

## School of Chemistry

### Course Review: Unit Self-Evaluation 2014/15

#### SUMMARY RESPONSES – YEAR 1

Unit code: CHEM10212	
Unit Title: Basic Physical Chemistry	
Unit co-ordinator: Klaus Muller-Dethlefs	
No of students taking unit: 226	
Other teaching staff: Gareth Morris, Jonathan Agger	
<b>Response Rate: 33.63% (76/226)</b>	
<b>General University Questions</b>	<b>Mean score</b>
Overall, I would rate this unit as being excellent	3.62
The feedback that I received on my work was helpful	3.76
This unit was well organised	3.86
The eLearning resources provided in this unit enhanced my learning experience	3.88
I found the tutorials linked to this course useful	4.16
<b><i>Please summarise the main themes from students' comments</i></b>	
<p>Students do like the delivery of the course and they show a high respect for the way that basic physical chemistry is presented. Student's main difficulties are apparent when they need to engage in derivations and numerical calculations and they need to be on top of connections between</p> <p>These difficulties are more apparent in the thermodynamics and the quantum mechanics part of the course. Students like the delivery by derivation of the equations on the visualizer so they can follow with their writing. Students want handouts to be put onto Blackboard before the lectures. Podcasts are very much appreciated. Two podcasts failed this year due to technical problems (has been addresses by Media Services). Students feel they need more time to grasp the quantum mechanics.</p>	
<b><i>Please provide feedback to students comments:</i></b>	
<p>Important technical issues that will be addressed are: Lecture theatre (must be G.51), dysfunctional lecture theatres such as Samuel Alexander will not be accepted by the School; technical problems with podcasts must be resolved; audio visual systems must be up to scratch.</p> <p>Since the number of lectures/workshops cannot easily be extended, the setting of more practice questions, in particular for the thermodynamics and quantum mechanics part, should help the students. The date of the exam should be set as late as possible to allow for more revision time, particularly for the quantum mechanics.</p>	

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*Please provide generic feedback on exam performance (eg questions which were particularly well/poorly answered, common mistakes)*

**Kinetics:** The students' exam performance was slightly less gratifying - average marks were quite respectable, but despite the practice workshop sessions a lot of very poor graphs were plotted, and despite multiple blood-curdling warnings many candidates forgot the importance of ensuring that temperature is expressed in kelvin, not degrees Celsius, in Arrhenius calculations. It was also a little disappointing that relatively few candidates attempted the (quite easy) question on sequential and parallel first order reactions - candidates should remember that the examination is intended to assess candidates' grasp of all of the course material.

**Thermodynamics:** Students' lack of application with regard to learning the course material and their inability to apply the equations therein to simple problem solving in the exam. Many tried to convert a temperature difference in degrees centigrade to kelvin by the addition of 273 - despite warnings in the lectures. Few knew the relationship between power, time and energy - despite being taught this in CHEM10600.

**Quantum Mechanics:** Overall the exam performance was better than last year, both for Q18 a and b. There is still a "tail " of non-performing students who believe they cannot tackle the QM exam question—it is pretty clear that they must work through the lecture material in order to get on top of it—and if they don't they will fail. It is noticeable that the students who did put in some effort to grasp the material did perform reasonably well. Next year I will set some more practice questions.

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Unit code: CHEM10312	
Unit Title: Basic Inorganic Chemistry	
Unit co-ordinator: Sarah Heath	
No of students taking unit: 228	
Other teaching staff: Frank Mair	
<b>Response Rate: 31.58% (72/228)</b>	
<b>General University Questions</b>	<b>Mean score</b>
Overall, I would rate this unit as being excellent	4.47
The feedback that I received on my work was helpful	4.32
This unit was well organised	4.51
The eLearning resources provided in this unit enhanced my learning experience	3.99
I found the tutorials linked to this course useful	4.49
<b><i>Please summarise the main themes from students' comments</i></b>	
This was the first run through for this lecturing duo and as such we were pleased with the feedback. The students enjoyed the course. The feedback was balanced; several others saying the opposite generally balanced any criticism out.	
<b><i>Please provide feedback to students comments:</i></b>	
We were pleased with the feedback, but we will look at the balance of the course again to make sure we feel each section is of equal difficulty.	
There were several comments that Dr Mair's notes were too dense and hard to determine what was important. Dr Mair will re-write his notes to address these comments. But put extra material on blackboard for those that want it.	
<b><i>Please provide generic feedback on exam performance (eg questions which were particularly well/poorly answered, common mistakes)</i></b>	
Both examiners had exam questions with one high average and one lower average. The higher average came from the exam questions which involved reworking or applying material that had been covered directly in the lectures; whereas the exam questions containing material which required the candidates to think laterally or extend their knowledge resulted in the lower average	

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#### SUMMARY RESPONSES – YEAR 1

