PURDUE UNIVERSITY
GRADUATE SCHOOL

Minutes of the Graduate Council Meeting
March 23, 2023
2:30 p.m.

Sixth Meeting
Zoom

PRESENT: Council Members, Linda J. Mason, chair, Raida Abuizam, Nurgul Aitalieva, Kola Ajuwon, Bradley J. Alge, Yong Bao, Shawn G. Bauldry, Carrie Berger, Stacy K. Betz, Arun Bhunia, Steven J. Burdick, Vetria Byrd, William B. Collins, Joy Colwell, G. Jonathan Day, Eric D. Deemer, Duane D. Dunlap, Emad Elwakil, Keith B. Gehres, Catherine A. Golden (Provost's Representative), Richard H. Grant, Nilupa Gunaratna, Nancy A. Jackson, Troy D. Janes, Kimberly P. Kinzig, Ann L. Kirchmaier, Douglas J. LaCount, Yanjun Li, Qiang Liu, Clarence D. Maybee, James L. Mohler, Deputy Chair, Melanie Morgan, Brad E. Oliver, Tina L. Payne, Julia M. Rayz, David Rollock, Paul Salama, Abraham Schwab, Alex Seto, Michael G. Smith, James E. Tisdale, Joshua R. Widhalm, Nicole Widmar

APOLOGIES FOR ABSENCE RECEIVED FROM: Thomas W. Atkinson, Kevin D. Gibson, Erla Heyns, Judith Lewandowski, Patti Ludwig-Beymer

ABSENCES: Suzanne C. Bart, Janice S. Blum, Levon Esters, Jeffrey P. Greeley, Chong Gu, Qing Jiang, Mary E. Johnson, Tong Jin Kim, Jiliang Li, Rodolfo Pinal, Joseph P. Robinson, Ann Shanahan, Kristin K. White, Christine Wuenschel, Amanda D. Zelechoski

GUESTS: Macy Angrick, Debbie Fellure, Kay Kobak, Linda Lee, Matt Ray, Libby Richards, Zachary Rost, Crockett Sewell, Sheri Tague, Korena Vawter, Juan Diego Velasquez

I. MINUTES

The February 2023 Graduate Council meeting minutes were approved via the Qualtrics Survey.

II. DEANS REMARKS AND REPORTS

Linda Mason

- Waiting to hear how the new administration will handle commencement in the future, with nine ceremonies being held this spring. The graduate has been moved to one ceremony for the Master's and Ph.D. that will be held on Sunday at 7:00 pm.
- The Purdue Graduate School is a member of the Council of Graduate Schools that is an international organization based in the United States representing member graduate schools. We need to be thinking about international enrollment and CGS is working on plans to help members increase enrollments from countries that have a growing higher education enrollment. Dean Mason served on a task force with several other Dean's across the world looking at how the Council of Graduate Schools can assist with members with international enrollment. Her task force examined the Global South, particularly South America and Africa. What can we do to gain more members and get more graduate partnerships?
- There is a need to have domestic students that are working on certain projects where we cannot have international students, such as DOD or DOE grants.
- Looking at future growth, we realize that both the African and South American institutions are different, the students are different, and the relationships are different between those areas and the United States.
- Purdue already has a lot of relationships with institutions in Central and South America and we know those will continue to grow.
- The funding model in getting those South American students here is often easier than we have for our institutions in Africa.
- Purdue has several colleges and faculty that have connections in Africa and work with African institutions.
- The future graduate student pipeline begins when you have faculty conducting research in a country and have a personal connection with an institution/faculty colleague.
- As we start looking at where students are coming from, how do we develop these new degrees, especially online degrees. That international component is something that we need to consider.
- A discussion later about the task force of an online Ph.D. that has been completed. We are now ready to start vetting these ideas.
    - How would it work with international companies to have a student do an international degree through Purdue versus a domestic student doing that.
    - How do we bring more students in?
    - What is it that we do to make that movement easier for them with our new degrees?
    - What type of students are we going to be looking to attract?
- The new administration's push is research excellence, which of course pushes us to continued improvement of graduate education.

- The research that is conducted at Purdue University is done by the hands of our thesis and dissertation students. They are the labor that fuels the research mission.
    - How do we improve the quality of the students that we attract?
    - How do we help students be productive as they move through the system?
    - What are things that we can do within the Graduate School to ease that strain for graduate students so that they can be good research partners?
- As the Graduate Council, what the graduate school does is dependent on what graduate faculty believe that will make graduate education excellent. These are the policies, programs, and degree for the students that allow Purdue to take that giant leap.
- We see a stronger interest and motivation by graduate students and faculty to do a better job of mentoring. We are in our second year of our five year mentoring programs and have seen some amazing ideas and concepts come forward. Building on the ideas with the first group on Peer Mentoring, the mentoring experience is what is going to allow students to excel, complete in a timely manner, and have a good experience.
- Dean Mason requested that the faculty on the Graduate Council have discussions with their departments/colleges about:
    - What does good mentoring look like in their departments/colleges?
    - What are the minimum standards of mentoring that we expect as a collective of faculty within our disciplines so that our students are successful.
- Melanie Morgan is in charge of this program in developing tools for faculty and will continue to have speakers come to campus who are top in their fields in this area.

III. AREA COMMITTEE REPORTS (Area Committee Chairs)

Graduate Council Document 23C Graduate Council Documents Recommended for Approval. See Appendix B. Voted via Qualtrics survey.

IV. PRESENTATION

Heide Arola, Director of the Office of Global Partnership presented information on *Building Diverse International Grad Student Pipelines.* See Appendix C.

V. TASK FORCE

James Mohler

- The Task Force for the Online Ph.D. Offerings at Purdue University started in 2019 prior to the pandemic and was resurrected in 2022.

- Gratitude to the committee for their contributions.
- Purdue has some doctoral degrees online; however, there are no Ph.D.'s approved complete, online delivery.
- There are mechanisms such as: 1) Change of Duty 2) Research in Absentia 3) Types Off Campus Research that provide exceptions on a case-by-case basis. No programs are authorized to advertise their PhD as "completely online".
- The Task Force wanted to define what a Ph.D. experience is;
    - Deep knowledge and export skills into disciplines
    - Expertise and written oral communication
    - Ability to conduct guided and independent research in a discipline
    - Mentorship and apprenticeship with that discipline
- Biggest hurdles to having online PhDs are: 1) intellectual property issues – each student will need to have an intellectual property management agreement vetted by legal and VPR and 2) most international students will not be able to (or want to) pursue it due to VISA restrictions and requirements.
- The Council was encouraged to review the proposal in its entirety before we have a full discussion in April. If the Council is amenable in the concept, the Graduate Programs Office and Provost Office could work on the mechanisms over the summer to be able to propose it in the Fall.
- See Appendix E.

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

Alex Seto, President of the Purdue Graduate Student Government (PGSG)

- 40 pieces of legislation came through the Graduate Student Senate.
- Implementing many new projects. Filling the need of a lack of transportation on weekends and late nights. Making changes to the bus contract for students.
- Mental Health Awareness Week
- Graduate Student Appreciation Week
- Collaboration with the Graduate School to put on several events.

VII. NEW BUSINESS

James Mohler

- When a graduate student finishes a master's degree, they can be recommended to continue on into a Ph.D. program in the same department without an application.
- Students who finish a master's degree in one department and then want to continue on with the department's approval in another department must reapply and pay an application fee.
- The procedure used now is Form 17, Transfer of Department when a student wants to matriculate from an departmental MS to the same department's PhD.

- It has been brought forward to Graduate School Records, the possibility of changing the policy to allow students to not only matriculate into a Ph.D. program in their own department, but to matriculate in a Ph.D. program into another department without reapplying.
- It would support many programs' efforts to keep some of the best and brightest here when they have successfully done things in a master's program and want to go into a PhD another program.
- This was presented to the council and was approved by consensus.
- This policy will also apply to student in online program but it cannot apply to regional campuses due to each campus using different Banner instances. Should this technical hurdle be removed in the future (aka, all campuses use the same instance of Banner) this issue can be revisited.
- Note that departments are not required to accept students into their PhD program from outside their department, but they may if they wish.
- See Appendix D, Section VII 2023-24 University Catalog: H. Changing Graduate Programs (Same Campus)

VIII. CLOSING REMARKS

- Discussions will continue on the Online Ph.D. offering.
- The Executive Committee will meet following the Graduate Council meeting.
- The April 20th Graduate Council meeting will be held face-to-face in PGSC, 105.

The council meeting was adjourned by Dean Mason at 3:45 p.m.

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

APPENDIX A

PENDING DOCUMENTS
(March 2023)

BOLDED ITEMS ARE IN REVIEW WITH AN AREA COMMITTEE

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

Graduate Council Document 23-12c, **PSY 58001, Ethics And Professional Issues In Psychology (PNW)**
Graduate Council Document 23-12a, **PSY 68010, Survey Of Industrial Psychology (PWL)**
Graduate Council Document 23-12b, **PSY 68020, Survey Of Organizational Psychology (PWL)**
Graduate Council Document 23-12c, **PSY 68110, Research Methods In Industrial-Organizational Psychology I (PWL)**
Graduate Council Document 23-12d, **PSY 68120, Research Methods In Industrial-Organizational Psychology II (PWL)**

Area Committee B, Engineering, Sciences, and Technology (Duane Dunlap, chair; ddunlap@purdue.edu):

Graduate Council Document 23-13a, **CE 57910, Foundations Analysis And Design (PNW)**
Graduate Council Document 23-14a, **CGT 57000, Information Visualization (PWL)**
Graduate Council Document 23-8a, **CS 52200, High-Performance Computing (PFW)**
Graduate Council Document 23-8b, **CS 56100, Software Testing (PFW)**
Graduate Council Document 22-23d **ECE 60432, Nanophotonic Modeling (PWL)**
Graduate Council Document 23-9a, **ECE 61220, Advanced VLSI Design (PWL)**
Graduate Council Document 23-10a, **MSE 53500, Lean Manufacturing Of Materials (PWL)**
Graduate Council Document 23-10b, **MSE 57400, Sports Engineering And Entrepreneurship (PWL)**

Area Committee C: Chemistry, Engineering, and Physical Sciences, (Suzanne Bart; chair, sbart@purdue.edu):

Graduate Council Document 23-7a, **ABE 54700, Models And Microbiomes (PWL)**
Graduate Council Document 23-15a, **BME 52500, Neural Engineering (IUPUI)**
Graduate Council Document 23-6a, **FS 58100, Microbial Genomics And Metabolism (PWL)**

Area Committee D, Humanities and Social Sciences (William (Bart) Collins, chair; bcollins@purdue.edu):

***Graduate Council Document 22-48a,* PHIL 56300, Directed Reading: Greek Philosophy Texts And Translations (PWL)**

Area Committee E: Life Sciences, (Richard Grant, chair; rgrant@purdue.edu):

***Graduate Council Document 23-5a,* BIOL 52601, Eukaryotic Microbiology (PFW)**
***Graduate Council Document 23-11a,* FNR 57000, Amphibian Ecology And Conservation (PWL**

APPENDIX B

GC Document 23-C

DOCUMENTS RECOMMENDED FOR APPROVAL
BY THE GRADUATE COUNCIL
MARCH 2023

GRADUATE COURSE PROPOSALS:

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

Graduate Council Document 23-12c, **PSY 58001, Ethics And Professional Issues In Psychology** (PNW) Lecture 1 time per week for 150 minutes. Credit 3.

