

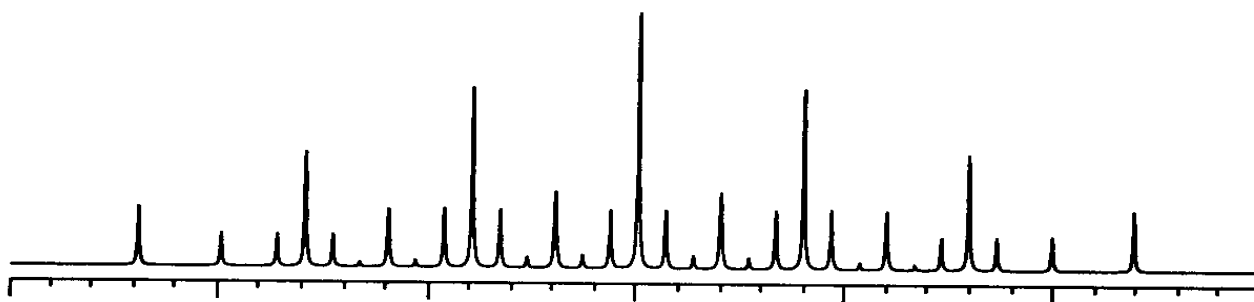
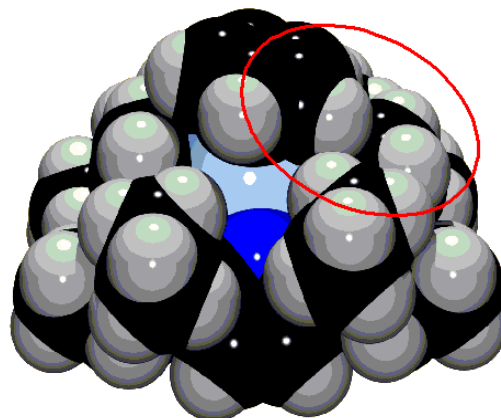
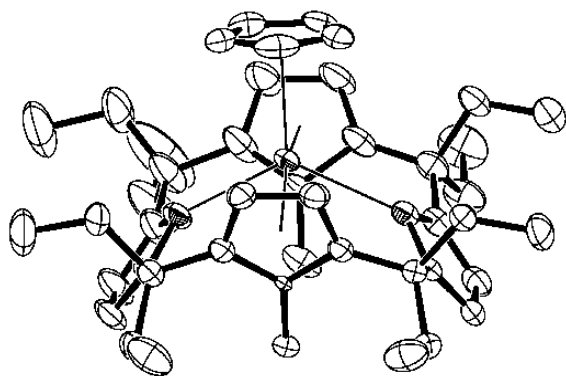


UNIVERSITY
OF TASMANIA

School of Chemistry
Faculty of Science, Engineering & Technology

KRA334: Structural Methods in Chemistry

Unit Outline, 2009



The latest version of this unit outline is available on the web at
<http://www.utas.edu.au/chem/chem3.htm>

(This version updated: 08/07/09)

Unit coordinator:

Michael Gardiner (room 301, ph 6226-2404, email Michael.Gardiner@utas.edu.au)

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Unit summary

Unit code	KRA334 (replacing parts of KRA301 and 302)
Unit title	Structural Methods in Chemistry
Unit description	This unit is intended to provide a solid basis for structural characterisation and compound identification. It is designed to complement KRA333 (Semester 1) and 335 (Semester 2).
Teaching staff	Dr Roger Mulder, Dr Michael Gardiner and Prof Brian Yates
Campus & mode	Hobart, internal
Unit weight	12.5%
Teaching pattern	Semester 2: 28 lectures, 7 tutorials, 5x9 hr lab
Prerequisites	KRA224 and (KRA223 or KRA225) (the following old unit codes are also acceptable: (i) KRA216 and KRA217, (ii) KRA210 or, (iii) KRA215 and KRA213)
Corequisites	none
Mutual exclusions	none
Assessment	Exams 65%, assignments 5%, laboratory 30%
Required texts, etc	Silverstein, RM, Bassler, GC & Morrill, TC <i>Spectrometric Identification of Organic Compounds</i> , ISBN 0471134570 Atkins PW, et al, <i>Inorganic Chemistry</i> , ISBN 0199264635 <i>KRA334 Lecture Notes</i> (available from UniPrint) <i>KRA334 Laboratory Manual</i> (available from UniPrint)
Recommended texts	as specified by individual lecturers

Learning outcomes

On completion of this unit, you should be able to/have:

