

CHEM 241 – 3 CREDITS – INORGANIC CHEMISTRY I: INTRODUCTION TO PERIODICITY AND VALENCE THEORY

1. GENERAL INFORMATION

Course Format:	Lecture 52	Thursday	18 :00 – 20 :30	CC 320 LOY
	Lab 51	Monday	18 :30 – 22 :30	Wet: SP-210, Dry: SP-S180-07
	Lab 56	<i>Only for students granted a lab exemption from both wet & dry labs.</i>		

Professor: **Dr. Peter Bird** (peter.bird@concordia.ca, (514)848-2424 x3367, SP-275.07)
Office hours: Mon. – Fri. 3:30 – 5:00 (or by appointment)

Lab coordinator: **Zornitsa Stoyanova** (zornitsa.stoyanova@concordia.ca, x5976, SP-201.10)
Office hours: by appointment (see for issues regarding wet lab schedule/attendance)

TAs: Refer to the Moodle site for contact information and office hours. *Normally, the TA's are not to be disturbed or detained outside of their scheduled lab or office hours.* Request an appointment by e-mail if necessary to hand in a late report.

Moodle site: CHEM 241 W17 Sect.52 (slides, dry labs, sample exams...)

2. COURSE DESCRIPTION

The structure of the atom; the periodic table; properties of atoms, covalent bonding treatments including Lewis theory, valence shell electron pair repulsion theory of structure, valence bond and molecular orbital theory. Crystal field theory applied to the structure and properties of transition metal complexes. Bonding theories of metallic materials and semi-conductors. Lectures and laboratory.

Prerequisites: CHEM 205, 206; PHYS 204, 206, 224, 226; MATH 203, 205; or equivalents for *all* of these.

3. OBJECTIVES

You should acquire familiarity with the concepts used to describe the bonding and some properties of a variety of types of compounds. You should be able to understand the ways in which structural and bonding information is presented for known molecules AND you should develop some predictive skills.

4. SCHEDULE

Important dates: Lectures begin Thursday, Jan. 12th
Labs begin (check-in in SP-210) Monday, Jan. 16th
Deadline to withdraw with tuition refund (DNE): midnight, Mon. Jan. 22nd
Midterm exam (in class): Thu. Mar. 9th
CHEM 101 quiz closes 23:55 Sun. Feb. 26th.
Deadline to withdraw (DSC): midnight, Sun. Mar. 19th
Lectures end: Apr. 10th
Last day to hand in lab reports: Thur., Apr. 13th
Exam period: Apr. 19th – May 2nd. Final exam date: TBA

5. COURSE MATERIALS (Obtainable from the Concordia Bookstore)

Readings List Miessler *et al* 5th Ed. Ch.1-3, 5, 7, parts of 9-12 & other readings (see p.5 of syllabus).

Required Text “*Inorganic Chemistry*”, G. Miessler, P. J. Fischer & D. Tarr, Pearson, 5th Ed. (341 too) as hard copy or e-book (180-day access; see bookstore & <https://www.vitalsource.com/student-etextbooks>)

+ any General Chemistry text you already have (e.g., Kotz, Zumdahl, Petrucci, etc.)

Optional “*Student Solutions Manual for Inorganic Chemistry*”, G. Miessler, P. J. Fischer & D. Tarr, Pearson, 5th Ed. (<https://www.pearsonhighered.com/chemistryresources/>)

Lab Manual “*Chem.241 Wet Labs*”, Dept. of Chem. & Biochem., Concordia (rev. Fall ‘12 - not older)
“*Dry Labs*”: see the Moodle site

Other Equipment i>clicker or smartphone/laptop REEF subscription – **required** for in-class participation. For labs – **mandatory**: Lab coat, safety glasses; **useful**: Scoopula, rubber bulb.

6. GRADING

To pass CHEM 241, **you must pass both the course work and the laboratory work**, by obtaining at least 50% on the course work (class participation, midterm and final exam) and at least 60% on the laboratory work. A failure in the laboratory part carries an automatic "R" grade, and a good lab mark will not compensate for a failure in the coursework. The final grade will be weighted as follows:

Lab Work - (Wet Labs)	10%
Lab Work - (Dry Labs)	10%
Class participation	5% (need an i>clicker OR a REEF subscription on smartphone/laptop)
Midterm Exam*	25%
Final Exam*	50% (in April/May, scheduled by Exams Office, NOT me)