This course will examine legislation, policies, regulations, and ethical codes applicable to psychology. The ethical decision-making process will be explored, with particular emphasis on ethical professional practice in a variety of settings.
https://purdue.curriculog.com/proposal:21477/form

Graduate Council Document 23-12a, **PSY 68010, Survey Of Industrial Psychology** (PWL) Lecture 2 times per week for 75 minutes. Credit 3. Prerequisite(s): Any undergraduate Statistics course and any undergraduate Social Science Research Methods course.

This seminar is designed to familiarize doctoral students with the basic areas of Industrial Psychology and Human Resource Management. The course will include a discussion and analysis of book chapters and journal articles related to key topics. The goal of this seminar is to help students develop frameworks for organizing the myriad conceptual, professional, and technical issues associated with Industrial Psychology / Human Resource Management. Development of these frameworks is requisite for effective acquisition and integration of information provided in future seminars and development of research ideas.
https://purdue.curriculog.com/proposal:21927/form

Graduate Council Document 23-12b, **PSY 68020, Survey Of Organizational Psychology** (PWL) Lecture 2 times per week for 75 minutes. Credit 3. Prerequisite(s): Any undergraduate Statistics course and any undergraduate Social Science Research Methods course.

The main objective of this course is to introduce doctoral students in the Industrial and Organizational Psychology program (and related disciplines) to the major areas of research in the field of organizational psychology. Additionally, the course aims to provide students an opportunity to: (1) hone their analytic and information presentation skills, and (2) gain practice in developing research ideas. We will discuss classical and contemporary issues in light of both their theoretical and practical implications for the field. The course will include presentations and (synchronous and asynchronous) discussions of assigned readings.
https://purdue.curriculog.com/proposal:21929/form

Graduate Council Document 23-12c, **PSY 68110, Research Methods In Industrial-Organizational Psychology I** (PWL) Lecture 2 times per week for 75 minutes. Credit 3.

Intensive analysis of application of various research and statistical methods to the study of human behavior in organizational settings. This course is the first part of a two-semester sequence which covers issues in research design and data analysis techniques common to I-O psychology and other applied fields. We will review the overall research process and various types of research. We will review the various threats to the validity of conclusions that can be drawn from quantitative research and how design features can help address these threats. We will spend time in class critiquing research articles. Permission from department required.
https://purdue.curriculog.com/proposal:21944/form

Graduate Council Document 23-12d, **PSY 68120, Research Methods In Industrial-Organizational Psychology II** (PWL) Lecture 2 times per week for 75 minutes. Credit 3. Prerequisite(s): PSY 68110 (or equivalent) and Basic Statistics.

This course is the second part of a two-semester sequence that covers core research methods in the social sciences focusing on Industrial/Organizational psychology, Organizational Behavior, and allied fields of Social and Personality psychology. This course sequence is designed for doctoral students who intend to conduct quantitative empirical research publishable in scholarly journals. This course begins with the philosophy of science, developing and evaluating theory, reviewing and summarizing relevant research. Topics include the examination of research methods applicable to survey data, multilevel data, and longitudinal data. The course concludes with a discussion of 'methods' (strategies) for publishing in scholarly journals. Permission from department required.
https://purdue.curriculog.com/proposal:21930/form

Area Committee B, Engineering, Sciences, and Technology (Duane Dunlap, chair; ddunlap@purdue.edu):

Graduate Council Document 23-14a, **CGT 57000, Information Visualization** (PWL) Lecture 1 time per week for 150 minutes. Credit 3. Prerequisite(s). Students should have finished their undergraduate study in domains that are closely related to one or more of the following: business analysis, statistics, knowledge management, computer science, software engineering, interaction design, human centered computing, scientific visualization or information visualization.

This course provides a systematic, comprehensive framework to study principles, design choices, and development toolkits on information visualization design and development. It focuses on creating innovative and intuitive visualization solutions to provide users with peripheral awareness of meaningful information from a complex data set. Employing a user-centric approach, this course studies and analyzes visualization design and development from data, tasks, and visualization and interactions. The students will learn perception theories on visualization and use visual elements such as space and color to encode data, compare, evaluate, choose among different visualization forms and interaction methods. Through a project-based learning approach, students will conduct case studies on various visualization designs, analyze

the user, data, tasks, and design choices in the visualizations, and finally design and develop information visualization solutions as course projects.
https://purdue.curriculog.com/proposal:19225/form

Area Committee C: Chemistry, Engineering, and Physical Sciences, (Suzanne Bart; chair, sbart@purdue.edu):

Graduate Council Document 23-7a, **ABE 54700, Models And Microbiomes** (PWL) Lecture 1 time per week for 170 minutes. Credit 3.

Determine the use of computational, physical, and biological models for studying and engineering microbiomes. Study peer-reviewed literature and synthesize findings in the form of oral and written deliverables. Background in microbiology either from coursework or research and interest in microbiomes recommended.
https://purdue.curriculog.com/proposal:22076/form

Graduate Council Document 23-15a, **BME 52500, Neural Engineering** (IUPUI) Lecture 2 times per week for 75 minutes. Credit 3. Prerequisite(s): MATH 17100 and ENGR 29700 and BME 22201 and BME 24101 or equivalents or permission of instructor.

Neural engineering is an emerging engineering discipline that combines the various disciplines of engineering with the biological, physical and material sciences to find the means to access, understand, manipulate, and perhaps enhance the nervous system and the information it contains. The aim of this course is to provide an introduction to the field of neural engineering and will start with the introduction of the neuron, the bioelectric phenomenon and the neural / electronic interfaces placed in the extracellular space on the peripheral nervous system. These topics will be reinforced through hands on practical experiments using electrodes for stimulation and recording.
https://purdue.curriculog.com/proposal:23240/form

Graduate Council Document 23-6a, **FS 58100, Microbial Genomics And Metabolism** (PWL) Lecture 2 times per week for 75 minutes. Credit 3.

Microbial genomics and metabolism will introduce students to how genomes are assembled, how microbial functional predictions are made, and how systems biology techniques are used to query microbial function in diverse ecosystems. Students will participate in activities including classroom lecture, group discussion, reading of primary literature, hands-on computational assignments, exams, and student projects. Basic knowledge of microbiology and molecular biology is expected. Department approval required.
https://purdue.curriculog.com/proposal:23402/form

Area Committee D, Humanities and Social Sciences (William (Bart) Collins, chair; bcollins@purdue.edu):

Graduate Council Document 22-48a, **PHIL 56300, Directed Reading: Greek Philosophy Texts And Translations** (PWL) Lecture 1 time per week for 75 minutes. Credit 1.

In this course we shall focus on an important Greek philosophical text in fine detail. We will be working in the original language, not from an English translation. Participants will translate the text at hand and philosophical discussion will follow. Normally a Platonic dialogue or a work of Aristotle will be selected.
https://purdue.curriculog.com/proposal:22024/form

Area Committee E: Life Sciences, (Richard Grant, chair; rgrant@purdue.edu):

Graduate Council Document 23-11a, **FNR 57000, Amphibian Ecology And Conservation** (PWL) Lecture 2 times per week for 50 minutes. Laboratory 1 time weekly for 170 minutes. Credit 3. Prerequisite(s): Undergraduate level FNR 24150 Minimum Grade of C- and Undergraduate level FNR 24250 Minimum Grade of C- and Undergraduate level BIOL 28600 Minimum Grade of C-.

This course will address the ecology and conservation of amphibians at the global scale. Lectures will cover diversity and natural history, phylogenetic relationships, basic biology and ecology, and conservation concerns and strategies. Class materials come from a text and primary literature. Labs will focus on important characteristics of species, families and orders of amphibians, including both North American and non-North American species. Class will also discuss and debate conservation issues. Course will include guest lectures, potential field trips or a class project. Permission of department required.
https://purdue.curriculog.com/proposal:22962/form

CERTIFICATE(S):

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

Graduate Council Document 23-1c, Graduate Certificate in Leadership Development Program - Work based Learning, submitted by the Department of Curriculum and Instruction, PWL
https://purdue.curriculog.com/proposal:19258/form

Graduate Council Document 23-1d, Graduate Certificate in Leadership Development Program - Advanced Manufacturing Education I, submitted by the Department of Curriculum and Instruction, PWL
https://purdue.curriculog.com/proposal:17916/form

Graduate Council Document 23-1e, Graduate Certificate in Leadership Development Program - Career Education, submitted by the Department of Curriculum and Instruction, PWL
https://purdue.curriculog.com/proposal:19267/form

APPENDIX C

BUILDING DIVERSE INTERNATIONAL GRADUATE STUDENT PIPELINES - OFFICE OF GLOBAL PARTNERSHIPS

March 23, 2022

Presentation to the Purdue Graduate Council

PURDUE UNIVERSITY

Office of Global Partnerships Staff

Heidi Arola
Director
Director, Purdue-India Partnership

- ***Arequipa Nexus Institute:*** *Moving to Research*

Juan Diego Velasquez
Assistant Director
Director, Latin American Partnerships
Director, Colombia Purdue Partnership

Crockett Sewell
Global Partnerships Administrator

Luz (Lucy) Tascon Villa
Global Partnerships Project Assistant (administrative)

PURDUE UNIVERSITY

Purdue – Office of Global Partnerships

University-level office

Mission – to increase the impact, scale and sustainability of Purdue's global programs and partnerships

Convene, Communicate, Connect, Catalyze

Process International Agreements

Strategic Partnerships: Colombia, India

Other notable partnerships:

Brazil (since 1950s)

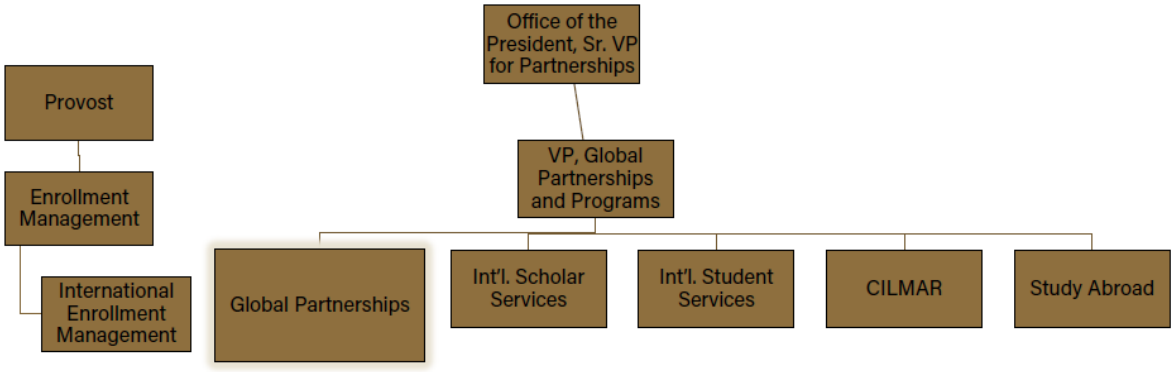
Increasing activity in **Latin America overall**

