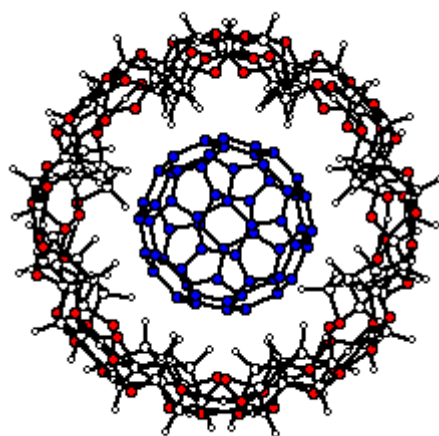


Chemistry Department

400-level Coursebook

2009



Information for B.Sc.(Hons), M.Sc.(Hons) and
P.G.Dip.Sci. students doing CHEM400-480 papers.

General Information

The co-ordinator of fourth year courses in the Chemistry Department is Owen Curnow. Please feel free to see him at any time if you have any queries or concerns about your programme of study.

This booklet contains information about lecture courses and other aspects of fourth year study in Chemistry. The house regulations listed here apply to all students who are doing their research project in the Chemistry Department. If your research project is in another Department or School, then different regulations regarding assessment and grading may apply.

If you are going to be carrying out research work in the Chemistry Department you **MUST** read and sign a Chemistry Department Safety Handbook.

Project work should begin during the week commencing 16 February. Before starting you **MUST** report to Bruce Reid (Room 536). He will provide you with a copy of the Departmental Health and Safety Handbook and other forms relating to photocopy access, keys and your place of research.

All students doing CHEM400 papers should attend a basic first aid course on **Wednesday 18 February at 9 am to 1 pm in Room 533** as well as a briefing session about safety, courses and undergraduate demonstrating on **Wednesday 18 February at 2 pm in room 533**. Lectures begin on 23 February. Most CHEM400 lectures are in room 533.

Demonstrator Training will be on **Friday 20 February at 9:30 am in Room 533**.

CHEMISTRY MASTERS - PART I and P.G. Dip. Sci. – 2009

Course Structure

Each student must select **eight** papers from CHEM 401–416. Students credited with only 56 points from CHEM 320 and 360 courses will be required to achieve concurrently a satisfactory standard in a further 300-level course as approved by the Head of Department.

Laboratory Work

Students are expected to spend an average of between 12 and 15 hours per week in the laboratory for the first three terms, including at least one week of the April vacation and two weeks of the mid-year recess, and then full time for term four onwards; laboratory work should finish around Friday 6 November, the exact date to be decided by the supervisor. A brief project report (2–4 A4 typed pages) should be submitted to the Head of Department by **Thursday 12 November**.

Part I exams

The exam timetable will be set by the end of term two.

Note that the regulations state that for a student to proceed to M.Sc. Part II, a student must either:

- Pass all eight papers with a grade average of at least C+, or
- Pass six papers with an average of at least B– for the eight papers (with special approval).

Project Talk

At the beginning of the **second** year (Part II) of the M.Sc. all students will be required to give a 15–20 minute presentation to the department outlining the background and aims of their research project, along with a summary of any results obtained in the first year.

B.Sc. Hons 400 Level Project Talks

All M.Sc. Part I students will be required to attend these talks scheduled for the afternoons of (a) March 27 and (b) November 10.

Liaison Committee

There is a small staff-student liaison committee to which a member of the Honours/M.Sc. class belongs.

CHEM 400 - CHEMISTRY HONOURS 400 LEVEL – 2009

Course Structure

Each student must select **eight** papers from CHEM 401–416 along with CHEM 480.

Research Project (CHEM480)

Students are expected to spend an average of between 12 and 15 hours per week in the laboratory for the first three terms, including at least one week of the April vacation and two weeks of the mid-year recess, and then full time for term four onwards; laboratory work should not be carried out beyond **23 October** without the permission of the 400-level coordinator.

Research Project Proposal

A written research proposal (≤ 3 A4 pages, double-spaced) should be submitted to the departmental secretary (Room 534) by **Friday 3 April**. **This proposal will not be graded in any way**, but advice may be given by academic staff, both during its preparation and after submission. Supervisors are expected to provide verbal feedback on the proposal.

