

**WORCESTER POLYTECHNIC INSTITUTE**  
**February 13, 2020**

**To:** The WPI Faculty

**From:** Tanja Dominko  
Secretary of the Faculty

The sixth Faculty meeting of the 2019-2020 academic year will be held on **Thursday, February 13, 2020 at 3:15 pm in Olin Hall 107.**

- |   |                          |
|---|--------------------------|
| 1. Call to Order  | T. Dominko               |
| • Approval of the Agenda  |                          |
| • Approval of the Consent Agenda and the Minutes from 1-16-2020 |                          |
| 2. Welcome  | T. Dominko               |
| 3. President's Report   | L. Leshin                |
| 4. Provost's Report   | W. Soboyejo              |
| 5. Other Reports  |                          |
| • <b>Update on WPI Forward</b>                                  | J. Solomon/<br>A. Morton |
| 6. Committee Reports  |                          |
| • <b>Committee on Governance</b>                                | G. Gaudette              |
| Motion to endorse formation of Aerospace Department             |                          |
| • <b>Committee on Academic Policy</b>                           | G. Heineman              |
| Motion to modify Commencement Policy                            |                          |
| 7. New Business   |                          |
| 8. Closing Announcements  |                          |
| 9. Adjournment  |                          |

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## Consent Agenda

WORCESTER POLYTECHNIC INSTITUTE

### Faculty Meeting Minutes

January 16, 2020

#### Summary:

1. Call to Order
2. Welcome
3. Committee Reports: CAP
4. Reports: Implementation of Global School – an update
5. Reports: WPI Journal as a faculty resource
6. Adjournment

#### Detail:

##### 1. Call to Order

The fifth Faculty meeting of the 2019-2020 academic year was called to order at 3:21pm in Olin Hall 107 by **Prof. Dominko (BBT)**. The agenda and consent agenda (including the minutes from the December 12, 2019 Faculty meeting, with one slight modification) were approved. She reminded everyone that the meeting is being recorded.

##### 2. Secretary of the Faculty Report

**Prof. Dominko** introduced **Prof. Simeoni** (Chair, FPE), who introduced new Faculty member **Prof. James Urban** (FPE). She then introduced **Prof. Jing Xiao** (Chair, RBE), who introduced new Faculty member **Prof. Xiangrui Zeng** (RBE). Both new Faculty members joined WPI in January 2020.

##### 3. Committee Reports

###### CAP

**Prof. Heineman** (CS), for the Committee on Academic Policy (CAP), shared a presentation on the Online Course Reporting System. (See **Addendum #1** attached to these minutes).

The new course reporting system is an online resource to access all of the recent course reports that are not posted on BannerWeb. Access to the system will be sent out to all students on January 17, 2020. Any questions can be directed to [coursereports@wpi.edu](mailto:coursereports@wpi.edu).

**Prof. Rundensteiner** (CS) asked if the access could be available earlier. Prof. Heineman stated that the committee tried to come up with a reasonable compromise on timing that would work for everyone. Ms. Kristin McAdams (Director, Academic Programs) verified that the opening was coordinated with the opening of the course report period.

**Prof. Humi** (MA) asked if it would be possible to make the deadline the day before the final day of classes. Prof. Heineman stated that this can be discussed in the committee.

**Prof. Fehribach** (MA) proposed the idea of timing the course reports, such as graduate courses being due 2 weeks before the end of the class. Prof. Heineman indicated that the goal is to get the system fully automated. Different timing would be easier with an automated system.

**Prof. Gericke** (CBC) asked about the concern linked with the ability for anyone to print a pdf of the course reports. He is concerned about online bullying of faculty. Prof. Heineman said that this is not a big concern since the banner system presented the data in a similar way. The system was designed so that exporting a pdf would be very tedious and screenshots are the only way to save a pdf. He also assured Prof. Gericke that the use of the system would be monitored.

**Prof. Weathers** (BBT) asked if there was a way to link the system through canvas so the instructor could set the deadlines for the course reports. Prof. Heineman said that the website is linked with Class Climate, which is currently available through canvas, but the course report system is too manual to fully link with canvas. If it is automated, this could be a possibility.