(e.g. Mexico – Tec de Monterrey and Peru -Arequipa Nex
Institute (Food, Energy, Water and Environ.)

www.Globalpartners.purdue.edu

PURDUE UNIVERSITY

Global Partnerships and Programs



Note: Each Academic College under the Provost also has an international associate dean or director and some, such as Agriculture and Engineering have entire units—International Programs in Agriculture and Global Engineering Programs and Partnerships. Purdue for Life is a separate foundation that houses International Engagement and Alumni Affairs

PURDUE UNIVERSITY

Purdue – Office of Global Partnerships

Activities:

- *International Agreements*
  -3 types (LOI, MOU, Activity Agreements)

Assist Colleges and Units with International Goals:

- *Research Collaboration (publications, projects)*
- *Sponsored partnerships*
- *Capacity Building*
- *Sponsored student programs*
  - *International Undergraduate Research*
  - *International Graduate Student Programs*

PURDUE UNIVERSITY

Purdue – Global Academic Committee

- **Representative from each College/Unit across campus**
- **Meets monthly**
- **Members provide the campus with an interdisciplinary and well-rounded approach to global issues, including evaluating:**
  - *the academic merit, potential impact, and risks and benefits of new and ongoing global partnerships and programs,*
  - *global trends as they affect Purdue's worldwide activities and profile, and*
  - *collaborative development of strategic campus-wide global initiatives.*
- **In practice, more of a forum to share best practices than to make policy**

https://globalpartners.purdue.edu/about/global-academic-committee/

PURDUE UNIVERSITY

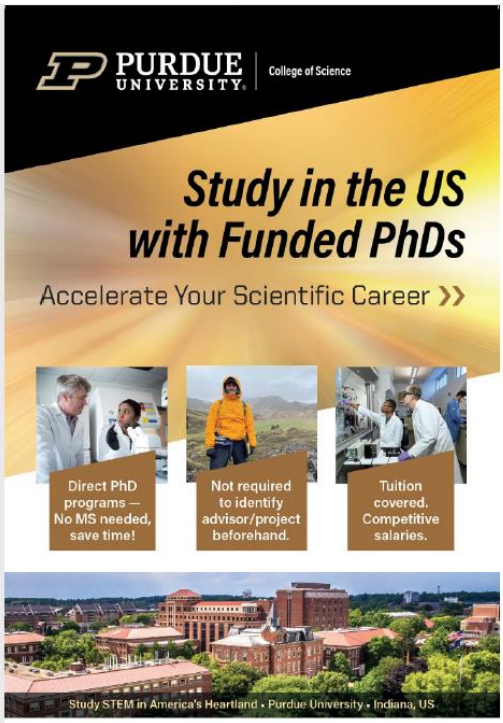
Purdue – Office of Global Partnerships

Challenge: **A reduced number of international PhD students from top-sending nations applying** *(esp. China)*

Goal: **Build a stronger and more diverse pipeline of talented graduate students – R1 necessity**

2 PROGRAM EXAMPLES

PURDUE UNIVERSITY



FACULTY AMBASSADORS PROGRAM

- College of Science Initiative
- Focus on Europe
- $2000 (airfare, lodging, food)
- 3-year commitment
- Expectations: hold info sessions, Purdue liaison with the institution
- 8 Faculty Ambassadors to Date

UNDERGRADUATE RESEARCH PROGRAMS

Colombia

- Since 2014. About 400 students

  UREP-C: 277; 123 apps (44%); 67 admitted (54%)

Brazil

- "Pontes" (launched 2022) – 15 a year from 3 partner institutions

India

- PURE – 5 years with 3 partners, pilot with 4th this summer

Mexico

- New program with Tec de Monterrey

Purdue – Office of Global Partnerships

Recommendations:

- Foster and support programs such as International UG Research and Faculty Ambassadors
- Consider hiring a Graduate School university-wide recruiter
  - University-wide representation, recruitment materials,
  - Analyzing data and trends and targeting specific countries for recruitment

Resources:

- EducationUSA
  Educationusa.state.gov
  Global Guides (Free advice, webinars, Learn about govt. funding)
- NAFSA, NAGAP

PURDUE UNIVERSITY

THANK YOU

Heidi Arola
Director
Director, Purdue-India Partnership

Juan Diego Velasquez
Assistant Director
Director, Latin American Partnerships
Director, Colombia Purdue Partnership

Crockett Sewell
Global Partnerships Administrator

PURDUE UNIVERSITY

APPENDIX D

Section VII
2023-24 University Catalog
Last Updated March 2023

H. Changing Graduate Programs (Same Campus)

2. Transfer of Department

A student who: 1) has established a graduate academic record at Purdue University, 2) has current eligibility to register in a graduate degree program, and 3) wishes to change to a graduate degree program in another department should submit a completed Request for Transfer of Department (G.S.Form 17) to the Graduate School. The Proposed department may request updated or additional admission information (e.g. scores or letters of recommendation) or even a new application.

Both departments should review any conditions of admission that have not been met at the time of transfer and make the appropriate notation on the transfer form. If a new application is requested, the department in which the student is currently enrolled must upload to Slate a completed Request for Transfer of Department(G.S.Form 17)

International students who wish to transfer from one department to another must check with the Office of International Students and Scholars to determine if their visa status will be affected by the transfer.

If a student who already has an approved plan of study in the current department is approved to transfer to a new department, the current plan will not be valid in the new program. A new plan of study will need to be submit after the request to transfer has been approved.

3. Continuing for Another Purdue Graduate Degree

Students who complete a graduate program in one department may request to stay at Purdue University to pursue another graduate degree. Requests to pursue a graduate degree in another department should be communicated to the Graduate School through either of the following methods at the discretion of the admitting program:

- Submission of a completed Request for Transfer of Department (G.S. Form 17)

  OR

- Submission of a formal online application

Students must have Eligibility to Register (ETR) in the requested effective start session for the new program in order to use the G.S. Form 17 (see Section VII.A.4). This means that the requested start date of the new program must be within three sessions of graduation from the previous program. Students who have lost ETR must formally apply to begin study in a new program.

APPENDIX E

The Potential for Online PhD Offerings at Purdue University

Online PhD Task Force

Carrie Berger, Purdue Online; Bart Collins, Liberal Arts; Jonathan Day, Health and Human Sciences; Duane Dunlap, Purdue Polytechnic; Audeen Fentiman, Engineering; Jim Greenan, Education; Patty Hart, Liberal Arts; Athena Kennedy, Purdue Online; Yanjun Li, Management; Jamie Mohler, Graduate School

Background

Currently no PhD program is approved by Purdue University or the Indiana Commission for Higher Education to be offered from a distance (i.e., over 80% online). Additionally, no PhD research course (XXX 69900) is approved for distance delivery either. Students may take graded coursework online as part of their PhD pursuit so long as it comprises less than 80% of their degree. They may also request research in absentia or a research leave that allows them to do a limited amount of research at another location but for the most part, Purdue University PhD degrees require a significant (if not, entirely) on-campus component.

Some faculty have questioned whether Purdue could or should offer PhDs completely online. It is also evident that some faculty erroneously believe that they can already offer a PhD completely at a distance *at their discretion*. Thus, the Online PhD Task Force was assembled to address the question of whether Purdue University at West Lafayette could or should offer PhDs at a distance should a unit desire it. The PhD task force began in 2019 prior to the onset of the pandemic. And, while the groups' work was paused during the pandemic, it has continued in 2022-2023 with the insights that were learned during non-normative operations during COVID-19.

Purdue University does have a limited number of doctoral degrees (non-PhD) that are offered 100% online. The Doctor of Technology from the Purdue Polytechnic Institute is one such example. It seems that there is no dispute with programs wanting to offer non-PhD doctorates online (given certain controls and approval by the Graduate Council). The mode of delivery for these degrees aligns with the professional nature of such degrees and their focus on meeting the needs of the working professional. As such, the question considered by the Online PhD Task Force was therefore limited to consideration of the PhD being offered 100% online.

The Task Force also looked to see if other examples might already exist within the State of Indiana. There are a limited number of programs:

- Ball State - PhD in Special Education (85-90% online)
- IU - PhD in Music Therapy (100% online); PhD in Nursing Science (80-99% online)
- Indiana State University: PhD in Educational Administration - Higher Education Leadership or PhD in Technology Management (both online with modest residency)

Appendix A provided a national market scan of higher education institutions and their offerings.

What Defines the PhD Experience?

One of the first things discussed by the Task Force was, what defines the PhD experience at Purdue University? The committee defined four critical components of the PhD experience:

- Attainment of deep knowledge and expert skills in a discipline
- Expertise in written and oral communication and the creation of related scholarship
- Ability to conduct guided and independent research in the discipline
- Mentorship and apprenticeship in the discipline

The Task Force recognizes that the PhD prepares students for positions as researchers both in and outside academia. These components may have some variability across positions, but in sum total the PhD is marked by the presence of all four.

The Task Force generally believes that distance delivery works quite well for the first component (knowledge/skills) but can be challenging for the two (research and mentorship). There is mixed opinion of the ability to do good communication and scholarship remotely.

In sum, if a unit were to propose a distance PhD, it would have to wrestle with how it ensures an *equivalent experience* for the distance student, *not just a high-quality experience* in comparison to other distance offerings. **A student getting a PhD in a distance mode should have equivalent quality and experience as a student on campus.** Any program proposing a distance PhD would have to clearly articulate and provide measures to ensure that mode of delivery would result in **no decrease of quality or experience**.

Another significant discussion point was the diversity of programs (and associated research types) at Purdue University West Lafayette. For some, thinking that research could be done online or at a distance is unthinkable (due to either logistics, requirements or both), while for others it seems quite natural and doable with today's technology. **The consensus of the Task Force was that any unit desiring to propose an online PhD should be allowed to do so.** It would be up to the Graduate Council to determine whether the proposal had merit and should be moved forward. Such proposals would also need to satisfy the Provost's Office, Board of Trustees, and the Higher Learning Commission.

A third discussion was focused around whether the university should allow distance PhDs. It seems that **there may be an openness to this idea by the faculty at WL as a whole**, but there are many questions surrounding the logistics and tactics of doing so. Likely this discussion of whether Purdue University should offer distance PhDs should be a larger discussion within the Graduate Council with input from more of the graduate faculty from across the West Lafayette campus.

A fourth area of discussion is the **balance between capability of doing programs online** and **the need for some amount of in-person interaction**. PhD students are more mature, tech savvy and diligent, making online delivery of the PhD a possibility. Fundamental for any program is

making sure that the student understands what the expectations are for the online and face to face components of the degree as well as the myriad technologies that might be used in both. The committee believes that even in an online degree, **there needs to be some exposure to the research and larger Purdue community to fully capture not only the quality but experience that is the Purdue University PhD**. The committee recognizes that these things can be balanced in many different ways and thus does not wish to prescribe a single approach. Any program proposing an "online" PhD needs to fully describe which aspects, if any, may be face to face and which aspects may be online.

A final area of discussion by the committee is a recognition that **online PhD programs, if they exist, should be small**, with faculty to student ratios that are manageable. An online PhD should be seen as a vehicle to serve students in niche areas or for enabling unique research opportunities; **it should not be seen as a mechanism for large enrollments or admissions**. It should not be assumed that PhD students in an online program would need less attention or engagement. The opposite is true: i**t takes more effort, attention and engagement to do any kind of effort online due to the requirements of intentionality in relationship and communication.** An online PhD, if it exists, should provide a custom and unique experience to the student, as do the on-campus programs.

