Bradley Core Curriculum Master Syllabus Guidelines

The master syllabus for a course is a framework upon which individual faculty members build their course syllabi for their particular course sections. A master syllabus is designed to provide a core of course information to assist in communication between University faculty members, University administration, and accrediting bodies outside the University. The master syllabus therefore represents the minimum contract between the course unit and the institution, and thus should NOT be specific to a particular course instructor or time period. For courses with multiple sections, the master syllabus should serve as a useful guide for new participating course instructors.

By contrast, an instructor syllabus outlines course specifics (instructor contact information, instructor-specific policies, deadlines, lecture outlines, reading lists, grading schemes, etc.) that apply to a particular instructor/semester. The master syllabus should not include dates and specific times. If course details do not affect course alignment with the curricular elements (CEs) or are not management tools for multisection courses, they are generally unnecessary for the master syllabus.

The master syllabus should include:

1) General course information
   - Course name and number
   - Course description from the handbook
   - Contact information for person who is the course keeper of the master syllabus
   - Brief description of the topics covered
   - Description of TYPICAL course materials/resources - distinguish between required and recommended if possible
   - Description of how the course grade is assigned. Briefly mention the methods of assessment used in the course (e.g., exams, quizzes, papers, presentations, standardized exams, group projects). Do not include specific assessments.

2) Description of the course alignment with the related Bradley Core Curricular Elements for Area of Inquiry or Core Practice tags. This is the same content as the table on the CRCRs site, but this does not need to be in table format. ***This section should be included in each instructor syllabus so that students are informed of the BCC learning objectives.***

3) *If needed* Description of the course alignment with any related external guidelines.
   - Description of the course alignment with related Illinois Articulation Initiative guidelines (if any).
   - Description of the course alignment with related national guidelines (if any).

Examples of BCC Master Syllabi follow on subsequent pages.

BCC Master Syllabus for Chemistry 112: Engineering Chemistry

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Catalog Description: **CHM112 – Engineering Chemistry** *(3 hours)* Continuation of CHM 110. For students majoring in engineering and related disciplines. Topics include: thermodynamics; equilibria; electrochemistry and corrosion; descriptive chemistry of metals and nonmetals; properties of metallic and silicon-based materials; organic and polymer chemistry; nuclear chemistry; environmental chemistry. Prerequisite: CHM 110.

This course has traditionally had two sections with two instructors in close contact to ensure consistent coverage. The course does vary somewhat from year to year in terms of specific points and coverage, driven in part by scheduling issues and by the desire of the faculty to keep improving the course.

Typical Course Coverage

solution behavior; kinetics; gaseous and aqueous equilibria; acids and bases; thermodynamics; electrochemistry and corrosion; descriptive chemistry of metals and nonmetals; properties of metallic and silicon-based materials; organic and polymer chemistry; nuclear chemistry; environmental chemistry

Course Materials:

Text: The common textbook for all sections of this course is a typical college-level general chemistry textbook selected by a committee in the Department of Chemistry and Biochemistry. The current text in use is Tro, N. J. Chemistry: A Molecular Approach, 3rd Edition, Pearson, 2014.

Notes: Supplemental course notes are usually placed online for the students to use.

Assessment:

Types of assessment instruments for the course are described below. The major focus of this course is the science content described above, and thus the majority of the assessment instrument coverage will be that science content. However, content associated with the NS Curricular Elements will also be assessed by these instruments (e.g,, by using quiz and exam questions about the ethics of the use of particular chemical species or about the scientific process applied to particular problems).

Exams: The course's primary means of assessment are three or four common exams, spaced at fairly regular intervals throughout the course, plus a cumulative final exam. The exams are written by committee and every faculty member has the opportunity to provide input. These exams usually account for roughly 70% of the course grade.

Quizzes: The goal of the quizzes is also to help the students prepare for the exams. We typically have about one quiz per week and try to make the quizzes sufficiently difficult that the quiz average is lower than the exam average for each section. The quizzes also typically only count for less than 15% of the course grade.

Homework: The goal of the homework is to help the students prepare for the exams. We typically use common online homework assessments, and since there are genuine concerns about how much the students abuse these systems (by not doing the work as they should) the homework counts only for less than 15% of the course grade.

Bradley Core Curriculum alignment:

The NS Curricular Elements (below) are woven into the fabric of this course, not as standalone topics, but as part of the examples that we provide in the course and as background information. This especially true for coverage of the more descriptive chemistry topics, as placing chemical facts into the context of scientific and public applications can assist students in remembering those chemical facts.

NS1 Recognize science as an ongoing process, guided by ethical standards of practice, that generates and refines knowledge.