- Solve complex structure determination problems from spectroscopic information
- identify molecular symmetry elements, classify molecules according to their point group symmetry and apply this knowledge to applications in spectroscopy, molecular orbital theory and diffraction.
- apply multinuclear nuclear magnetic resonance, electron paramagnetic resonance and electronic spectroscopy of inorganic compounds to structural elucidation
- Have knowledge of space group symmetry, the solid state structure of crystalline materials, their diffraction of X-rays and neutrons and the applications of these to the analysis of solids and structure determination
- Be able to use computational chemistry at an elementary level to obtain structural information about molecules
- Have developed experimental skills allowing the application of many of the topics listed above to structure determination and other chemical analyses. In addition, some experience in experimental and interpretive skills not covered in lecture topics will be obtained through the laboratory course

Details of teaching arrangements

Lectures	Spectroscopy 1	Dr Roger Mulder	9L
	Spectroscopy 2, Diffraction Techniques	Dr Michael G Gardiner	15L
	Computational Chemistry	Prof Brian F Yates	4L

Lecture times Tues 12:00-12:50, Fri 9:00-9:50 (weeks 15-26),
Tues 9:00-9:50 (weeks 16-17), Thurs 8:00-8:50 (weeks 15-16)

Lecture location Lecture Theatre Chem328

Lecture schedule See last page.

Tutorials Tues 11:00-11.50, Lecture Theatre Chem328. 7 tutorials will be held during the semester. A library tutorial will be arranged early in the semester at a time to be announced later and held in the Chemistry Computer Lab (room 309). It will cover advanced aspects of chemical literature searching with SciFinder including searching based on chemical structures.

The ChemClub Room (room 107) may be used as a study room. There are numerous chemistry texts (donated by staff) available for your use. Please do not remove these books from the room.

Seminars Attendance at School of Chemistry seminars (Wednesday 12 noon in Lecture Theatre Chem329) is expected. The teaching laboratory will be closed during this time. These are normally visitor and research student talks. The topics are advertised in the foyer of the Chemistry Building.

Study day A study day will be held in the Chemistry Building during the Semester 2 study week. This will include a BBQ and tutorials to focus on past examination papers in the unit.

Laboratory course

Nine hours a week, chosen from Wednesday or Thursday 9 am-6 pm (lab closed Wed 12 pm-1 pm for School seminars), for 5 weeks in the Level 4 teaching laboratory (room 418).

The University is committed to providing a safe and secure teaching and learning environment. In addition to specific requirements of this unit you should refer to the University's policy at: http://www.admin.utas.edu.au/hr/ohs/pol_proc/ohs.pdf.

Occupational health and safety will be emphasised as part of the lab course. Before attending the first session, students are expected to have a laboratory coat, a pair of safety glasses or goggles, a laboratory record book and a laboratory manual, which describes the laboratory course in detail. The laboratory manual should be obtained from UniPrint, and a suitable record book is a *Collins 3880 Account Book*. The laboratory manual explains the fine system in place to recover costs for breakages and lost equipment.

Laboratory exemption: Students who are repeating the unit may be eligible for a full or partial laboratory course exemption. A necessary condition is that they have already obtained a mark of 60% or greater in the laboratory course parts for which they wish to be exempt. Any student seeking an exemption will need to make a written application (to the Unit Coordinator).

Learning expectations

The University is committed to high standards of professional conduct in all activities, and holds its commitment and responsibilities to its students as being of paramount importance. Likewise, it holds expectations about the responsibilities students have as they pursue their studies within the special environment the University offers.

The University's Code of Conduct for Teaching and Learning states:

Students are expected to participate actively and positively in the teaching/learning environment. They must attend classes when and as required, strive to maintain steady progress within the subject or unit framework, comply with workload expectations, and submit required work on time.

Learning strategies

If you need assistance in preparing for study please refer to your lecturer. For additional information refer to the Learning Development website: <http://www.utas.edu.au/learndev/>.

If you will be using MyLO for the first time and would like some information on how to use MyLO refer to the Learning Online website: <http://www.utas.edu.au/coursesonline/>.

Assessment details

Exams End-of-Semester exam, 3 hrs duration
Questions are to be answered in the supplied examination booklets (and graph paper if required). No other written material will be assessed. If you are offered a choice of questions (say, requiring only 4 answers out of 5 possible questions), if you answer all the questions then only the first required number of answers (in the order they are presented by the student) will be marked. Answers to multipart questions will be dealt with the same way.