Considerations

Given these points of discussion, the Online PhD task force addressed several things that a program/proposer would need to outline and define in a proposal to the Graduate Council should a unit wish to propose a PhD for which more than 80% is offered online. Such a proposal would need approval by the Provost's Office, Board of Trustees and the Indiana Commission for Higher Education.

Presently, the committee assumes that any PhD may be offered as a hybrid degree (up to 80% of the degree being online) if approved to do so and in conjunction with Purdue Online. In most cases, a "hybrid" PhD likely has the candidate doing most, if not all, coursework online, and conducting the research credits while registered as on campus, although a student may be gathering data at another location.

Any unit desiring a PhD with more than 80% of it offered online would need to address each of the following elements.

- How will program equivalence and quality be evaluated and how frequently?
- How will the mentor/mentee relationship be managed in the online environment? How will the mentee experience of a traditional PhD program be replicated online?
- How will scholarship – the publishing of journals, conferences, manuscripts, reports, grants – be managed in the online environment? What agreements will be in place ahead of time to ensure originality, authorship credit, and intellectual ownership and the like?

- How will intellectual property be handled? On-campus, Purdue University typically has a majority stake due to the use of university resources. The online environment shifts this. Who will own the intellectual property and what agreements will be in place to define that for each online student?
- How will research data issues be handled? What Material Transfer Agreements, Data Transfer Agreements or other agreements will be needed?
- How will students garner the experiences available to students on campus – teaching experience, professional development and other?
- How will qualifying examinations (if applicable), preliminary examinations, and final examinations be handled?
- How will committees meet and provide feedback to the student?
- Will the student be expected to spend any time on campus?
- What are the financial considerations for units considering online PhDs?
- What are the challenges and risks for international students?

Given this set of questions, the Task Force set out to provide some initial guidance and thoughts surrounding these questions.

Program and Experiential Equivalence

The expectation is that any unit desiring a fully online PhD would need to address the questions outlined by the task force and approvals would be required by the Graduate Council, Provost's Office, Board of Trustees, and the Indiana Commission for Higher Education. The onus is on the proposing unit; however, the Task Force offers some ideas for how students might garner the experiences available to students on campus, including teaching experience, professional development, mentoring of students, and community.

Course Availability

Purdue has rapidly increased the availability of higher-level courses (500/600 level) available online. This provides a solid foundation for the implementation of online Ph.D. programs.

While requirements are determined by discipline, Ph.D. coursework can be considered in three general categories: Discipline related coursework, foundations of research, and outside specialties. Each of these types of courses will have specific challenges to be worked through by the program. Some sample issues are raised below.

> **Discipline-related:** Departments considering offering online Ph.D. programs will need to ensure they have sufficient courses available online. Many Ph.D. programs are relatively small and programs will need to consider the issues of modality when offering these classes to pool of online and residential students.
>
> **Foundational Courses:** There are a number of types of courses that are foundational to a range of research disciples. For example, many disciplines require statistics and

methodology classes as required components of Ph.D. plans of study. Ensuring these classes are available will be critical to transitioning to online PhDs. Collaborating with the departments that provide these courses may be necessary.

Outside Specialties: Many PhD programs require students to take courses from fields outside the immediate discipline. Departments considering adopting online PhDs would need to be confident that there were sufficient offerings in outside fields relevant to the discipline to satisfy student needs and achieve the goals of this approach.

It will be necessary for each discipline to assess the viability of current and anticipated online courses to satisfy the requirements of PhD programs.

The discussion of availability has several dimensions. Assessing availability requires addressing the following questions:

- Is the course offered online?
- Is it scheduled at times that align with student needs? For example, a course offered once every 2 years may create problems for students. Another example – synchronous classes may create scheduling problems for some students)
- Is there space in the class for students, including students from other disciplines, where appropriate?

Teaching experience

PhD students pursuing their degree online could serve at teaching assistants and/or instructors of record for undergraduate courses after receiving proper training. There is training available to faculty to help them learn best practices for teaching online; this support could be extended to PhD students. Georgia Tech uses online MS students as paid teaching assistants for their very popular online Master of Science in Computer Science (OMSCS). Currently graduate students at Purdue cannot teach 50000 or 60000 level courses; they could however teach in lower division courses.

Hiring and paying domestic students living in another state is not a major barrier as Purdue is committed to registering in any state domestically required to do our work. Purdue is currently registered in thirty states. There are different payroll laws and tax laws that would apply but the differences are not significant enough to cause major issues to this approach.

Paying students to teach when they are living in another country adds compliance challenges related to tax and employment laws. A possible solution is to work with a service provider such as Velocity Global (VG) to comply with local laws. VG would serve as the employer of record for the PhD student. The fees associated with this option may be prohibitive. Another option could be to leverage international relationship to partner with a local institution of higher education. The partner institution would hire the student and we would reimburse the associated

expenses. In both these scenarios, we could provide unpaid employee status to the student so they would have access to the Purdue systems needed to do their work.

Progress and Progression assistance

Online PhD students should have a clear understanding of milestones within their academic plan of study for the management of their progression while balancing professional and personal commitments. It may benefit the faculty advisor and student to have a more formalized schedule of meetings and progress, such as the Individual Development Plan as outlined in Appendix B. The Online Student Success Coach would be able to support this effort as part of their persistence and retention strategies. Purdue Online could work collaboratively with the academic unit to incorporate online doctoral students into its tracking systems for retention, persistence, and academic performance.

Professional development

The Graduate School at Purdue offers 102 professional development classes/opportunities for graduate students and 76 of these are already fully online or hybrid. It does not seem like a heavy lift to provide these opportunities for remote students. The Graduate School will be the primary source of information and resources relevant to students seeking or utilizing fellowships and/or assistantships. Purdue Online will build professional development programming and resources for students on a variety of topics focused on adult and online learners. Purdue Online will provide consistent onboarding and orientation to the online learning environment and will guide online doctoral students as they connect with the offices, services, and resources available through Purdue West Lafayette.

Mentoring of students

Online PhD students could be partnered with undergraduate experiential and capstone courses to provide mentoring to teams of undergraduate students. Many of these types of teams are already engaged with company sponsors and/or community stakeholders by meeting remotely. Meeting virtually with a PhD student mentor could provide additional, specialized support for teams. Online PhD students can also be paired with undergraduate students or online graduate students working with their advisor to gain valuable mentoring experience.

Community

Arguably, one of the most important aspects of a PhD program is networking and being part of a robust intellectual community, which allows for the exchange of ideas, support of peers, and having a sense of belonging. With attention and intentionality, this too can be accomplished in a virtual format. Faculty can establish online scholarly communities such as journal clubs, writing groups, and peer mentoring groups. Online PhD students can be supported to travel and attend in-person conferences. Special events that foster a community of connectedness can be planned to make the most of the time people are together in-person. Purdue Online has established a community for online students at the graduate level and has a dedicated student

success coach team focusing on engagement to the campus community and to their peers. Partnering with faculty to assist in additional activities and resources as well as providing location bound opportunities with the remote staff in Purdue Online unit.

Faculty can make a greater effort to know who their students are. There are existing online resources such as the Global PhD Server and @PhDForum that expand students' networking and community building opportunities.

Just with on-campus programs, there will not, nor should there be a "one size fits" all approach to remote PhD programs. For example, it is possible that teaching experience is not important for an individual's career path. Faculty and students should work together to develop an individualized development plan (IDP) that extends beyond coursework and research to ensure that there is alignment of needs and expectations and to help ensure needs and expectations are being met. While IDPs are important (and in some cases required) for graduate students, the Task Force believes they would be imperative and likely should be required for online PhD students.

Examination and Other Processes

Post-Covid, each department has undoubtedly developed a process for handling these exams remotely. The question in the case of online Ph.D. students becomes "Do we require them to be on campus for the exams or not?" A follow-up question is "Does the Graduate School establish rules about whether or not preliminary and final examinations for online graduate students are held on campus?" Qualifying examinations are optional for departments, and there are no current Graduate School standards for them.

Preliminary and final examinations have a written component and an oral component. The written portion is almost always a document prepared by the student and submitted to the committee for review at least two weeks before the oral portion of the exam. There is no reason for the student to be on campus to write the document, and it can be submitted to the committee electronically, which is common even for students who are on campus. Originality of the document can be established by faculty expertise and the use of tools such as iThenticate.

The oral component of the exam can easily be held remotely. In most cases, the student and committee members all attend a Zoom (or Teams or WebEx or …) meeting. The student makes a presentation and committee members ask questions as usual. The student goes to a breakout room while the committee deliberates and comes back to the meeting room to hear the results of the exam and receive feedback. Faculty members complete the assessment rubric for the exam and submit it electronically. Likewise, they can sign the required forms electronically.

During the pandemic, the Graduate School implemented guidelines for remote exams. Post-pandemic, those guidelines have been permanently adopted:

https://catalog.purdue.edu/mime/media/15/9730/Remote+Graduate+Examinations+and+Defenses.docx.pdf

Should virtual oral exams be allowed? If a student is international, and we must assume that some will be, it could be quite a financial burden to come to campus to take the oral portion of an exam in person. Many, if not most, of our domestic online Ph.D. students are also likely to be place bound by job, family, disability, or other circumstances.

When a degree program is marketed as being fully online, students have the expectation that all requirements can be fulfilled remotely. If students will be required to be on campus for the preliminary exam, the final exam, or both, that needs to be clear (and emphasized) before the student enrolls in the program. For some students, it could make the degree program impossible.

Requiring On-Campus Presence

Why is it important for a student to spend time on campus? Being on campus provides a student with an opportunity to interact frequently with their advisor and with other students, especially those in their advisor's research group. Students on campus can attend seminars and participate in professional development workshops. While on campus, they have an opportunity to absorb the culture of their discipline.

Can the student realize those benefits remotely? If the advisor is accustomed to virtual interactions, holding regular meetings with the student virtually will not be a problem. Technology is available to have research group meetings that include remote members. Virtual meetings are not unusual in research groups where the advisor or some of the students are away from campus for an extended period (e.g., gathering data, on sabbatical). Many departments now provide the option for remote participation in seminars. They may even advertise their seminars to other institutions. Professional development workshops are more and more frequently available virtually – either synchronously or asynchronously.

Absorbing the culture of the discipline is more difficult to do virtually. Many, if not most, of the online Ph.D. students are likely to be working. They already understand the culture of their workplace but may not have an appreciation of academic research. If we have a fully online research degree program, there will need to be some thought given to how a person develops research skills without being immersed in research with people who have a passion for it. Or else we must find a way for the student to be immersed in the research group remotely. It seems apparent, post pandemic, that the biggest challenges to long term, remote work are relationship, connectedness and informal exchange. Aside from immersion, programs need to consider how these challenges will be overcome.

Intellectual Property

One of the biggest challenges for programs wanting to deliver online PhD programs is the issue of intellectual property. As it pertains to on campus students, all intellectual property is owned by the University (see Policy 1.A.1) by virtue of student or employee status and the use of University resources.

