

**PURDUE UNIVERSITY
GRADUATE SCHOOL**

Minutes of the Graduate Council Meeting
January 23, 2020
1:30 p.m.

Fourth Meeting
Room 279
STEW

PRESENT: Linda J. Mason, chair, Council Members, Dulcy M. Abraham, Christopher R. Agnew, Blake A. Allan, Thomas W. Atkinson, Taylor W. Bailey, Christopher K. Belous, Ryan A. Cabot, David S. Cochran, William (Bart) Collins, Duane D. Dunlap, Emad Elwakil, Keith B. Gehres, Margaret Gitau, Richard H. Grant, Patricia Hart, Signe E. Kastberg, Athena Kennedy, James L. Mohler, John A. Morgan, Melanie Morgan, Paul F. Muzikar, Zhan Pang, Manushag (Nush) Powell, Paul Salama, Abraham Schwab, David G. Skalnik, Rebecca H. Stankowski, Jill Sutor, Joseph D. Thomas, Candiss B. Vibbert (Provost's Representative), Eric Waltenburg, Nicole J. Widmar, Yoon Yeo

APOLOGIES FOR ABSENCE RECEIVED FROM: Christopher K. Belous, Rita A. Burrell, Kuan-Chou Chen, G. Jonathan Day, Timothy B. Lescun, William McCartney, Beth McNeil, Tina L. Payne, Anson Soderbery, John A. Springer, Mitchell L. Springer, Chenn Zhou

ABSENCES: Janice S. Blum, Xavier M. Tricoche, Daoguo Zhou

GUESTS: Don Brier, Ayrielle Espinosa, Debbie Fellure, Donna Ferullo, John Gibson, Nicole Key, Julayne Moser, Korena Vawter

I. MINUTES

The minutes of the November 21, 2019, Graduate Council meeting were approved as presented.

II. DEANS REMARKS AND REPORTS

- a. Dr. Linda Mason presented a few remarks on what is going on in Graduate Education as we change the way the Graduate Council goes and the way we move to electronic voting. As the paper proposals finish out, we will move to full electronic voting within the Graduate Council as the Council's time is valuable. Dr. Mason noted that what she wants for faculty who are serving on Council is to have discussions of where Graduate Education is going and what is working and what is not working. That is where we bring these bodies together so we are not pulling faculty out of the classroom or the lab to come to the Council meeting to just vote on

proposals unless there is a discussion needed for a proposal, so the electronic voting should suffice. If faculty do not attend the Council meeting and there are not enough Council members to have a quorum, we will not be able to conduct business; in such a case electronic voting may be suspended.

Dr. Mason noted that the next step in the phase is to have discussions of the Graduate Council itself, and not the processes that we go through, but the function of the Graduate Council. Dr. Mason noted that what we are looking at: Does it serve the needs that we want and is there a better way to do that? Dr. Mason noted that as we move into these discussions on what is going on in Graduate Education where we as an institution want to move Graduate Education in those bigger issues that affect all of us. As the knowledge and discussions move from the Council meeting back to the graduate faculty. Dr. Mason noted that when she was nominated to the Graduate Council she served as a member at large for her college and did not have a body that she would go back to and report the Council information. Dr. Mason noted that multiple representatives were doing this as well. Dr. Mason noted that when she served on the Senate she was representing her department and would report on what was being discussed at the Senate meeting to her department. Dr. Mason noted the Graduate Council does not function in that way and noted that when she speaks with faculty about what is happening in Graduate Education at the Graduate Council meeting, they are not aware of these discussions. Dr. Mason noted that it is not effective to send an email about Graduate Education to communicate with the faculty in the departments. Dr. Mason noted that as she thinks about where we go as the Graduate Council, do we need to increase the membership? Do we need to have representation from all departments that are represented? What would be a better way to take the policies and information being discussed by the Graduate Council back to our colleges, departments and the Graduate Faculty and come back to the Council? Is the Graduate Council serving ourselves the best way that we can in the structure that we currently have? Dr. Mason noted that the structure was established many years ago as a University with a structure of colleges and disciplinary studies. Dr. Mason noted that the world is very different now and especially Graduate Education when the University was established. We must look at where Graduate Education is going and how we can best serve those populations. Is it best served by having the representation the way we have it now as when the Council was established? Dr. Mason noted that more members were added recently to help with the review process for the Graduate Council Area subcommittees where most of the work is done as most government bodies are. Dr. Mason noted that as Graduate Education and Master Certificates grow, this is another reason to add members to handle the load. More importantly, to have voices as we discuss where Graduate Education is going. If we do not have all of the voices at the table, will we miss some of those critical voices as decisions are made by the Graduate Council? Dr. Mason noted that part of the discussions as we move forward is are we organized the best way and do we have all of the voices at the table that we need to have and how would that look different and how might we do it? We have the power to be able to do that if we need to, so we have that discussion with all of the bodies at the Graduate Council meeting. Dr. Mason noted that as we grow and get more people it is harder to have a discussion. Dr. Mason noted that she does not want to lecture as if she is in the classroom and no one participates in the discussion except the front row of people. Dr. Mason noted there are limits when you grow and how to get people to have a conversation and space on where the Council meetings would be held. Dr. Mason noted that the possibility of doing some electronic WebEx of the meeting so others could be a part of the discussions and when speakers come in to talk about Graduate Education others may be interested in those topics also. How might we do that so that others can hear where they may not have the time to come here or if they are at a Regional Campus? Dr. Mason asked the Council to ruminate about this, especially those Council members who have served on the council for a longer period as they have some historical perspective where we might go with this.

