COURSE SYLLABUS

Course Title: Enhancing the Creativity of a Research Project
Course Number: CHEM T580
Credit: 3.0 (Section cap of 15 students)
Course Schedule: Mondays   5:30 pm - 8:30 pm
Location: Room 3014, in 3401 Market Street (School of Ed)
Term/Year: Winter 2020

Instructor team:

Prof. Fraser Fleming.	Professor of Chemistry, College of Arts & Sciences. fleming@drexel.edu
Prof. Paul Gondek.	Research Professor, Chemistry Department, College of Arts and Sciences. Adjunct Teaching Professor, Psychology Department, College of Arts & Sciences and LeBow College of Business pcg@drexel.edu
Prof. Jen Katz-Buonincontro.	Associate Professor of Education and Associate Dean of Research, School of Education. jkb@drexel.edu
Prof. Diana Nicholas.	Assistant Professor of Design and Director of MS Design Research, Department of Architecture, Design & Urbanism, Antoinette Westphal College of Media Arts and Design. dsn35@drexel.edu

Office Hours, Location, Mailbox:

By appointment via an email sent to the appropriate class instructor requesting a time to meet. All other inquiries may be directed to Dr. Paul Gondek, email: pcg35@drexel.edu .

Course Format

The course is taught in a face-to-face format. The team exercises will require the participants to meet outside of class, either face-to-face or through a video interface.

Course Description:

This course is designed to facilitate the development of a research idea. Participants will learn proven creative practices to enhance their independent, problem-solving creative ability as practiced through developing a research project such as the selection of a thesis topic, an original research proposal, or the writing of a grant proposal. Students need to have formulated at least one potential research topic that they must be prepared to iterate on, develop, and hone.

Expanded Description:

Arguably the most difficult challenge in graduate school is the transition from student and novice to an independent and expert, researcher. In this course, students will learn how to maximize creative approaches to conducting research in their discipline.

The course is designed to help graduate students generate creative research ideas and methodological approaches for a thesis, an original research proposal, or a research grant. The course structure roughly follows the development of a research idea: the background, literature, and scope; the hypothesis/objective of the research question; methodology and research design; outcomes, models, evaluation, and the creative process. Students will complete iterative, self-evaluations and peer evaluations during the course to provide insight and evaluation into the creative evolution of the research idea and team development. The focus on process and technique will feature several panel discussions to highlight different approaches that researchers take to develop creative approaches to research.

Students will work in teams to learn how to present their project to non-experts and to provide peer feedback. A key component in this course experience is the work in interdisciplinary teams where peer presentations and evaluations will provide multiple opportunities for feedback in an environment that highlights the creative problem-solving approaches employed in different disciplines. The teams will work to ensure that creativity techniques and processes are applied to each individual's work, rather than focusing on discipline-specific content.

Course Purpose:

Students will learn about and participate in the creative practices that characterize all stages of research project development and research program evaluation. Students will gain an appreciation of interdisciplinary creative problem solving.

Expected Learning:

On completion of this course participants will be able to:

1. Strategize with peers to generate leads for addressing a research question using creative process terms, and process diagrams, to demonstrate divergent and convergent thinking.
2. Apply problem solving strategies and creative practices to the development of a researchable question.
3. Perform literature searches in support of a research question.
4. Evaluate project ideas for potential obstacles to implementation and propose solutions.
5. Contribute effectively in an interdisciplinary team; the following activities will be practiced to develop competency in this learning objective:
   o Team contributions and assessments to develop individual research objectives.
   o Team interview and engagement with experts in the field of creativity and teamwork.
6. Explain how to enhance research with creative practices; the following activities will be practiced to develop competency in this learning objective:

- o Design thinking and creative practice techniques will be deployed in relationship to the students' self-defined research projects.
7. Describe key differences in research approaches by discipline; the following activities will be practiced to build competency in this learning objective:
   - o Team interview and engagement with experts in the field of creativity and teamwork.
   - o Understand what conceptual roadblocks are likely and implement strategies to overcome them.
   - o Become proficient in developing a research lead.