However, when a student conducts their research off campus, having no physical footprint on campus and potentially only having student status, issues if intellectual property rights emerge.

> ***Of importance, any program wanting to enable students to conduct research off campus will require intellectual property agreements to be developed by the Office of Legal Counsel in conjunction with the Chief Intellectual Property Officer of the University.***

Because each PhD student would be working on unique research problems in an environment other than Purdue, an IP agreement would be needed for each student. Additionally, programs wanting to have large numbers of students in an online PhD program would be expected to provide appropriate resources to negotiate the required IP agreements.

Authorship and Scholarship

Scholarly activities on the Purdue campus are a common practice between faculty and graduate students. However, students working outside the University while in student status may pose some distinctive challenges. As such faculty working with remote PhD students would need to consider issues unique to such students.

Recommended practice in the development of research and publication development includes:

- Establishing clear roles and responsibilities in collaborative works via authorship agreements or contracts
- Discussing contributions and expectations and determining author order throughout the lifecycle of a project and subsequent publications
- Ensuring that all authorship arrangements abide by relevant University Standards (see Standard S-24)

Financial Considerations

Most online graduate programs currently supported at PWL provide graduate education to industry professionals seeking professional degrees to advance their careers while working full-time. These programs are expected to be self-sustaining through tuition dollars paid by students, and, over time, most programs hope to realize a return on investment to support a range of initiatives within their academic units.

However, launching and sustaining online programs can be expensive, therefore, online Ph.D. programs that seek to be self-sustaining through tuition and/or other revenue sources need to have accurate estimates of program startup and support expenses associated with their program relative to anticipated Ph.D. student enrollment at anticipated tuition rates.

Programs proposing an Online Ph.D. should consider the full range of possible startup and support costs typically associated with online graduate programs as a part of their proposal. Depending on the degree program and existing department, school, or college resources, these potential expenses may vary considerably.

Potential Initial Start-Up Costs

- Online Ph.D. Proposal Development
- Course Design (e.g., instructional designers, subject matter experts, multimedia development, etc.)
- Marking/Recruitment Planning and Design (e.g., marketing staff)
- Initial Marketing Direct Costs (e.g., digital advertising campaigns, academic conference recruitment, industry association engagement, etc.)

Potential Ongoing Support Costs

Departmental Expenses

- Graduate Application Management
- Instructional Personnel Costs (e.g., full-time faculty, full-time lecturers, limited term lecturers, teaching assistants)
- Instructional Materials Costs (e.g., software, textbooks, course materials)
- Research Experience Coordinator (Assist in coordinating/managing research experiences for Ph.D. students with employers, faculty advisor, etc. Advise and assist with non-disclosure agreements, publication restrictions, etc.)
- Dissertation Advising

Online Program Support Costs

- Purdue Online Staff
  - Program Administration
  - Marketing Professionals
  - Recruitment/Admission Counseling Staff
  - Academic Advisors
  - Student Support and Success
  - Instructional Design
- Non-Personnel Expenses
  - Direct Marketing Direct Costs
- Purdue F&A (currently 10%)
- Purdue Online Digital Education Fee ($50 per credit hour)
- Department/School/College revenue sharing expectations

Potential Revenue Sources

- Market Based Tuition
- Differential Fees
- Internal and External Grants
- Corporate/Industry Partnerships
- Program Fees

Key questions to help determine financial feasibility of an online Ph.D. program:

1. What are the program's financial goals?
2. Is there a market of qualified students for the program?
3. What competition for this program exists at other institutions?
4. How many online courses would need to be developed to serve students in the program? Are there existing online MS courses that can be leveraged for the Ph.D. program?
5. How difficult is it to develop online curriculum and resources for the program (e.g., virtual labs, virtual lectures, etc.)
6. Does the department have adequate faculty and instructional resources to deliver and develop coursework for the program, mentor, and chair committees for the students?
7. Would additional faculty or lecturers need to be identified to support an additional online version of you Ph.D. program?
8. What tuition rates are competitive for the program?
9. How many students at a given tuition rate would be needed to cover administrative and instructional costs?
10. Does the program anticipate providing scholarships, fellowships, or assistantships to students in the program? Grad and staff fee remissions are not currently applicable for online programs.
11. How long will it take to realize an ROI for the program given the number of anticipated students and expenses?
12. What plans are in place to "sunset" and teach out the program if it fails to meet enrollment or revenue needs/expectations?

Resources for Building a Financial Model

For each college, Purdue Online has Senior Managing Directors that serve as liaisons with Purdue Online for discussing potential online programs. They can work with departments, schools, and colleges to discuss potential program and initiate initial market research to help facilitate information collection to help inform decision making.

International Students

The two largest challenges with international students participating in a proposed online PhD degree program are not unlike challenges of them participating in other degrees. The challenges hinge upon degree recognition by their home country and risks associated with visa/international status.

Degree recognition

On January 28, 2023, China's Ministry of Education (CMoE) published a statement that, effective immediately, they will no longer recognize degrees that are earned via online education or recognize courses that are delivered online from any foreign institution. The CMoE

allowed online learning during COVID, but not before COVID. As such this action is deemed a return to "normal" by the CMoE.

The Saudi Arabia Cultural Mission, and other similar government and military funding programs, do not allow any students they sponsor to engage in online courses. If the student mistakenly engages in online learning, they will be required to retake the course delivered in the traditional format at their own expense. Violating the policy can result in the loss of their sponsorship. Overall, countries in the middle east are less likely to recognize online degrees.

India and many other industrialized nations do recognize foreign degrees earned online if they are earned from an accredited institution.

Visa/International Status

It is a violation of visa status for any foreign national inside the United States under the F or J visa types to enroll in a fully online program. Any program offering online PhDs would need to ensure foreign nationals inside the US did not mistakenly enroll in an online program.

Students in F or J status who are engaged in employment based on the post-completion benefits of their visa program would lose any remaining employment eligibility and violate their lawful status if enrolled in an online PhD program. Students with F or J visa will have earned their previous degree from any of the SEVIS approved institution in the United States, including Purdue. Thus, the online PhD would likely be uninteresting for international students who have completed a BS or MS inside the U.S.

Foreign nationals in the U.S. under other visa types are allowed to pursue educational opportunities either online or via residential learning. Distinguishing between those who may, and those who may not pursue the online/hybrid programs can be particularly challenging.

Conclusions

If amenable, the Graduate Council should have a larger discussion of the could/should question. If the council agrees that units should be able to propose distance PhDs, then Council should decide if the questions above request sufficient detail to approve or deny such a proposal. If the above questions are sufficient, the Graduate Programs Office will create a form in Curriculog (and the necessary information in the online Policies and Procedures for Administering Graduate Student Programs) such that programs may propose such a degree (or addition of online delivery to an existing degree) should a unit elect to do so. **It is recommended that any PhD program that is online through this described process be subject to a program review cycle of not more than 3 years to ensure that the quality and experience are representative of Purdue University. The Graduate School would conduct the review at the direction of the Dean of the Graduate School and the Provost.**

Appendix A – National Market Scan of Online PhD Programs

Institution	Offering Online or Hybrid Ph.D.?
Arizona State University	None
Auburn University	None
Baylor University	Online Ph.D. in Social Work
Binghampton University	None
Boston College	None
Boston University	None
Brandeis University	None
Brown University	None
California Insitute of Technology	None
Carnegie Mellon University	None
Case Western Reserve University	None
Clemson University	Blended Ph.D. in Rhetoric, Communication, and Information Design
	Blended Ph.D. in Parks, Recreation and Tourism Management
Colorado School of Mines	Online Ph.D. in Space Resources
Colorado State University	Online Ph.D. in Systems Engineering
	Hybrid Ph.D. in Higher Education Leadership
	Hybrid Ph.D. in Organizational Learning, Performance, and Change
Columbia University	Partially Online Doctorate in Engineering Science (has identical academic requirements to a Ph.D.)
	Partially Online Doctorate in Electrical Engineering (has identical academic requirements to a Ph.D)
	Partially Online Doctorate in Mechanical Engineering (has identical academic requirements to a Ph.D.)
Cornell University	None
Dartmouth College	None
Drexel University	None
Duke University	None
Emory University	None
Florida International University	None
Florida State University	Blended Ph.D. in Nursing
George Mason University	None
George Washington University	Online Ph.D. in Systems Engineering
Georgetown University	None
Georgia Institute of Technology	None
Georgia State University	Online Ph.D. in Nursing
Graduate Center, CUNY	None
Harvard University	None
Indiana University Bloomington	Online Ph.D. in Music Therapy
	Online Ph.D. in Nursing Science
Iowa State University	Hybrid Ph.D. in Apparel, Merchandising, and Design

	Hybrid Ph.D. in Hospitality Management
Johns Hopkins University	None
Kansas State University	Hybrid Ph.D. in Adult Learning & Leadership
	Online Ph.D. in Curriculum & Instruction
Kent State University	None
Louisiana State University	None
Massachusetts Institute of Technology	None
Michigan State University	None
Mississippi State University	Various
Montana State University	None
New Jersey Institute of Technology	None
New York University	None
North Carolina State University	None
North Dakota State University	None
Northeastern University	None
Northwestern University	None
Ohio State University	None
Ohio University	None
Oklahoma State University- Stillwater	Online Ph.D. in Fire and Emergency Management Administration
	Online Ph.D. in Health, Leisure and Human Performance
Old Dominion University	Online Ph.D. in Community College Leadership
	Online Ph.D. Educational Leadership
	Online Ph.D. in English
	Online Ph.D. in Public Administration and Policy
Oregon State University	Hybrid Ph.D. in Counseling
Pennsylvania State University	None
Princeton University	None
Rensselaer Polytechnic Institute	None
Rice University	None
Rutgers University- New Brunswick	None
Stanford University	None
Stony Brook University	None
Syracuse University	None
Temple University	None
Texas A&M University	Online Ph.D. in Plant Breeding
	Online Ph.D. in Interdisciplinary Engineering
Texas Tech University	Online Ph.D. in Curriculum and Instruction
	Online Ph.D. in Educational Leadership Policy
	Online Ph.D. in Family and Consumer Science Education
	Online Ph.D. in Higher Education Administration
	Online Ph.D. in Special Education
Tufts University	Online and Hybrid Ph.D. in Data, Biotech, and Engineering
Tulane University	None

University at Albany, SUNY	Online Ph.D. in Curriculum and Instruction
	Online Ph.D. in Literacy
University at Buffalo	Online Ph.D. in Information Science
	Online Ph.D. in Nursing
University of Alabama	Online Ph.D. in Communication & Information Sciences
	Online Ph.D. in Mechanical Engineering
University of Alabama at Birmingham	None
University of Alabama at Huntsville	Hybrid Ph.D. in Engineering Management
	Hybrid Ph.D. in Industrial and Systems Engineering
	Hybrid Ph.D. in Civil Engineering
	Hybrid Ph.D. in Join Nursing Science
University of Arizona	None
University of Arkansas	None
University of California, Berkeley	None
University of California, Davis	None
University of California, Irvine	None
University of California, Los Angeles	None
University of California, Riverside	None
University of California, San Diego	None
University of California, Santa Barbara	None
University of California, Santa Cruz	None
University of Central Florida	Online Ph.D. in Nursing
University of Chicago	None
University of Cincinnati	None
University of Colorado Boulder	None
University of Colorado Denver	None
University of Connecticut	None
University of Delaware	None
University of Denver	None
University of Florida	Online Ph.D. in Classical Civilization
	Online Ph.D. in Latin and Roman Studies
University of Georgia	None
University of Hawaii at Manoa	None
University of Houston	None
University of Illinois at Chicago	None
University of Illinois Urbana-Champaign	None
University of Iowa	None
University of Kansas	Online Ph.D. in Nursing
University of Kentucky	Online Ph.D. in Arts Administration
University of Louisiana at Lafayette	None
University of Louisville	None
University of Maine	None

