PURDUE UNIVERSITY
GRADUATE SCHOOL

Minutes of the Graduate Council Meeting
February 18, 2021
1:30 p.m.

Fifth Meeting
Via Zoom - No face to face meeting due to COVID-19

PRESENT: Linda J. Mason, chair, Council Members, Dulcy M. Abraham, Raida Abuizam, Thomas W. Atkinson, David S. Cochran, Joy Colwell, G. Jonathan Day, Eric D. Deemer, Duane D. Dunlap, Emad Elwakil, , Keith B. Gehres, Margaret Gitau, Richard H. Grant, Patricia Hart, James L. Mohler, John A. Morgan, Melanie Morgan, Madelina Nuñez, Zhan Pang, Tina L. Payne, Paul Salama, Abraham Schwab, Ann Shanahan, David G. Skalnik, Jill Suitor, Joseph D. Thomas, Candiss B. Vibbert (Provost's Representative), Eric Waltenburg, Nicole J. Widmar, Yoon Yeo, Chenn Zhou, Daoguo Zhou

APOLOGIES FOR ABSENCE RECEIVED FROM: Janice S. Blum, Steven J. Burdick, Levon Esters, Timothy B. Lescun, John A. Springer, Mitchell L. Springer

ABSENCES: Christopher R. Agnew, Suzanne C. Bart, Christopher K. Belous, Rita A. Burrell, Bryan DeWitt, Chong Gu, Erla Heyns, Paul F. Muzikar, Anson Soderberry

GUESTS: Debbie Fellure, Korena Vawter

I. **MINUTES**

The January 2021 Graduate Council meeting minutes were approved via the Qualtrics Survey.

II. DEANS REMARKS AND REPORTS

Dean Linda Mason

- Contact the Graduate School Deans if there are topics of interest for discussion about graduate education that would be of interest to the Council.
- The Provost Office is looking at the idea of teaching evaluation for graduate courses. The Graduate Council governs graduate education and the Senate does everything else.

- They came up with a teaching policy that all courses would be evaluated including graduate courses. A discussion was held with the Provost Office and the Center for Instructional Excellence (CIE) that it is not standard practice in Graduate Education to evaluate 500 and 600-level graduate courses in some departments.
- A query will be sent to graduate contacts to look at teaching evaluations to see if they are appropriate for graduate level courses.
- Students must be cleared to be on campus physically due to COVID, including graduate students in research labs.
- There are policies in place that students must follow if they are not going to be on campus by filling out a form. We need to know where students are if there were an emergency. They need to complete a change of duty station form. This is an electronic form to make sure that students are not going to be working somewhere that Purdue cannot pay them. For students off campus more than 22 days, a Change of Duty form is required.
- Form 19 for the West Lafayette Campus would indicate that students are not an employee and not physically on campus.
- When one of those forms are filed, students are able to be cleared that they are not physically on campus and do not have to take a COVID test.
- Students who are not cleared, will have holds put on their account by the Office of the Dean of Students.
- Faculty need to have a discussion with their students who are taking 698 or 699 the first two weeks of the semester to determine what is expected to get a satisfactory grade by acknowledging that it has been discussed and check the box. The only consequence we have at this time if a faculty member gives a student an unsatisfactory and the student appeals, the Graduate School will stand on the side of the student.
- Should this continue to be an issue, the Graduate Council may need to discuss the policy and find a way to implement it for the students. Students appreciate this documentation because it is clear what is expected by having a discussion between the faculty member and student on what is needed. It is also a chance to discuss what a student's career goals are.
- As departments have discussions with faculty, we ask that council members discuss the importance of faculty completing this.
- Volunteers needed to help put information together from: 1) Task Force collected last year on housing and stipend levels for graduate students. 2) Summary of work from the graduate student funded through the Graduate School on the cost of living and understanding the implication on graduate students of different categories. 3) The Purdue Protect Grant funded by Forge looked at food insecurity for the graduate student population at West Lafayette.
- The dean discussed the survey from the Fall semester asking graduate students what they were struggling with and look at the things associated with it along with the Student Experience at the Research University) GradSERU survey.