**Dean Rissmiller** (*interim* IGSD) let everyone know that the same problem can be seen with IQP reports. They were collected, but can no longer be seen.

**Prof. Nandram** (MA) was concerned with fewer people submitting course reports through the online system. Prof. Heineman confirmed that concern and added that this rate further decreases as the year goes on. He mentioned that advertising the due date to students could potentially increase the response rate. Working with SGA could help advertise the due dates.

**Prof. Dominko** (BBT) asked about what the course reports are used for. **Dean Heinricher** (UGS) stated that he reviews responses at the end of each semester. Depending on the results, he may have a discussion with department heads. He mentioned that the data is supposed to start conversations and not end them. Prof. Dominko reminded everyone of Prof. Aravind's recent email, which pointed to the recently published article in Physics Today, entitled "Re-Evaluating Future Evaluations in Higher Education", and that copies of that article were available at the meeting. He was not the only Faculty member who was concerned with this matter, and perhaps there is a need to start discussing these evaluations, and how they are used to evaluate teaching.

**Prof. Sakulich** (CEE) wondered about a survey fatigue, because of so many surveys being circulated. Prof. Heineman spoke about how it is helpful to gain an insight as to how students are feeling. **Prof. Cowlagi** (ME) stated that perhaps a better response rate would be achieved if a specific note could be included in the evaluation, stating exactly what the evaluation would then be used for. Prof. Heineman responded by explaining that this is a way to customize the software, which can be used once it is automated.

**Prof. Skorinko** (SPSS) questioned the presence of potential biases and increased biases due to evaluations being available for students to read prior to course selection. Prof. Heineman said they will look into doing comparisons during the summer regarding different biases between paper reports and the online version.

**Prof. Nandram** (MA) asked about the number of questions on the evaluation. Prof. Heineman stated that the committee had reduced the number of questions.

## CAP

**Prof. Heineman** (CS), for the Committee on Academic Policy (CAP), shared a presentation on the Policies and Practices Guiding MQP Projects. (See **Addendum #1** attached to these minutes).

Four years ago WPI faculty approved the policy that allowed students to be compensated while receiving credit for project work or internship. This was a temporary policy, requiring that a report be presented to the faculty on its need and actual use. As of January 2019 the policy expired and current policy does not allow for compensation of students while they receive credit. He stated that only 8 students took advantage of the policy in the past years. He urged all to help the committee identify any additional students that may have taken advantage of the policy.

**Prof. Gaudette** (BME) was concerned that master agreements that were prepared by the General Counsel violate WPI policy. Prof. Heineman stated that General Counsel was trying to help by drawing up a standard boilerplate agreement, but that it wasn't entirely accurate. He also stated that there is a meeting set up to rectify the situation and bring the agreement in line with the policy. He explained that this will be easy to correct, and that perhaps General Counsel should have asked the Faculty first, but that he believes they were trying to be helpful.

## 4. Reports

### Implementation of The Global School – an update

**Dean Rissmiller** (*Interim*, IGSD) and **Dean McNeill** (*Interim*, School of Engineering) presented an update on the Implementation of The Global School. They introduced the Implementation Committee Members and the committee's charge. (See **Addendum #2** attached to these minutes.)

**Prof. Humi** (MA) inquired about the resources needed for the Global School programs. Dean Rissmiller stated that these programs are being promoted by current faculty members who have specific ties with these proposed areas already. Prof. Humi stated that when these faculty members are away at these locations, additional faculty to teach these courses are needed on campus, pointing to a major budget issue. Dean Rissmiller agreed that this will cost money. He indicated the ties developed in different countries are slowly developing and highlighted Switzerland where partners are interested in both research collaborations and students' interests.

Dean McNeill gave a brief update on the Dean of the Global School search. He stated that the search committee was formed by Faculty Governance and the Administration, with a balance of tenure-track and non-tenure-track Faculty, the position description has been approved, and the Search firm has begun looking for possible candidates from widely varied backgrounds (about 200 preliminary candidates). He stated that first-round interviews would be conducted in February/March; campus interviews in April/May; goal for final decision would be made in June; and the launch of the Global School would take place on October 8 and 9, 2020. Dean Rissmiller stated that this launch and the launch of The Campaign were purposely coordinated to happen at the same time.