Dr. Mason noted that we are moving forward on the system-wide application within the system so that students could have three applications within the system at one time rather than one application. July 1st is the target date to go live for the next round of applications for next year. One thing to think about as we move into that system is, for those who think that you might be in a program and may utilize that or have students that are interested in multiple programs, and how do we get this information out that this is available to students as they are looking at programs? This will be discussions that we need to be thinking about is how do we get this information out? Dr. Mason noted that we are also looking at the application of gender to have more than two categories of gender on the application. Dr. Mason noted that we are attempting to coordinate with undergraduate education to do this, but if they do not add it, we will add it without coordinating our application with the undergraduate application. We are strongly committed to making this happen in the Graduate world.

Dr. Mason noted that there was a discussion at the Regionals meeting that she would like everyone to be aware of that will be happening this year. We are a system of Graduate School and trying to emphasize the portal, the application system we are working on, and approve proposals, and have discussions that are relevant system-wide to have us to understand the system better. We are pleased to have our Regional Campuses travel to West Lafayette monthly to attend the Graduate Council meeting. Dr. Mason noted that if we are going to operate as a system, we should not always expect the Regional campuses to come to West Lafayette. We are us; not them versus us, and that we are one Graduate School. Starting next year, we will coordinate one council meeting a year at one of the Regional Campuses and tour that campus. Dr. Mason noted that we will learn about their mission and have the speaker focus on that campus. Our first visit will be in the Spring of 2021.

Dr. Linda Mason noted to the Council members to continue emphasizing to the faculty as they meet with their students of the 69800 and 69900 credit two-week limit on getting a mentoring plan or what they will do to meet the requirements for satisfactory versus unsatisfactory in those courses.

Dr. Linda Mason thanked Melanie Morgan for the work that the Professional Development Office continues to do. We were able to receive an additional allocation from the Provost Office to continue with the growth of our programs. Dr. Mason notes that The Professional Development group came up with a new idea called, Boilers Work. It is an exciting program for students who want to get real-world credit and experience in a career, but it is not a paid internship if they do not get it. There is a burden to be able to go through an internship when you are not paid to do it so an opportunity to do that and go out and learn and come back to tell us the things that they learned. Dr. Mason asked the Council members to spread the word, especially in a discipline that might work for agencies that do not do paid internships. Dr. Mason also asked the Council members to encourage their students on another great idea on this innovate our Graduate Research publication where we will feature 10 students a quarter. Students will write the stories for this like the Three Minute Thesis in a popularized form. The idea is that we want to communicate the amazing things that our graduate students not only this campus, but the alumni and the development folks want to be able to get that information out. This is a way to sing the praises of the great work that our graduate students are doing and give them the experience in writing in non-technical terms the things they are doing and the great findings that have and to feature those. The top graduate students will receive a financial award and present at an event that we will host.