- A small group needed to look at this information for the best way to deal with these issues associated with the stipends and housing issues to put a report together.
- Concern on the reports of maintenance on graduate programs and how to determine that programs should be producing graduate students. Does the responsibility lie within graduate education for producing the number of Ph.D.'s and matching the job market out there?
- Some say that it is an individual's choice to go to graduate school. If there are no jobs and an individual wants to get a doctorate for the sake of an education. There is the other side about being a responsible institution on producing graduate students with no job market for students.
- The data pulled on the debt load for graduate students indicates that one quarter of all the debt load is comprised of graduate students. That could be because they come into graduate school with a debt load already.
- Data being gathered to pose the question to the Provost on these issues on stipends and fees and time to degree. How many are funded verses not funded when they come to graduate school.
- The Big 10 Deans are looking at the idea of program evaluation. How do you examine a program for admitting students? What is the right number of students that it should admit? What are student's career opportunities?
- The data for programs is located on the Graduate School Data Dashboard.
- The Grad SERU survey will be done March 15 through April 23.
- The Grad SERU was done as a test in 2019. This is a way to get a sense on how we compare nationally because it can match our data to other institutions. Department Heads found the information to be valuable.

James Mohler, Associate Dean of the Graduate School

RIO UPDATE

- RESEARCH MISCONDUCT
- Offenses resulting in corruption of the research record.
- Fabrication, Falsification, or Plagiarism in proposing, performing, or reviewing research, or in reporting research results; when:
    - Committed intentionally, knowingly, or recklessly;
    - Actions depart significantly from standard practices for major research institutions such as Purdue; and
    - Conduct does not arise out of honest errors or differences of opinion.
- Not misconduct to be controversial or wrong.

REPUTATION

- Accusations or suspicions of misconduct can damage an individual's reputation even if found to not be misconduct
- If you believe you have witnessed research misconduct, what should you do? Discretion and confidentiality are critical.

RCR REQUIREMENTS

- Graduate Council Policy
    - CITI Training Requirement for graduate faculty and graduate students
- EVPRP Policy
    - All Purdue associates involved with research
    - CITI Training
    - Discipline Specific Training (2 hr. minimum)
    - RCR Training Tracking Tool

RCR TRAINING OPPORTUNITIES

- RIO/Graduate School
    - Professional Development Workshops
        - Overview of RCR
        - Authoring & Peer Review
    - Grad 612
    - Custom workshops (jlmohler@purdue.edu)
- EVPRP
    - RCR Training (RCRTraining@purdue.edu)
- Research Ethics Courses at Purdue

WHAT IS UNDUE FOREIGN INFLUENCE

- Use of the academic research enterprise to compromise US economic competitiveness and national security

FOUR MAIN ISSUES

1. Peer review violations
2. Failure to disclose substantial foreign resources:
    a) Foreign employment arrangements
    b) Foreign support (money, people, over commitment)
    c) Foreign grants
    d) Talent awards
3. Failure to disclose significant foreign financial conflicts of interest
    a) Equity in foreign companies
    b) Failure to abide by US export control laws and regulations
    c) Foreign patents that leverage US tax-payer

III. AREA COMMITTEE REPORTS (Area Committee Chairs)

Graduate Council Document 21B, Graduate Council Documents Recommended for Approval. See Appendix B. Voted via Qualtrics survey.

IV. PURDUE GRADUATE STUDENT GOVERNMENT -- PRESIDENT'S REPORT

Madelina Nuñez, President of the Purdue Graduate Student Government (PGSG)

- Thanked the Career Team for first fully-virtual Career Fair that occurred on Tuesday, Feb. 16th
- February Immigration Attorney Sessions (Informational Session on Tuesday Feb, 23rd at 6pm EST)

- Mental Health Action Week (March 1st-5th)
- Working with The Graduate School on Graduate Student Appreciation Week (April 5th-9th)

V. CLOSING REMARKS

- Dean Mason thanked the members for serving on the Graduate Council. Graduate Education would not go forward without all of the work for reviewing proposals as online programs grow.