A Faculty member asked about a prior notification that Global School would start offering programs in the Fall of 2020, and asked if they would still be doing so, assuming the launch wasn't until October. Dean Rissmiller stated that the goal was to have the students begin enrolling for the Fall of 2021.

**Prof. DiBiasio** (CHE) asked if candidate names could be submitted directly to the committee, or if they had to go through the search firm. Dean Rissmiller said any names should be sent to the Co-Chairs of the committee, Dean Jean King and Prof. Stoddard.

**Prof. Dominko** (BBT) asked if the position had been posted. Dean Rissmiller stated that it would be released tomorrow or Monday.

**Prof. Heineman** (CS) asked how the success of any new programs will be measured. Dean Rissmiller stated that that question still needs some attention, and that all five proposed graduate programs would not launch at the same time, but gradually, and see if the revenue support the costs.

**Prof. Xiao** (RBE) asked if these students will be mostly master-level students. Dean Rissmiller confirmed that, and stated that there may be opportunity for PhD students, though not at the initial launch. **Prof. Xiao** further asked if these students would be online and on-campus. Dean Rissmiller clarified that both on campus and online delivery will be considered.

**Prof. Weathers** (BBT) asked if all these students would be paying full tuition. Dean Rissmiller stated that he was unsure that all would, that some suggestions were made to provide some financial aid, as well as teaching assistantships or research assistantships.

**Prof. Xiao** (RBE) asked whether any funding agencies have been identified that would be interested in supporting global programs. Dean Rissmiller stated that no proposals have been submitted to any agency as of yet. He stated that opportunities also existed among alumni donors.

**Prof. Simeoni** (FPE) asked how these programs would articulate and integrate with existing programs. Dean Rissmiller stated that there had been talks about joint appointments, such as Global/Biology and Global/Social Sciences; and opportunities for Humanities as well. He explained that the goal was to integrate and elevate existing sources.

**Prof. Gaudette** (BME) stated that there are many goals with the engineering departments as well, and hopes that is looked into as well. He asked about the financial projections, originally presented a year ago, and whether WPI Forward will change those projections. Dean Rissmiller stated that nothing has changed thus far, but that it probably would, with the timing of hiring tenure-track faculty across the University, but that the goal is to build on where we have existing strengths.

**Prof. Boudreau** (HUA) questioned why financial aid for new graduate students is being considered when financial aid for the undergraduates is the reason why there are discouraging cuts on the table. Dean McNeill explained that, on the undergraduate side, the gap is because we

have assumed a certain discount rate historically, and due to the market changing, we cannot assume that discount rate going forward. This has never been done on the graduate side, so the goal is to maximize revenue in the graduate program.

Dean Rissmiller also stated that they were hoping the market research will answer questions like, will this program be more valuable if it were 12 or 15 months, since it would be less costly to students, or more valuable if it were two years and generate higher level of credibility with employers/students. They are also looking at the possible timing of these programs, i.e. start in the summer and end in the summer, and be 15 months at a lower cost to the students.

**Prof. Weathers** (BBT) asked why the market research was being conducted now, when it should have been done years ago. Dean McNeill stated that the research has indeed been going on for some time now, but more rigorously as of late. Dean Rissmiller also added that it has taken a long time, and involve many people, to bring enough clarity to these graduate proposals to be able to do the market research.

**Prof. Heineman** (CS) asked if there are any programs nation-wide that are comparable at the structural level. Dean Rissmiller spoke about the Tisch School at Tufts University, which doesn't have a curriculum and graduate programs, but touches every student, which is somewhat comparable. He explained that our goal is something that is recognizable and that is distinctively WPI - engaging technologies with global challenges. This is not the approach used by The Hopkins School of International Studies, The Kennedy School, or The Wilson School. He continued that WPI's approach to these global challenges is unique because it's a combination of society and technology expertise.

**Prof. Xiao** (RBE) asked about funding for travel that will be needed for these programs. Dean Rissmiller stated that tuition would need to support the programming and yet still provide revenue. He stated that net revenue would be returned to WPI, but that revenue would cover costs for travel.

