

NAME:



**DEPARTMENT OF COMMUNICATION  
& ELECTRONIC ENGINEERING**

# **ELEC115: Introduction to Electronic Systems 1**

**CSN: Stage 1 & ITA: Stage 1**

**Module Booklet (2002-2003)**

Full and latest information at:

<http://www.tech.plym.ac.uk/dcee/staff/PaulFilmore/undrgrad.htm>

& ELEC115 Module: Student Portal

<http://exchange.plymouth.ac.uk/portal/>

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# ELEC115: Introduction to Electronic Systems 1

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## Introduction

This module contains:-

- Theory
- Laboratory
- Computer Simulations (using the package Electronic Workbench: EWB)
- CAL (computer aided learning - backup for the theory)
- A simple design exercise

### **Module Aims :**

- To provide an introductory, systems perspective on electronics.
- To provide a general understanding of the key electrical/electronic building blocks (components, tools and concepts) and to understand their applications.

### **Skills Elements :**

Knowledge & understanding (LO1, LO2, LO3), Analysis (LO1), Problem Solving (LO1), Practical & Pscho Motor (LO2, LO3, LO4)

### **Objectives / Learning Outcomes :**

The primary outcome of this module is to expedite the subsequent studies of electronic technologies in that students will:

LO1: Understand the fundamental electrical and electronic concepts underpinning the subject,

LO2: Appreciate how electrical signals may be used within systems to represent meaningful information and how electronic systems may be used to perform useful operations on such signals,

LO3: Understand how electronic systems are composed of components and subsystems with defined roles and with defined interfaces between them,

LO4: Be able to undertake simple practical electrical and electronic tasks meaningfully and safely.

## Module Content:

### Theory

The theory covers dc circuits, ac, capacitors, diodes, transistors, amplifiers and transducers, with a general emphasis on a systems approach.

### Laboratory

- Lab 1 Instrument Familiarisation (Sm 304)
- Lab 2 Op Amps (Sm 304)
- Lab 3 Systems Lab (IEEE-488 & LabView) (Sm 5)

### Simulations (EWB):

- Electronic Work Bench: [Simple Resistor Networks](#)
- Electronic Work Bench: [AC Signals and the CRO](#)
- Electronic Work Bench: [Meter Loading](#)
- Electronic Work Bench: [Capacitor Timing Circuits](#)
- Electronic Work Bench: [The Reactance of a Capacitor](#)
- Electronic Work Bench: [Diodes and Rectifier Circuits](#)
- Electronic Work Bench: [The Transistor Switch](#)
- Electronic Work Bench: [Operational Amplifier](#) (Op Amp)
- Electronic Work Bench: [Tone Controls \(Filters\)](#)

### CAL

- CAL – Basic Electricity
- CAL – Capacitors
- CAL - Diodes and Transistors (part)

## Assessment

The laboratories will be assessed in the laboratory (and for Op-Amps via an additional brief computer based test): and form 35% of the total coursework mark. Other work adds a further 65%:- Coursework 1 (computer based test): =20%, Op Amp Design Project = 20%, Computer based tests on the EWB sheets = 25%. A schedule of computer based tests will be published.

## Module Expectations

As there are about three hours of "contact" per week, it is expect that, on average, you will spend another three hours per week of self-study on this module. This may be: Duncan reading & questions, or computer-based, in 201/209 Smeaton, e.g. completing simulations (EWB), or working on CAL tutorials.