The council meeting was adjourned by Dean Mason at 2:40 p.m.

Linda J. Mason, Chair
Tina L. Payne, Secretary

APPENDIX A

PENDING DOCUMENTS

(February 2021)

BOLDED ITEMS ARE IN REVIEW WITH AN AREA COMMITTEE

Area Committee A, Behavioral Sciences (G. Jonathan Day, chair; gjday@purdue.edu):
Graduate Council Document 21-1a, **EDPS 50701, Foundational Techniques For Telemental Health Providers (PWL)**
Graduate Council Document 20-60a, **OLS 57200, Integration Of Project Management For Leaders (IUPUI)**

Area Committee B, Engineering, Sciences, and Technology (Dulcy M. Abraham, chair; dulcy@purdue.edu):
Graduate Council Document 20-19h, **ME 52000, Imaging-Based Computational Hemodynamics For Cardiovascular Assessment (IUPUI)**
Graduate Council Document 20-19i, **ME 57400, Additive Manufacturing (IUPUI)**
Graduate Council Document 20-21d, **MSTE 59900, Motorsports Advanced Internship (IUPUI)**

Area Committee E: Life Sciences, (Timothy Lescun, chair; tlescun@purdue.edu):

Graduate Council Document 21-2a, **AGRY 60100, Introduction To Graduate Research (PWL)**

Graduate Council Document 21-3a, **BIOL 50401, Mammalogy (PFW)**

Graduate Council Document 21-3b, **BIOL 51501, Non-Mendelian Genetics (PFW)**

Graduate Council Document 21-3c, **BIOL 58301, Environmental And Agricultural Microbiology (PFW)**

Graduate Council Document 21-3d, **BIOL 58302, Laboratory In Environmental And Agricultural Microbiology (PFW)**

Graduate Council Document 20-58a, **NSCI 55900, Endocrinology (IUPUI)**

APPENDIX B

GC Document 21-B

DOCUMENTS RECOMMENDED FOR APPROVAL
BY THE GRADUATE COUNCIL
February 2021

GRADUATE COURSE PROPOSALS:

Area Committee A, Behavioral Sciences (G. Jonathan Day, chair; gjday@purdue.edu):

Graduate Council Document 21-1a, **EDPS 50701, Foundational Techniques For Telemental Health Providers** (PWL) Sem. 1 and 2. SS. Distance/Lecture 120 minutes per meeting/1 asynchronous meeting per week/8 week term. DIS/LAB 40 minute per meeting/1 meeting every 2 weeks/8 week term. Credit 3.

The purpose of this course is to provide a broad overview of individual therapy with adults via telemental health using a videoconferencing platform. Within this course, students will develop general, foundational knowledge related to pre-screening adults for individual therapy, conducting intakes with adult clients, engaging in individual therapy sessions with adult clients, terminating with adult clients, and managing risk with adult clients. Additionally, this course offers a brief overview of telemental health therapy with children, couples, families, and groups.

This course is taught in an asynchronous manner and uses various strategies to facilitate student learning, which include: discussion boards, case studies, role plays, self-assessment papers, and pre-recorded lectures with associated PowerPoint slides. Access to necessary technology and resources, which includes but is not limited to: stable internet access, Brightspace, a telemental health or associated platform, and a computer, is required to complete the course. Typically offered Fall Spring Summer.
https://purdue.curriculog.com/proposal:14978/form

Graduate Council Document 20-60a, **OLS 57200, Integration Of Project Management For Leaders** (IUPUI) Sem. 1 and 2. SS. Lecture 1 time per week for 120 minutes. Credit 3. Prerequisites: OLS 57100 or INFO-B 505 Informatics Project Management or instructor approval. C is the lowest passing grade in either course for admission to OLS 57200.