The midterm examination will cover all material taught in the period preceding it. The final examination will cover the entire course. If you do better on the final than on the midterm, the midterm will not count, and the final will count 75%, **but only if you wrote the midterm, or have a legitimate excuse for missing it.*

The **grading scheme** is as follows:

A mark ≥	0%	40	50.00	53.33	56.67	60.00	63.33	66.67	70.00	73.33	76.67	80.00	83.33	86.67
and <	40	50	53.33	56.67	60.00	63.33	66.67	70.00	73.33	76.67	80.00	83.33	86.67	100%
gets an:	R	F	D–	D	D+	C–	C	C+	B–	B	B+	A–	A	A+

NB: if you do not complete "Chem101", you will earn an INC notation, and a grade one step lower than you would otherwise deserve (see below)' that means, for example "B/INC" instead of "B+".

Important: to pass CHEM 241, you must pass the theory part and the lab parts separately.

- **Theory pass:** class participation + midterm exam + final exam ≥ 40/80
- **Theory fail,** even if you passed the lab: < 40/80 "F" (Fail) or < 30/80 "R" (Repeat)
- **Lab pass:** wet + dry labs ≥ 12/20, and no more than 1 lab missed, excuse or not. If you miss lab for a legitimate reason, it will be excused, but not more than 1 time.
- **Lab fail:** you will receive an automatic "R" grade, *whatever your theory mark might be.*

For the midterm and final examinations, only non-programmable calculators will be accepted. To avoid potential problems with invigilators, the Faculties of Engineering and of Arts & Science have selected and recommend two inexpensive models: the Sharp EL-531 and the Casio FX-300MS.

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

7. LABORATORY INFORMATION (more details p.6-)

The labs in CHEM 241 will further your experience of the practical aspects of inorganic chemistry and of the concepts studied in class. Laboratory performance is graded on the quality of the experimental work and the report. During the **second week** of term, go to SP210 when your lab is scheduled. Each section will be divided into two groups which will alternate weekly between:

- **Wet Labs.** These are conventional (small scale) experiments. Your TA/demonstrators(s) will tell you which experiment you will do in which week. A printed lab manual is sold in the University bookstore, and can also be downloaded from the Moodle web site.
You will not be permitted to enter the laboratory if you are not wearing a lab coat and safety glasses, if you have not completed the prelab exercises, or if you are late.
- **Dry Labs.** These are computer-based exercises illustrating concepts in the course for which wet labs are not feasible.

More details can be found in the lab instruction pages (p.6-8) of this syllabus. Remember, experimental chemistry can be dangerous; there is no shame and no penalty in asking any kind of questions. Your experimental skills will be evaluated through your lab reports. Hence, pay extra care for the **scientific significance** and the **scientific presentation** in your reports. A good report goes beyond superficial

questions and is based on **critical thinking**. In other words, you have to ask yourself constantly why you are doing this and that during the experiment and relate this to your knowledge.

Lab Absences: If you miss a lab, you must provide a written excuse appropriately signed (e.g., doctor or similar) within one week or you will receive a grade of **zero**. No more than ONE absence is allowed.

Lab exemptions: If you have taken CHEM 241 and passed both the wet & dry lab components (>12/20) in Fall 2014-Winter 2016, you should request a lab exemption (at SP-201.01 during the first week of class). The previous mark(s) will be used in calculating your grade this term. If you have not yet applied, please go to <http://chem.concordia.ca/undergraduate/programs/fagforms/>. **To get a lab exemption, you must (1) submit the exemption application by Friday Jan. 13th AND (2) register in lab section 56 (students in all other lab sections must perform ALL labs). All late lab-exemption requests will be refused.**

8. CLASS PARTICIPATION – i>CLICKER DEVICE or REEF POLLING SUBSCRIPTION

Teaching & learning research has shown that active participation in class (for grades) significantly improves student engagement and success. Thus, you are required to purchase either (1) an i>clicker classroom response device or (2) a subscription to the i>clicker REEF Polling System for your smartphone or laptop. Bring your device to each class. Note: REEF is cheaper than a new i>clicker, but if you will need a clicker for ≥ 4 courses, the clicker itself might be cheaper, and used clickers can be sold back to the bookstore.

Details: A clicker is a response system that enables you to respond to questions we pose during class. Your class participation mark will be partly earned by merely responding, and partly for answering correctly. Some advance preparation is a good idea: the questions are in the PowerPoint presentations on the Moodle site. To receive marks, you must register your clicker (see below), so that we know which clicker is yours.

