The University Of Sheffield.

# EEE105
# “Electronic Devices”

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# Introduction

Aims and Objectives

Motivation

Lectures and this Module

Examination

My Role

# Aims, Objectives

- Review physical properties and conduction processes of metals, insulators, semiconductors
- Understand the operation of a semiconductor p-n diode and it's design and use in wide ranging applications
- Understand the operation of a semiconductor transistor (bipolar junction transistor)

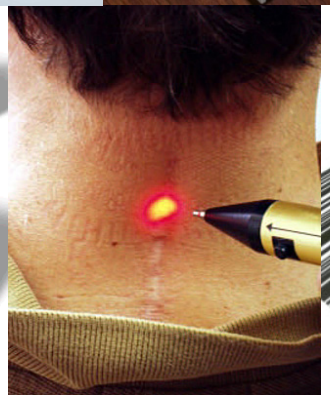
# Course Content

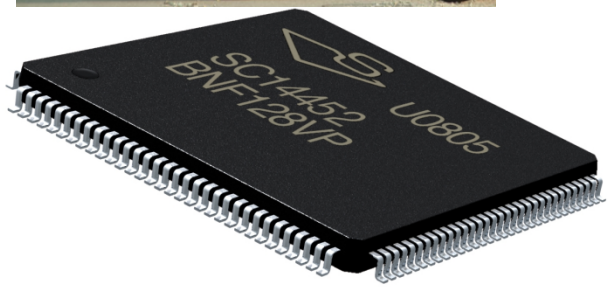
- 1-4 – Crystals, Conductors, Insulators, Capacitors
- 5-9 – Semiconductors – doping, electrons, holes
- 10-14 – p-n junction
- 15-19 – BJT
- 20 - Review  - past paper discussion

# Chips with Everything !









# Difficulties of this course.....

- This course aims to allow the student to understand the measured properties (e.g. current-voltage characteristics) of resistors, diodes, transistors

- It is highly conceptual -Invisible particles moving inside a "black box" structure through physical processes which are new to the student
  - Electrostatics, Quantum mechanics, Statistical mechanics

  → Many new ideas, phrases and much new vocabulary

# Why this course is useful

- Like all Y1 courses – important for future studies – analogue and digital electronics, more advanced semiconductor devices (2nd, 3rd, 4th year), 1st & 2nd Year Labs, 3rd and 4th year projects, PhD?

- It is a very important area of engineering and technology - Future employment – company/university

# Policy

- Spare handouts will be thrown away after each lecture – I will not have copies if you miss the lecture
- Tutorials – attend and complete question sheets to receive marks – starts W3
- I am available outside these times by appointment – email me for a meeting time
- No queues of students wanting exam hints 1 day before the exam please!

# What is a Module?

The University requires that it is ~100 hours of work!

- Lectures = 24
- Tutorials = 10
- Exam = 2
- Total Contact Time = 36

So that results in...

~60 hours of study on your own...

# Self Study – My Advice

- **When**
- Try to spread the pain over a large time period – a few hours per week during term time, following the points introduced in the lectures and trying the tutorial sheets before the tutorial session

- **How**
- Do problem sheets, read books, web (earlier in term), look at old exam papers and solutions (later in term)

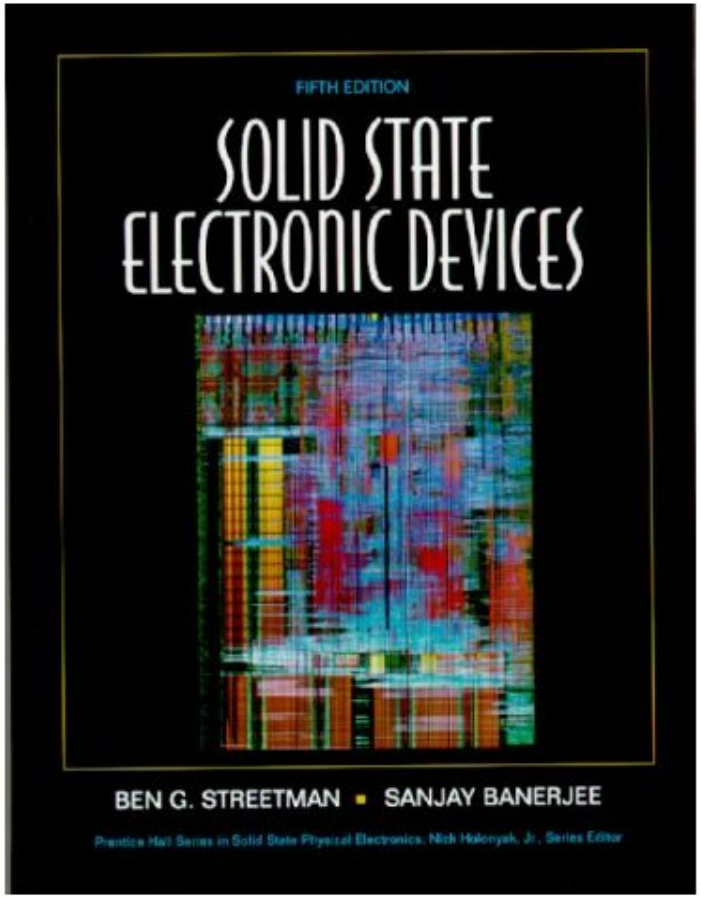
 

# Recommended Textbooks

One stop shop –
Streetman & Banerjee

See books with similar classmark in library

When using books – work out what you don't know and browse books in library to answer your needs