**Prof. Sakulich** (CEE) inquired about the market research that has been done, who is doing it, how are they doing it, and when the results will be public. He stated that, as an engineer, decisions are usually based on numbers, not hope and confidence. Dean McNeill reported that there is representation on the committee from CPE, who has vast experience in identifying markets and revenues. Dean Rissmiller stated that preliminary market research results should be available by the end of the January.

**Prof. Gaudette** (BME) inquired whether market research is also looking at job opportunities for participating students. Dean Rissmiller stated that another opportunity here is an international engineering program, which has received a lot of industry support for educating engineers that are bilingual and have multicultural experience.

**Prof. Boudreau** (HUA) asked about projected timeline to recover costs for the programs and if costs are not recovered, what the plan would be. She also asked if there would be a review process of school's performance. Dean Rissmiller stated that the 2021 enrollment would show tuition revenue and show if it will cover incremental costs. He also stated that he thinks there should be a review process every year to monitor the situation closely.

**Prof. Richman** (ME) asked if the Trustees, as WPI fiduciaries, had shared any budgetary models or expectations for the programs. Dean Rissmiller stated that the committee had shared the plan with the Trustees, not the other way around, that the Trustees do not do program development.

WPI Journal as a Faculty Resource

Ms. Doreen Manning (Magazine Editor) gave a brief presentation of the importance of the WPI Journal and its usefulness as a resource to Faculty members. She urged faculty to act as WPI ambassadors when they are off campus and that WPI Journal is a valuable “business card” to share with audiences when travelling.

8. Adjournment

Meeting was adjourned at 4:40pm by **Prof. Dominko**.

Respectfully submitted,

Tanja Dominko  
Secretary of the Faculty

**Addenda on file with these minutes:**

1. Addendum #1 CAP, Online Course Reporting System – January 16, 2020;  
CAP, Policies and Practices Guiding MQP Projects – January 16, 2020
2. Addendum #2 Implementation of The Global School update – January 16, 2020

## **Consent Agenda Motions**

**CAO** Add IMGD 4030

**CAO** Add Audio & Music Concentration to IMGD (BA) Major

**CAO** Add the permanent course PSY3400

**CAO** Add a Diversity Science Concentration to the Psychological Science Major

**CGSR** Change credit range for GQP in Data Science

**CGSR** Modify BS/MS credit requirements in Computer Science

**CGSR** Change description of MA 504

**Date:** February 13, 2020  
**To:** The WPI Faculty  
**From:** Committee on Academic Operations (Prof. Mathisen, Chair)  
**Re:** Motion to add IMGD 4030: Advanced Topics in Interactive Audio approved by IMGD Steering Committee on December 5, 2019.

**Motion:** The Committee on Academic Operations recommends and I move that the following Category II permanent course (IMGD 4030: Advanced Topics in Interactive Audio) be approved for AY20-21.

**Course/Catalog description:**

**IMGD 4030. Advanced Topics in Interactive Audio.**

*Cat. II.*

This course provides students the opportunity to gain hands-on proficiency with the complete audio development pipeline for interactive applications, from concept and asset creation to post-production and integration. Topics may include custom recording techniques; procedural audio generation; audio object states and conditions; asset management; automated effects processing; and spatial presentation of audio in stereo, surround and mixed/virtual reality formats.

Recommended background: Prior experience with editing and mixing techniques on a digital audio workstation (such as provided by IMGD 2030), together with experience in studio and field recording of audio and voices (such as provided by IMGD 3030).

**Anticipated instructor:** Keith Zizza, Scott Barton, Charles Roberts or other qualified instructors.

**Expected enrollment:** Expected enrollment is 20-24 students, based on recent demand for IMGD 3030. The course will be capped at 24 to accommodate the capacity of the IMGD Lab (Fuller 222).

**Intended audience:** IMGD majors and minors, and students from other disciplines interested in advanced audio production.

**Rationale:** Audio is an essential component of digital media. Effective sound design can be used to guide user behavior, and enhance the immersion and depth of interactive experiences. This course offers in-depth understanding of the theory and tools needed to produce audio content for interactive applications, together with insight into the role of the sound designer on a production team.

