Inorganic Chemistry
CH 481-51
Spring 2015

Instructor: Paul R. Challen

Meeting time and place: MWF 9.00-9.50 a.m. Dolan W220

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Office Hours: Mon. Tues. 1.00-4.00 p.m.

Students are also encouraged to make appointments. E-mail questions may be sent to me at any time.

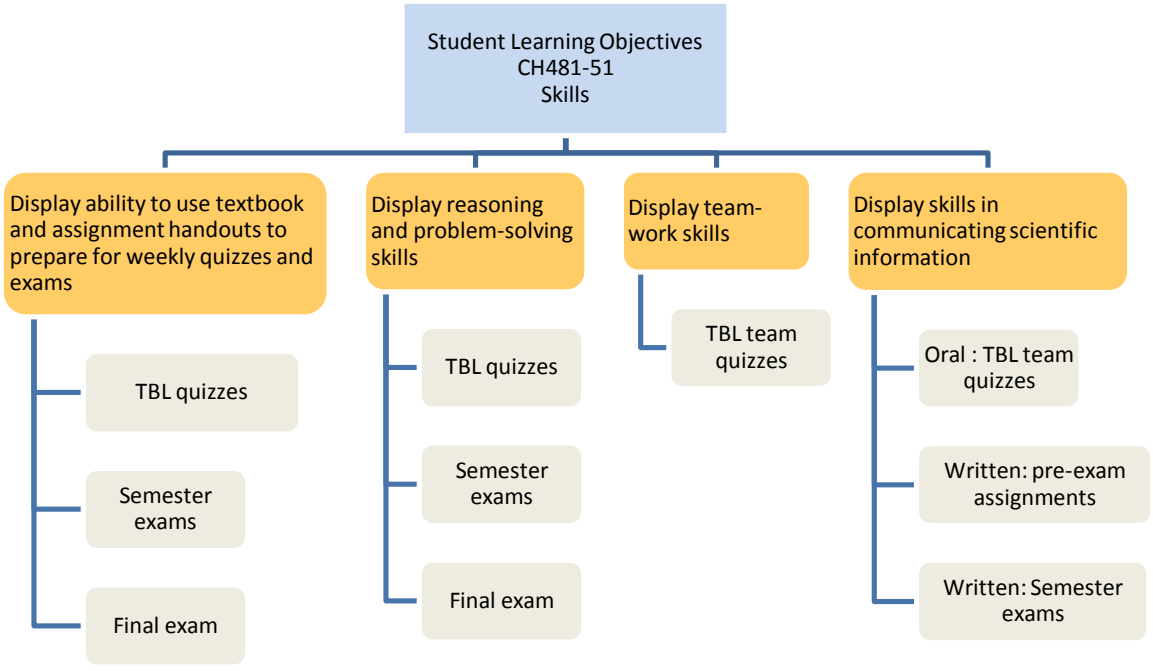
Course Description This is an advanced undergraduate course in inorganic chemistry for chemistry majors. Topics covered will include atomic structure and periodicity, bonding in molecules and solids, acid-base and redox chemistry, coordination chemistry, some descriptive chemistry of main group and transition metal compounds, and selected other topics if time is available.

Textbook: "Inorganic Chemistry" by Shriver et al, 6th Edition, published by Freeman.

Learning goals:

Skills

The flowchart below shows skills that students should develop and display throughout the course. It also shows the assignments in which those skills will be assessed.



Content

The course will cover most of chapters 1-7 and selected parts of chapters 9, 19, 20, 22 of the Shriver text as time allows.

The major topics covered will be:

Atomic Structure. Spectra and orbitals, ionization energy, electron affinity, shielding and effective nuclear charge.

Covalent Molecular Substances. Geometries (symmetry point groups), valence bond theory (hybridization, σ, π, δ bonds), molecular orbital theory (homo and hetero-nuclear diatomics, multi-centered MO, electron-deficient molecules, π -donor and acceptor ligands).