This course emphasizes critical analysis, synthesis, and evaluation of theories and applications of project management knowledge and skills, leadership, communication, and stakeholder engagement. Students integrate theoretical and applied skills in planning, distributing, and managing communication; analyzing and interpreting project organization in context; and applying best practices in team management. Typically offered Fall Spring Summer.
https://purdue.curriculog.com/proposal:15189/form

Area Committee B, Engineering, Sciences, and Technology (Dulcy M. Abraham, chair; dulcy@purdue.edu):

Graduate Council Document 20-19h, **ME 52000, Imaging-Based Computational Hemodynamics For Cardiovascular Assessment** (IUPUI) Sem. 1 and 2. SS. Lecture 2 times per week for 75 minutes. Credit 3. Prerequisites: ME 31002, or BME 44200, or equivalent (consent of the instructor)

Image-based computational hemodynamics is a newly-emerged computational technique for non-invasive and patient-specific assessment of cardiovascular diseases based on medical imaging data. In this course, students will learn (1) concepts and principles of cardiovascular circulation in the human body and imaging modalities for cardiovascular diseases; (2) image-based computational modeling methods for quantification of hemodynamics (velocity, pressure, and wall-shear stress) in human vessels based on CT/MRI and Doppler ultrasound imaging data; and (3) computational analysis to assess the severity of cardiovascular diseases. Team projects to non-invasively assess the severity of arterial stenosis in renal, iliac, and coronary arteries via quantification of trans-stenotic pressure gradient and/or fractional flow reserve will provide first-hand experience of how computational modeling and analysis can contribute to medical innovation and advanced precision medicine. Typically offered Fall Spring Summer.
https://purdue.curriculog.com/proposal:9259/form

Graduate Council Document 20-19i, **ME 57400, Additive Manufacturing** (IUPUI) Sem. 1 and 2. SS. Lecture 2 times per week for 75 minutes. Credit 3. Prerequisites: Graduate standing or instructor's consent.

During this course, students evaluate the engineering aspects and physical principles of available AM technologies (binder and material jetting, sheet lamination, vat photopolymerization, directed energy deposition, powder bed fusion, and material extrusion technologies) as well as these technologies' most relevant applications and criteria in order to successfully select the AM technology that is best suited for the embodiment of a particular design (material compatibility, interface issues, strength requirements). The topics of this course are grouped into three modules: (1) AM Technologies (2) Design for AM (3) AM Process Planning. During the first module (50% of the course), the historical development of AM is examined and then the underlying physical principles of current AM technologies are evaluated. The second module (25% of the course) focuses on investigating the mathematical principles and technical aspects of design optimization methods for AM (including topology optimization). The third module (25% of the course) incorporates product evaluation (mechanical properties and dimensional accuracy), process optimization, and applications. Students taking this course will create original products using CAD/CAE systems and topology optimization tools. Students will hone skills on image post-processing, segmentation, vectorization, and generation of STL files. Students also will execute tasks using several 3D printers and manipulate different AM technologies including material extrusion, vat photopolymerization, and powder-bed fusion. They will also have the opportunity to visit local industries and interact with AM practitioners. This course is collaboratively taught by specialists in the areas of manufacturing, design, and materials. Typically offered Fall Spring Summer.
https://purdue.curriculog.com/proposal:9214/form

Graduate Council Document 20-21d, **MSTE 59900, Motorsports Advanced Internship** (IUPUI) Sem. 1 and 2. SS. Internship. Variable Credit 1 to 3.

Graduate-level based course, in an off-campus internship position. Internship must be in the area of Motorsports Engineering. Individual Internship must be preapproved by the supervising MSTE faculty member, before the student can register for the course. A written report must be submitted and approved by the faculty before credit is accepted. This course cannot be used to satisfy the minimum course requirements for the Master's degree. The project must be at the graduate engineering level, with elements that complement the MSTE MSE course work. The project must satisfy the agreement between the US industry where the CPT program is to be conducted and the MSTE faculty at IUPUI. The project must be an integral part of the MSTE MSE program. This issue is important for the International approval. The feedback from industry advisor together with the engineering research/design outcomes as seen by the MSTE faculty, will determine the final grade of the course. Permission of instructor required. Typically offered Fall Spring Summer.
https://purdue.curriculog.com/proposal:13254/form

Area Committee E: Life Sciences, (Timothy Lescun, chair; tlescun@purdue.edu):

Graduate Council Document 21-2a, **AGRY 60100, Introduction To Graduate Research** (PWL) Sem. 1 and 2. Lecture 1 time per week for 100 minutes for 8 weeks per term. Credit 1.