Core Intellectual and Practical Skills	
Communication	Information Literacy
Creative and Critical Thinking	Technology Use
Experiential and Applied Learning	
Leadership	Research, Scholarship and Creative Expression

Definitions of each of the priorities can be found at: http://drexel.edu/provost/assessment/outcomes/dslp/

Course Materials:

All resource material will be available on BbLearn. Each class will employ weekly reading available on BbLearn prior to class which will use discussions and practical, team-based exercises. Students are expected to read the material and bring copies to class for discussion.

Required Readings:
1. Sawyer, Keith (2017). *Group Genius: The Creative Power of Collaboration (Revised Edition).* New York, Basic Books. Chapter 3: Group Flow.
2. Kahneman, Daniel. (2011). *Thinking, Fast and Slow* (1 edition). New York: Farrar, Straus and Giroux. Selected chapters.
3. Repko, Allen F. and Szostak, Rick. *Interdisciplinary Research: Process and Theory* (2016, SAGE Publications, Inc; Third edition). Selected chapters.
4. Csikszentmihalyi, Mihaly (1990). *Flow: The Psychology of Optimal Experience.* New York: Harper Collins. Chapters 4, 6 and 7.
5. Chen Chaomei, (2011) *The Nature of Creativity*, Springer, Ch. 3.
6. Kounios, John and Beeman, Mark (2015). *The Eureka Factor: Aha Moments, Creative Insight, and the Brain.* New York: Random House. Chapter 14.
7. Institute, L. (2012). *Innovating for People Handbook of Human-Centered Design Methods* (1st edition). Pittsburgh,PA: LUMA Institute. Selected Technique pages.
8. Cross, N. (2001). Designerly Ways of Knowing: Design Discipline Versus Design Science. *Design Issues*, *17*(3), 49–55. https://doi.org/10.1162/074793601750357196
9. Sanders, L., & Stappers, P. (2013). *Convivial Toolbox: Generative Research for the Front End of Design.* Amsterdam: BIS Publishers. Chapter 1

Recommended Readings:
1. APA Changes 6th Edition // Purdue Writing Lab. Retrieved April 28, 2019, from Purdue Writing Lab/website: https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/apa_changes_6th_edition.html
2. Owen, C. (2008). *Design Thinking: On Its Nature and Use*. Retrieved December 15, 2016, from https://hbr.org/product/design-thinking-on-its-nature-and-use/an/ROT060-PDF-ENG
3. Creswell, John W.; Plano Clark, V. L. *Designing and Conducting Mixed Methods Research*, (Third Edition) SAGE Publications, Inc, 2017.
4. SAGE Research Methods: Find resources to answer your research methods and statistics questions. (n.d.). Retrieved February 17, 2017, from http://methods.sagepub.com/
5. Silva, P. J. (2007). *How to Write a Lot: A Practical Guide to Productive Academic Writing* (1st edition). Washington, DC: Amer Psychological Assn.
6. Sawyer, K. (2013). *Zig Zag: The Surprising Path to Greater Creativity* (1 edition). San Francisco: Jossey-Bass.

Resources:

Examples of research proposals from different disciplines:
- http://www.urop.uci.edu/SURP/surp_sample_proposals.html
- How to write a research proposal:
- http://www.studygs.net/proposal.htm

<u>Research Foci:</u>

The course is designed to focus on using creative thinking, design-oriented processes, self-awareness, and interdisciplinary teamwork to develop and enhance the following essential research skills:
1. Literature review
2. Problem definition
3. Research questions and hypotheses
4. Empirical methods
5. Analysis and results
6. Dissemination of findings
7. Incorporation of feedback to improve quality of research

Teamwork:

Every other week, students will present their progress on their individual research project to their groups during class time, in addition to teamwork outside of class. Group members will give feedback to each other using active listening and problem-solving skills. Students will continue to develop the teamwork and leadership skills, employing the teams as a think tank resource.