Research Report

The research report should take no longer than 35 hours for its preparation, and should be as short as convenient, and no longer than 4000 words, excluding diagrams, tables, graphs and references. The report must be written using the RSC style, for which guidelines can be found at <http://www.rsc.org/Publishing/ReSource/AuthorGuidelines/index.asp>.

Three copies (which may be double-sided) of the completed research report should be handed to the departmental secretary by **Monday 2 November**, and an electronic copy should be sent to Owen Curnow.

Examples of previous reports (though not in RSC format), good and bad, will be available on the web.

Grading of the Research Project

The research project (CHEM480) is given a weighting equivalent to **two** written papers and the mark will be determined from three components:

Supervisor's Grade	70%
Research Project Talk (Term 4 only)	20%
Oral Interview	10%

The Supervisor's Grade will take into account (i) the experimental ability of the student, (ii) the approach and initiative of the student to the research project, (iii) the level of understanding displayed by the student, and (iv) the ability of the student to produce a written report on the research project. It is anticipated that the supervisor will provide assistance in the preparation of the research report. Mid-year feedback will be provided by your supervisor with respect to areas (i)–(iii).

The Supervisor's Grade will be moderated at a Staff meeting. Copies of each research report will be available to academic staff.

Research Project Talks

To give Chemistry Honours students experience in presenting brief scientific talks, and to allow academic staff to advise students on presentation techniques, each student will give a 5-minute talk on the aims of the research project. These practice talks will be presented to the Honours/Masters Part I class and the individual student's supervisor(s) on the afternoon of **Friday 27 March**. **These practice talks will not be graded in any way.** Feedback will also be provided.

The grade for the Research Project Talk will be awarded on the basis of a 10-minute presentation by the student to the Chemistry Honours/Chemistry Masters Part I class. These presentations will be scheduled for **Tuesday 10 November**. All students are expected to attend. The grades for these Research Project Talks will be determined by academic staff members, and judged as a verbal scientific presentation, and **NOT** on the extent of the research results.

Interview

A short interview (approximately 15 minutes) will be held with each student on **Thursday 12 November**. Your supervisor will be present in an observational role only. The interview will be worth 10% of the CHEM480 grade and will assess your understanding of the project.

Liaison Committee

There is a small staff-student liaison committee to which a member of the Honours/M.Sc. class belongs.

Other commitments

The 4th year Chemistry programme is a full time commitment. In addition to lectures (average 5 per week) and project work (average 16–20 hours per week), there are a number of other demands on your time:

First Year Demonstrating

All students (B.Sc(Hons), M.Sc. and P.G.DipSci) doing research projects in the Chemistry Department are expected to demonstrate in the First Year Laboratory Course (for which you are paid). This involves 3 hours in the lab per week, along with marking of the lab books and attendance at the weekly demonstrators' instruction meeting (Monday 12 noon in room 533).

Seminars

Fourth year students are expected to attend ALL Departmental Seminars. These are talks by visiting or local chemists on a diverse range of chemistry-related topics and take place on most Mondays at 11.00 am in room 531. Occasionally, additional seminars are scheduled for other times during the week.

Research group meetings

Most research students will belong to a group that has regular (weekly) meetings to report the latest research results, discuss literature results or solve research problems.

Study

Adding up the above times results in a rather full programme, and this is without doing any study for the final exams which account for 70–80% of your Honours grade. Most papers require significant extra reading of the chemical literature in order to understand the topics covered. The exam timetable will be set by the end of term two taking into account the courses taken by individual students.

CHEMISTRY 400 Course Content 2009

CHEM 401 Inorganic Chemistry

15 lectures. Assessment: Final exam: 100%

Dr. Owen J. Curnow (8 lectures) — Metal clusters: from molecules to metallic lattices

Prof. Thorri Gunnlaugsson (7 lectures) — Photochemistry of d- and f-block based supramolecular coordination complexes

CHEM 402 Organic Chemistry

15 lectures. Assessment: Final exam: 100%

Dr. Antony Fairbanks (8 lectures) — Carbohydrate chemistry and an introduction to glycobiology