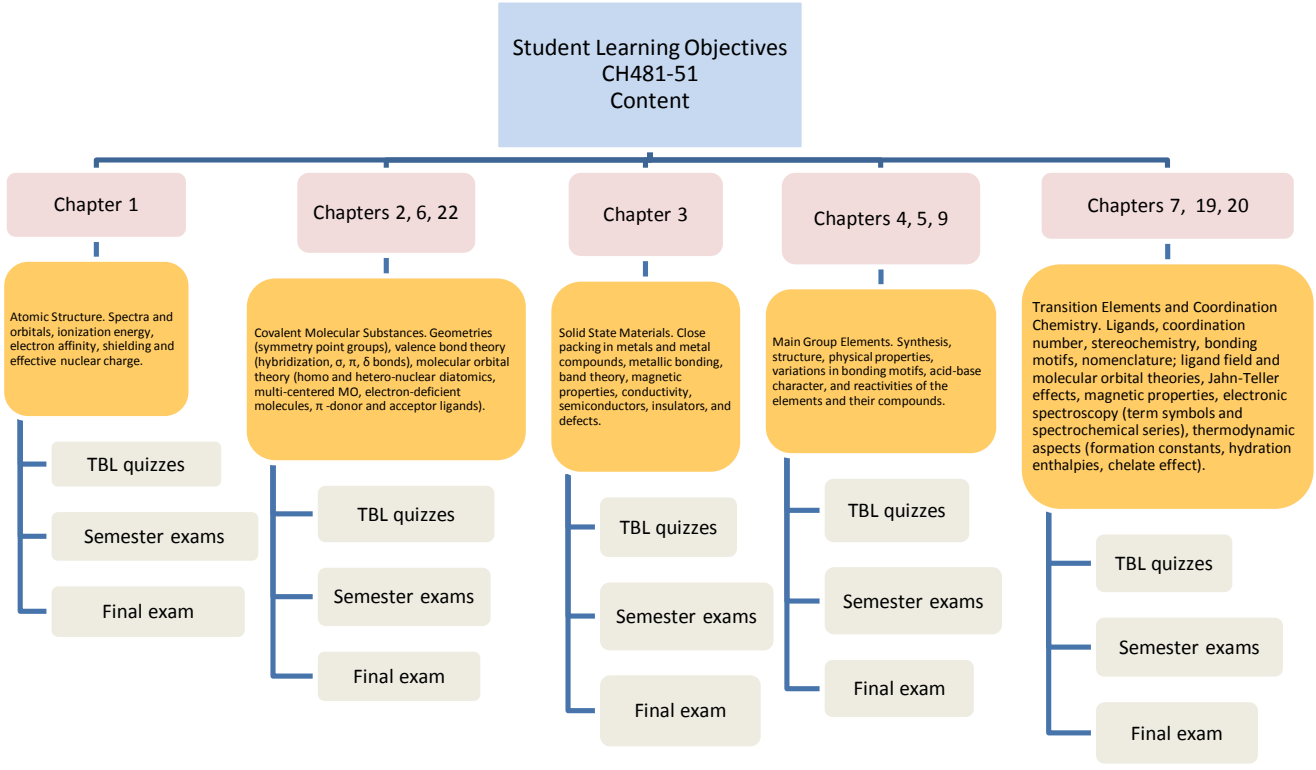
Main Group Elements. Synthesis, structure, physical properties, variations in bonding motifs, acid-base character, and reactivities of the elements and their compounds.

Transition Elements and Coordination Chemistry. Ligands, coordination number, stereochemistry, bonding motifs, nomenclature; ligand field and molecular orbital theories, Jahn-Teller effects, magnetic properties, electronic spectroscopy (term symbols and spectrochemical series), thermodynamic aspects (formation constants, hydration enthalpies, chelate effect).