Assignments In order to provide opportunity for continuous assessment and feedback to students, a number of assignments will be issued. The marks of each lecturer will be scaled according to the proportion of lectures in the unit. The total assignment mark will be 5% of the total for the unit.

Laboratory Your final laboratory mark will be based on your performance in the lab, the quality of your chemical preparations and/or qualitative/quantitative analyses, and your reports. Due dates for your reports will be given in the lab manual.

Specific attendance/performance requirements

In order to pass this unit students must achieve a minimum of 45% in both the examination and laboratory components. In addition, to obtain a pass in the laboratory course you must have submitted reports for at least 70% of the experiments.

How your final result is determined

From time to time, it may be necessary to re-scale marks to allow for what is determined to be either a relatively tough or easy assessment task compared with previous years. The procedure for this is governed by the Faculty policy available on the web (see link below). Final grades are determined in accordance with Faculty policy, which is also available on the web (see link below). The Faculty's Teaching & Learning Operational Guide No 3 will be followed in relation to withdrawals after census dates. All policies are located at <http://fcms.its.utas.edu.au/scieng/scieng/policies.asp>.

Submission of assignments and reports

Lecturers and lab coordinators will provide details of when and where assignments and reports are due to be submitted. A signed cover sheet is required for every assignment and prac report (see the statement on plagiarism in this handout). The cover sheets will be available from the lecturer or the lab, respectively, or from www.utas.edu.au/plagiarism).

An electronic version of most your laboratory reports (word file: excluding spectra, lab diary, other attachments etc) must be submitted through MyLO along with the full hard copy of the reports for the purpose of examining with the plagiarism detection software *TurnItIn* (<http://www.utas.edu.au/tl/supporting/academicintegrity/software.html>). This software cross-references the reports with previously submitted laboratory reports, web-based material, textbooks and the scientific literature for correct referencing/copying from previously submitted work. Failure to submit the final version of your laboratory report to *TurnItIn* will result in no marks being awarded for the relevant laboratory reports.

Nexus: journal of undergraduate science, engineering, and technology is published annually and contains the work of undergraduates. This unit contains assignments that are suitable for submission to the journal. For more information, ask your lecturer, and see <http://www.utas.edu.au/scieng/nexus>.

Requests for extensions

Applications for extensions due to extenuating circumstances (such as a medical condition) are required **before the due date of the work** and should be made known to the topic lecturer (for assignments) or the laboratory coordinator (for laboratory reports) as soon as practicable. Students without a medical certificate for absence will be assumed to have scored zero for the experiments/assignments not submitted.

Penalties

A penalty of 10% of the actual mark will be imposed for each **working day** that an assignment or laboratory report is late. For example, if a student submits an assignment 3 days late and the work is assessed at 70% (without penalty), the mark would then be adjusted to $70 - (3 \times 0.1 \times 70) = 49\%$. **Late penalties for lab reports refer to both the hard copy and the *TurnItIn* electronic submission. *TurnItIn* submissions will close off 10 days after the deadline for lab reports.**

Review of results and appeals

All students may have their results reviewed in accordance with the Faculty policy available on the web at <http://fcms.its.utas.edu.au/scieng/scieng/policies.asp> (policy 6).

Academic referencing

In your written work you will need to support your ideas by referring to scholarly literature, works of art and/or inventions. It is important that you understand how to correctly refer to the work of others and maintain academic integrity.

Failure to appropriately acknowledge the ideas of others constitutes academic dishonesty (plagiarism), a matter considered by the University of Tasmania as a serious offence.

The appropriate referencing style for this unit is that used by either the *Australian Journal of Chemistry* or the *Journal of the American Chemical Society*.

Plagiarism

Plagiarism is a form of cheating. It is taking and using someone else's thoughts, writings or inventions and representing them as your own; for example, using an author's words without putting them in quotation marks and citing the source, using an author's ideas without proper acknowledgment and citation, or copying another student's work.

If you have any doubts about how to refer to the work of others in your assignments, please consult your lecturer or tutor for relevant referencing guidelines, and the academic integrity resources on the web at

<http://www.utas.edu.au/tl/supporting/academicintegrity/index.html>. The intentional copying of someone else's work as one's own is a serious offence punishable by a range of penalties that may range from a fine or deduction/cancellation of marks to, in the most serious of cases, exclusion from a unit, a course, or the University. Details of penalties that can be imposed are available in the Ordinance of Student Discipline – Part 3 Academic Misconduct, see <http://www.utas.edu.au/universitycouncil/legislation/ord9.pdf>.