Within our textbooks and in the classroom, we describe how chemistry has impacted the world in which we live. A theme that occurs frequently is that there is typically no perfect chemical answer to a societal or technological challenge involving chemistry. For example, many older chemical "answers" to problems require new and radically different, but often more expensive, approaches in order to accommodate increasing global environmental awareness. Discussions of these chemical problems MUST recognize science as an ongoing process that incorporates ethical standards. In turn, these discussions place chemical facts, especially those from more descriptive topics, into the context of scientific and public applications that can assist students in remembering those chemical facts. For example, a description of the strength of carbon-halogen bonds can lead to discussions of compounds that contain these bonds lasting far beyond their useful lifetimes.

Assessment: Types of assessment instruments for the course are exams (~70%), quizzes (~15%), and homework assignments (~15%). The major focus of this course is traditional science content described above, and thus the majority of the assessment instrument coverage will be that science content. However, content associated with the NS Curricular Elements will also be assessed by these instruments (e.g, by using quiz and exam questions about the ethics of the use of particular chemical species or about the scientific process applied to particular problems). An example of a quiz question assessing element NS1 would be: Why is building taller smokestacks at coal-fired power plants considered by many to NOT be an ethical solution to acid rain issues?

NS2 Engage in multiple aspects of the scientific process.

The scientific process is covered in multiple ways in the course. For example, particular chemical phenomena can be introduced using preliminary observations of data or demonstrations and then possible explanations for those observations can be sought from the students. The discussion then shifts to what experimental data can be used to test the student hypotheses. Finally, the relevant data are presented to the class with discussion of how that data supports or does not support the student hypotheses. An example of this approach is the use of boiling and melting data of specific chemical species to explore how molecular structures tend to influence intermolecular forces.

Assessment: Although CHM112 does not have a formal laboratory component, take-home quizzes/assignments can be used to assess element NS2. In addition to analysis of "dry" data, simple wet labs might be performed. For example, one take-home mini-lab (counted as a quiz) that we have used involves students cutting up soda straws and floating them in cups of water to study the thermodynamics of crystallization and spontaneous assembly.

NS3 Apply scientific principles in their personal and professional lives as active members of their communities.

Similarly to NS1, we describe how chemistry has impacted the world in which we live. By providing examples of what approaches to chemical problems have been successful and which have not, we show students how they can apply scientific principles as members of their communities. For example, a discussion of the development of white paint from whitewash to lead compounds to titanium dioxide shows engineering students that they need to consider issues like cost and toxicity in selecting materials.

Assessment:

This element can be assessed by requiring students bring together seemingly disparate concepts to address practical problems they might encounter in their personal and professional lives. An example of a quiz question assessing element NS3 that integrates nuclear chemistry and electrochemistry would be: Some accidents at nuclear power plants like Chernobyl and Fukushima Daiichi have been accompanied by explosions. These were not nuclear explosions like at Hiroshima and Nagasaki - some of the explosions appear to have been produced by hydrogen gas reacting with air. But where did the hydrogen gas come from? It turns out that when zirconium (used as cladding for the fuel rods) gets really hot, it is very easily oxidized to zirconium(IV) species. Suggest what the hot zirconium reacted with to produce the hydrogen gas (and write a balanced redox reaction).

Alignment with External Guidelines:

American Chemical Society alignment:
The course extensively covers the American Chemical Society Committee on Professional Training guideline topics of thermodynamics, kinetics, and equilibria

Illinois Articulation Initiative alignment:
The course extensively covers the following Illinois Articulation Initiative content topics of acids and bases, equilibrium,
acid-base equilibria, solubility equilibria, thermodynamics, electrochemistry, descriptive chemistry, kinetics, and nuclear chemistry

In addition to the information described previously and a chapter-by-chapter breakdown of the course schedule, the following information shall be included in the course syllabus:

Breaches of Academic Integrity – from the Undergraduate Catalog

(see also http://www.bradley.edu/academic/departments/chemistry/policies/plagiarism/):

"Cheating is officially defined as giving or attempting to give, or obtaining or attempting to obtain, information relative to an examination or other work that the student is expected to do alone and not in collaboration with others, or the use of material or information restricted by the instructor. Each instructor will indicate beforehand **work that may be done in collaboration with other students. Examples of cheating include but are not limited to** copying from another person during an examination, using materials not allowed by the instructor during an examination, collaboration on a take-home examination or other assignments where it has been expressly prohibited by the instructor, and the submission of a laboratory report based on data not obtained by the student in the manner indicated by the instructor. The person who provides illicit information is liable to the same punishment as the person who receives and uses it.