On-line web registration for an i>clicker device: any time, go to your "myConcordia" portal, then "Student Services", then "i>Clicker Registration". Your i>clicker remote ID is found on the bar-code sticker on the back of your i>clicker device. Note: if you choose to use REEF, registration will occur via the REEF website.

Please be aware that using a clicker belonging to another student in order to fake their presence in the class when they are actually not present would be a form of cheating under the Academic Code of Conduct. ☹

9. RIGHTS AND RESPONSIBILITIES OF THE STUDENT

Read the Moodle site within the first week of classes:

Full explanations of the course policies, activities, and helpful tips are provided there. Please read it before the 2nd week of class – by registering for the course, you are agreeing to follow these rules. The information will remain accessible all term for your reference. If you have questions, please ask the professor and/or lab coordinator.

Be prepared for lectures & labs:

Lectures: Read the lecture materials before class, and then be ready to (i) answer clicker questions (including calculations) during the lecture and (ii) engage in discussion with classmates to clarify each others' understanding.

Labs: Read the experiment thoroughly & complete the prelaboratory exercises (individually), and then be ready to (i) perform the experiment together with a lab partner and (ii) write a lab report based on your data (individually).

Contribute to a positive learning environment:

Disruptive or disrespectful behaviour will not be tolerated in classrooms or laboratories. Laptop computers are permitted for course-related activities. Students engaging in inappropriate behaviour will be asked to leave, without the opportunity to make up the missed work.

Complete the CHEM 101 seminar & quiz: (MANDATORY COURSE REQUIREMENT)

As part of this course, you **are required to** (i) attend a Chemistry & Biochemistry seminar on academic integrity, the academic code of conduct and the appropriate use of information sources **and** (ii) earn 100% on the "Chem 101" moodle on-line quiz. The aim of the seminar and quiz is to clarify the code of conduct in terms of what practices are considered unacceptable with regards to work submitted for grading in Chemistry & Biochemistry courses. **The seminar (1 hour) will be held several times during the week of Jan. 23rd - 27th: Mon. - Fri. at 4:45pm, Mon. & Wed. at 8:45pm.** Please sign up for your preferred time, as

seating is limited. Sign-up sheets (with room locations indicated on them) will be located outside SP 201.01 (Departmental office). **IMPORTANT: Late-comers will not be admitted.**

You are exempt from the Chem 101 requirement ONLY if you already did both (i) and (ii) in Winter 2012 or more recently;* otherwise, you must complete both this term. *You are exempt if you can find your ID in the pdf file found on the on the Departmental website at:

<http://www.concordia.ca/artsci/chemistry/programs/undergraduate/procedures-forms.html>

Look under the CHEM101 tab.

If you do not complete Chem 101, your final Chem 241 grade will be lowered by one grade division and carry an incomplete notation (e.g., C+/INC if you earned a B-). Please refer to the Department website FAQs or the Undergraduate Calendar (section 16.3.6) for details on removing an INC notation (thus restoring your grade) via the “Late Completion” process.

The Concordia University academic code of conduct can be found in section 17.10 of the current academic calendar (<http://www.concordia.ca/academics/undergraduate/calendar/current/17-10.html>). Any form of unauthorized collaboration, cheating, copying or plagiarism found in this course will be reported and the appropriate sanctions applied. The Chem 101 seminar is a clear and fair opportunity to learn what our faculty regards as academic misconduct. Failure to take part in this learning opportunity and thus ignorance of these regulations is no excuse and will not result in a reduced sanction in any case where academic misconduct is observed.

Demonstrate academic integrity:

(Source: Academic Integrity Website, www.concordia.ca/students/academic-integrity/plagiarism.html)

The most common offense under the Academic Code of Conduct is **plagiarism**, which the Code defines as **“the presentation of the work of another person as one’s own or without proper acknowledgement”**. This could be material copied word for word from books, journals, internet sites, professor’s course notes, etc. It could be material that is paraphrased but closely resembles the original source. It could be the work of a fellow student, for example, an answer on a quiz, data for a lab report, or a paper or assignment completed by another student. It might be a paper purchased through one of the many available sources. “Presentation” is not limited to written work – it can also refer to copying images, graphs, tables, ideas, oral presentations, computer assignments and artistic works. Finally, if you translate the work of another person into French or English and do not cite the source, this is also plagiarism. In simple words: **DO NOT COPY, PARAPHRASE OR TRANSLATE ANYTHING FROM ANYWHERE WITHOUT SAYING FROM WHERE YOU OBTAINED IT!**