# Assesment

- Exam  - 70%
- Mid-term test – 5%

- Tutorials – 25%
- Question sheets distributed at tutorial on Wednesday at 9AM
- Work through in tutorial and submit completed sheets the following week
- Tutorials start Week 3

# My Role

- I am not your teacher - Big difference between A-level and Degree
- You need to be able to work out what you don't know
- I help in explaining and exploring concepts
- I help in working through problems in tutorial
- I am a small component in your learning in this module

- Do not be surprised if I say ;

"Have you read any books on this subject ?"

"Would you like me type it into Google for you?"

# Attend Lectures or Not?

- I **strongly** suggest you do so
- Good exam performance directly correlates to good attendance

- But ultimately;
- You are all adults not children
- Sometimes you'll be ill / drunk / in the wrong bed / etc.
- I get paid if you're here or not !

- If you are ill – inform your tutor. We need to know ASAP.

# In Lectures

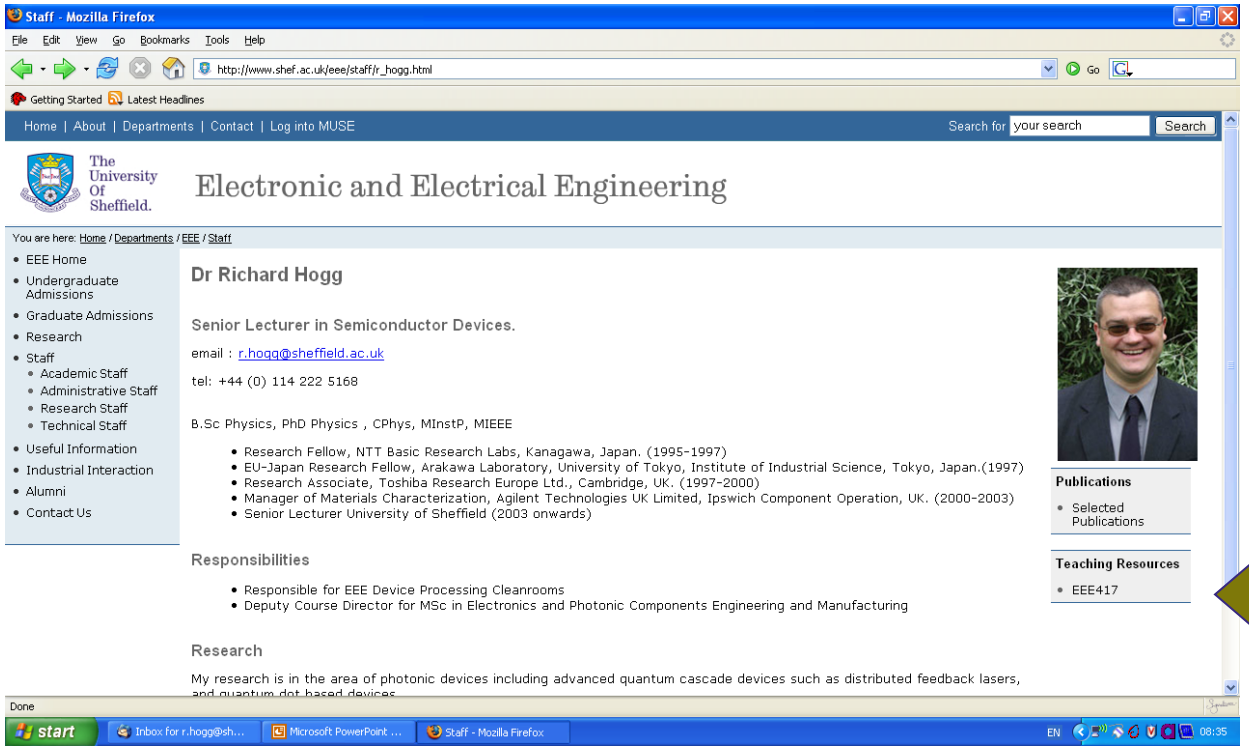
- Try to sit as far in the row as possible – the lecture theaters hold just a few more than the cohort
- Please don't chatter – It puts me off only a little bit, but I feel it's rude to other students
- **Please ask questions**
- Make notes ! The handouts aren't a text book!
- Take spare notes if your friend can't make it
- If you don't follow my (Yorkshire) English – just ask

The University Of Sheffield.

# University Web Resources

http://hercules.shef.ac.uk/eee/teach/resources/eee105/eee105.html




Click here

# Other Resources

- Wikipedia / Google – try a few key words