Unit code: CHEM10412	
Unit Title: Organic Chemistry	
Unit co-ordinator: John Gardiner	
No of students taking unit: 231	
Other teaching staff: Igor Larrosa, Jonathan Clayden	
<b>Response Rate: 28.14% (65/231)</b>	
<b>General University Questions</b>	<b>Mean score</b>
Overall, I would rate this unit as being excellent	3.68
The feedback that I received on my work was helpful	3.94
This unit was well organised	4.20
The eLearning resources provided in this unit enhanced my learning experience	3.89
I found the tutorials linked to this course useful	4.32
<b><i>Please summarise the main themes from students' comments</i></b>	
<p>The general comments were positive as most commented on the good organisation, clear handouts etc, and the consistent clarity and detail in which mechanisms were covered throughout the course. In particular handout structure and regular summary sections / revision guides appear to have been appreciated.</p> <p>The commonest themes in the suggested improvements included the level of content being high and the wish for more workshop/quiz type elements. We intend to address these, though noting that the return rate in this was just 13% whilst the exam was in fact done well, suggesting that the majority of students did appear to understand the material well, so that changes to content level may not be significant.</p>	
<b><i>Please provide feedback to students comments:</i></b>	
<p>We propose to introduce more quiz/problem elements within lectures. To review summaries and revision guides across the course and to any elements where peripheral content may be removed in lieu of more mechanism practice via short problems.</p>	
<b><i>Please provide generic feedback on exam performance (eg questions which were particularly well/poorly answered, common mistakes)</i></b>	
<p>The performance on each section was similar. The questions averages this year again suggested Q6 being left as last resort. It was noted that this year Q2 Section A was slightly more challenging than previously, including more marks weighted to mechanistic answers, and this significantly impacted the averages vs Q1 (same section) but also the typical case of Q1 and Q2 having high answer numbers and high averages.</p> <p>Generally, however, it felt like there were fewer cases of very poor answers and fewer cases of the traditional 'mechanism faux-paxs' (such as nucleophile protons, pentavalent carbonyls and fireworks curly arrows)</p>	

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#### SUMMARY RESPONSES – YEAR 1

Unit code: CHEM10520	
Unit Title: Transferable Skills for Chemists	
Unit co-ordinator: Peter Budd	
No of students taking unit: 222	
Other teaching staff: Peter Gorry, David Mills, Gavin Miller	
<b>Response Rate: 31.98% (71/222)</b>	
<b>General University Questions</b>	<b>Mean score</b>
Overall, I would rate this unit as being excellent	3.07
The feedback that I received on my work was helpful	3.03
This unit was well organised	3.94
The eLearning resources provided in this unit enhanced my learning experience	3.62
<b>Course specific questions</b>	
I found the Chemdraw exercise to be useful	4.31
I found the Excel exercise to be useful	3.54
I found the Scientific Review exercise to be useful	3.89
I found the Group Poster exercise to be useful	3.41
I found the Maths exercises to be useful	4.17
I found the session on CVs and applications to be useful	3.25
I think that the workload for this 10 credit course unit was appropriate	3.82
Sufficient time was given in order to complete each exercise	4.14
<b><i>Please provide feedback to students comments:</i></b>	
<p>This unit received some very positive comments from students, which we appreciate.</p> <p>Some students found the transition from “teaching” to “student-centred learning” difficult, in particular in relation to the quantitative skills (mathematics) component. However, an essential part of a University education is to learn how to learn for yourself. If you can take responsibility for your own learning, it will help you through the rest of your life.</p> <p>Some students indicated that they would like to have lectures on mathematics. The problem with formal lectures is the range of mathematical skills amongst the students. Some have only got GCSE - others have Maths and Further Maths at A-level. We used to teach the course by lectures - but it was universally unpopular. Half the students felt the lectures were far too slow - the other half thought them far too fast. The alternative is to insist on A-level maths at entry - but then around 35% of the students wouldn't be here!</p>	

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The "student-centred learning" approach is the only way we have found to encompass the broad spectrum of mathematical skills within the first year. The work book has the topic material, worked examples, practice tests (with full solutions at the rear of book), some exercises in PASS sessions, physical tutorials, practice tests in BB - and the online-exams. Most importantly, there are maths clinics each Friday where students can bring along their problems for one-to-one advice. Overall there is considerable support for students in this approach.

Some students asked to be able to use calculators in the on-line mathematics examinations. Unfortunately, many modern calculators can perform significant mathematical operations, vectors, statistics, algebra and couldn't be used in the exam. It simply isn't feasible to inspect the capabilities of 226 calculators for three sequential 45 min examinations. In reality the number of questions requiring calculators is small and the scientific mode of the windows calculator has all the necessary functions. The same restriction applied to CHEM10511 in semester 1 - so students have had plenty of time to get familiar with it.

The format and timing of the ChemDraw, Excel, Scientific Writing and Poster exercises will be reviewed, with the aim of providing more effective feedback.