10. CONCORDIA UNIVERSITY SERVICES FOR STUDENTS (partial list)

- Counselling & Development: career services, student learning services, psychological services: <http://cdev.concordia.ca/>
- Access Centre for Students with Disabilities: <http://supportservices.concordia.ca/disabilities/>
- Concordia Library Citation & Style Guides: <http://library.concordia.ca/help/howto/citations.html>
- Academic Integrity Website: <http://provost.concordia.ca/academicintegrity/>
- Advocacy & Support Services: <http://supportservices.concordia.ca/>
- Financial Aid & Awards: <http://web2.concordia.ca/financialaid/>
- Student Success Centre: <http://studentsuccess.concordia.ca/>
- New Student Program: <http://newstudent.concordia.ca/>
- Student Transition Centre: <http://stc.concordia.ca/>
- Health Services: <http://www-health.concordia.ca/>

CHEM 241 – TOPICS TO BE COVERED

These are the required readings from the text *Inorganic Chemistry* by Miessler, Fischer and Tarr, 5th Ed. There you will find, at least, an introduction to topics covered in class. Sometimes, lectures will go into greater or lesser detail than the textbook (lectures guide how deeply you should learn the material). For topics not covered in Miessler, refer to the appropriate chapter in any General Chemistry textbook (e.g., Kotz). There may also be additional reading assignments announced in class, which may form the basis for clicker questions.

Ch. 1 Introduction to Inorganic Chemistry

What is Inorganic Chemistry?

Contrasts with Organic Chemistry
The History of Inorganic Chemistry

Elements & Isotopes

Not in this text – See lecture slides & Gen.Chem. textbook
Genesis of the Elements, Nuclear Reactions & Radioactivity

Ch. 2 Atomic Structure

- 2.1. Historical Development of Atomic Theory
 - 2.1.1. The Periodic Table
 - 2.1.2. Discovery of the Subatomic Particles & the Bohr Atom
- 2.2. The Schrodinger Equation
 - 2.2.1. The Particle in a Box
 - 2.2.2. Quantum Numbers & Atomic Wave Functions
 - 2.2.3. The Aufbau Principle
 - 2.2.4. Shielding
- 2.3. Periodic Properties of Elements
 - 2.3.1. Ionization Energy
 - 2.3.2. Electron Affinity
 - 2.3.3. Covalent and Ionic Radii

Ch. 3 Simple Bonding Theory

- 3.1. Lewis Electron-Dot Diagrams
 - 3.1.1. Resonance
 - 3.1.2. Higher Electron Counts
 - 3.1.3. Formal Charge
 - 3.1.4. Multiple Bonds in Be & B Compounds
- 3.2. Valence Shell Electron-Pair Repulsion Theory
 - 3.2.1. Lone-Pair Repulsion
 - 3.2.2. Multiple Bonds
 - 3.2.3. Electronegativity & Atomic Size Effects
 - 3.2.4. Ligand Close Packing
- 3.3. Molecular Polarity
- 3.4. Hydrogen Bonding

Valence Bond Theory

Not in this text – See lecture slides & Gen.Chem. textbooks

Ch. 5 Molecular Orbital Theory

Ch. 7 The Crystalline Solid State

- 5.1. Formation of Molecular Orbitals from Atomic Orbitals
 - 5.1.1. Molecular Orbitals from s Orbitals
 - 5.1.2. Molecular Orbitals from p Orbitals
 - 5.1.3. Molecular Orbitals from d Orbitals
 - 5.1.4. Nonbonding Orbitals & Other Factors
- 5.2. Homonuclear Diatomic Molecules
 - 5.2.1. Molecular Orbitals
 - 5.2.2. Orbital Mixing
 - 5.2.3. Diatomic Molecules of the 1st & 2nd Periods
 - 5.2.4. Photoelectron Spectroscopy
- 5.3. Heteronuclear Diatomic Molecules
 - 5.3.1. Polar Bonds
 - 5.3.2. Ionic Compounds & Molecular Orbitals
- 5.4. Molecular Orbitals for Larger Molecules
 - 5.4.1 to 5.4.3 Linear & Bent AX₂ molecules

5.4.4 to 5.4.6 AX₃ molecules

- 7.3. Molecular Orbitals & Band Structure
 - 7.3.1. Diodes, Photoelectric Effect, Light-Emitting Diodes
 - 7.3.2. Quantum Dots
- 7.4. Superconductivity
 - 7.4.1. Low Temperature Superconducting Alloys
 - 7.4.2. The Theory of Superconductivity (Cooper Pairs)
 - 7.4.3. High Temperature Superconductors