Dr. Mason noted that this is the year of Mentoring and we are stressing mentoring from all aspects. It is amazing how many students do not know what mentoring is or do not identify when they are in a bad situation until it is really bad. The idea is to educate folks on what is good mentoring and what is not so that help button also is there that allows a student to easily be able to report things that are going on that they would not feel comfortable reporting. We can then go in and help investigate independently for them because they are a very vulnerable population and we want to make sure that we do protect them if something is going wrong.

b. Dr. Melanie Morgan noted that Dr. Brad Johnson an expert on mentoring will present the following workshops on January 31st:

- How to get good mentoring and how to be a good mentee for Graduate students
- Keynote talk for everyone
- Grad Directors and Department Chairs on how to change the culture to have a positive culture around mentoring
- The transition from being a graduate student to being a mentor themselves, and how to develop their skills in that area

Dr. Morgan noted the Aurora platform by Beyond The Professoriate to explore career pathways and learn job search strategies for academic and non-academic positions. Aurora is an eLearning platform with over 80 hours of on-demand videos, and 120 interviews with Ph.D.s who have obtained roles in universities, colleges, companies, government agencies, and nonprofits. Dr. Morgan noted that we are trying to get more graduate students to use it. The top resources for last year for productivity and time management were: real-life stress management, your resume and cover letter writing on your terms, launch your non-faculty job search and how to apply for a faculty position in STEM. Dr. Morgan noted that there are different topics that we could never cover in our face to face workshops here. If more students do not start using it, we will not be able to continue to pay for it. Students say they want workshops at all times and all formats and so there is something for everyone here. Dr. Morgan asked the Council members to encourage their students to take advantage of this resource.

III. AREA COMMITTEE REPORTS (Area Committee Chairs)

Graduate Council Document 20A, Graduate Council Documents Recommended for Approval:

Area Committee A, Behavioral Sciences (Signe Kastberg; chair, skastber@purdue.edu):

Graduate Council Document 19-6e, **EDCI 54501, Teaching STEM Through Agriculture, Food, and Natural Resources** (PWL)

Dr. Signe Kastberg presented one course for consideration. The course was approved by the council, upon a motion by Dr. Kastberg.

Area Committee D, Humanities and Social Sciences (Manushag (Nush) Powell, chair; mnpowell@purdue.edu):

Graduate Council Document 19-32b, COM 64400, Strategic Personal Branding (PWL)
Graduate Council Document 19-2j, ENGL 51402, Using Poems To Beat Death (Finding Poetry To Live) (PFW)

Graduate Council Document 19-47b, LING 59002, Semantics (PFW)

Dr. Nush Powell presented three courses for consideration. The courses were approved by the council, upon a motion by Dr. Powell.

Area Committee E: Life Sciences, (Ryan A. Cabot, chair; rcabot@purdue.edu):

Graduate Council Document 19-49q, MUSC 55000, Music Therapy Thesis or Clinical Project (PFW)

Graduate Council Document 19-49r, MUSC 56500, Contemporary Issues In Music Education (PFW)

Due to the absence of Chair, Dr. Ryan Cabot, Dr. David Skalnik presented two courses for consideration. The courses were approved by the council, upon a motion by Dr. Skalnik.

CERTIFICATES:

Area Committee A, Behavioral Sciences (Signe Kastberg; chair, skastber@purdue.edu):

Graduate Council Document 20-1a, Graduate Certificate in Communication and Leadership from the Brian Lamb School of Communication, PWL

Graduate Council Document 20-2a, Graduate Certificate in Applied Helping Skills from the Department of Educational Studies, PWL

Dr. Signe Kastberg presented two certificates for consideration. The certificates were approved by the council, upon a motion by Dr. Kastberg.

Area Committee D, Humanities and Social Sciences (Manushag (Nush) Powell, chair; mnpowell@purdue.edu):

Graduate Council Document 20-12a, Graduate Certificate in Inclusive Excellence from the Graduate School, PWL

Dr. Nush Powell presented one certificate for consideration. The certificate was approved by the council, upon a motion by Dr. Powell.

