

These materials have been developed to teach the basis of Electronics in English to non native speakers. Normally, this content is taught to 15-16 year old students within Physics or Technology subjects.

This project is part of the programme of the Catalan Education Department in Spain to introduce CLIL (content and language integrated learning) in schools. Subject specific teachers develop teaching materials in the UK. In this case, I am a Technology teacher at Institut Camarles in the south of Catalonia. I have developed this project with the support and supervision of the experienced CLIL teachers at NILE school in Norwich. The materials cover the electronics block of contents for the Technology subject in the 4<sup>th</sup> course of ESO. The timing should be between around 15 to 20 hours but can be extended even further with the practical activities.

The teaching materials consist basically of a workbook for the students and some powerpoints to project the activities onto an interactive white board and interact with them. There are also lesson plans, audio files, simulation software, etc. You can find the detailed structure of the materials and how to use them in the teaching notes file.

The content is structured in 3 units:

- *Unit 1: Introductions to electronics.* Students learn the main facts in the short history of electronics and about some present issues like e-waste. Then they learn about system block diagrams and the differences between analogue and digital signals.
- *Unit 2: Analogue electronics.* Analogue circuits use a continuous range of voltage as opposed to discrete levels as in digital circuits. Students learn the basic electronic components and how to combine them in basic circuits to process signals. Guidelines for optional circuit building practice are at the end of this unit.
- *Unit 3: Digital electronics.* Digital circuits are the most common physical representation of Boolean algebra and are the basis of all digital computers. Students learn about the basic gates, analyse logic systems and design them. Optional simulation work is at the end of this unit.
- *Revision and assessment:* Here you can find some individual and collaborative revision-assessment activities and a summative assessment exam.

The 4Cs approach to CLIL (content, cognition, communication and culture) has been followed to design these materials. The content dealt with is new for students and quite cognitively demanding. It has to be built up step by step and involves a lot of work requiring individual analysis and reflection as every student has a different learning pace. This type of work is balanced with pair work for mutual support and communication tasks. The learning process is supported by lots of visuals. Language scaffolding is provided to help students understand the input and produce output. Units build knowledge upon knowledge. As the units advance components are combined into simple circuits. Finally these simple circuits are combined into more complex application circuits, like a timer or a light regulator. Finally students can build or simulate these systems. This makes the learning more meaningful.

I hope these materials help many students enter the field of Electronics and improve their English language at the same time. I hope Technology teachers find them useful in their CLIL adventure. If you use them I would welcome any feedback at [jcrisol@xtec.cat](mailto:jcrisol@xtec.cat)