Dr. Chris Fitchett (7 lectures) — Transition metals in organic synthesis

CHEM 403 Chemical Dynamics and Spectroscopy

15 lectures. Assessment: Final exam: 100%

Prof. Peter W. Harland (8 lectures) — Molecular dynamics

Prof. Michael A. Collins (7 lectures) — The dynamics of chemical reactions

CHEM 404 Analytical and Environmental Chemistry

16 lectures, choice of two out of three topics. Assessment: Final exam: 100%

Dr. Sally K. Gaw (8 lectures) — Terrestrial bioavailability of contaminants

Prof. Ian Shaw (8 lectures) — Mechanisms of environmental toxicity and toxicity testing

Prof. Mark Pollard (8 lectures) — Archaeological Chemistry

CHEM 405 (BCHM410) Bioorganic Chemistry

13/14 lectures. Assessment: Assignment 10%; Final exam: 90%

Dr. Emily Parker (8 lectures) — Enzymic catalysis

Dr. Andy Pratt (5 or 6 lectures) — Biological chemistry of nucleic acids

CHEM 406 Theoretical Chemistry

15 lectures. Assessment: Final exam: 100%

Prof. Leon F. Phillips (8 lectures) — Quantum chemistry I

Dr. Robert G. A. R. Maclagan (7 lectures) — Hartree-Fock theory

CHEM 407 Metallosupramolecular Chemistry

15 lectures. Assessment: Final exam: 100%

Prof. Peter J. Steel (8 lectures) — Part A: Discrete assemblies

Dr. Paul Kruger (7 lectures) — Part B: Infinite assemblies

CHEM 408 Reaction Mechanisms

15 lectures. Assessment: Final exam: 100%

Prof. Jim M. Coxon (8 lectures) — Orbital symmetry and pericyclic reactions

Prof. Jeffrey Keillor (7 lectures) — tba

CHEM 409 Rate Processes

15 lectures. Assessment: Final exam: 100%

Dr. Greg T. Russell (7 lectures) — Radical polymerisation and its kinetics

Prof. Leon F. Phillips (8 lectures)—Statistical mechanics

CHEM 410 Nanotechnology

15 lectures. Assessment: Final exam: 100%

Dr. Vladimir B. Golovko (7 lectures) — Nanostructured materials

Dr Alison J. Downard (8 lectures) — Nano-based sensors

CHEM 411 (BCHM411) Bioinorganic Chemistry

15 lectures. Assessment: Final exam: 100%

Dr. Richard M. Hartshorn (10 lectures) — Redox processes in biological systems: electron transfer theory, biological electron transfer, cytochrome P450 and other oxygenases

Dr. Jan Wikaira (5 lectures) — Small molecules as biomimetics: structural and functional models for large biological molecules

CHEM 412 (BCHM412) Structural Chemistry and Biology

15 lectures. Assessment: Final exam: 100%

Prof. David Jefferson (10 lectures) — Basic X-ray, neutron and electron diffraction plus microscopic imaging and compositional analysis

Dr. Richard M. Hartshorn (5 lectures) — NMR techniques in structural chemistry and biology

BCHM403 Protein Science

Assessment: Assignments: 60% Final exam (in September): 40%

Prof. Juliet Gerrard (Rm 464 Biology): Tutorials 1 and 6–8

Dr. Andy Pratt: Tutorials 2, 3 and 8

Dr. Emily Parker: Tutorials 4, 5 and 8

CHEM 413–416 Special Topics

In special circumstances, and by arrangement with the Head of Department and fourth-year coordinator, a special course of study may be designed to meet the needs of a particular student and examined under these paper designations.