The course provides a framework for graduate studies. It helps the new graduate student understand the roles and responsibilities in graduate education, providing guidance for scientific reading, writing, and research activities. Topics include understanding ethical issues in science, enhancing their ability to communicate with a broad range of people, and establishing initial perspectives on professional development. Permission of department required. Typically offered Fall Spring.
https://purdue.curriculog.com/proposal:11110/form

Graduate Council Document 21-3b, **BIOL 51501, Non-Mendelian Genetics** (PFW) Sem. 2. Lecture 2 times per week for 75 minutes. Credit 3. Prerequisites: BIOL 21800 (C- or better), Graduate, or Permission from Instructor.

In this course students will explore topics and papers on genetic and environmental sources of variation in inherited disorders. This includes but is not limited to epistatic and other pathway influences, complex (multigenic) diseases, quantitative traits, genetic modifiers, environmental risk factors, gene x environment interactions. Students will look at primary research that identifies examples of these factors, both in human disease and in animal models of disease. They will also complete a miniature proposal, in which they will identify a human disease or disease model that is subject to phenotypic variation. They will propose an experiment to either characterize the impact of a modifying factor on that disease, or a way to screen for/identify modifying factors. We will have in-class time to work on this project during the Journal Club/Workshop portion of the course. Permission of instructor required. Typically offered Fall.
https://purdue.curriculog.com/proposal:15186/form

Graduate Council Document 21-3c, **BIOL 58301, Environmental And Agricultural Microbiology** (PFW) Sem. 2. Lecture 2 times per week for 75 minutes. Credit 3. Prerequisites: BIOL 21900; minimum grade of C or better.

Introduction to the ecosystem-wide impacts of microorganisms in the various habitats on earth and their effects on agriculture. Students will learn and evaluate various methods of sample collection and detection, understand biogeochemical cycling, remediation of pollutants by microorganisms and be able to elaborate on microbial interactions in natural ecosystems. Students will gain and apply knowledge on bioinformatic, genomic, proteomic and metabolomic approaches to the study of environmental microorganisms. The optional laboratory section will enable students to apply techniques for isolating and growing soil and aquatic microorganisms. Typically offered Spring.
https://purdue.curriculog.com/proposal:15223/form

Graduate Council Document 21-3d, **BIOL 58302, Laboratory In Environmental And Agricultural Microbiology** (PFW) Sem. 2. Lecture 2 times per week for 75 minutes. Credit 3. Prerequisites: (PFW) Sem. 2. Laboratory 1 time per week for 110 minutes. Credit 1. Prerequisites: BIOL 21900; Minimum grade of C. Co-requisite: BIOL 58301.

The lab will enable students to apply techniques for isolating and growing soil and aquatic microorganisms. Students in the lab section will apply molecular biological and biochemical techniques for analyzing such microbes. Students will participate in an inquiry-based laboratory project to perform a case study on microbes relevant to agriculture. The optional laboratory section can be taken only by students enrolled in the lecture section. The lecture is a co-requirement for the lab. Typically offered Spring.
https://purdue.curriculog.com/proposal:15236/form

Graduate Council Document 20-58a, **NSCI 55900, Endocrinology** (IUPUI) Sem. 1 and 2. Lecture 2 times per week for 75 minutes. Credit 3. Prerequisites: BIOL 55600 or equivalent and CHEM-C342.