Ch. 9 Coordination Chem. I: Structures, Isomers

Ch. 10 Coordination Chem. II: Bonding

Ch. 11 Coordination Chem. III: Electronic Spectra

Ch. 12 Coord. Chem. IV: Reactions & Mechanisms

- 9.1. History
- 9.2. Nomenclature
- 9.3. Isomerism
 - 9.3.1. Stereoisomers
 - 9.3.2. Four-Coordinate Complexes
 - 9.3.3. Chirality
 - 9.3.4. Six-Coordinate Complexes
 - 9.3.5. Combinations of Chelate Rings
 - 9.3.6. Ligand Ring Conformation
 - 9.3.7. Constitutional Isomers
 - 9.3.8. Separation & Identification of Isomers
- 9.4. Coordination Numbers & Structures (...)
- 9.5. Coordination Frameworks
- 10.1. Experimental Evidence for Electronic Structures
 - 10.1.1. Thermodynamic Data
 - 10.1.2. Magnetic Susceptibility
 - 10.1.3. Electronic Spectra
 - 10.1.4. Coordination Numbers & Molecular Shapes
- 10.2. Bonding Theories
 - 10.2.1. Crystal-field theory
- 10.3. Ligand Field Theory
 - 10.3.2. Orbital Splitting & Electron Spin
 - 10.3.3. Ligand Field Stabilization Energy
- 10.4. Angular Overlap
 - 10.4.4. The Spectrochemical Series
- 10.6 Four- & Six-Coordinate Preferences
- 11.1 Absorption of Light
- 11.3 Electronic Spectra of Coordination Compounds
 - 11.3.1 Selection Rules
 - 11.3.7 Charge-Transfer Spectra
- 12.4 Experimental Evidence in Octahedral Substitution
 - 12.4.5 The Kinetic Chelate Effect

Ch. 7 The Crystalline Solid State

- 7.1. Formulas & Structures
 - 7.1.1. Simple Structures
 - 7.1.2. Structures of Binary Compounds
 - 7.1.3. More Complex Compounds
 - 7.1.4. Radius Ratio
- 7.2. Thermodynamics of Ionic Crystal Formation
 - 7.2.1. Lattice Energy & the Madelung Constant
 - 7.2.2. Solubility, Ion Size & Hard-Soft Acid-Base Theory
- 7.5. Bonding in Ionic Crystals
- 7.6. Imperfections in Solids
- 7.7. Silicates

CHEM 241 – LABORATORY INSTRUCTIONS

Coordinator: Zornitsa Stoyanova

Office: SP 201.10

Phone: (514)848-2424 Ext. 5976

Email: zornitsa.stoyanova@concordia.ca

Wet lab TA:

Office:

Phone:

E-mail:

Dry lab TA:

Office:

Phone:

E-mail:

1. WET LABS

Wet Laboratory Experiments

The complete lab manual is available in the Concordia Bookstore (Loyola) and on the course Moodle web site. It includes safety information with which you must be familiar before being allowed to begin the experiments. You will be required to sign a form attesting that you have read the information.

The five experiments in the manual are listed below. You will be told the schedule for doing them after you have checked into the lab.

- Paper Chromatography Separation of Inorganic Cations
- The Nine-Solution Problem
- Copper: Its Chemical Transformations. Preparation of Copper(II) Compounds with Glycine
- Synthesis of Urea from Silver Cyanate and Ammonium Chloride
- Semiconductors: Preparation of Semiconducting Thin Films

It is probably cheaper to buy the complete manual from the Bookstore, rather than print it yourself from the Moodle site. If any of the diagrams are not reproduced well in the bookstore version, or if you need to print a clean copy of the report forms, refer to the downloadable files on the Moodle site.

