

Electrification 2

1. **Course number and name:** 020IE2ES3 Electrification 2
2. **Credits and contact hours:** 4 ECTS credits, (2 lectures per week) x 1:15 contact hours.
3. **Name(s) of instructor(s) or course coordinator(s):** Georges Nawfal
4. **Instructional materials:** Instructor's PowerPoint slides, textbook
5. **Specific course information**
 - a. **Catalog description:**

Short circuit current: three-phase short-circuit current at the secondary of a transformer MV/LV, three-phase short-circuit current at any point in a LV installation. Electrical panels & cables: description of electrical panels, types and forms of tables, composition of electrical panels, types of electrical cables, thermal stress of the cables, selection of protective devices. Disturbances due to harmonics: harmonics, reminder of the Fourier Series, harmonic pollution, the effects of harmonics and resonance, IEC Standards in the fight against harmonics, basic solutions to attenuate harmonics, measurement of harmonics in electrical networks. Software for the design and sizing of LV electrical installations: ECODIAL, draw a single-line diagram, make calculations, and make reports. Extra low voltage systems: telephone and TV system, residential telephone, telephone line, business phone system, VoIP, television and antennas, RG cables. Fire alarm system: operation and components, Addressable and conventional systems, fire alarm cable, maintenance, and evacuation plan. Surveillance System – CCTV: operation and advantages of CCTV, schematic diagram and components, CCTV cabling, maintenance. Lightning protection system: lightning, lightning rod characteristics and operation, the different types of lightning rods, differences between lightning rod and surge arrester, rules to follow and isolation spark plugs.
 - b. **Prerequisites:** Electrification 1 (020IE1ES2).
 - c. **Required** for EE students.
6. **Educational objectives for the course**
 - a. **Specific outcomes of instruction:**
 - Acquire the necessary knowledge for the design of low voltage and extra low voltage electrical installations with reference to the NF C and IEC standards,
 - Master and apply the design rules of electrical installations,
 - Control and calculate protections according to the earth connection diagrams,

b. PI addressed by the course:

PI	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	4.1	7.1
Covered	X	X	X	X	X	X	X	X	X	X
Assessed	X	X	X	X	X	X	X	X		

7. Brief list of topics to be covered:

- Introduction
- Short circuit current
- Electrical Panels and Thermal Constraints
- Harmonics and Project Monitoring
- Schneider Electric presentation
- Ecodial + Project Monitoring
- Phone + TV
- Fire Alarm System + Project Monitoring
- CCTV System + Project Monitoring
- Lightning Protection System + Project Monitoring