTS)

4th semester: Master's Thesis and Dissertation (30 ECTS)

- **Specific Courses and Seminars** (3 ECTS)

- **Preparation and Presentation of the Thesis** (27 ECTS)

Curriculum Pre-requisites

- ➢ **Discrete Mathematics**
- ➢ **Calculus**
- ➢ **Basic Computer and Network Architectures**
- ➢ **Programming and Data Structures**
- ➢ **Basics of Operating Systems**
- ➢ **Basics of Software Engineering**
- ➢ **Basics of Probability and Statistics**

The portal to MSc Curriculum and Courseware material

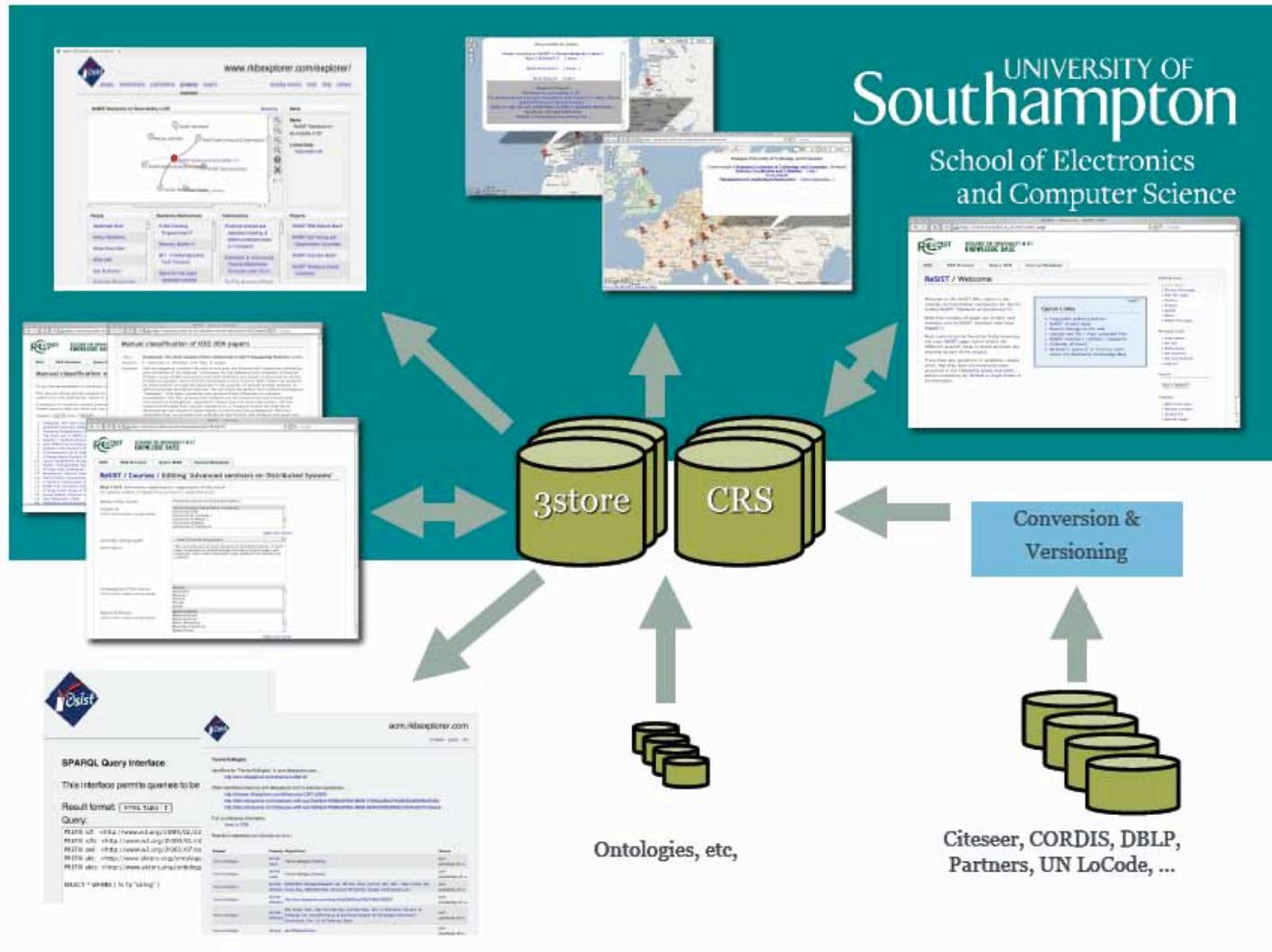**http://resist.isti.cnr.it/home.php**

This is a local portal and will be linked to the official ReSIST web site as well as it will be integrated with the RKB to extend the information related to all members of the resilient computing community

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The RKB explorer is is the user interface for the entire RKB, and is accessible at http://www.rkbexplorer.com/explorer/

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Contributions welcome !

- **Resilient Computing Curriculum - Deliverable D16 downloadable from http://www.resist-noe.org/**
- Comment first year courses and their content
- Propose courses and application tracks for second year
- Identify existing support material for all courses

Means for contributing:
- Through the curriculum forum at ReSIST web portal
  http://www.resist-noe.org/
- Through a dedicated Consultation Panel at:
  http://resist.isti.cnr.it/home.php

Persons interested to be informed:
Mail to me: Luca Simoncini <luca.simoncini@isti.cnr.it>