University of Maryland, Baltimore County	None
University of Maryland, College Park	None
University of Massachusetts Amherst	None
University of Memphis	Online Ph.D. in Nursing
University of Miami	None
University of Michigan	None
University of Minnesota	None
University of Mississippi	None
University of Missouri	Online Ph.D. in Architectural Studies
	Online Ph.D. in Information Science and Learning Technologies
University of Montana	Online in Ph.D. International Educational Leadership
University of Nebraska-Lincoln	Online Ph.D. in Educational Leadership and Higher Education with a concentration in Educational Studies
University of Nevada- Las Vegas	Online Ph.D. in Nursing
University of Nevada- Reno	None
University of New Hampshire	None
University of New Mexico	None
University of North Carolina Chapel Hill	None
University of North Texas	Online Ph.D. in Learning Technologies
University of Notre Dame	None
University of Oklahoma	None
University of Oregon	None
University of Pennsylvania	None
University of Pittsburgh	None
University of Rochester	Hybrid EMBA
University of South Carolina	Online Ph.D. in Civil Engineering
	Online Ph.D. in Computer Engineering
	Online Ph.D. in Computer Science
	Online Ph.D. in Mechanical Engineering
	Online Ph.D. in Nuclear Engineering
University of South Florida	Online Ph.D. in Career & Workforce Education
University of Southern California	None
University of Southern Mississippi	None
University of Tennessee	Online Ph.D. in Educational Psychology & Research
	Online Ph.D. in Industrial Engineering
	Online Ph.D. in Nursing
University of Texas at Arlington	None
University of Texas at Austin	None
University of Texas at Dallas	None
University of Texas at El Paso	None
University of Texas at San Antonio	None
University of Utah	None

University of Virginia	None
University of Washington	None
University of Wisconsin- Madison	Online Ph.D. in Nursing
University of Wisconsin- Milwaukee	Online Ph.D. in Nursing
Utah State University	Online Ph.D. in Career & Technical Education
Vanderbilt University	None
Virginia Commonwealth University	Online Ph.D. in Nursing
Virginia Tech	None
Washington State University	None
Washington University in St. Louis	None
Wayne State University	None
West Virginia University	Online Ph.D. in Nursing
Yale University	None

Appendix A – Example Graduate student Individual Mentoring Plan

The goal of the mentoring program will be to provide the skills, knowledge and experience to prepare the PhD student for a successful career. To accomplish this goal, the mentoring plan will enhance the PhD student experience by providing career planning assistance and opportunities to learn a number of career skills such as preparing grant proposals, writing journal papers and presenting their work.

The PhD student, [insert name], will be mentored academically by [insert name], on the project, "[insert title]" (please refer to the attached project plan for details regarding specific tasks and responsibilities). [insert student name] will be mentored in performing research in an interdisciplinary environment. [insert student name], as an expert in [list expertise], will join a team of collaborators with additional expertise in [list expertise]. By the end of the project, the team will have significant understanding and experience in all these areas and expertise in how to bridge across these disciplines. [insert student name] will be mentored administratively by Dr. [insert name], Executive Associate Dean for Research and Strategic Initiatives.

Orientation, Personalized Professional Development, Communication & Timeline

[insert student name] will begin with in-depth conversations with [insert faculty mentor names] to align expectations for the nature and scope of work as well as a basic skills assessment. These initial conversations will form the beginning of the PhD student's personalized professional development plan with an associated timeline. [insert student name] will be provided orientation to each investigator's lab as well as to other key collaborators (if any). A communications plan will also be developed including weekly team meetings and frequent communication to discuss progress, issues, and satisfaction. Specific items to be addressed include:

1. The amount of independence the PhD student requires;
2. Interaction with coworkers (frequency and in what form);
3. Productivity including the importance of scientific publications;
4. Work ethics and laboratory safety;
5. Documentation of research methodologies and experimental details so that the work can be continued by other researchers in the future.

Training in the Responsible Conduct of Research

[insert student name] will assist in the design of experiments and the collection and interpretation of data to understand the social and behavioral aspects of this project. They will participate in Purdue Institutional Review Board (IRB) training (if required), including the online training and certification in the responsible conduct of research through the online CITI responsible conduct of research training modules. [insert student name] will also gain experience in developing and submitting protocols for IRB approval (if required by the project).

Project Manager Responsibilities
[insert student name] will take on all responsibilities of project manager for the project including writing and editing publications (in collaboration with mentors), giving presentations as appropriate, writing progress reports, submitting research proposals on his/her ideas, and mentoring undergraduate and graduate students who are involved in the execution of the project. The performance of [insert student name] on this measure will be closely monitored by the faculty mentors, watching for his/her leadership and offer guidance if needed.

Experience with Preparation of Grant Proposals
[insert student name] will be directly involved in the development and writing of proposals prepared in collaboration with [insert faculty name]. As is appropriate, [insert student name] will be a named Co-PI on proposals. If effort for [insert student name] is included in grant applications, salary and other expenses required to perform assigned tasks will be included in the budget of the proposed grant, cost sharing is not allowed. To help build [insert student name] academic reputation, the PIs will recommend they serve on NSF or other panels or replace them as appropriate.

Publications and Presentations
Publications and presentations are expected to result from the work performed by [insert student name]. These will be prepared under the direction of and in collaboration with the mentors. [insert student name] will receive guidance and training in the preparation of manuscripts and professional presentations. [insert student name] will work with the mentors to identify appropriate venues for publishing and presenting. Conference travel support may be requested from the Polytechnic Research Office to present the work in the form of a talk at venues supported by the faculty mentors and should be included in the budget request.

Career Counseling
[insert student name] will be exposed to a variety of campus resources such as Purdue's Center for Career Opportunities and the Writing Lab. [insert student name] is encouraged to get involved with graduate student groups at Purdue. Additionally, they are expected to attend relevant Research Impact Area meetings, and Polytechnic Research Mentoring lunches.

Mentors, [insert faculty mentor name]. will provide [insert student name] with the skills, knowledge, and experience needed for to launch a successful career. Topics mentors will consider range from setting and achieving career goals, resume preparation, applying for a faculty position, career paths outside of academia, to tips for negotiating salary and start-up funds.

Timeline and Progress
The mentor will work with the graduate student to establish an Individual Development Plan (IDP). Thereafter, the mentors and the graduate student will review and assess progress each month to assess progress. Reporting of mentoring will be included in annual and final project reports to the Polytechnic Executive Associate Dean of Research and Strategic Initiatives.

Success of this mentoring plan will be assessed by tracking the progress of the graduate student through their Individual Development Plan, interviews with the student to assess satisfaction with the mentoring program and tracking of the student's progress toward his career goals after finishing the appointment. The Online Student Success Coach will be able to follow the student's milestone and add appropriate guidance and support into the IDP to support the academic plan. The evaluation will be every six months with [insert name]. In case of termination due to unsatisfactory performance; the graduate student will be notified of concerns in writing, where the researcher will be put on probation for 30 calendar days. During this period, the researcher has to opportunity to demonstrate the ability to perform at expected levels. At the end of this period, the academic and administrative mentors will discuss any change in the student's performance and decide on an action.

Individual Development Plan

Mentoring Activities and Milestones		2021				2022					
		SEP-DEC				JAN-APR			MAY-AUG		
Task 4	**Professional Development**										
4.1	Training courses										
4.1.1	CITI-RCR and IRB training								x	x	
4.1.2	Preparing for funding opportunities								x	x	x
4.1.3	Research Seminar or Job Talk for the Academic Interview										x
4.1.4	The Teaching Demonstration for the Academic Interview										x
4.1.5	Postdoc Grant Writing Lecture	x	x	x	x						
4.1.6	NSF Personal Statement Writing Workshop (Grantsmanship)						x				
4.1.7	NSF Research Statement Writing Workshop (Grantsmanship)						x				
4.1.8	Battery Management Systems	x	x	x	x	x	x	x	x	x	x
4.2	Post-doc Specific Events										
4.2.1	Relevant lab meetings	x	x	x	x	x	x	x	x	x	x
4.2.2	Weekly online group check-in	x	x	x	x	x	x	x	x	x	x
4.2.3	Weekly meeting with mentors	x	x	x	x	x	x	x	x	x	x
4.2.4	Guest lectures, guest talks and research presentations			x	x		x	x			
4.2.5	Prepare application packages and apply for faculty/research scientist positions	x	x	x							
4.2.6	Give practice job talks to the mentors and the research group						x	x			
4.3	Polytechnic Research Events										

	4.3.1	Polytechnic Research Mentoring Lunch	x	x	x	x	x	x	x	x	x	x
	4.3.2	Monthly RIA meetings	x	x	x	x	x	x	x	x	x	x
	4.4	Deliverables										
	4.4.1	Submit abstract and paper to one of the following: Power Sources, IMECE, or ECS Conference										x
	4.4.2	Submit journal manuscript to ECS or JPS and other relevant Journals						x			x	
	4.4.3	Submit Grant Proposal to UL and one of: NRL/ONR/NSWC								x	x	x
	4.5	Services										
	4.5.1	Review papers and proposals			x			x			x	
	4.5.2	Help organize RDE research symposiums	x	x	x	x	x	x	x	x	x	x
	4.6	Others										

Faculty Mentor

Postdoctoral Research Assistant

NEW DOCUMENTS RECEIVED
(After the March 23, 2023, Graduate Council Meeting)

GRADUATE COURSE PROPOSALS:

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

Graduate Council Document 23-27a, **PUBH 51250, International Health Systems: A Comparative Approach** (PWL) Distance. Credit 3.

This course is an introduction to public health priorities from an international perspective, illustrating the interdependent nature of health promotion and disease prevention issues across diverse regions and populations. Coursework examines population health determinants, contrasting industrialized and developing countries and how these influence health goals established by public health institutions, such as the World Health Organization, philanthropic foundations and governmental agencies.

International health care needs continue to emerge as interchanges among peoples and nations increase. To effectively address these needs, public health leaders must understand the social, economic, environmental, and political determinants of health and be prepared to respond to challenges related to health and health care at the local, national, and global level. This course examines the historical evolution of international health challenges as well as the future trends that will continue to impact health and health systems worldwide.

The course is intended for graduate students in public health; however, it may be of interest to students in social work, nursing, education, criminal justice, psychology, and other related fields. Permission of instructor required.
https://purdue.curriculog.com/proposal:21373/form

Graduate Council Document 23-27b, **PUBH 51350, Global Health Security and Disaster Management** (PWL) Distance. Credit 3.