Creativity Interview: Students interview an industry expert or researcher in their respective disciplines and ask them how they apply creative thinking to their jobs and what they do when they encounter problems, challenges, resource shortages etc. Students write up the interview and include a section on what they learned from the interview that is applicable to their own research

project. The interview may include an observation of a lab or other type of work process to see how people work together creatively. Ideally the industrial colleague will continue involvement in the research project through, for example, participation on the Ph.D. thesis committee.

Style

The class is intended to provide a discussion forum in which research topics can be identified and developed as part of each person's progression through their graduate program. The classes will be interactive with discussion helping to show the value of different disciplines' approach to creativity and problem solving. Discussion in student teams will provide a safe, generative environment for individuals to develop research ideas, and communicate projects to peers from different disciplines. Faculty instructors will facilitate the discovery process and group discussions.

Grade Scale

Letter Grade	Numerical Grade
A+	97-100
A	94-96
A-	90-93
Excellent. Completes all assignments exceeds all class standards	
B+	87-89
B	84-86
B-	80-83
Good. Completes all assignments exceeds most class standards	
C+	77-79
C	74-76
C-	70-73
Average. Completes all assignments to class standards	
D+	67-69
D	60-66
Passing. Completes all assignments under class standards	
F	Below 60
Failing. Does not complete assignments & under class standards	

Graded Assignments and Learning Activities

- PARTICIPATION: 15%
  Attendance and participation are required because of the emphasis on discussion. For any absence, learning the missed material before the next session is assumed.
- CREATIVITY INTERVIEW: 10%
- PEER EVALUATIONS: 15%
  Students will be asked to complete one midterm peer evaluation and one final peer evaluation at the end of the term. These evaluations will also be used to determining each student's final grade for the course.
- REFLECTION BOOKLET: 20%
  - 1st Reflection completed by class #2
  - 2nd Reflection completed by class #6

o Final Reflection completed and submitted by end of week 10 (March 13)
- MIDTERM SUMMARY & PRESENTATION: 20% (see assignment for details)
- FINAL POSTER & PRESENTATION: 20% (see assignment for details)

Graduate students need to earn a B in courses in their plan of study to receive credit for the course. The university requires that all graduate students maintain a GPA of 3.0. Please see the Student Handbook for additional details on degree plan persistence and expectations.

Class Outline.

Each student will complete a Topic Outline form prior to the start of the course that describes his or her research topic realizing that some students will likely be in the exploratory phase while others may be more advanced in developing the research topic. These forms will be signed by the faculty advisor, or a similar advisor in the student's home department. The topic could be a thesis proposal, a grant proposal, or a similar major research topic.

Prior to the start of the course, students are expected to complete three survey questionnaires that will be used for reflection and discussion during multiple class periods. To access the surveys, log into BlackBoard Learn and follow the links to complete the three surveys. Be sure to save your results, bring them to class, and participate in classroom discussions.

a. BACS (Beliefs about Creativity Scales)
b. CPSP (Creative Problem-Solving Profiles) (aka. Basadur Profiles)
c. SKIPI (Skills Perception Inventory)

Class 1 (Jan. 6). DUE: Complete the three surveys and Topic Outline Form

Part A. Class Structure, Expectations, Teamwork, Evaluations, and Framing the Research Problem (F^3). The course has an unusual class structure that will be explained along with the use of the Basadur survey, the course expectations and deliverables, team assignments, and introductions. The course structure is designed to help students embarking on a research project to ensure that the research is relevant, current, and original.

Part B. Typologies (JK-B). Disciplinary approaches to creative knowledge and research practices will be examined and discussed. An overview of disciplinary perspectives across the natural and social sciences, and the humanities will precede a discussion of the differences between grand versus smaller theories. Research typologies will be discussed to dispel the myth that there is one true approach for solving disciplinary problems.