Wet Lab Rules

1. You must arrive on time for all labs. Teaching assistants, lab instructors or technical staff may refuse admission to students arriving late.
2. Contact lenses are strictly forbidden.
3. Safety glasses and lab coats are mandatory.
4. Long hair must be tied back.
5. For safety reasons, cell phones may be used as calculators or cameras, but nothing else! For example, there is a danger of transferring chemicals to your skin if they are used to make or answer phone calls.
6. Prelabs (see below) must be submitted at the beginning of the lab and signed by the teaching assistant before starting the experiment.
7. Lab reports are due two weeks after the experiment is completed and must be submitted at immediately on arrival at the lab otherwise they may be considered a day late. **except that the last lab report must be handed in no later than Thursday, Apr. 13th** *Your TA should tell you where and when he or she can be found before then.*
8. Late lab reports are subject to a 10% per day penalty. If you are handing in a late lab report, you must contact the T.A. *for the section you are registered in.* The professors and technicians do not accept lab reports.
9. Please have your teaching assistant sign the lab report receipt form when you hand your reports in. No excuses of the type “the TA lost my report” will be accepted without this proof.
10. Your TA is required to mark your lab reports so that they can show them to you in your lab period two weeks after you hand them in in order that you can learn from your mistakes. You are not permitted to keep them. *Please let the course coordinating professor (C. Rogers) know immediately if your TA is late doing his or her marking.*
11. You must submit all medical notes to the lab coordinator, Zornitsa Stoyanova (not your TA), in the case of a missed lab.

12. You are required to inform the course coordinating professor *at the beginning of the term* if you foresee a conflict with attending a lab, for example due to a religious holiday.
13. You have 4 hours to complete the experiments, *and clean up*. All work stations must be clean prior to leaving the lab.

Lab Reports for Wet Labs

- Please consult the individual experiments for details.
- You must prepare a written prelab summary before going to do the experiment. You will not be permitted to enter the lab unless this has been done. If the T.A. believes that your prelab is incomplete, you will not be allowed to perform that experiment and will receive a mark of zero.
- Prelabs and lab reports identified with the experiment number and title, and include your name, student number and the date.
- Each lab has some questions to be answered, and submitted with your lab report.
- Each lab describes what should be included in the report, and there is a tear-out form on which to record your observations and data to include as part of the report.
- The marks allocated for the above components are shown for the individual experiments in the lab manual. Your TA's should respect this allocation when marking your work.

Grading of Wet Labs

You will be graded out of a total of 20 marks. The number of marks allotted to each section/question is indicated in the lab manual. Your TA(s) should respect that allocation.

2. DRY LAB “EXPERIMENTS”

- Molecular Models in Inorganic Chemistry
- The Bohr Atom - The Electronic Spectrum of Hydrogen
- The Probabilistic Interpretation of Atomic Orbitals
- Lewis Bonding Theory and VSEPR Theory
- Molecular Orbital theory - Linear Combinations of Atomic Orbitals

These “dry labs”, available only on the Moodle site, involve computer exercises which can be done:

- on your scheduled lab period on Chemistry/Biochemistry Department computers in SP-S185.01, where a teaching assistant will be available to help you.
- on your own time, in IITS labs at the Sir George Williams or Loyola Campuses, or in the Library.
- on your own time, at home if you have internet access on an adequate computer.
- on your own time, at your favorite internet café.

The dry labs are to be done in the specific order above, connected approximately to the lecture schedule.

Wherever you do them, you *must* hand in your dry lab reports as if you had done them in your lab period in the Department computer lab, that is, two weeks after they are scheduled. Make sure you know when that is! You will need to go to the Department computer lab SP-S185.01 *at the beginning of your lab period* to be sure to find your teaching assistant. The exception: **the last dry lab must be handed in no later than Thursday, Apr. 13th**. *Your TA should tell you where and when he or she can be found before then.*

Please have your TA sign the lab receipt form each time you hand in a report.

Your TA is required to mark the reports so that they can show them to you in the lab period two weeks after you hand them in so that you can learn from your mistakes. You are not permitted to keep them. *Please let the professor and/or lab instructor know immediately if your TA is late doing his or her marking.*

Lab Reports for Dry Labs

You have to answer all questions found on the web page of each Dry Lab. The answers should be concise, yet complete.

Grading of Dry Labs

You will be graded out of a total of 20 marks. The number of marks allotted to each question is indicated on the web pages. Your TA(s) should respect that allocation.

PHB – Nov.16

CHEM 241 – Laboratory Report Receipt

Important

Do not lose this sheet. You must have your teaching assistant sign this sheet for each group of labs you hand in. No arguments of the type: "The T.A. lost my lab report" will be investigated without this proof that your T.A. received the report.

ID #:		NAME:	TERM:
Experiment		TA Signature	Date
Wet 1	Prelab		
	Lab		
Wet 2	Prelab		
	Lab		
Wet 3	Prelab		
	Lab		
Wet 4	Prelab		
	Lab		
Wet 5	Prelab		
	Lab		
Molecular Models			
Bohr Atom			
Atomic Orbitals			
Lewis Structures			
M.O. Theory			