MAJORS:

Area Committee E: Life Sciences, (Ryan A. Cabot, chair; rcabot@purdue.edu):

*Graduate Council Document 20-6a, **New Major in Imaging Sciences** from the School of Health Sciences, PWL*

*Graduate Council Document 20-6b, **New Major in Medical Physics** from the School of Health Sciences, PWL*

*Graduate Council Document 20-6c, **New Major in Toxicology** from the School of Health Sciences, PWL*

Due to the absence of Chair, Dr. Ryan Cabot, Dr. David Skalnik presented three majors for consideration. The majors were approved by the council, upon a motion by Dr. Skalnik.

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

Mr. Taylor Bailey, President of the Purdue Graduate Student Government (PGSG) reported the following:

- The Graduate Student Bill of Rights and Responsibilities was endorsed by the Senate.
- Career Fair will be held in February. We are looking for departments that have external partnerships with companies to be able to connect proactively to be able to recruit more companies that students are interested in to improve both the experience of the students at our fairs and for companies to know that students are interested in.
- PGSG is working with the Center for Engagement and Leadership Development to explore a pop-up location for a Food Pantry at the Graduate Student Center. The Administrative Grad Staff from the departments meets regularly with a group at the Graduate School who will be gathering food from the departments. The Graduate School will gather the supplies for the Food Pantry for Graduate Students. There is an unofficial ad hoc committee centered from Food Science that will be looking at other options to help address this need not just for graduate students, but for the campus at large.
- Jill Spencer the PGSG Administrative Assistant and Professor and Arne Flaten, Head of Design, Art, and Performance will reimagine how to operate the Universities Print and Poster Exchange. We hope to be able to host the Poster Exchange which will be announced in the *Purdue Today*.
- The PGSG will be working with the Undergraduate Student Government and upper Administration for the campus-wide Mental Health Awareness Week the week of February 17-22 to acknowledge conversations and improve the access to resources for students, staff and faculty. There will be additional sharing of resources from Human Resources and the Provost Office for faculty and staff, as well. We would ask Council members to encourage students to attend the events.

- PGSG is continuing with the Project of Cost of Living Survey. More details will come as details of logistically on how to complete it.
- The National Associate of Graduate Professional Students is one of a couple of large national graduate special student advocacy organizations. Purdue will host the Midwest Regional conference on the first weekend of April. The conference is largely for students here at Purdue, and then for schools, membership schools or any schools in the Midwest region of the national organization. If Council members have any contacts who work in administration and graduate education and other institutions, we would like to invite those individuals the opportunity to participate. We are also working with the Graduate School to provide a parallel set of appropriate programming for administrators, not necessarily just for the students.

V. PRESENTATION

Dr. Kevin Gibson, Professor of Botany and Plant Pathology has been serving as a Graduate Fellow in the Graduate School half time the past two years to work on diversity initiatives. Dr. Gibson has a lot of experience working with the Sloan Foundation and the GRE.

Dr. Gibson gave a presentation on Reconsidering the GRE. Dr. Gibson noted that the GRE has been a controversial test since its inception. The controversy has deepened in the last few years with several high profile studies casting doubt on the usefulness of the GRE and several high profile programs dropping the GRE requirement. Dr. Gibson noted that applicants in some disciplines, particularly in ecology, neuroscience, and molecular biology can now find competitive programs that do not require the GRE. 31 Purdue programs do not require the GRE. The experience of Chemistry and Computer Science suggests that the test can be dropped without reducing the rigor and ranking of the program. It is also worth noting that Chemistry was until recently the biggest producer of black Ph.D. students in Chemistry in the U.S. Chemistry and Computer Science stopped requiring the GRE at least 15 years ago. National Science Foundation (NSF) does not require the GRE for its fellowship program.

Dr. Gibson noted that an additional argument against the test is the cost. The general test costs \$205 and some students will take the GRE multiple times. It privileges students or families with money and there are Sloan Indigenous Graduate Program (SIGP) scholars who have delayed taking the GRE because they could not afford it. 559,000 students took the test last year. Dr. Gibson noted that there is a large industry that helps paying customers to improve their scores. Dr. Gibson noted the Comprehensive GRE Prep Options:

- Live Online – Starting at \$1299
- In Person – Starting at \$1299
- Tutoring – Starting at \$2499
- Self-Paced – Starting at \$699

Since Underrepresented Minority Student (URM) students on average come from families with less wealth, they are clearly disadvantaged. However, it is important to note that white students from poorer backgrounds are also disadvantaged.