Part C. Teamwork (PG). Students will present their "Topic Outlines." Each student will provide an overview of the project they will work on throughout the course. The structure of high functioning teams and their benefits will be discussed. Topics include: identifying and assigning appropriate roles effective communication-active listening, conflict resolution; writing effective critiques for peer review; oral presentations; group psychological safety; rotating leadership. In the initial team meeting, students will share their completed *Topic Outline* for their research project and discuss how they would like the team to facilitate the project development during the course. Instructor feedback will be provided to guide the process. Students will engage in developing an outline of how the teams will approach the course.
Readings:
Repko & Szostak: *Chapter 2: Introducing the disciplines and their perspectives*

Repko & Szostak: *Chapter 6: The Flow of Thought*
Class 2 (Jan. 13).
DUE: Complete Journal Entry #1 (link in Black Board)
Part A. Background, Literature, and Scope (Faculty Panel I – Fleming, Katz-Buonincontro, Nicholas; Librarian Panel II). The class period will help in evaluating whether a research question has value or has been previously addressed. Three faculty from different disciplines will present search strategies for taking a latent idea, checking for previous research, and showing how to search for related work through an interactive presentation. This presentation will be hosted in one of the library computer resource rooms and facilitated by library staff. Faculty will describe how they guide students in crafting a research problem into a project of suitable scope. Faculty will cover their best practices for capturing and harvesting relevant resources, tracking their research and organizing their thoughts. Students will also consider how reflective writing might augment their research process.

Part B. Students will use the information to refine their projects with guidance from library staff and instructors.
Readings: Library Guide

Week 3 / Jan. 20 **– NO CLASS - University Holiday**

Class 3 (Jan. 27). Part A. Creative mindsets and learning (JK-B). Creative mindsets and preferences for learning will be covered through reflections on learning, goal setting, affect, cognition, and motivation. We will demonstrate how researchers map out proposed approaches to the stated research problems and identify the pros and cons of various research methods to solve those problems.

Part B. (PG) Csikszentmihalyi's concept of flow is arguably one of the most important methods of experiencing personal creative insight. We discuss readings from *Flow* as a prelude to identify the essential requirements for experiencing flow in research. We will cover the environments that facilitate flow and create exercises for participants to experience group flow through a discussion of "Group Flow" in *Group Genius.*

Part C. Teamwork. Student teams will use the structure of a research program (the background, literature, and scope; the hypothesis/objective of the research question; methodology and research design; outcomes, models, evaluation, and the creative process) and a set of foundational questions that we will develop, to evaluate individual research programs. We will have the students practice using these questions in class, so they become a valuable evaluation tool.
Readings: Sawyer, Keith (2017). *Group Genius: The Creative Power of Collaboration (Revised Edition).* New York, Basic Books. Chapter 3: Group Flow.
Csikszentmihalyi, Mihaly (1990). *Flow: The Psychology of Optimal Experience.* New York: Harper Collins. Chapters 4, 6, and 7.
Hass, R., Katz-Buonincontro, J., & Reiter-Palmon, R. (2018). The creative self and creative thinking: An exploration of predictive effects using Bayes Factor analyses. *Psychology of Aesthetics, Creativity, and the Arts*, http://dx.doi.org/10.1037/aca0000169

Class 4 (Feb. 3).

DUE: Midterm Summary Outline (Submit in BBLearn & bring hard copy to class)

Part A. Design (DN): Discussion of human centered design and processes. Students will create stakeholder, concept and affinity maps to organize and analyze their work thus far. They will use these maps to guide their next steps and draw on their tacit knowledge. Students will practice interviewing and speaking to people about their idea and collect relevant comments and thoughts from those discussions. These themes will allow them to ideate on next directions and solutions. Students will be asked to think of these processes as a researcher's investigative sketchbook that they can turn to in order to develop their work and thoughts.

