



## PhD Course on “Temporal constraint networks”

**Prof. Roberto Posenato**  
**Prof. Luke Hunsberger**

### Abstract

In many area of AI, natural language cognition, scheduling, planning, qualitative reasoning, etc., representing and reasoning about time is an important research topic. A temporal reasoning system should consist of a temporal knowledge base, a service to check its consistency, and an inference mechanism capable of discovering new information. Constraint processing frameworks and techniques are usually considered for such temporal reasoning issues. A constraint processing framework works on entities and constraints. Two type of temporal entities are considered: points and intervals. Intervals correspond to time periods during which events occur or proposition hold, and points represent beginning and ending points of some events. Temporal statements like “the beginning of A precedes the end of B” or “the duration of task A has to be in the range [1, 10]” are treated as constraints on the location of entities along the time line. There are two type of constraints: qualitative and quantitative. Qualitative constraints specify the relative position of paired entities, and quantitative constraints place absolute bounds or restrict the temporal distance between points. In this short course, after an introduction to the field of constraint processing, the most relevant graph based temporal constraint models are presented and analyzed to give the state of art in such field.

The short course duration is 12 hours divided in 6 lessons.

Outline of the topics:

First part – By Roberto Posenato

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Introduction to Constraint processing

- Constraint networks
- Consistency and constraint propagations
- Directional consistency

Second part- by Luke Hunsberger.

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Introduction to Temporal Networks and Consistency/Controllability

- Simple Temporal Networks
- Simple Temporal Networks with Uncertainty
- Conditional Simple Temporal Networks
- Extensions



**UNIVERSITÀ**  
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Scuola di Dottorato  
di **SCIENZE NATURALI**  
**ED INGEGNERISTICHE**

### **Class meeting**

November 12 – 14.30/16.30 Sala Riunioni II piano  
November 13 – 14.30/16.30 Sala Riunioni II piano  
November 14 – 14.30/16.30 Sala Riunioni II piano  
November 15 – 14.30/16.30 Sala Riunioni II piano  
November 16 – 14.30/16.30 Sala Riunioni II piano  
November 19 – 14.30/16.30 Sala Riunioni II piano