Dr. Gibson finished by noting how much we still need to do and ask them to reconsider the use of a test with questionable use in predicting grad student success and its barrier. The American Astronomical Society noted the following: “Given the research indicating that the GRE and PGRE are *poor predictors of graduate student success*, that their use in graduate admissions

has a particularly *negative impact on underrepresented groups*, and that they represent a *financial burden* for many students in pursuing advanced degrees in the astronomical sciences. The AAS recommends that graduate programs *eliminate or make optional* the GRE and PRGE as metrics of evaluation for graduate applicants. If GRE or PGRE scores are used, the AAS recommends that admissions criteria account explicitly for the known systematics in scores as a function of gender, race, and socioeconomic status, and that *cutoff scores not be used to eliminate candidate* from admission, scholarships/fellowships, or financial support, in accordance with ETS recommendations” (Italics added for emphasis)

VI. CLOSING REMARKS AND ADJOURNMENT

Dr. Linda Mason reminded the Graduate Council the list of pending proposals in their packets being reviewed by the Council.

The council meeting was adjourned by Dr. Mason at 2:46 p.m.

James L. Mohler, Deputy Chair

Tina L. Payne, Secretary

APPENDIX A

PENDING DOCUMENTS

(January 2020)

BOLDED ITEMS ARE IN REVIEW WITH AN AREA COMMITTEE

Area Committee A, Behavioral Sciences (Signe Kastberg; chair, skastber@purdue.edu):

Graduate Council Document 19-6e, EDCI 54501, Teaching STEM Through Agriculture, Food, and Natural Resources (PWL)

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

Graduate Council Document 19-62a, CNIT 52300, File Systems Forensics (PWL)

Graduate Council Document 19-62b, CNIT 52500, Mobile and Embedded Device Forensics (PWL)

Graduate Council Document 19-64a, CS 58300, Big Data Analytics in Cloud Computing (PFW)
Graduate Council Document 19-38c, CSCI 52500, Parallel Computing (IUPUI)
Graduate Council Document 19-38d, CSCI 57500, Computer Systems Security (IUPUI)
Graduate Council Document 29-15f, ECE 52500, Introduction To Computer Graphics, PNW
Graduate Council Document 19-15g, ECE 56810, Design with Embedded Systems (IUPUI)
Graduate Council Document 19-15a, ECE 61020, Operation of Modern Power Systems (PWL)
Graduate Council Document 19-61a, ENGT 58300, Applied Engineering Statistics for Industry (PWL) (PFW)
Graduate Council Document 18-22a, IE 68500, Competitive Strategy (PWL)
Graduate Council Document 19-17d, ME 59100, Mechanical Engineering Project (IUPUI)
Graduate Council Document 19-39c, MSE 67000, Atomistic View of Materials: Theory, Modeling And Simulations (PWL)
Graduate Council Document 19-65a, MSTE 57200, Vehicle Dynamics, (IUPUI)
Graduate Council Document 19-65b, MSTE 57400, Advanced Vehicle Dynamics, (IUPUI)
Graduate Council Document 19-65c, MSTE 58200, Motorsports Aerodynamics, (IUPUI)
Graduate Council Document 19-65d, MSTE 58400, Advanced Motorsports Aerodynamics, (IUPUI)

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

Graduate Council Document 19-11b, BME 51100, Biomedical Signal Processing (PWL)
Graduate Council Document 19-11c, BME 68300, Polymers In Biomedical and Pharmaceutical Systems (PWL)

Area Committee D, Humanities and Social Sciences (Manushag (Nush) Powell, chair; mnpowell@purdue.edu):

Graduate Council Document 19-32b, COM 64400, Strategic Personal Branding (PWL)
Graduate Council Document 19-2j, ENGL 51402, Using Poems To Beat Death (Finding Poetry To Live) (PFW)
Graduate Council Document 19-47b, LING 59002, Semantics (PFW)

Area Committee E: Life Sciences, (Ryan A. Cabot, chair; rcabot@purdue.edu):

Graduate Council Document 19-49q, MUSC 55000, Music Therapy Thesis or Clinical Project (PFW)
Graduate Council Document 19-49r, MUSC 56500, Contemporary Issues In Music Education (PFW)

NEW DOCUMENTS RECEIVED
(After the January 23, 2020 Graduate Council Meeting)

Area Committee A, Behavioral Sciences (Signe Kastberg; chair, skastber@purdue.edu):

*Graduate Council Document 20-13a, **EDCI 52001, Curriculum and Instruction Online MS Seminar I*** (PWL) Sem. 1 and 2. SS. Distance. Credit 1.