The University reserves the right to submit assignments to plagiarism detection software, and might then retain a copy of the assignment on its database for the purpose of future plagiarism checking.

For further information and referencing guidelines, see <http://www.utas.edu.au/plagiarism/>.

Each time that you submit an assignment or laboratory report you are required to accompany it with a signed declaration that all the material is your own work except where there is clear acknowledgement or reference to the work of others and that you are aware of the University's plagiarism policy.

Unit evaluation and student feedback

The School of Chemistry is an active participant in the Student Evaluation of Teaching and Learning (SETL) program and the overall unit will be evaluated towards the end of Semester 2. As a result of previous SETL feedback we have, for example, introduced a timetabled regular tutorial slots and reorganised the laboratory experiments. As well as SETL, you should not hesitate to approach the Unit Coordinator or lecturer concerned if you have any problems during the year. Any difficulties may also be raised with the Chemistry Club, which arranges regular meetings between student representatives and the Head of the School.

Further information and assistance

If you are experiencing difficulties with your studies or assignments, have personal or life planning issues, disability or illness which may affect your course of study, you are advised to raise these with your lecturer in the first instance.

There is a range of University-wide support services available to you including Student Services, International Services and Learning Development. Please refer to the Current Students homepage at: <http://www.utas.edu.au/students/>.

Should you require assistance in accessing the Library visit their website for more information at <http://www.utas.edu.au/library/>.

The University aims to ensure that your time here is enjoyable and rewarding. However if you have a concern or complaint that is affecting your study, the University has created a web page (http://www.admin.utas.edu.au/ac_serv/complaints_info.html) to offer you guidance on solving these problems. Most issues can be resolved informally and therefore you are encouraged to discuss the matter with the person involved as a first step. The web page deals primarily with complaints concerning assessment and academic progress;

however advice on who to contact concerning complaints about non-academic issues is also included.

Electronic resources

School of Chemistry home page

<http://www.utas.edu.au/chem>

School of Chemistry safety page

<http://www.utas.edu.au/chem/chemsafety.htm>

University's MyLO site

<http://www.utas.edu.au/coursesonline/>

University Handbook entry

<http://www.utas.edu.au/units/KRA334>

SciFinder Scholar

access available on a new web-based interface. See the library database catalogue for details.

Staff contacts and responsibilities

Enquiries regarding the course should be directed to the unit coordinator in the first instance. However, students are welcome to discuss particular problems with the Head of School, Prof Brian Yates (Brian.Yates@utas.edu.au). There is also a "suggestion box" available in the foyer of the chemistry building for constructive, confidential comments.

Staff member	room	responsibilities	Contact
Dr Michael Gardiner	301	Unit coordinator lectures – spectroscopy, diffraction	6226 2404 Michael.Gardiner@utas.edu.au
Dr Roger Mulder	tba	lectures - spectroscopy	tba
Prof Brian Yates	204	lectures – comput. chem.	6226 2167 Brian.Yates@utas.edu.au
Dr Andrew Grosse	419	laboratory support	6226 2184 Andrew.Grosse@utas.edu.au

Unit Schedule

(white = scheduled event, light grey = scheduled event for KRA335, dark grey = holiday)

Week	Starting	Lectures				Tutorials Tuesday 11.00 – 11.50	Laboratory Wednesday/ Thursday
		Tuesday 9.00 – 9.50	Tuesday 12.00 – 12.50	Thursday 8.00 – 8.50	Friday 9.00 – 9.50		
14	13 July	JAS	JAS	JAS	JAS	KRA335 lab tutorial	Organic Chemistry Weeks 14-20
15	20 July	JAS	RM	RM	RM	JAS	
16	27 July	RM	RM	RM	RM	RM	
17	3 August	RM	RM	JAS	MGG	RM	
18	10 August	JAS	MGG	AG	MGG	JAS	
19	17 August	AG	MGG	AG	MGG	MGG	
20	24 August	AG	MGG	AG	MGG	MGG	
	31 August	Mid-Semester Break					
21	7 Sept.	BFY	MGG	BFY	MGG	AG	Structural Methods in Chemistry Weeks 21-25
22	14 Sept.	BFY	MGG	BFY	MGG	MGG*	
23	21 Sept.	BFY	MGG	BFY	MGG	BFY	
24	28 Sept.	JAS	MGG	JAS	MGG	MGG*	
25	5 October	JAS	BFY	JAS	BFY	JAS	
26	12 October	JAS	BFY	JAS	BFY	BFY	free
Study week	19 October	a study day during the week					

* special time to be determined in consultation at a later date.