Part B. (DN & PG) Project tuning, preparation for midterm presentations. Students will be asked to consider the scale, scope and culture of their ideas; next steps and past steps. They will fine tune their abstracts, hypothesis and research questions. Working in groups they will share-back their development.

Readings: Institute, L. (2012). *Innovating for People Handbook of Human-Centered Design Methods* (1st edition). Pittsburgh, PA: LUMA Institute. Looking, Making, Understanding Pages: 6-11; 31-35; 48-55; 59-69

Cross, N. (2001). Designerly Ways of Knowing: Design Discipline Versus Design
Science. *Design Issues*, *17*(3), 49–55. https://doi.org/10.1162/074793601750357196

Sanders, L., & Stappers, P. (2013). *Convivial Toolbox: Generative Research for the Front End of Design*. Amsterdam: BIS Publishers. Chapter 1

***Class 5 (Feb. 10)**.*
DUE: Peer Evaluation Worksheet; Midterm Presentation

*Student Presentations (PG & CIRGE Team)***.** Students will present the development of their research problem, the progress made, and the goals for the remainder of the course. Students will submit a summary with presentations of 10 minutes, 5 for the presentation and 5 for questions. Instructors will provide feedback.

***Class 6 (Feb. 17)**.*
DUE: Complete Journal Entry #2 (link in Black Board)

Part A. Hypothesis/Objective of the Research Question (F^3). Creativity technique overview. While there are various models of creativity, many researchers identify distinct phases in the creative process: incubation, elaboration, evaluation of ideas, narrowing of ideas, and implementation of ideas. This content will be augmented with student breakout sessions to explore disciplinary differences in each stage, helping students to identify the stages of their own project. Participants will identify the barriers to the advancement of their idea and then use creativity strategies to develop approaches to breaking through these barriers. The goal of the class is to help identify how the different stages can be developed and applied to the individual research projects.

Part B. Teamwork. (DN) Teams will work in class using specific collaborative techniques to gain a new perspective on their work, and create a concept map of the opportunities, challenges, and positive aspects for their ongoing work. Best practices set up in class one will be re-visited and strengthened through discussion.

Readings: Kahneman, D. (2011). *Thinking, Fast and Slow* (1 edition). New York: Farrar, Straus and Giroux*, Part III: Overconfidence (Ch. 19-24).*

Chen Chaomei, (2011) The Nature of Creativity, Springer, Ch. 3.

Class 7 (Feb. 24). *Part A: Panel: Professors Who Teach or Study Creativity.* Each panelist will describe how research on creativity informs their research questions. The interactive discussion will focus on creative cognition (creative thinking, creative problem solving, etc.) led by practitioners in a variety of research programs. Students will use the foundational questions to ask the panelists for potential strategies to develop their own projects, particularly the areas identified as challenges.

Part B. Using Logic Models in Research Design (JK-B). The instructors will provide a map of different research methods that are used to solve problems. The class will show how researchers develop strong and persuasive logic models using data to describe research problems and research gaps and to set the stage for the urgency of a research problem.

Readings:

W.K. Kellogg Foundation. (2004/1998). *Using logic models to bring together planning, evaluation, and action. Logic model development guide.* Battle Creek, Michigan.

Class 8 (March 2). *Part A (F³).* Often thought of as complementary, logic and intuition serve different roles in the creative process. Logic progresses through a series of retraceable steps whereas intuition involves an intellectual leap that could lead to a new paradigm. We will use a comparative analysis of logic and intuition to help students understand the value and application of logic and intuition. We will discuss chapter 14 of *The Eureka Factor* which provides one of the few evidence-based methods to help individuals foster intuitive leaps.

Part B. Teamwork and coaching for final presentation.

Readings: Kounios, John and Beeman, Mark (2015). *The Eureka Factor: Aha Moments, Creative Insight, and the Brain.* New York: Random House. *Chapter 14.*

Class 9 (March 9).