This boot camp is designed to help you to understand the knowledge and skills necessary for your successful online learning in the Curriculum and Instruction program. In this orientation, you will explore what online learning entails and reflect on how you can best set yourself up to succeed in your studies. You will also learn about various learning strategies and online resources that you can utilize in your courses. In this seminar, you will be responsible for completing all assignments on time over the course of the semester. Read the guidelines for each week and complete the assignments. NOTE: This course is a core course in the C&I online masters program. A grade of B- or better is required (if a lower grade is received, the course must be retaken). Permission of department required.

*Graduate Council Document 20-13b, **EDCI 52002, Curriculum and Instruction Online MS Seminar II*** (PWL) Sem. 1 and 2. SS. Distance. Credit 1. Prerequisites: EDCI 52001

This seminar is designed to help you to understand the knowledge and skills necessary for your success throughout the Curriculum and Instruction program. In addition to providing you with information that will help you succeed in the program, you are also asked to think about ways to make yourself more marketable to current and future employers. Permission of department required.

*Graduate Council Document 20-14a, **EDPS 55300, Application Of Applied Behavior Analysis To Manage And Support Personnel*** (PWL) Sem. 1 and 2. SS. Distance. Credit 3.

This course will teach students how to use applied behavior analysis to maximize the potential of an organization. Students will learn the role of a Behavior Analyst in implementing principles of applied behavior analysis to motivate employees, intervene with challenges in the organization, evaluate the program, and collect and deliver ongoing performance feedback. Permission of instructor required.

*Graduate Council Document 20-14b, **EDPS 62800, The Behavior Analyst As Supervisor*** (PWL) Sem. 1 and 2. SS. Distance. Credit 3. Prerequisites: EDPS 61200.

This course will address the provision of supervision of behavior analysis trainees and technicians utilizing principles and procedures of applied behavior analysis. Application of goal development, behavioral skills training, and progress monitoring within a behavioral analytic framework will be explored. Permission of instructor required.

*Graduate Council Document 20-11b, **SLHS 57401. Hearing Aids II*** (PWL) Sem. 1. Lecture 1 time per week for 100 minutes. Credit 2. Prerequisites: SLHS 56400.

The focus of this course is on the evolving technology in hearing aids with an emphasis on the information students will need to make efficacious clinical decisions not only for the hearing aids of today but also for the hearing aids of tomorrow. For each of the hearing aid features that are discussed, we review (1) the need or potential benefit to the patient, (2) the engineering behind the feature, (3) research supporting its efficacy and effectiveness, (4) its limitations, and (5) how to conduct routine clinical measurements to document its functioning.

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

Graduate Council Document 20-22a, AT 54800, Aircraft Asset Management (PWL) Sem. 1 and 2. SS. Lecture 1 time per week for 150 minutes. Credit 3.

This course provides the student with a detailed exploration of aircraft asset management programs in both airlines and business aviation organizations. Students analyze and study the critical components of an asset management program, the financial methods in aircraft asset management, acquisition proposals, and development plans of aircraft acquisitions in this course. An airline industry-relevant project is used to improve student reasoning and application of industry standard aircraft asset management analysis procedures to include forecasting techniques, present value calculations, and benefit-cost analyses. This course serves as the foundational knowledge required for AT 54900.

Graduate Council Document 20-22b, AT 54900, Aircraft Leasing (PWL) Sem. 1 and 2. SS. Lecture 1 time per week for 150 minutes. Credit 3. Prerequisites: AT 54800.