CHEM 400 Lecture Timetable First semester

			Starts	23/2	2/3	9/3	16/3	23/3	30/3	4/4-26/4	27/4	4/5	11/5	18/5	25/5	1/6
				1	2	3	4	5	6	Break	7	8	9	10	11	12
M	9	533	CHEM402	AJF	AJF	AJF	AJF	CMF	CMF		CMF	CMF				
M	9	533	CHEM404										SKG	SKG	SKG	
M	10	533	CHEM404												SKG	
M	10	533	CHEM405	EJP	EJP	EJP	EJP		AJP		AJP	AJP	AJP	AJP		
M	12	533	CHEM406	LFP	LFP	LFP	LFP	RGM	RGM		RGM	RGM				
Tu	9	533	CHEM407	PJS	PJS	PJS	PJS									
Tu	9	533	CHEM411					JLW								
Tu	9	533	CHEM401									OJC	OJC	OJC	OJC	
Tu	10	533	CHEM409										LFP	LFP	LFP	LFP
Tu	10	533	CHEM411	RMH	RMH	RMH	RMH	RMH	JLW							
Tu	11	533	CHEM412									RMH	RMH	RMH	RMH	RMH
W	9	533	CHEM402	AJF	AJF	AJF	AJF	CMF	CMF		CMF					
W	9	533	CHEM404										SKG	SKG	SKG	SKG
W	10	533	CHEM401									OJC	OJC	OJC	OJC	
W	10	533	CHEM405	EJP	EJP	EJP	EJP		AJP		AJP					
W	12	533	CHEM406	LFP	LFP	LFP	LFP	RGM	RGM		RGM					
Th	9	533	CHEM408	JMC	JMC	JMC	JMC									
Th	9	533	CHEM411					JLW	JLW							
Th	9	533	CHEM409										LFP	LFP	LFP	LFP
Th	10	533	CHEM410										VBG	VBG	VBG	
Th	10	533	CHEM411	RMH	RMH	RMH	RMH	RMH	JLW							
Th	11	533	CHEM412									DJ	DJ	DJ	DJ	DJ
F	9	533	CHEM412									DJ	DJ	DJ	DJ	DJ
F	9	533	CHEM407	PJS	PJS	PJS	PJS									
F	10	533	CHEM410									VBG	VBG	VBG	VBG	
F	11	533	CHEM408	JMC	JMC	JMC	JMC									

The dates and times for Jeffrey Keillor's CHEM408 lectures are to be announced. DJ is David Jefferson.

Second semester

			Starts	13/7	20/7	27/7	3/8	10/8	17/8	22/8-6/9	7/9	14/9	21/9	28/9	5/10	12/10
				13	14	15	16	17	18	break	19	20	21	22	23	24
M	9	533	CHEM404	ICS	ICS	ICS	ICS									
M	10	533	CHEM403	PWH	PWH	PWH	PWH						MAC	MAC	MAC	MAC
M	12	533	CHEM401										TG	TG	TG	TG
Tu	9	533	CHEM407	PEK	PEK	PEK	PEK									
Tu	10	533	CHEM409	GTR	GTR	GTR	GTR									
Tu	12	533	CHEM401										TG	TG	TG	
W	9	533	CHEM404	ICS	ICS	ICS	ICS									
W	10	533	CHEM403	PWH	PWH	PWH	PWH						MAC	MAC	MAC	
Th	9	533	CHEM409	GTR	GTR	GTR										
Th	10	533	CHEM410	AJD	AJD	AJD	AJD									
Th	11	533	CHEM404	MP	MP	MP	MP									
F	9	533	CHEM404	MP	MP	MP	MP									
F	10	533	CHEM410	AJD	AJD	AJD	AJD									
F	12	533	CHEM407	PEK	PEK	PEK										

Visitors: MAC is Mick Collins, TG is Thorri Gunnlaugsson, MP is Mark Pollard

CHEM400 Important Dates

16 February	Research Project begins (week before lectures begin)
17 February	Library tutorial (11 am in PSL computer room)
18 February	First aid course (9–11 am) and orientation (2 pm)
20 February	Demonstrator training (9:30 am)
23 February	Lectures begin
27 March	BSc(Hons) practise talks
3 April	Written Proposals due
1 May	MSc(part 2) seminars
3 June	400-level liaison meeting
17–31 August	EXAM period
16 October	Lectures finish
23 October	Complete experimental
2 November	BSc(Hons) project reports due (see comment below)*
4–6 November	Second EXAM period (401 and 403)
10 November	BSc(Hons) project talks
12 November	BSc(Hons) interviews
12 November	MSc(part 1) reports due

* Students with exams in the second exam period should complete their experimental and hand in their project reports at an earlier date. They should also make a start on their final seminars before studying for their November exams. If you are unsure about how to plan your course of study, you should discuss it with your supervisor and the 400-level coordinator.