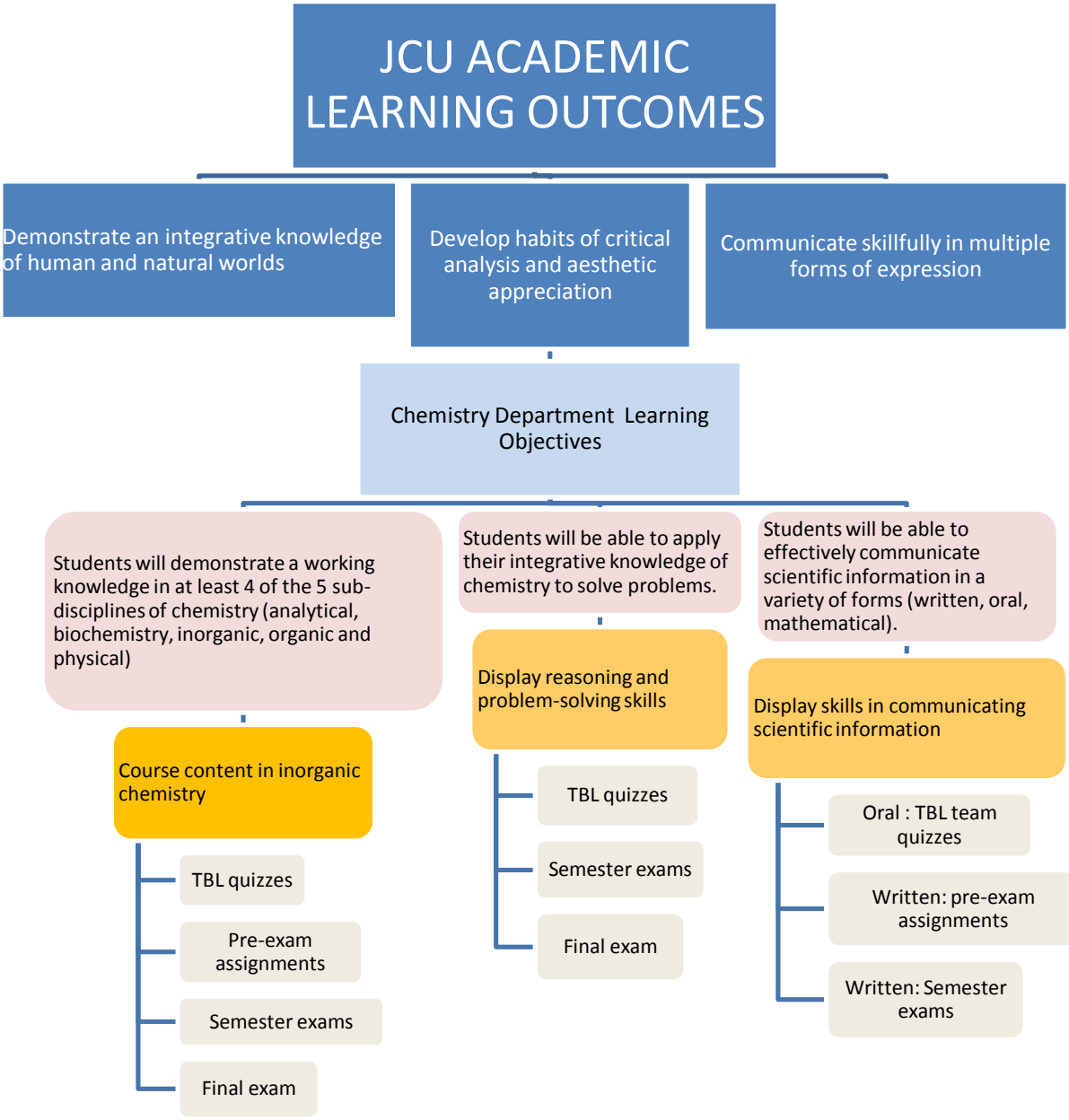
Solid State Materials. Close packing in metals and metal compounds, metallic bonding, band theory, magnetic properties, conductivity, semiconductors, insulators, and defects.

More details of the chemistry content will be given in assignment handouts during the semester.

The flowchart below shows the relationship between the above topics and the textbook chapters. It also shows the assignments through which student knowledge of the topics will be assessed.



The flowchart below shows how the Course Learning Goals connect to the Chemistry Department Learning Objectives and three of the nine JCU Academic Learning Outcomes. It again shows the assignments in which those learning goals will be assessed.


JCU ACADEMIC LEARNING OUTCOMES
Demonstrate an integrative knowledge of human and natural worlds
Develop habits of critical analysis and aesthetic appreciation
Communicate skillfully in multiple forms of expression
Chemistry Department Learning Objectives
Students will demonstrate a working knowledge in at least 4 of the 5 sub-disciplines of chemistry (analytical, biochemistry, inorganic, organic and physical)
Course content in inorganic chemistry
TBL quizzes
Pre-exam assignments
Semester exams
Final exam
Students will be able to apply their integrative knowledge of chemistry to solve problems.
Display reasoning and problem-solving skills
TBL quizzes
Semester exams
Final exam
Students will be able to effectively communicate scientific information in a variety of forms (written, oral, mathematical).
Display skills in communicating scientific information
Oral : TBL team quizzes
Written: pre-exam assignments
Written: Semester exams

Classroom activity and student preparation

The class will be conducted using a combination of lectures and the Team-based Learning (TBL) approach.

Lecture classes will often begin with a question written on the board or screen. As students arrive in class they should begin working on this 'warm-up' question.

TBL classes will begin with a quiz on the assigned study material. The quiz will first be taken by each student individually, and then the same quiz will be taken again by students in assigned teams. The remaining class time will be spent reviewing the quiz with the instructor. The quizzes are closed-book. Scores on both the individual and team quizzes will contribute to each student's grade.

It is very important that students fulfill their study assignments as indicated on the assignment handouts. Students should complete the assigned study before the lecture class. Students should take advantage of the classroom time to ask questions about the assigned study materials. Students should come to each TBL class prepared to take the quiz and contribute to their team's efforts on the quiz.

Assignments and exams

Study assignments: every few days a study assignment will be given. This will provide information directing students to the sections of the text that should be studied to prepare for lectures and the TBL quizzes.

Semester exams: each semester exam will be on the material studied since the previous exam. These will be closed-book exams. The format consists of written answers.

Pre-exam assignments: prior to each semester exam a set of practice questions will be given to help students develop their skills in writing scientific explanations. These will be collected and graded according to a rubric that students will be given.

