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## 2IN5020 – Semiconductor innovation

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**Instructors:** Tanguy Phulpin

**Department:** DÉPARTEMENT SYSTÈMES D'ÉNERGIE ÉLECTRIQUE

**Language of instruction:** FRANCAIS

**Campus:** CAMPUS DE PARIS - SACLAY

**Workload (HEE):** 40

**On-site hours (HPE):** 27,00

**Elective Category :** Engineering Sciences

**Advanced level :** No

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### Description

Welcome in the semiconductors area. This domain has a really strong impact on our lives and future innovation requires new topologies, new improvements, new researchers. To understand what are the challenges, it is fundamental to possess the basics and to handle them.

After several industrial conferences the 24th November afternoon, and after 6 hours of lesson the 28th November, let's start in C2n and GeePs laboratory for realization, characterization and simulation.

The Friday is booked for data analyses and report redaction

### Quarter number

Intensive week SG6

### Prerequisites (in terms of CS courses)

none

### Syllabus

Energy band model will be described in this lesson. You will study the different semiconductors interfaces with a focus on a PN junction and the FET effect. You will be able to understand how a bipolar transistor or a MOSFET or a solar cell is working. You will estimate the main characteristics of semi-conductors to be able to understand what are the requirement of this domain.

Then the group will be divided in 3, and you will work one day on MOSFET fabrication, one day on electrical characterization and one day on simulation

### Class components (lecture, labs, etc.)

A conference the Thursday afternoon one week before. Then the lesson takes place the Monday before going into laboratories to work on the



project. The Friday is free for report redaction

### **Grading report**

### **Resources**

- Teaching staff (instructor(s) names): P. Molinié, T. Phulpin
- Maximum enrollment: 9 binomes, 18 students

### **Learning outcomes covered on the course**

Basics in semi-conductor physic: Energy Band, Electric field, Current density, Field-Effect transistors, PN junction, photovoltaic cell

### **Description of the skills acquired at the end of the course**

After the short lesson, students will understand the basic knowledge of semiconductors technology.

They will meet professionals, and work in laboratories. They will work on new topics with high technology measurement tools.