The study of hormone function. Consideration will be given to the role of hormones in growth, development, metabolism, homeostasis, and reproduction. Typically offered Fall Spring.
https://purdue.curriculog.com/proposal:14784/form

NEW DOCUMENTS RECEIVED
(After the February 18, 2021 Graduate Council Meeting)

Area Committee A, Behavioral Sciences (G. Jonathan Day, chair; gjday@purdue.edu):

Graduate Council Document 21-1c, **EDPS 50800, Cultural and Linguistic Diversity in Special Education Programs** (PWL) Sem. 1 and 2. SS. Lecture 1 time per week for 150 minutes. Distance. Credit 3.

Living in a diverse society provides special education teachers and support personnel the opportunity to encounter a wide array of cultures in their educational settings. The course, designed for special education stakeholders (i.e., teachers, staff, support personnel, administrators), considers issues of human diversity, broadly defined to include ability, ethnicity, culture, gender identity, linguistic background, race, religion, socioeconomic status, and sexual orientation. This course challenges biased assumptions that influence the provision of educational services, and examines issues related to promoting equal learning opportunities in the classroom and other educational settings. It is designed to facilitate student examination of how diversity and diverse experiences shape systems that affect individuals, families, communities, and society. It allows students to explore their own cultures and the biases and internalized messages about those who are different from themselves. Students will be introduced to specific approaches to practice, and frameworks for equity, advocacy, and empowerment to support students who receive special education and/or applied behavior analysis (ABA) service, as well as their families. The course also includes information and discussion topics pertaining to the culturo-behavior science (CBS) specialization of the Association for Behavior Analysis International (ABAI) and to interpersonal communication skills – to include speaking, listening, reading, and writing - and their effect on students and families. Permission of instructor required.

Area Committee B, Engineering, Sciences, and Technology (Dulcy M. Abraham, chair; dulcy@purdue.edu):

*Graduate Council Document 21-18a***, ENGT 50900, Applied Computational Methods** (PWL) Sem. 2. Lecture 1 time per week for 150 minutes. Credit 3. Prerequisites: Six credits of undergraduate classes in technical mathematics, focusing on calculus. Since graduate students arrive from many different backgrounds, the equivalent to this prerequisite is sufficient.

This class covers the mathematics typically needed for research in engineering technology and is especially suited to the needs of ENGT students. The class includes basic calculus, introductory numerical methods, implemented in MATLAB, and elementary linear algebra. It uses relevant, practical problems to teach concepts and provides the students with actionable information. The starting point is graphical and numerical solutions of systems of non-linear algebraic equations. The class progresses to simple ordinary differential equations. Typically offered Spring.

Graduate Council Document 21-17a, **MFET 55700, Smart Manufacturing Enterprise: Exploring The Applied Technologies** (PWL) Sem. 1 and 2. SS. Lecture 1 time per week for 150 minutes. Credit 3.

The core foundations of digital transformation in manufacturing for making all things digital, making all things smart, and making all things connected to drive business value. Typically offered Fall Spring Summer.

Graduate Council Document 21-17b, **MFET 64200, Programming Robotics And Cyber-Physical Systems With The Robotics Commons** (PWL) Sem. 1 and 2. Lecture 1 time per week for 150 minutes. Credit 3. Prerequisites: ECE 56900.

Robot Operating System (ROS) is an open-source programming platform that allows the sharing of software packages for more in-depth exploration of complex software projects involving robotics and cyber-physical systems. The basic tools of simulation, visualization, computer vision, simultaneous localization and mapping (SLAM), path planning, manipulation, grasping, and social interaction in robotic systems will be presented in the context of advanced projects with a publishable result. Students will develop complex, independent projects as part of the class that will result in a final report in the form of a publication-worthy paper suitable for submission to an international conference. Student knowledge of a procedural programming language, familiarity with robotics, and a rudimentary understanding of linear algebra is assumed. Typically offered Fall Spring.

Graduate Council Document 21-, **MSE 52400, Mechanical Behavior Of Polymers** (PWL) Sem. 2. Lecture 2 times per week for 75 minutes. Credit 3. Co-Requisites: MSE 38200 OR equivalent OR Graduate Student.