A "Zero," or whatever is the equivalent of the lowest failing grade possible, shall be assigned for that piece of work to any student cheating on a non-final examination or other class assignment. A "Zero," or whatever is the equivalent of the lowest failing grade possible, shall be assigned on a final examination to any student cheating on a final examination. An "F" shall also be assigned as the course grade to any student cheating on a comprehensive final examination.

Plagiarism

Plagiarism is no lesser an offense than cheating. Examples of plagiarism as stated in The Modern Language Association's *MLA Handbook for Writers of Research Papers* include but are not limited to repeating another's sentences as your own, adopting a particularly apt phrase as your own, paraphrasing someone else's argument as your own, and presenting someone else's line of thinking in the development of a thesis as though it were your own. A "Zero," or whatever is the equivalent of the lowest failing grade possible, shall be assigned for that piece of work to any student plagiarizing on a non-final piece of work. In the case of a student plagiarizing on a final research paper or project, an "F" shall also be assigned as the course grade.

Repeated Offenses of Plagiarism and Cheating

For repeated or aggravated offenses of cheating and or plagiarism, additional action, including dismissal from the University, may be taken pursuant to the Student Handbook procedures related to the University Judicial System and the disciplinary sanctions for violation of University regulations.

Other Breaches of Academic Integrity

Other examples of what might constitute a breach of academic integrity include, but are not limited to, the following: bribes, favors or threats with the intent of influencing a grade or any other evaluation of academic performance; taking an examination for another student; and grade tampering."

BCC Master Syllabus for PSY 201 Brain and Behavior

Course Description: An introduction to the scientific study of the nervous system and its relation to behavior. The underlying biology of learning, memory, language, sensation, emotion, reproductive behavior, psychopathology, and other topics will be explored.

Brain and Behavior (PSY 201) represents an introduction to neuroscience, a growing academic research discipline that is inherently interdisciplinary. Therefore, this course will draw upon basic principles from biology, chemistry, physics, pharmacology and psychology. For example, an understanding of how cells of the central nervous system communicate requires an understanding of biology (structural components of cells, protein structure), biochemistry (energy utilization, selectively permeable membranes), physics (laws of thermodynamics), and pharmacology (ligand-gated ion channel blockers, indirect agonists). The methodologies of neuroscience range from the micro (cellular and molecular biology/genetics) to the macro (neurological assessment and psychiatric diagnosis).
Students in PSY 201 should:

- Understand the vocabulary and methods of neuroscientists sufficient to formulate questions and hypotheses (What is the basis of antidepressant efficacy? What is the role of prefrontal cortical mirror neurons in Autism? What are the cellular mechanisms of learning and memory?). This means that students should be able to acquire a functional understanding of the basic mechanisms of neuronal communication, link brain structures to function and understand the relationship of neural transmission to psychoactive drug action.
- Make scientific observations and organize, interpret and analyze data to address specific questions and test hypotheses (For example, using a computer simulation program, students should be able to systematically manipulate intracellular and extracellular ion concentrations and describe the consequences of those changes on the resting membrane potential).
- Students should grasp the nature of questions that are of interest to neuroscientists, and to understand how questions are framed (hypothesis statements and operational definitions) and to interpret research outcomes, including the ability to interpret graphic data representations. Students will be assigned two review peer-reviewed research articles, asked to identify hypotheses and experimental variables and to summarize whether results support the hypothesis. In addition, students should gain an understanding of the relative strengths and limitations of different techniques (for example, eeg vs fMRI), and articulate the appropriateness of various techniques to specific questions.
- Communicate the results of neuroscientific studies. To this end, students will be introduced to the principles of scientific peer review. Students will be introduced to utilizing APA style when referencing the peer-reviewed literature.
- Understand the impact of neuroscience on civilization (students will be introduced to the broad impact of neuroscience: the neurobiology of gender, aggression and violence; the neurobiology of disease and addiction; neuroethics – the genetics of intelligence and personality or the use of immunizations to manage addiction). An emphasis on ethics will lead students to understand that ethical decisions and sensibilities are frequently determined by the premises through which information is considered.

Bradley Core Curriculum Alignment:

NS1 Recognize science as an ongoing process, guided by ethical standards of practice that generates and refines knowledge.

Instruction emphasizes the historical bases of contemporary neuroscience, emphasizing the evolution of understanding from early work to current innovations. APA ethical guidelines are introduced and utilized to explore contemporary ethical concerns. Students will understand the roles of IRBs and IACUCs.

Assessment includes 4 exams that include multiple choice, short answer and short essay questions that can measure these objectives. In addition, periodic quizzes are administered to gauge student mastery of these concepts.