This course is a contemporary examination of the growing threat and potential public health consequences of disasters and the role of climate change. Additionally, we review the variety of public health and environmental health disasters, their consequences and the role of public health agencies health care systems and practitioners in preparedness, response and recovery from a local, national and global perspective. The course is designed to develop proficiency in analyzing and evaluating the public health response to disasters, the linkage to emergency management frameworks and identifying solutions and methods for improvement.

The course is intended for graduate students in public health; however, it may be of interest to students in social work, nursing, education, criminal justice, psychology, and other related fields. Permission of instructor required.
https://purdue.curriculog.com/proposal:21375/form

Graduate Council Document 23-27c, **PUBH 54250, Public Health and Nutrition** (PWL) Distance. Credit 3.

This course will emphasize development, implementation, and evaluation of nutrition intervention programs from a public health perspective. Students have an opportunity to practice setting realistic goals that produce outcomes aimed to improve health and support community and public nutrition. Students will explore changing nutritional behavior and the barriers to such change. This course is intended for graduate students interested in developing, implementing, and evaluating community-based nutrition programs.

The course is intended for graduate students in public health; however, it may be of interest to students in social work, nursing, education, criminal justice, psychology, and other related fields. Permission of instructor required.
https://purdue.curriculog.com/proposal:21374/form

Graduate Council Document 23-27d, **PUBH 54750, Public Health Program and Policy Evaluation** (PWL) Distance. Credit 3.

This course provides an overview of the methods required to evaluate the effectiveness of public health intervention or prevention programs and policies. The course introduces a range of quantitative, qualitative, and mixed methods research designs, and the process for applying and tailoring these designs to program and policy evaluations. In addition, we will focus on the process of engaging communities and stakeholders in program evaluation efforts.

The course is intended for graduate students in public health; however, it may be of interest to students in social work, nursing, education, criminal justice, psychology, and other related fields. Permission of instructor required.
https://purdue.curriculog.com/proposal:21372/form

Graduate Council Document 23-27e, **PUBH 54850, Public Health Law** (PWL) Distance. Credit 3.

This course examines the role of law in promoting or impeding positive health outcomes. Students will study the authority and limitations of governments engaging in public health activities as well as the types of legal interventions available to promote public health. Students will apply legal principles to public health case studies on topics such as infectious disease, chronic disease, and violence prevention, among others. Students will also apply public health legal research methodologies to current public health issues and discuss the role of law in public health advocacy.

The course is intended for graduate students in public health; however, it may be of interest to students in social work, nursing, education, criminal justice, law, psychology, and other related fields. Permission of instructor required.
https://purdue.curriculog.com/proposal:21376/form

Graduate Council Document 23-18d, **SLHS 52101, Speech Disorders In Children** (PWL) Lecture 2 times per week for 75 minutes. Credit 3.

Knowledge base necessary for the competent assessment, diagnosis, and treatment of speech sound disorders in children, including developmental phonological disorders, motor speech disorders, and residual speech errors.

https://purdue.curriculog.com/proposal:24471/form

Graduate Council Document 23-18e, **SLHS 54600, Clinical Seminar In Speech-Language Pathology** (PWL) Lecture 1 time per week for 50 minutes. Credit 1.

This is a clinical seminar course designed to support students' ability to meet knowledge and skills standards related to the scope of practice of speech-language pathologists. This course provides supplemental learning opportunities and support for students as they complete their hands-on clinical practice each semester by taking a more in-depth look at conditions within the nine areas of practice as well as cultural and linguistically diverse families, ethical standards in clinical practice, professional issues and trends within communication sciences and disorders, and interprofessional education and practice. The course is offered each semester and objectives vary to advance the knowledge and skills required to meet the program and ASHA/CAA guidelines for completion of the program as well as certification standards as indicated by the CFCC.

https://purdue.curriculog.com/proposal:24310/form

Area Committee B, Engineering, Sciences, and Technology (Duane Dunlap, chair; ddunlap@purdue.edu):

Graduate Council Document 23-20b, **CM 61000, Urban Built Environment** (PWL) Lecture 1 time per week for 150 minutes. Credit 3. Prerequisite(s): CM 51000.

This provides students with advanced theories and applications of analyzing multiple performance indicators in urban built environments. Students will learn the concepts of energy, environment, human comfort, and mobility performance in urban built environments. This course will offer an overview of various analysis techniques using Geographic Information System, Building Energy Modeling and Simulation, and Spatial Analytics using a programming language. Graduate students will learn problem-solving skills through project-based learning, and how to apply the skills to effectively conduct research related to urban built environment planning, design, and development.

https://purdue.curriculog.com/proposal:22202/form

Graduate Council Document 23-20d, **CM 62500, Smart Infrastructure System** (PWL) Lecture 1 time per week for 150 minutes. Credit 3. Prerequisite(s): CM 58100.

Applying advanced cutting-edge technologies to the civil and construction industry to address traditional infrastructure problems is becoming more popular. One of the very hot areas is developing smart infrastructure. How to make our civil infrastructures smarter and more resilient plays a vital role for our society. The first half of this course will cover the fundamental knowledge of some cutting-edge technologies and smart infrastructure including sensing, signal processing, data collection and transmission, and closed-loop control. The second half of this

course will focus on smart infrastructure applications including smart bridges, smart grid, smart building and smart railways. This advanced-level course will provide advanced knowledge of cutting-edge technologies to develop smart infrastructure systems. Through this course, student will polish their research skills in different aspects including: conducting literature review, developing their own research idea, implementing their ideas, presenting their work and publishing their results. In addition, at the end of this course, students will be able to implement various types of systems, create smart infrastructure systems and check their performance.
https://purdue.curriculog.com/proposal:22219/form

Graduate Council Document 23-20c, **CM 63500, Advanced Facilities Management** (PWL) Lecture 1 time per week for 150 minutes. Credit 3. Prerequisite(s): CM 52600.

This course provides advanced facilities management (FM) practices in the life-cycle of the built environment, including core competencies, compliance and standards, operations & maintenance, risk management, sustainability, health & safety, real estate and financial management, human resources management, and workplace and utility management. In addition, FM practices include emergency preparedness, business continuity, leadership, contracts, capital and maintenance planning, outsourcing, procurement, space planning, occupant comfort and productivity, and energy management. The role of the facilities manager in hard (space and infrastructure) and soft services (grounds, custodial, waste management, pest control, parking, workspace management, catering) will be analyzed with case studies emphasizing the need for their integration in the design and construction process. The students will be able to interpret and analyze critical management principles in the operations phase of the built environment by identifying the fundamentals of facilities management theory and practice.
https://purdue.curriculog.com/proposal:23344/form

Graduate Council Document 23-20e, **CM 63600, Future-proof Construction And Infrastructure** (PWL) Lecture 1 time per week for 150 minutes. Credit 3. Prerequisite(s): CM 51000.

The course provides advanced tools and methods to optimize the maintainability, resilience, flexibility and responsiveness of infrastructure and construction so to ensure that these provide an adequate level of service under uncertain future conditions. This includes methods to rigorously quantify the level of service, model the uncertainty over variable parameters, identify maintainable, resilience flexible and responsive design solutions, run simulations to estimate their impact (i.e. costs of interventions and risk on the service) and identify the optimal balance with the costs of construction.
https://purdue.curriculog.com/proposal:22241/form

Graduate Council Document 23-20f, **CM 63700, Computer Vision Application For Smart Infrastructure Management** (PWL) Lecture 1 time per week for 150 minutes. Credit 3.

This graduate-level course is for students who major in Construction Management Technology, Construction Engineering and Management, Civil Engineering, and other related majors in the architecture, engineering, and construction domain. Computer vision (CV) technology can play a critical role in constructing and managing built environments (infrastructure systems and facilities). It promises to become even more critical in the next few decades as technologies are more efficient and effective for infrastructure inspection and maintenance. The CV technologies include the principles and utilization of object detection, action recognition, and 3D reconstruction technologies. This course will offer the students the advanced knowledge and ability to come up with a solution for infrastructure and facility management challenges by evaluating current computer vision technologies. After this course, the students can evaluate appropriate computer vision algorithms and develop frameworks for various infrastructure management problems by creating their own training data sets and models.

https://purdue.curriculog.com/proposal:22240/form

*Graduate Council Document 23-26a***, CNIT 54600, The Internet of Things for Information Technology** (PWL) Lecture 2 times per week for 50 minutes. Laboratory 1 time per week for 100 minutes. Credit 3.

This course will explore the emergence of technologies and vertical solutions in the Internet of Things (IoT) domain. The course explores the top-level problems that IoT promises to solve, the business drivers, the attributes of IoT-enabled enterprise and consumer markets, and how IoT is different from the contemporary Internet. The course will discuss and apply IoT components such as the "things", the data, the people and the processes, as well as vertical markets. Emphasis will be placed on types of architecture, reference models, and standards (both open and proprietary), underlying technologies, commercial products, issues (such as security), and research efforts in the Internet of Things. The lab component will focus on the complete IoT ecosystem (sensors, actuators, networks, etc.), but will specifically emphasize the functionality of IoT cloud platforms.

https://purdue.curriculog.com/proposal:18581/form

Graduate Council Document 23-28a, **ENGT 54000, Change Management For Enterprise Sustainability** (PWL) Lecture 3 times per week for 115 minutes for 7 weeks. Distance. Credit 3.

Change management is at the core of an engineering organization's processes and data, and it affects every member of the enterprise. Change management provides a method for identifying, analyzing, preparing, implementing, validating, and documenting engineering changes throughout a product’s lifecycle, to ensure everyone in the organization is working from the same product record and changes are communicated in real-time. In this course, the core elements, data structures, stakeholders, and workflows of change management and their role as enablers of the digital thread and the digital enterprise are discussed. The application of the industry standard CM2 methodology is emphasized as a strategy to provide control, maintain data integrity, and improve visibility and traceability of changes.

https://purdue.curriculog.com/proposal:24200/form

Graduate Council Document 23-21a, **ME 52701, Kinetic Theory & Computational Modeling In Fluid Dynamics** (IUPUI) Lecture 2 times per week for 75 minutes. Credit 3. Prerequisite(s): ME 20000, ME 31400, and ME 31000, or equivalent.

This course consists of two parts: (1) Microscopic description of thermal fluids including Boltzmann equation, kinetic theory of gases, solutions of Boltzmann equations and Monte Carlo modeling method, and (2) Lattice Boltzmann Methods (LBM), Finite Volume Methods (FVM) and/or Finite Difference (FD) for solving problems, isothermal/non-isothermal incompressible flows, and multiphase flows. Team projects to simulate a cavity flow using Monte Carlo modeling, LBM and FVM with varying Knudsen number will provide a first-hand experience about how to solve thermal fluid situations through various scale modeling and numerical simulations.
https://purdue.curriculog.com/proposal:9282/form

Graduate Council Document 23-21b, **ME 56806, Materials Characterization Techniques** (IUPUI) Lecture 2 times per week for 75 minutes. Credit 3. Prerequisite(s): ME 34400, or Graduate Standing, or Instructor Consent.