This course will focus on the mechanical properties and behaviors of polymeric materials. The course will utilize fundamental solid and fluid mechanics to understand the response of bulk polymers (solid and liquid, above and below T_g). The impact of deformation rate and temperature on the mechanical response of polymers will be covered in detail. The course will start with an overview of linear elastic mechanics, move to rubber elasticity, and then viscoelasticity (concentrating on time-temperature superposition). We will also cover fluid dynamics and the rheology of non-Newtonian fluids. We will conclude with a section on deformation, yield, and fracture mechanisms (focusing on those phenomena that are unique to polymers such as rubber cavitation, drawing, and crazing). Typically offered Spring.

Area Committee C: Chemistry, Engineering, and Physical Sciences, John Morgan; chair, jamorgan@purdue.edu):

Graduate Council Document 21-20a, **CHE 52100, Principles Of Tissue Engineering** (PWL) Sem. 1 and 2. Lecture 2 times per week for 75 minutes. Credit 3.

This course is designed to provide background for the application of engineering principles with the life sciences to facilitate understanding of normal and pathological mammalian tissues. Applications of drug delivery, tissue and cell transplantation, bio-artificial organs, tissue regeneration, disease models, and applications in clinical practice will be explored. Typically offered Fall Spring.

*Graduate Council Document 21-20*b, **CHE 55400, Smart Manufacturing In Process Industries** (PWL) Sem. 1 and 2. Lecture 2 times per week for 75 minutes. Credit 3.

This course surveys the tools and techniques, which are relevant to support the multiple levels of technical decisions that arise in modern integrated operation of manufacturing facilities in the chemical and related process industries. The linkage of these decisions levels and sharing of associated data and knowledge via effective IT methodology is currently termed Smart Manufacturing in the US and Industry 4.0 in Europe. The topics covered in the course include the structure of the operations decision hierarchy, role of online process measurements, elements of sensor network design, information systems to support process operations, plant data reconciliation, detection and diagnosis of process faults, plant wide control, real time process optimization, production planning and scheduling, and supply chain management. Each topic will be addressed by first summarizing the basic role and scope of that component, then discussing the structure of the decision problem, and then will outlining some representative tools available to address that decision problem. Each major topic will include a lecture given by an industrial practitioner who will offer a perspective on the state of industrial practice. Permission of instructor required.

Graduate Council Document 21-20c, **CHE 56200, Battery Systems** (PWL) Sem. 1 and 2. Lecture 2 times per week for 75 minutes. Credit 3.

This course is designed to introduce fundamentals of electrochemistry and electrochemical engineering of primary and rechargeable lithium ion batteries (LIBs) to undergraduate and graduate students. The course will be reviewing working principles of LIBs. Strong emphasis will be given on the Li-ion battery technology, primary batteries, nanotechnology implementation and the materials design. Beyond conventional Li-ion systems and Pb-acid batteries, next generation Na-ion, K-ion and Li-S batteries will be discussed. Students will be understanding energy density calculations, fabrication, and testing mechanism of batteries utilizing engineered electrodes, electrolytes, and separators. Broader perspectives on sustainable, cost effective, longer lasting battery manufacturing will be provided. Typically offered Fall Spring.

Area Committee D, Humanities and Social Sciences (Jill Suitor, chair; jsuitor@purdue.edu):

Graduate Council Document 21-16a, **AMST 60600, American Studies Methods** (PWL) Sem. 1 and 2. Lecture 1 time per week for 170 minutes. Credit 3.

This class is specifically designed to be a survey course on the various methods employed by American Studies scholars from different disciplines. The objective of this course is to approach methods from both an epistemological and empirical perspective. In particular, we will investigate the what, why, and how of conducting research in an interdisciplinary field. As such, the following questions will drive this course: What are American Studies methods? Why are certain methodologies utilized (i.e., for what purpose)? How does one conduct research in American Studies? What method(s) should you use in your own research inquiry? And finally, what are some potential drawbacks in using a certain methodology for your project? This is a graduate seminar, and your active participation in discussions is mandatory. You will be asked to

submit weekly discussion questions, lead five seminar discussions on selected topics from the required readings, and complete five assignments. Typically offered Fall Spring.