Final exam: in finals week, will be a standardized (multiple choice) American Chemical Society exam. It will cover material from the entire semester. It is a closed-book exam.

Grading

TBL activities	30% of grade
3 semester exams	40% of grade
1 Final exam	20% of grade
Pre-exam assignments	10% of grade

The score for TBL activities will be made up of two components:

the score on the individual quizzes	10%
the score on the team quizzes(see below)	20%

The team quiz score will be the team score multiplied by a factor determined from a peer-assessment* that will be completed by all team members at the end of the semester.

*See Blackboard for more details.

The grading scheme is not fixed, but will be close to the following:

A	90-100%	C	60-65%
A-	85-90%	C-	55-60%
B+	80-85%	D+	50-55%
B	75-80%	D	45-50%
B-	70-75%	F	<45%
C+	65-70%		

Policy on missed classes and exams

Attendance at all TBL and exam classes is required.

Unexcused absence from a TBL class will result in a zero score for both the individual and team quizzes.

Unexcused absence from an exam will result in a zero score for the exam.

Excused absences will be granted only if:

- the instructor is informed of the missed class before 9.00 a.m. the following day
- the reason for missing the class is given in writing within

2 days of the missed class
- documentation for the valid excuse is provided within 1 week of the missed class

Students with a valid documented excuse for missing a TBL class will receive the full team score for the quiz. They will be allowed to make up the individual quiz.

Students with a valid documented excuse for missing an exam will be allowed to make up the exam at a time convenient to the instructor.

Valid excuses include illness (with doctor's or hospital note); family bereavement; an officially sanctioned university activity with at least one week's advance notice. The following are some examples of what are not considered valid excuses: feeling sick but no documentation; having to study for another class; leaving early for the weekend or Spring Break; family event.

Exam schedule

Exam 1	Feb. 13
Exam 2	Mar. 20
Exam 3	Apr. 24
Final	May 8, 8.00-9.50 a.m.

Policy on Academic Honesty

You are expected to uphold the highest standards of academic honesty as stated on pages 112-113 of the 2013-2015 Undergraduate Bulletin. Copying from other students during quizzes or exams is considered cheating and is a breach of academic honesty. Calculators used in quizzes or exams must not be used to store notes, equations or other aids. The minimum penalty for cheating on a quiz or exam will be a zero score for the quiz or exam, plus an additional 10 point deduction from the course score.

The instructor reserves the right to impose additional penalties for breach of the Academic Honesty policy, appropriate to the severity of the infraction, such as an F grade for the course, or other penalties as indicated in the 2013-2015 Undergraduate Bulletin.

Policy on Documentation and Accommodation of Disabilities:

In accordance with federal law, if you have a documented disability (learning, psychological, sensory, physical, or medical) you may be eligible to request accommodations from the Office of Services for Students with Disabilities (SSD). To make a request for accommodations, please contact SSD Director Allison West at (216) 397-4967 or visit the SSD office, located in Room 7A, on the garden (lower) level of the Administration Building. Please keep in mind that accommodations are not retroactive so it is best to register with SSD at the beginning of each semester. Only those accommodations approved by SSD will be recognized by your instructors. Please contact SSD if you have further questions.

Statement on Mutual Respect, Discrimination and Bias:

John Carroll University is committed to fostering ethical and moral values that are consistent with Jesuit and Catholic traditions. Among the central values of the University are the inherent dignities of every individual as well as the right of each person to hold and to express his or her viewpoint. When these views conflict it is the obligation of members of the community to respect other perspectives.

The University welcomes students, faculty, staff, and visitors from diverse backgrounds and it works to ensure that they will find the University environment free of discriminatory conduct. It is unacceptable and a violation of University policy to harass, abuse, or discriminate against any person because of age, race, gender, ethnicity, sexual orientation, religion, or disability.

Furthermore, each member of the JCU community is expected to take an active role in fostering an appreciation for diversity and inclusion and sending the message that bias-related acts will not be tolerated. "Bias" is defined as intentional or unintentional actions targeting a person because of a real or perceived aspect of that person's identity, including (though not limited to) age, gender, religion, race, ethnicity, nationality, sexual orientation, gender identity, or (dis)ability.

All bias incidents, including those occurring in the classroom, should be reported using the JCU Bias Reporting System at http://sites.jcu.edu/bias/.

Questions about the Bias Reporting System or bias incidents may be directed to Dr. Terry Mills, Assistant Provost for Diversity and Inclusion, at tmills@jcu.edu or (216) 397-4455. For more information about University policies and community standards for appropriate conduct, please refer to the Dean of Students web page at http://sites.jcu.edu/deanofstudents. For more information about the University commitment to diversity and inclusion, please see http://sites.jcu.edu/diversity.