This course provides students with training and experience managing aircraft leases using financial and risk management methodologies specific to the airline and business aviation industries. Students conduct financial evaluations of leasing versus ownership programs of airlines, as well as analyze debt, equity and capital markets for aircraft financing. The course includes an examination of taxation issues related to aircraft leasing, maintenance reserves, and auditing of aircraft financial performance. The prerequisite for this course is AT 54800.

Graduate Council Document 20-19a, ME 53500, Design and Modeling of Fluid Power Systems (PWL) Sem. 1 and 2. SS. Lecture 1 time per week for 150 minutes. Credit 3.

Introduction to fluid power technology. Design of hydraulic systems for mobile and industrial application for functionality, cost and energy efficiency. Modeling strategies for fluid power systems. Labs and class projects are given to reinforce the design and modeling learning projects.

Graduate Council Document 20-18a, MSE 69600, Graduate Professional Practice (PWL) Sem. 1 and 2. SS. Experiential. Credit 0.

Professional practice in Industry.

Graduate Council Document 20-21a, MSTE 57800, Composite Materials For Automotive Applications, (IUPUI) Sem. 1. Lecture 2 times per week for 75 minutes. Credit 3. Prerequisites: Graduate standing or ME 27200.

Different composite materials have been used for many years in the automotive industry to create components that have unique characteristics, such as being strong and light. The trend in using composite materials is accelerating to meet lightweighting requirements to meet the next generation of fuel economy standards. An interesting lightweighting application combines the use of continuous fiber composite material with resin. The continuous fiber composite material forms a lightweight shell, while the necessary support structure can be created by supporting it with a fiber-filled plastic. This so-called hybrid technique can create extremely lightweight strong parts that can be manufactured in large volumes. This course focuses on Development of Low-Cost Carbon Fiber for Automotive Applications, Mechanical Properties of Advanced Pore Morphology Foam Composites, Automotive Composite Structures for Crashworthiness, Crashworthiness Analysis of Composite, Hybrid Structures Consisting of Sheet Metal and Fiber Reinforced Plastics for Structural Automotive and Design Solutions to Improve Crash-Box Impact Efficiency for Racing Applications. Permission of department required.

Graduate Council Document 20-21b, **MSTE 57900, Design And Analysis Of Materials And Structures In Lightweight Vehicles**, (IUPUI) Sem. 1. Lecture 2 times per week for 75 minutes. Credit 3. Prerequisites: ME 27200.

The materials for the construction of automobiles are changing from mostly low carbon steels to a combination of steels, light alloys, such as aluminum and magnesium alloys, and polymer matrix composites. Many of these materials are already used in today's vehicles, albeit in smaller volumes. Future vehicles, which will have to be much lighter in weight for improved fuel economy and reduced environmental pollution, will contain much larger volumes of these materials. The selection of materials will not only be influenced by their weight reduction potential, but also by factors such as safety, durability, processing, joining, recycling and cost. This course focuses on materials, their properties, processing technology and design and materials selection issues pertinent to designing lightweight vehicles. It will provide first-hand knowledge and experience of working with these advanced materials. It starts with a broad review of the materials scenario and design considerations for lightweight automotive structures. It is then divided into two major parts: materials, and design and manufacturing. The materials part contains topics on advanced steels, aluminum alloys, magnesium alloys and polymer matrix composites. It will provide information on material properties, processing characteristics and application examples. The design and manufacturing part contains information on manufacturing processes for light alloys, joining, crashworthiness considerations, recycling and life-cycle issues. Permission of department required.

Graduate Council Document 20-21c, **MSTE 59200, Motorsports Simulations**, (IUPUI) Sem. 1. Lecture 2 times per week for 75 minutes. Credit 3. Prerequisites: Graduate standing or MSTE 29800 and MSTE 47200.

A course on mathematical modeling and computer simulation of mechanical systems offering a complete tool for modeling and simulation of integrated and complex systems for use within automotive and motorsports applications. Complex multi-disciplinary systems modeling and analysis problems will be solved, using a modeling and simulation environment for complex systems analysis such as Dymola's Modelica simulation technology. Dymola is a complete environment for model creation, testing, simulation and post-processing. Equal emphasis is placed on model development and simulation via Dymola GUI interface. Models range from simple spring-mass-damper system to whole vehicle models will be covered. Permission of department required.