## Textbook

Electronics for Today and Tomorrow, Tom Duncan, 2nd Ed., John Murray  
1997

## Schedule of Work

<u>Areas</u>	<u>Duncan*</u> (text book)	<u>Weeks</u>	<u>Lab.</u> [pre-reading]	<u>CAL &amp; EWB</u> <b>(201 Sm)</b>	<u>Course Work</u>
1. <u>Basic Electricity</u> V, I, R, C, P Measurement	1-6,8, 9, 15, 20, 21, 41-43 Also see p234-235  Capacitors: 10,12	10-13	1. Measurement and Loading (Smeaton 304) [2-5, 40-42]	Basic Electricity Meter loading, AC Signals and the CRO  Capacitors and Reactance	1. On going Computer based Tests on the EWB sheets. Schedule to be advised.
2. <u>Practical Electricity</u> AC, generation, use, charging, safety & home,	7, handout handout	13-14			2. Basic Electricity Computer Test (CW1) 5 <sup>th</sup> – 7 <sup>th</sup> November 2002, 201 Sm. Workings to be handed in to DCEE office (101 Smeaton) on 8/11/02.
3. <u>Semiconductor</u> Diodes, transistors Op Amps	25-30, 35, 35-37 48, 53, 54, 56	15-17	2. Transistors and Op Amps (Smeaton 304) [30, 44,48,56]	Diodes, Transistors Amplifiers	3. Op Amp Design Project: to be handed in to DCEE office (101 Smeaton) on 9/1/03).
4. <u>Systems</u> Systems e.g. IEEE-488  Transducers, activators interfacing Loading,	79, 81, 84, 85, 89 96, handout  17, 18, 19, 22, 23 93-95, 97  49, 50	18-21 & 25	3. Systems: to be advised (Smeaton 5)	Prior to lab. 3: to be advised	

## ELEC115: DRAFT LAB SCHEDULE (V4)

Month	Week Starting	Laboratory	Group Tuesday 10-12	Group Friday 9-11	Group Friday 11-1	Group Friday 3-5	Room
September	30/9		-	-	-	-	Smeaton 304
October	7/10	Instrument Introduction	-	-	ITA-A Surnames: A-M	-	
	14/10	Instrument Introduction	CSN-C	CSN-B	ITA-B Surnames: N-Z	CSN-A	
	21/10	Instrument Specifications	CSN-C	CSN-B	ITA-B	CSN-A	Smeaton 304
	28/10	Instrument Specifications	-	-	ITA-A	-	
November	4/11	Op Amps	CSN-C	CSN-B	ITA-B	CSN-A	Smeaton 304
	11/11	Op Amps	-	-	ITA-A	-	
	18/11		-	-	-	-	
	25/11		-	-	-	-	
December	2/12	IEEE-488	CSN-C	CSN-B	ITA-B	CSN-A	Smeaton 5
	9/12	IEEE-488	-	-	ITA-A	-	
	16/12		-	-	-	-	

### Seminars (EWB): Smeaton 201

		Even Weeks	Odd Weeks
Monday 3-4 pm	CSN	Group Y	Group X
Tuesday 3-4 pm	ITA	Surnames: A-M	N-Z

Attend only one of the above seminar sessions every other week (attendance is monitored).

# Coursework Sheets

# Laboratory Sheets

**Instrumentation Familiarisation:** for students unfamiliar with basic laboratory test equipment

**Instrument Specifications:** making basic electrical measurements and seeing the effect equipment has on circuits

**Op-Amps:** using this basic analogue building block in a number of different applications

**IEEE-488,** a systems experience of industrial software for automatic computer controls. Further details at:  
<http://www.tech.plym.ac.uk/dcee/staff/PaulFilmore/teaching/undrgrad/LabViewWeb/LabVIEW.html>

## Simulation Sheets (EWB)

(Electronic Work Bench: Quick Reference Card)

Electronic Work Bench: [Simple Resistor Networks](#)

Electronic Work Bench: [AC Signals and the CRO](#)

Electronic Work Bench: [Meter Loading](#)

Electronic Work Bench: [Capacitor Timing Circuits](#)

Electronic Work Bench: [The Reactance of a Capacitor](#)

Electronic Work Bench: [Diodes and Rectifier Circuits](#)

Electronic Work Bench: [The Transistor Switch](#)

Electronic Work Bench: [Operational Amplifier](#)

Electronic Work Bench: [Tone Controls \(Filters\)](#)