This course introduces principles and applications of materials characterization techniques including bulk characterization, microscopic, and spectroscopic techniques, as well as chemical and thermal analysis. Examination of characterization approaches such as imaging (SEM, TEM), scattering & diffraction, and spectroscopic techniques (Raman, XPS) will be covered.
https://purdue.curriculog.com/proposal:20943/form

Graduate Council Document 23-21c, **ME 60602, Topology Optimization** (IUPUI) Lecture 3 times per week for 50 minutes. Credit 3. Prerequisites: Graduate standing.
Co-Requisites: ME 55100 and ME 50601.

This graduate-level course focuses on theoretical and practical aspects of numerical methods utilized in the solution of finite element-based structural optimization problems with emphasis on topology optimization. Typically offered Fall Spring Summer.
https://purdue.curriculog.com/proposal:9853/form

Area Committee C: Chemistry, Engineering, and Physical Sciences, (Suzanne Bart; chair, sbart@purdue.edu):

Graduate Council Document 23-15f, **BME 51000, Neural Mechanisms In Health And Disease** (PWL) Cross-listed with BIOL 51099. Lecture 2 times per week for 75 minutes. Credit 3. Prerequisites: BME 30100 or BIOL 43600 or BIOL 32800, OR Concurrent Prerequisites: BIOL 53800 or BIOL 56200.

An examination of the mechanisms by which nervous systems process information in normal and pathologic states. Cellular and systems-level information processing will be studied with a focus on sensory and motor systems. Students will gain some hands-on experience in the analysis of neural data. Some neuroanatomy will be included to understand how nervous systems are organized. Pathological states such as Alzheimer's, autism, and aging will be studied, both in

terms of understanding the systems and cellular deficits as well as examining potential solutions to improve the outcomes for these neural disorders.
https://purdue.curriculog.com/proposal:24179/form

Graduate Council Document 23-15c, **BME 52300, Embedded Bioinstrumentation** (IUPUI) Lecture 2 times per week for 75 minutes. Credit 3. Prerequisites: BME 22200 or equivalent; and BME 33100 or equivalent or permission of the instructor.

The advent of the current generation of low cost, low power, electronically programmable embedded systems has enabled the development of a new generation of portable medical bioinstrumentation. Biomedical manufacturers are transitioning from in-house built devices, to those taking advantage of these low-power devices. Their use reduces development time, reduces coding error, while improving energy economy, leading to longer up-times, smaller form factors and wider powering solutions. However, implementation of such devices requires the integration of analog interfaces, analog to digital / digital to analog signal conversion, digital filtering and programming in the medical devices arena. Development of devices integrating these various topics with respect to the specialist requirements of medical devices will be taught and reinforced through the development of an embedded microcontroller based biomedical devices.
https://purdue.curriculog.com/proposal:23286/form

Graduate Council Document 23-15d, BME 53000, Imaging Diagnostic Technologies For Medical And Biological Applications (PWL) Lecture 1 time per week for 50 minutes. Credit 3.

This gateway course teaches the physics, engineering techniques associated with modern imaging and diagnostic tools for biological and medical applications. The course covers fundamental principles of radiology, optics, contrast generation (including genetically encoded probes and physiological indicators), image formation, detection, and analysis. The specific biomedical imaging modalities covered include: x-ray, computed tomography, nuclear medicine imaging, ultrasound, optical microscopy and tomography, and MRI. The specific biological microscopy modalities covered include: phase contrast, DIC, confocal microscopy, two-photon microscopy and super-resolution microscopy. The course also teaches the principle concepts of adaptive optics, lightsheet microscopy, 4Pi microscopy, and modern super-resolution microscopy techniques (PALM/STORM, STED and ISM). To bridge the technology and physics with the latest diagnostic advances and biomedical discoveries, research progresses in specific biomedical applications are presented by leading experts in their respective biomedical field such as OCT, ultrasound, MRI, fluorescence microscopy, electron microscopy, concurrent MRI and optical functional imaging, and super-resolution fluorescence microscopy. This course also includes a crash sub-course on MATLAB programming including both introductory content and contents of MATLAB-C API and MATLAB-C-CUDA (GPU computing).
https://purdue.curriculog.com/proposal:15176/form

Graduate Council Document 23-15e, **BME 57200, Engineering Principles Of Biotechnology Applications** (IUPUI) Lecture 2 times per week for 75 minutes. Credit 3.

Explore engineering principles behind modern biotechnology. Examine engineering fundamentals in development, manufacturing modern biopharmaceuticals, biotechnology products. Discuss topics in microbial fermentations, cell growth kinetics, genetic and recombinant engineering, biological thermodynamics. Cover principles in production of biopharmaceuticals: reactor, bioreactor design, bio-separation, chromatography. Topics include recombinant technology, fermentation, reactor design, relevant topics. Permission of department required.
https://purdue.curriculog.com/proposal:24450/form

Graduate Council Document 23-25a, **IPPH 57400, Pharmaceutical Biotechnology** (PWL) Lecture 2 times per week for 75 minutes. Credit 3.

Pharmaceutical biotechnology is the array of scientific and engineering principles used to develop, manufacture, and regulate biologic drugs. Biologic drugs - also known as "biologics" "biopharmaceuticals", or "large molecule drugs" - are medicinal agents derived from living systems, in contrast to more conventional "small molecule drugs" produced by organic chemical synthesis. Since the approval of the first recombinant human insulin in 1982, biologics have grown from niche products to occupy a prominent place in the pharmaceutical armamentarium. Today, biologics provide innovative treatments for a host of previously intractable diseases, including cancers, autoimmune disorders, and diabetes. The global biologics market was more than $300 billion in 2019, accounting for 20-25% of all pharmaceutical sales. This course introduces students to pharmaceutical biotechnology. The five didactic sections of the course present: (i) the biotech drug market, (ii) cellular and molecular biology foundations, (iii) formulation and stability of biotech drug products, (iv) analytical methods for quality assurance, and (v) manufacturing methods. In the sixth and final section of the course, students will present case studies on currently approved biotech drugs, integrating and applying what they've learned. The course is intended for beginning graduate students in the Departments of Industrial and Physical Pharmacy, Chemical Engineering, and Biomedical Engineering. The course may also be suitable for well-qualified upper-division undergraduates. Permission of department required.
https://purdue.curriculog.com/proposal:23433/form

Area Committee E: Life Sciences, (Richard Grant, chair; rgrant@purdue.edu):

Graduate Council Document 23-5c, **BIOL 51201, Advanced Cell Biology** (IUPUI) Lecture 2 times per week for 75 minutes. Credit 3. Prerequisites: BIOL 32200 and BIOL 32400 and BIOL 33100. A minimum of B is required in all prerequisite courses.

This course provides detailed analysis of cell biology, gene regulation and applications of cell biology and genetics. This is a lecture, literature and presentation driven course that utilizes an advanced graduate level textbook as a foundation to dive into recent primary literature on new and emerging topics in cell biology.
https://purdue.curriculog.com/proposal:23997/form

Graduate Council Document 23-29a, **BTNY 69200, Graduate Professional Practice** (PWL) Experiential. Credit 0 to 3.

An internship experience with a for-profit, non-profit, or government entity to complement the student's academic coursework. The student must present a letter from the proposed employer documenting the work and expectations expected to be undertaken and must find a Botany and Plant Pathology faculty advisor/instructor to oversee the experience. Course may be taken in successive semesters. Permission of instructor required.
https://purdue.curriculog.com/proposal:24463/form

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

Graduate Council Document 23-22a, **MGMT 56300, Machine Learning For Business Analytics** (PWL) Lecture 2 times per week for 100 minutes for 8 weeks. Distance. Credit 2. Prerequisites: MGMT 57100 AND MGMT 58600.

With the rise in big data, Machine Learning has experienced rapid growth over the last ten years with major advances in its subfields of Deep Learning, Reinforcement Learning, Natural Language Processing, Computer Vision, Robotics, and other subfields. The purpose of this course is to provide the students with a systematic introduction to the recent developments in machine learning through the coverage of modern machine learning concepts and practical business applications, as well as hands-on experience with modern machine learning frameworks. The course plans to cover neural nets, convolutional neural networks, recurrent networks, deep generative models, deep reinforcement learning, and the trustworthy AI framework with the properties of safety, robustness, privacy, and fairness.
https://purdue.curriculog.com/proposal:24332/form

Graduate Council Document 23-22b **MGMT 56700, Deep Learning For Business Analytics** (PWL) Lecture 2 times per week for 100 minutes for 8 weeks. Distance. Credit 2. Prerequisites: MGMT 58600.

With the rise in big data, Machine Learning has experienced rapid growth over the last ten years with major advances in its subfields of Deep Learning, Reinforcement Learning, Natural Language Processing, Computer Vision, Robotics, and other subfields. The purpose of this course is to provide the students with a systematic introduction to the recent developments in deep learning through the coverage of modern machine learning concepts and practical business applications, as well as hands-on experience with modern machine learning frameworks. The course plans to cover neural nets, convolutional neural networks, recurrent networks, deep generative models and deep reinforcement learning.
https://purdue.curriculog.com/proposal:24331/form

Graduate Council Document 23-22c **MGMT 58700, Using R For Analytics** (PWL) Lecture 2 times per week for 100 minutes or 1 time per week for 200 minutes for 8 weeks. Distance. Credit 2. Prerequisites: MGMT 30500 or MGMT 67000 or Equivalent Statistics course.

R has been one of the leading open-source programming languages used by analytics professionals today. You will develop the ability to interpret and modify R code to perform data analysis using the popular RStudio integrated development environment (IDE). During the first four weeks programming syntax, data structures, logic, functions, data loading, data reshaping, and shiny tool creation will be discussed to establish the necessary foundation to turn your data into insights using R. In every class we will discuss and apply a new R library or set of functions. During the last three weeks of the course you will perform descriptive, predictive, and prescriptive analytics with R. Assignments are both conceptual and hands-on exercises. The culmination of this course entails a final team project where you design, develop, and present a working Shiny application prototype that integrates descriptive, predictive, and prescriptive analytics to support a business problem. Permission from department required.
https://purdue.curriculog.com/proposal:22014/form

Graduate Council Document 23-22d **MGMT 63610, Business Ethics** (PWL) Lecture 2 times per week for 100 minutes or 1 time per week for 200 minutes for 8 weeks. Distance. Credit 2 or 3.

This course is designed to move past a surface level understanding that we need to act ethically in the business environment to wrestling with what does that look like and what frameworks can help us do just that. I also firmly believe that we have to prethink our decisions before we are confronted with opportunities to compromise ethically. We will incorporate current headlines to our evaluation of major ethical lapses of the past.
https://purdue.curriculog.com/proposal:23477/form

Graduate Council Document 23-23a **OBHR 66310, Leader Communication & Negotiation** (PNW) Lecture 1 time per week for 100 minutes. Distance. Credit 1 to 4.

The best leaders are effective communicators and negotiators. They know how to use all the levers at their disposal to engage, inform, persuade, inspire, and instill confidence in key stakeholders. They look at each interaction as an opportunity to advance their agenda and/or achieve a specific outcome. This course will examine key internal and external engagement moments through your lens as an individual leader. Students will learn how to map communications best practices to real-world scenarios and make use of frameworks and guidance that will improve their ability to effectively use communications to help teams/organizations navigate issues. Students will also dissect the nature of negotiations, understand frameworks for building strategies for effective negotiations and explores the nature of conflict and conflict resolution.
https://purdue.curriculog.com/proposal:24072/form