**Outcomes:** The IMGD degree is designed to ensure that students have a broad understanding of artistic and technical areas related to interactive media and game development. This course will allow enable faculty to teach advanced topics that build upon existing IMGD audio courses, emphasizing the importance of audio in the creation of interactive applications, which is often overshadowed by graphics.

**Impact on distribution requirements and other courses:** This course will count towards the distribution requirement of 5/3 units of IMGD in the IMGD Technology (BS) major, either the

8/3 IMGD units or 2/3 Focus Pair units requirement in the IMGD (BA) major, or as 2 graduate credits towards the Elective Course requirement of the IMGD MS degree.

**Implementation date:** Implementation date for this action is AY 20-21, beginning in D21 and offered in alternate years thereafter.

**Resource needs:**

- This course will be offered within the available loads of current faculty and/or new faculty hires already in-process.
- Classes will require no additional technology or facilities beyond the computer and interaction labs already maintained by IMGD.
- Laboratory: N/A
- Library resources: N/A.
- Information Technology: Students will be expected to purchase a personal license for Tsugi Procedural Audio software (estimated @ \$175), in lieu of a text book. No other software needs are anticipated beyond what is already available in the computer and interaction labs maintained by IMGD.

**Assessment:** This course will be assessed based on the aesthetic and technical quality of the student work produced in the course assignments. Student feedback, particularly the outcomes of questions 1, 2, 7, and 19 of student course evaluations, and instructor feedback and reflections will also be taken into account.

**Date:** February 13, 2020

**To:** The WPI Faculty

**From:** Committee on Academic Operations (Prof. Mathisen, Chair)

**Re:** Motion to Add Audio & Music Concentration to IMGD (BA) Major approved by IMGD Steering Committee on December 5, 2019.

**Motion:** The Committee on Academic Operations recommends and I move that an Audio & Music concentration be added to the IMGD (BA) major in AY2020-21, as described below.

### **Rationale**

Students pursuing the current IMGD (BA) major may, at their option, choose to focus their studies in one of four areas of concentration:

- Visual Art
- Design
- Technical Art
- Writing

However, the field of IMGD encompasses other skill sets of critical importance to both prospective students and their future employers. The ability to meet the unique creative and technical challenges of producing audio and music for interactive media and games is prominent among these.

Recent faculty hires, new MU course offerings and a proposed 4000-level Advanced Topics in Interactive Audio course (described in an accompanying motion) have substantially expanded IMGD's ability to serve this key competency area.

The addition of an optional Audio & Music concentration to the IMGD (BA) major will broaden the scope, appeal and diversity of the IMGD program, expanding it to address the evolving needs and expectations of both students and industry.

### **Implementation**

The distribution requirements of the IMGD (BA) major currently require all students to choose 2/3 units from any one of the following IMGD Focus Pairs:

- Technical Game Development I & II (IMGD 3000 + 4000)
- Artistic Game Development I & II (IMGD 3500 + 4500)
- Digital Game Design II & Digital Game Design Studio (IMGD 3900 + 4900)
- Writing Narrative for IMGD & Advanced Storytelling: Quest Logic and Level Design (IMGD/WR 3400 + IMGD 4700)

All IMGD (BA) majors must also complete a 4/3 IMGD Electives requirement.

Concentrations are earned by choosing the IMGD Focus Pair relevant to their topic (IMGD 3500 + 4500 for Visual/Technical Art, IMGD 3900 + 4900 for Design, IMGD 3400 + 4300 for Writing), and completing a topic-specific selection of 4/3 IMGD Electives.

Students who choose to pursue the proposed Audio & Music Concentration will be expected to:

1. Satisfy the 2/3 units IMGD Focus Pair requirement by choosing a newly-created pair consisting of Game Audio II and the concurrently proposed Advanced Topics in

Interactive Audio course (IMGD 3030 and 4030). NOTE: These courses will also satisfy the Focus Pair requirement of the IMGD BA degree with no concentration.