DUE: Creativity Interview; Final Peer Evaluation; and Final Poster

Panel: Creativity in Industry. Led by researchers from industry, this panel will provide a vision of how creativity is practiced in an industrial context. The panel will be followed by a poster session in which students will present both their research project and the creative development process. The poster presentations will provide a tangible product for grading while providing a valuable aid for students' research.

Reflection Booklet Due by March 13: *Submit in Black Board*

Exam Week: Focus Groups *– sign up for a time in Black Board*

Code of Student Conduct

In this class, we agree to uphold these 3 values:

1. **Positive engagement**

   A. Have positive energy.

     B. Show genuine interest.

     C. Be punctual, and prepared.

     D. Use active engagement.

2. **Quality communication**

     A. Respond to emails and questions in class.

     B. Be respectful.

     C. Collaborate equally in group activities or during teamwork.

     D. Consult instructor to work out conflicts and concerns.

3. **Careful listening**

     A. Listen with care.

     B. Refrain from interrupting.

Academic Honesty

Drexel University is committed to a learning environment that embraces academic honesty. In order to protect members of our community from results of dishonest conduct, the University has adopted policies to deal with cases of academic dishonesty. Please read, understand, and follow the academic policies on Academic Dishonesty located at http://www.drexel.edu/provost/policies/academic_dishonesty.asp.

Course Change Policy:

Course changes may occur during the term; these changes will be communicated during the term in person and by email. Drexel email addresses will be used for all course communications please see the Drexel email policy below for more information.

Drexel Email Policy:

https://drexel.edu/it/about/policies/policies/01-Acceptable-Use/

Americans With Disabilities Act

Students requesting accommodations due to a disability at Drexel University need to request a current Accommodations Verification Letter (AVL) in the ClockWork database before accommodations can be made. These requests are received by Disability Resources (DR), who then issues the AVL to the appropriate contacts. For additional information, visit the DR website at drexel.edu/oed/disabilityResources/overview/ or contact DR for more information by phone at 215.895.1401, or by email at disability@drexel.edu

Student Enrollment Responsibilities

It is the student's responsibility to ensure that he/she is properly enrolled for the course. Students whose names do not appear in Banner at the time final grades are entered at the end of the term will not be entitled to a grade by the instructor. If the student stops attending the class, she/he will not be automatically dropped from the course and she/he will receive a grade

according to her/his overall performance which will include grades for completed and incomplete work. Incomplete work will be graded as no-credit. It is the student's responsibility to make sure that she/he is properly enrolled or withdrawn from the course.

Course Drop/Withdrawal Policy

Once a student is registered, it is his/her responsibility to attend the course, drop the course, or withdraw from the course. Dropping and withdrawing are distinct actions that impact your course enrollment status. For information on policies, please see http://drexel.edu/provost/policies/overview/.
Students may add or drop the course until the end of week 1. For more information on adding or dropping a course, please see
http://drexel.edu/drexelcentral/courses/adjustments/Adding%20and%20Dropping%20Courses/.
Students may withdraw from the course until the end of week 7. For more information on withdrawing from a course, please see
https://drexel.edu/drexelcentral/registration/courses/course-withdraw/
Students should note the deadlines for add/drop/withdrawal noted in the University's Academic Calendar on the Drexel University website:
https://drexel.edu/provost/calendars/academic-calendars/quarter-2018-2019/

Course Material Copying/Recording Usage Policy

Copying, recording, and use of course content and/or materials outside of the course is prohibited without the consent of the instructor.

Special Circumstances/ Special Requests

Please note that the instructor reserves the right to evaluate special requests or circumstances, determine if an alternate educational assignment is warranted, and of what the content/process of that alternate assignment would consist. No special consideration for alternate educational assignments will be given after the term has ended.

Technology Support

24/7 technology support is available to students by phone or online:
– itg@drexel.edu
– 215-895-1224
Should you have questions about the functioning of any portion of the course, please do not hesitate to email the instructor for guidance and assistance.