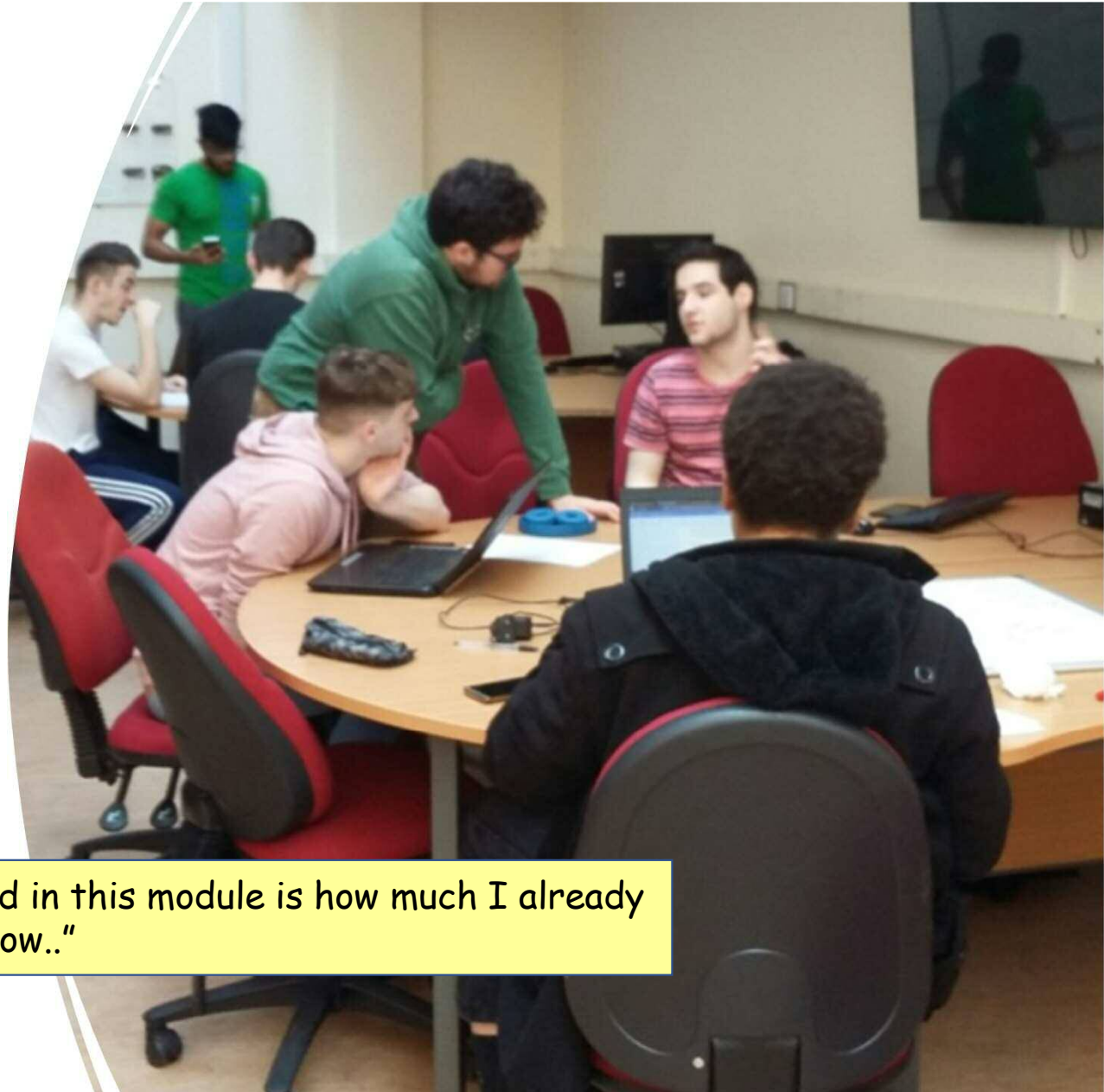


Synoptic Physics/Astrophysics

- Teams solve weekly problems in real time ;
- They submit a properly structured report, formatted and with figures, equations etc at the end of the session;
- Skills include team work, communication, time management, leadership, reflection, commercial awareness.

" The most important thing I learned in this module is how much I already know.."



Thoughts on teams.

- Four is the perfect number.
- I allow friendship groups to nominate themselves into teams. Everyone else is allocated by me.
- I allocate on the basis of academic performance in the previous year, so students are at a similar level. This avoids students being shy and reticent, or allowing one to be dominant from the start.
- I avoid single woman in a male team, equally a single male in a female team.

Captaincy allocated for first four weeks

- Every team member has to take a turn at leading the group. The student is named in front of the whole class.
- **No student has ever refused.**
- Female students in particular comment that they would never have stepped forward without this opportunity.
- Again this avoids dominance by individuals who 'take charge' from week 1.

Being randomly selected as group leader for the first session I feel was of paramount importance to my assertiveness and involvement in the group for the remainder of the module. This prospect, however, was incredibly daunting. The initial team dynamics involved two natural leaders therefore without this opportunity to prove my worth against these stronger characters, not only would I have doubted my own abilities but I fear I may have lost the confidence of the other team members.



Word counts, by gender

Words	Frequency in male comments / statement		Frequency in female comments /statement	
Confident, confidence, confidently	35/47	75%	34/20	170%
Leader, leading, leadership	60/47	128%	37/20	185%
Shy	0	0%	3	15%

“...working in a team of people who have different strengths and weaknesses has shown me that I can become a leader when needed to.”

