



## SYSTÈMES AUTONOMES DE PRODUCTION (SAP)

### DISCRETE EVENT SYSTEMS

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| Lecturers : 8.0 | TC : 4.0 | PW : 16.0 | Autonomy : 4.0 | Study : 0.0 | Project : 0.0 | Language : FR

#### Objectives

Many industrial processes are working through a discrete time operation sequence. Flexible production units or manufacturing lanes composed what is called discrete event systems and are controlled by logical loops.

First the aim is to handle a set of specifications for such a close-loop process and to build up the control part of the loop. Industrial applications are nowadays mainly embedded in a Programmable Logic Controller (PLC).

The other aim is to discover and learn how to use Petri network tool so as to model part or totality of a close-

**Keywords :** Programmable Logic Controller, Behavior modelisation, Sequential functional chart, performances checking, Petri networks

#### Programme

- Control of continuous systems and discrete event systems
- Programmable Logic Controller and GRAFCET langage (also called Sequential Functional Chart – SFC)
- Petri networks (principles, most used structures, property analysis)

#### Learning outcomes

- To modelise discrete event systems behavior
- To use a model so as to check and compare performances
- To know a conventional programming language for PLC
- To be aware of PLC singularities

#### Independent study

**Objectifs :** To find and to handle a Freeware dedicated to Petri networks simulation

**Méthodes :** Case study

#### Core texts

GENDREAU D., *7 FACETTES DU GRAFCET, APPROCHES PRATIQUES DE LA CONCEPTION À L'EXPLOITATION, PRATIQUES DE LA CONCEPTION À L'EXPLOITATION*, CEPADUES-Editions, 2000  
MORENO, S/PEULOT *LE GRAFCET. CONCEPTION-IMPLANTATION*, CASTEILLA – TECHNIPLUS  
DAVID, R/ALLA, *ADU GRAFCET AUX RÉSEAUX DE PETRI*, Hermès, 1992

#### Assessment

Final mark is composed with 50% individual writing test + 50% based upon practical activities.