

Junior Demonstrator Briefing



Tim Davies & Ben Jenkins
(Slides Adapted From Dr Lewys Jones)

Overview

- Undergraduate labs in Materials Science
 - Important people
 - Purpose,
 - Schedules,
 - Groupings,
 - Topics.
- The role of the Junior Demonstrator
 - What it is,
 - What it isn't.
- Some advice
- Possible UG lab scenarios

Ice Breaker

Introduce yourself (not which group you work in), your teaching experience, and one weird fact



The Purpose of UG Labs

- Labs provide essential training in practical scientific skills, conducting work independently from written instructions and report writing
- Labs support the academic lecture course series throughout the year
- Labs are EXAMINED coursework towards either Preliminary or Final exams

Undergraduate Degree Structure

Year	Module	Assessment
1	MS1 – Structure of Materials	Written Summer ‘Prelims’ Exams 400 / 500 marks
	MS2 – Properties of Materials	
	MS3 – Transforming Materials	
	MMES - Maths for Materials and Earth Scientists	Written assessment of lab reports 50 / 500 marks
	Practical Labs	
Crystallography Classes	Written assessment during classes 50 / 500marks	
2	GP1 - Structure and Transformation of Materials	Written Summer ‘Finals’ Exams at end of 3 rd year 400 / 1200 marks
	GP2 - Electronic Properties of Materials	
	GP3 - Mechanical Properties of Materials	
	GP4 - Engineering Applications of Materials	
	Practical Labs	Written assessment of lab reports 60 / 1200 marks
Industrial Visits, Business Module	Written assessment of reports 40 / 1200 marks	
3	OP1 – Materials Options Paper 1	Written Summer ‘Finals’ Exams at end of 3 rd year 200 / 1200 marks
	OP2 – Materials Options Paper 2	
	Team Design Project	Written assessment of reports 50 / 1200 marks
	Characterisation / Modelling Module	Written assessment of reports 50 / 1200 marks
4	Masters (Part II) Project	Written assessment of thesis 400 / 1200 marks

Important People



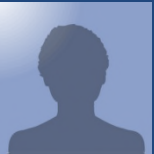
- Dr Keyna O'Reilly – Practical Class Coordinator



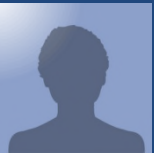
- Paula Topping – Practical Class Technician



- Senior Demonstrators



- The Students (\approx 30-35 each year)



- Other Junior Demonstrators



- Paul Warren etc. – Departmental IT
 - itsupport@materials.ox.ac.uk

UG Labs Schedule

- First year UGs:
 - Thursday & Friday 14:00 – 17:00 alternate weeks (MT & HT)*
 - *Excluding some introductory labs in MTwk1 & MTwk2.
 - PLUS two afternoons (assorted days) in the first half of TT.
- Second year UGs:
 - Monday – Wednesday afternoons alternate weeks*
 - *Except Trinity term which has a special timetable.
- Junior demonstrators should aim to arrive at least 10 minutes before the start of labs,
- Labs may not happen in the same order as previous years.

UG Lab Groups

- Students work in groups of two or three
- Generally grouped by college but not always
- Designed to encourage and teach teamwork
- Will undoubtedly include a mixture of abilities, personalities, approaches, genders

UG Lab Topics – Year 1

- Practical 1P1a Computing
- Practical 1P1b Microscopy
- Practical 1P2 Young's Modulus and Stress Analysis
- Practical 1P3 Electrode Potentials
- Practical 1P4 Energy Levels and Band Gaps
- Practical 1P5 Bubble Raft
- Practical 1P6 Thermal Analysis
- Practical 1P7 Fabrication and Tensile Testing
- Practical 1P8 Metallography
- Practical 1P9 Polymers - Molecular weight effects
- Practical 1P10 Introduction to MatLab & Labview

UG Lab Topics – Year 2

- Practical 2P1 Diffusion
- Practical 2P2 Dislocations and Plasticity
- Practical 2P3 Casting
- Practical 2P4 Introduction to AFM Analysis
- Practical 2P5 SEM and Fracture
- Practical 2P6 Extrusion
- Practical 2P7 Corrosion
- Practical 2P8 Transmission Electron Microscopy
- Practical 2P9 Steels
- Practical 2P10 Materials Selection
- Practical 2P11 Mechanical properties of polymers
- Practical 2P12 Semiconductor Devices

Group Exercises

Split into (≈ 4) groups:

What makes the best teachers/educators effective?

Think of a couple of examples of bad teaching

In your experience, what makes a good/bad demonstrator?

The Role of the Senior Demonstrator

- To write lab handout for the students to follow
- To introduce and explain the relevance of the lab
- To tell the students the key deliverables they are looking for
- To instruct the JDs if there are special themes they want highlighted by the students
- To be around in the labs to answer academic questions, around an average of one hour per day (not fixed)
- To read and mark the written reports
 - The marking method is now displayed on a chart outside the labs.

The Role of the Junior Demonstrator is... (1)

- To familiarise themselves with the practical and the equipment in advance of the lab session, including reading the online handout
- (For new JDs) doing a practice run of the lab
- To oversee delivering the SDs requirements
- To assist the PCT in encouraging safe, respectful and professional behaviour in the labs
- To assist the PCT in concluding the labs in a timely fashion
- To answer reasonable questions from students

What are reasonable questions?

- “What should we do first?”
- “Is one measurement enough?”
- “We are unsure if we have set up our testing equipment properly, please could you check?”
- “Do these results look right to you?”
- What should you do if you are asked a question that you don't know the answer to?

The Role of the Junior Demonstrator is... (2)

- To assist student in becoming effective experimental scientists with:
 - proper lab discipline, behaviour and time management
 - effective team-work and communication skills
 - correct use of lab notebooks (not examined but available to the examiners for inspection)
- To assist students with experimental equipment
- To develop themselves in their communication and teaching skills.

The Role of the Junior Demonstrator is not...

- To give students the 'answers' to the lab
- To do any work for the students or tell the students how to approach the tasks
- To tell them if they've gotten something 'right' or 'wrong'
- To earn some quick money by baby-sitting a group of young-adults / to catch-up on reading

A few words of advice

- Make sure to spend time getting familiar with your practical(s)
 - It is much easier to deal with problems if you understand the practical and apparatus!
 - You get paid for the training time!
- Be proactive and talk to *all* the groups regularly
 - This often helps to identify problems before they arise
- Enjoy yourself!

Possible UG Lab Scenarios (1)

- A student doesn't understand the handout's instructions
- You see someone copying / cheating
- An accident/near miss occurs
- A student is in the IT room completing tute-work for a deadline
- A student leaves the lab unannounced to go smoke / to the vending machines
- You see a student about to do something without the required PPE

Real Scenario (1)

- You are approaching the end of day two of a three day lab. You have concerns that one group will struggle to finish on time. They have taken multiple measurements for 2 out of 5 samples, but have not yet taken any measurements on the other three samples. They seem more concerned with taking multiple measurements for each sample.
- What would you do?

Possible UG Lab Scenarios (2)

- One person in a group is doing no work
- One person in a group is doing all the work
- A student is checking emails / listening to music / playing with a smart-phone in the lab
- You think a student / group are rushing their work just to leave early
- Several groups in the lab all need help at the same time
- You see a group doing the practical/analysing their data incorrectly

Real Scenario (2)

During the first week of your practical, one of the sets of equipment for the second half of the practical will not achieve enough signal for a group to get data

What would you do:

A) If there is lots of time left?

B) If time pressure is such that the group can't use someone else's apparatus after them?

C) If the equipment is not fixed for the next week?

Discussion Time