Graduate Council Document 21-15c, **POL 68600, Career And Placement Practicum** (PWL) Sem. 1 and 2. Lecture 1 time per week for 100 minutes for 8 weeks and Individual Study. Credit 2.

Provide practical guidance and workshops to help students plan job searches, prepare application materials, and develop skills in public presentations such as video interviews, in-person interviews, job talks, teaching talks, and other public talks. Permission of department required. Typically offered Fall Spring.

Area Committee E: Life Sciences, (Timothy Lescun, chair; tlescun@purdue.edu):

Graduate Council Document 21-3e, **BIOL 57501, Systematic Biology** (PNW) Sem. 1 and 2. SS. Lecture 2 times per week for 75 minutes. Distance. Credit 3. Prerequisites: A minimum of a grade of C- in Cell Biology (BIOL 24300) and Genetics (BIOL 24400). Evolution (BIOL 31100/58000) highly recommended

Systematic biology is the study of how life is classified in order to best study and understand biodiversity. This course is both a historical course and a research methods course. The history of classification systems (such as how Linnaean ranks came to be, and the weakness of using these ranks) will be discussed, leading into how modern phylogenetic methods were developed that have given rise to reliable methods to test hypotheses of evolutionary relationships. The course will go into detail for modern systematic methods, and will incorporate short exercises in how to use these methods - including model-based methods of studying genomic data - to reconstruct evolutionary relationships. Students complete several systematic research projects, including one they design and implement. Typically offered Fall Spring Summer.

Graduate Council Document 21-3f, **BIOL 59001, Mammalogy** (PNW) Sem. 1. Lecture 1 time per week for 110 minutes and Laboratory 1 time per week for 170 minutes. Lecture portion my be offered online (DIS)). Credit 4. Prerequisites: A minimum of a grade of C- in Cell Biology (BIOL 24300) and Genetics (BIOL 24400). Evolution (BIOL 31100/58000) highly recommended.

This course will cover mammalian evolutionary history from the first basal synapsids over 300 million years ago, when the mammalian lineage spilt from the reptile lineage. The series of transformations that occurred leading to modern living mammals will be studied by examining the fossil record. Living mammalian biodiversity will be explored at the family level. For all extant groups the course will examine evolutionary history, life history traits, and ecological aspects – including conservation issues. Current ‘hot button’ issues regarding conservation will be highlighted, such as the plight of the white rhino and cases were mammals are invasive species. Anatomy of mammals will be examined in lab, with dissections and study of osteological specimens. Typically offered Fall.

Area Committee F, Management Sciences (Nicole J. Widmar; chair, nwidmar@purdue.edu):

Graduate Council Document 21-4b, **MGMT 52020, Analytics for Marketing Managers** (PWL) Sem. 1. SS. Lecture 2 times per week for 90 minutes for 8 weeks. Distance. Variable Credit 2 or 3.

The purpose of this course is to learn tools, technologies, applications and practices used to collect, integrate, analyze, and present raw data in order to create insightful visualization and actionable marketing information. It will cover conceptual understanding of marketing performance based on data and statistical methods. Once conceptual understanding is familiarized, students will learn common tools and techniques for marketing managers in today's industry.

Graduate Council Document 21-4c, **MGMT 53900, Analytics for Social Media Marketing** (PWL) Sem. 1 and 2. Lecture 2 times per week for 90 minutes for 8 weeks. Distance. Variable Credit 2 or 3.

The objective of this course is to equip students with tools and develop marketing skills required to address current marketing problems. The approach is to learn R software for conducting basic scraping on social media sites to understand user behavior and sentiment. In addition, Python will be used for web-scraping data from various websites and websites with dynamic content. The goal is to become familiar with such qualitative techniques as: word clouds, cluster dendrograms, sentiment analysis, and other methods. Occasional homework assignments or check points will be given to gain deeper understanding of the materials covered in class.