

---

**Ano Letivo** 2017-18

---

**Unidade Curricular** INSTRUMENTAÇÃO ELETRÓNICA

---

**Cursos** ENGENHARIA ELETRÓNICA E TELECOMUNICAÇÕES (Mestrado Integrado)

---

**Unidade Orgânica** Faculdade de Ciências e Tecnologia

---

**Código da Unidade Curricular** 14811111

---

**Área Científica** ENGENHARIA ELETRÓNICA

---

**Sigla**

---

**Línguas de Aprendizagem**

---

**Modalidade de ensino**

---

**Docente Responsável** Peter Stallinga

---

DOCENTE	TIPO DE AULA	TURMAS	TOTAL HORAS DE CONTACTO (*)
Peter Stallinga	PL; T; TP	T1; TP1; PL1	15T; 15TP; 30PL

\* Para turmas lecionadas conjuntamente, apenas é contabilizada a carga horária de uma delas.

ANO	PERÍODO DE FUNCIONAMENTO*	HORAS DE CONTACTO	HORAS TOTAIS DE TRABALHO	ECTS
4º	S1	15T; 15TP; 30PL	168	6

\* A-Anual;S-Semestral;Q-Quadrimestral;T-Trimestral

---

**Precedências**

Sem precedências

---

**Conhecimentos Prévios recomendados**

---

**Objetivos de aprendizagem (conhecimentos, aptidões e competências)**

## Conteúdos programáticos

### 0. Introduction

- Instrumentation system
- SI
- Chain Rule. Sensitivity

### 1. Signal conditioning

- Op-amp circuits
- Wheatstone bridge
- Noise
- Lock-In amplifier
- Cables (coaxial, twisted pair, optical fiber, etc.)

### 2. Signal generation (Sensors)

- Actuators: Relais, solid-state switch
  - Temperature: Thermo-couple, PT100, diode, LM35DZ, bimetal
  - Optical: LDR and optodiode.
  - Movement: RPM and Doppler
  - Length
  - Bending (extensimeters)
  - Angle (Gray code)
  - Magnetic field: Hall and NMR
  - Humidity
  - Pressure: Membrane, Piranni, Penning
  - (Sound) pressure sensors (microphone) and actuators (speakers)
  - Stepper motors
- ### 3. Signal acquisition
- Analog-digital converters (ADC/DAC)
  - Interfacing
  - Serial port (null modem, DTE/DXE, handshaking)
  - USB

**Metodologias de ensino (avaliação incluída)**

---

**Bibliografia principal**

Lecture notes.

Academic Year 2017-18

Course unit ELECTRONIC INSTRUMENTATION

Courses ELECTRONIC ENGINEERING AND TELECOMMUNICATIONS (Integrated Masterçs)

Faculty / School Faculdade de Ciências e Tecnologia

Main Scientific Area ENGENHARIA ELETRÓNICA

Acronym

Language of instruction en if >0 foreign students, pt if 0 foreign students

Teaching/Learning modality

Coordinating teacher Peter Stallinga

Teaching staff	Type	Classes	Hours (*)
Peter Stallinga	PL; T; TP	T1; TP1; PL1	15T; 15TP; 30PL

\* For classes taught jointly, it is only accounted the workload of one.

---

**Contact hours**

T	TP	PL	TC	S	E	OT	O	Total
15	15	30	0	0	0	0	0	168

T - Theoretical; TP - Theoretical and practical ; PL - Practical and laboratorial; TC - Field Work; S - Seminar; E - Training; OT - Tutorial; O - Other

---

**Pre-requisites**

no pre-requisites

---

**Prior knowledge and skills**

---

**The students intended learning outcomes (knowledge, skills and competences)**

---

**Syllabus**

see Tutoria Electronica

---

**Teaching methodologies (including evaluation)**

---

**Main Bibliography**

Lecture notes.