Creativity -

- Getting the students to make a team video, over the course of the semester, highly successful.
- Excellent work of very high calibre submitted. Very varied and creative!
- None of the usual problems with students failing to turn up to meetings.
- But the students need a brief to get started- don't set something too open.
- We ask them to film and explain an optical phenomenon , the Schlieren effect'.



“It was so amazing to find that we could demonstrate the Schlieren Effect without any special equipment...”

Setting effective, exciting and challenging problems.

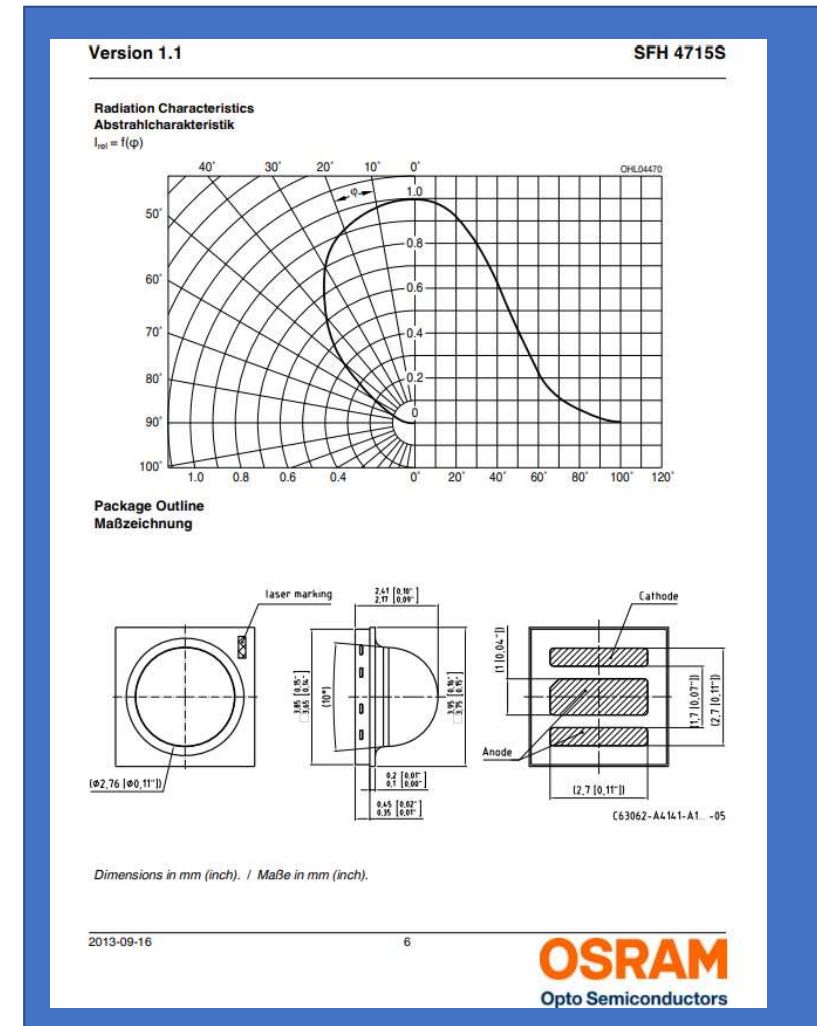
- Find problems with a personal connection- for example involving a recent graduate.
- Make sure there are several different components, so that everyone in the team has responsibility for researching or producing something.
- Use problems which cross over different 'modules'
- Eg lightning striking an aircraft.



"These were real life problems that you can't find in a book...."

Setting effective, exciting and challenging problems.

- Connect to something they are personally interested in. eg an optics problem connected to motion capture.
- Emphasise real world- use real datasheets or refer them to papers with key parameters.
- And include costings sometimes! Students are interested in how much things cost and how that optimises a solution.



This year's favourite problems:

- Calculate the thickness of copper or aluminium necessary to protect an Airbus 500 from a typical lightning strike. Based on minimising added weight, which do you recommend?
- Design a portable vaccine refrigerator which will maintain 4°C for 48 hours with no power, based on the 'Surechill' technology.
- Design a coil for an MRI scanner to operate at 7T and be large enough to accommodate Alan Wyn Jones. Optimise for cost, using data sheets and costs from the Supercon website.



BLF100AC Sure Chill® Vaccine Refrigerator

PQS Code:	E003/013
Description:	Ice lined category refrigerator
Manufacturer's Reference:	BLF100AC
Manufactured in:	UK
Manufacturer:	The Sure Chill Company Pendre Enterprise Park Tywyn, Gwynedd, Wales LL36 9LW United Kingdom T +44 (0) 1654 712 713 F +44 (0) 1654 710 641 hello@surechill.com surechill.com

SPECIFICATIONS

Climate Zone	Hot (H 43°C)	Refrigerant	R134a (CFC free)
Min rated ambient temp	+10°C	Ext dimensions	H185 x W89 x D76cm
Fuel and Cycle type	Electric-compression		

Recommendations

- Teamwork modules benefit from many small assignments, rather than one large one; repetition and learning from failure is really powerful.
- Allocating teams based on friendship or ability, really helps to make this a positive experience. Allocate each student the leadership role at least once.
- TAKE TIME TO RESEARCH INTERESTING AND WORTHWHILE PROBLEMS THAT THE STUDENTS ARE PROUD OF THEMSELVES FOR SOLVING (AND CAN'T BE GOOGLED!!)



“...Sometimes we would disagree on what was the right equation or method and it was important to keep an open mind, listen to others and make sure you have evidence to support your point.”