The following questions may prove useful in conceptualizing assessments of student learning congruent with NS1: Does student provide evidence of an understanding that neuroscience is an interdisciplinary endeavor? Can student identify various techniques that advance knowledge of neuroscience? Can student recognize key ethical considerations of neuroscience?

NS2 Engage in multiple aspects of the scientific process.

Course includes at least 2 laboratory simulations, at least one of which includes parameters (variables) that are defined by students. Students will also be asked to procure and summarize at least 2 peer-reviewed articles linked to course content.
Lab reports should require students to operationally define variables, hypotheses and to summarize results of experimental simulations. Summaries of peer-reviewed articles should require students to identify variables and hypotheses and to determine whether the data supports the hypotheses.

The following questions may prove useful in conceptualizing assessments of student learning congruent with NS2: Can student distinguish between dependent and independent variables? Can student interpret data sufficient to generate a conclusion?

NS3 Apply scientific principles in their personal and professional lives as active members of their communities.

Neuroscience concepts tend to generate intrinsic interest from students, and PSY 201 addresses a variety of personally meaningful areas, including personality formation, learning and memory, subjective well-being and disorders of the nervous system. A specific goal of PSY 201 is to optimize these areas of interest by advancing an ability of students to become savvy consumers of scientific information. The “Neuroscience and Society” component of the class should guide students through opportunities to critique neuroscientific concepts as they are portrayed in media.
In-class discussions of emerging neuroscience concepts will routinely orient students towards critical analyses of science in the media.
The following questions may prove useful in conceptualizing assessments of student learning congruent with NS3: Can students identify and analyze source material from popular news items? Can students critique the quality of the media coverage? Can students articulate how developments in neuroscience have the ability to impact broader society?
In addition to BCC guidelines, individual instructors are encouraged to utilize the following information in course design and assessment.

Required Text(s): There are a variety of introductory texts to choose from that should assist students with comprehension of terms and to enrich concepts. Examples include:

Pinel, J.P.J. (2011). *Biosychology, 8th Edition.* Boston MA, Pearson.
Kalat, J.W. (2012). *Biological Psychology*, *11th Edition*. Belmont, CA, Thomson

In addition, faculty may select additional texts to explore specific themes, e.g., neurology (Sacks, O. The Man Who Mistook His Wife for a Hat).

Suggested Grading Criteria: Grades should be based on multiple measures of performance. Exams may utilize multiple choice formats, but should also include short answer, matching, and short essay formats. Quizzes are recommended as a means to reinforce steady rates of studying and to provide feedback to students between exams.
Because information presented later in the course builds on topics introduced at the beginning of the course, a cumulative final exam is strongly recommended.

An example grading criteria:

Exams: (50% of grade) There will be four exams for this course representing 30% of the final grade. These exams are non-cumulative and will represent material covered in lecture and in the text. The lowest exam may be dropped. The Final Exam (20%) will be cumulative. Each exam will include multiple choice, matching, and short answer/short essay questions.
Quizzes: (20% of grade) In order to assist students in keeping up with course material, quizzes will be offered as indicated in the syllabus. Quizzes will include multiple choice, matching and short answer/short essay questions. In total, 6 quizzes will be given over the course of the semester. They are to be taken on the course's Sakai website, they will be time-limited, and they must be completed prior to class on the specified due date. You may drop your lowest quiz grade. There will be no make-up opportunities.
Neuroscience and Society (N&S): (5% of grade) Identify a neuroscience-related topic that appears in the popular media (newspapers, blogs, magazines, etc.). Identify the original source of the topic (peer-reviewed article). Your job is to provide a very brief summary of the research topic and a critique of the popular media coverage of the research. Your review should be 2-3 pages, double spaced, not including your reference page.
Article Reviews: (10% of grade) You will be charged with acquiring and reviewing at least two peer-reviewed, original research articles related to topics discussed in class. Each review will be different, based on specific objectives that will evolve across the semester.
Lab Reports (15% of grade): You will complete two lab reports, whereby you will be asked to state hypotheses, operationally define variables, perform a manipulation and report your results. Lab Reports will be double-spaced and conform to APA Style requirements.

FINAL GRADES: The scale for final grades is: 90%-100% = A, 80%-89% = B, 70%-79% = C, 60%-69% = D, and 59% and lower = F. It is anticipated that mean and median grades will typically fall within the 75-80% range. However, both workload and grade distributions should be conceptualized such that PSY 201 is congruent with the expectations of other courses offered in the NS Area of Inquiry.

The course should generally represent a survey of topics that links neuroscience methods and concepts to areas typically relevant to psychology. Professors are encouraged to customize the presentation of topics to areas of expertise and enthusiasm. However, the course should be generally broad so as to be congruent with contemporary textbook coverage of major areas.