Training related to "CVs and finding work experience" will be revised and extended for the 2016/17 session. The plan is for the introductory week to include a 15 minute introduction to the career service and how to make the most of your time at Manchester, then in Week 10 of Semester 2 there will be a two hour interactive workshop on CV writing. This will be followed with further training in the 2<sup>nd</sup> year, with workshops on interviews and assessment centres.

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### Course Review: Unit Self-Evaluation 2014/15

#### SUMMARY RESPONSES – YEAR 1

Unit code: CHEM10600	
Unit Title: Practical Chemistry	
Unit co-ordinator: Garry Procter/Jonathan Agger	
No of students taking unit: 221	
Other teaching staff:	
<b>Response Rate: 32.58% (72/221)</b>	
<b>General University Questions</b>	<b>Mean score</b>
Overall, I would rate this unit as being excellent	4.28
The feedback that I received on my work was helpful	3.88
This unit was well organised	4.46
The eLearning resources provided in this unit enhanced my learning experience	3.94
<b>Synthesis Lab</b>	
I found the work to be interesting and enjoyable	4.47
The equipment I needed was readily available	4.46
My demonstrator was helpful	3.92
The lab technicians were helpful	4.31
<b>Measurements Lab</b>	
I found the work to be interesting and enjoyable	3.72
The equipment I needed was readily available	3.85
My demonstrator was helpful	4.08
The lab technicians were helpful	4.15
<b><i>Please summarise the main themes from students' comments</i></b>	
<p>There was much positive feedback from the students, who seemed to have enjoyed the practicals. The efforts of the lab technicians and demonstrators were clearly appreciated by most students. The variability of PG demonstrators was commented on, though the majority of comments were positive. The main concerns appear to surround apparent lack of consistency in the marking of PG demonstrators.</p>	
<b><i>Please provide feedback to students comments:</i></b>	
<p>We are pleased at the overall very positive response, and grateful for the useful suggestions. There were calls for the marks to be moderated – marks are indeed moderated, but this can only be done once all the marks are in for the whole course. We always strive to ensure the PG demonstrator marking is as consistent as possible. Students often forget that the mark for an experiment is a composite mark, and the mark for report contributes only <i>part</i> of the overall experiment mark, thus very different overall experiment marks can result, even though the mark for the reports might be very similar.</p>	

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#### SUMMARY RESPONSES – YEAR 1

Unit code: CHEM10812	
Unit Title: Intro to Forensic & Analytical Chemistry	
Unit co-ordinator: Roy Goodacre	
No of students taking unit: 85	
Other teaching staff: Robin Pritchard, Vasudevan Ramesh	
<b>Response Rate: 27.06% (23/85)</b>	
<b>General University Questions</b>	<b>Mean score</b>
Overall, I would rate this unit as being excellent	3.3
The feedback that I received on my work was helpful	2.65
This unit was well organised	3.7
The eLearning resources provided in this unit enhanced my learning experience	3.43
<b><i>Please summarise the main themes from students' comments</i></b>	
<p>The students' comments overall were very positive. The course was generally well received, the lecture material appropriate, delivered with enthusiasm and in context, with additional on-line resources, and the lectures were well delivered.</p> <p>There were however some concerns over the following:</p> <ul style="list-style-type: none"><li>(i) Some wanted a more practical element to the techniques discussed;</li><li>(ii) Some queries regarding the accuracy of marking within Blackboard;</li><li>(iii) There were queries about some content in the Blackboard assessed work that was not covered in the lectures.</li></ul>	
<b><i>Please provide feedback to students comments:</i></b>	
<p>We thank the students for their very useful comments; there were 23 feedback forms submitted which was only ~27% of the class.</p> <p>Overall we are pleased with the student's positive feedback in terms of content of the lectures and delivery style.</p> <p>We have discussed some of the problems and concerns raised and our responses are as follows:</p> <ul style="list-style-type: none"><li>(i) In the immediate future the introduction of a practical element will be difficult given timetabling problems. However, when the years 1 and 2 are reviewed this will be discussed as a possibility.</li><li>(ii) We can allay any student fears who think that the marking in Blackboard is inaccurate. It is not: this is the 7<sup>th</sup> year that these workshops have been used and all questions have been carefully checked regularly throughout this period.</li></ul>	

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- (iii) We discuss the Blackboard coursework at our annual review and we can confirm that all material taught in the formal lectures is reflected in the workshops. We note that some questions in the workshop require synthesis of the lecture material rather than simple regurgitation.
- (iv) With respect to the analytical 'statistics' that is covered, it is absolutely essential than any analytical measurements report precision, accuracy as well as limits of detection and quantification, so this is an important part of the course. We do note that attendance in these lectures was very low (*ca.* 40%) and this may well correlate with the difficulty arising in the workshop by some students.