2. Satisfy the 4/3 units IMGD Electives requirement by choosing:
  - 1/3 unit from any of:
    - Foundations of Music Technology (MU 2300)
    - Music and Mind (MU 2501)
    - Fundamentals of Music II (MU 2611)
    - Men's Glee Club (MU 2631)
    - Alden Voices (MU 2632)
    - Brass Ensemble (MU 2633)
    - Jazz Ensemble (MU 2634)
    - Stage Band (MU 2635)
    - Concert Band (MU 2636)
    - String Ensemble (MU 2637)
    - Vocal Performance Lab (MU 2638)
    - Music Composition (MU 2723)
    - Jazz Theory (MU 2730)
    - Making Music with Machines (MU 2801)
    - Other 2000+ level audio or music courses subject to program approval
  - 1/3 unit from any of:
    - Jazz History (MU 2719)
    - Music History I (MU 2720)
    - Music History II (MU 2721)
    - History of American Popular Music (MU 2722)
    - World Music (MU 3001)
    - Other 2000+ level music history courses subject to program approval
  - 2/3 units from any of:
    - Arranging and Orchestration (MU 3002)
    - Topics in MIDI (MU 3614)
    - Topics in Digital Sound (MU 3615)
    - Topics in Interactive Programming (MU 3616)
    - Electronic Music Composition (MU 3620)
    - Other 3000+ level audio or music courses subject to program approval
3. Contribute substantially to the audio and music aspects of their Major Qualifying Project, as determined by the project advisor(s).

### **Resource Impact**

The proposed revisions to the IMGD (BA) major require no change in current IMGD or HU&A faculty count or physical/administrative resources, as all relevant courses are already offered (excepting the proposed IMGD 4030) by IMGD and HU&A on a regular basis, and will continue to serve the same number of students.

Course scheduling can meet all intended course offerings with enough flexibility to offer more sections of high demand courses, enabling us to meet programmatic goals and respond to student demand.

### **Implementation Date**

The proposed Implementation date for this action is AY2020-21.

### **Proposed Catalog Revisions**

It is proposed that the above revisions to the IMGD (BA) major be formally documented by the following amendments to the language in WPI's undergraduate catalog. Additions and changes are indicated in red.

### **IMGD FOCUS PAIR**

Choose 2/3 units from one of the following IMGD course pairs:

- **Audio & Music**
  - **Game Audio II and Advanced Topics in Interactive Audio (IMGD 3030 and 4030)**

### **IMGD CONCENTRATIONS**

Students pursuing the IMGD major may, at their option, choose to focus in one of ~~four~~ five topics of concentration:

- Visual Art
- Design
- Technical Art
- Writing
- **Audio & Music**

### **Audio & Music Concentration**

Students taking the Audio & Music Concentration must:

1. Satisfy the 2/3 units IMGD Focus Pair requirement by choosing **Game Audio II and Advanced Topics in Interactive Audio (IMGD 3030 and 4030)**.
2. Satisfy the 4/3 units IMGD Electives requirement by choosing 1/3 unit from any of:
  - **Foundations of Music Technology (MU 2300)**
  - **Music and Mind (MU 2501)**
  - **Fundamentals of Music II (MU 2611)**
  - **Men's Glee Club (MU 2631)**
  - **Alden Voices (MU 2632)**
  - **Brass Ensemble (MU 2633)**
  - **Jazz Ensemble (MU 2634)**
  - **Stage Band (MU 2635)**
  - **Concert Band (MU 2636)**
  - **String Ensemble (MU 2637)**
  - **Vocal Performance Lab (MU 2638)**
  - **Music Composition (MU 2723)**

- Jazz Theory (MU 2730)
  - Making Music with Machines (MU 2801)
  - Other 2000+ level theory or practice courses subject to program approval
  - 1/3 unit from any of:
    - Jazz History (MU 2719)
    - Music History I (MU 2720)
    - Music History II (MU 2721)
    - History of American Popular Music (MU 2722)
    - World Music (MU 3001)
    - Other 2000+ level music history courses subject to program approval
  - 2/3 units from any of:
    - Arranging and Orchestration (MU 3002)
    - Topics in MIDI (MU 3614)
    - Topics in Digital Sound (MU 3615)
    - Topics in Interactive Programming (MU 3616)
    - Electronic Music Composition (MU 3620)
    - Other 3000+ level production courses subject to program approval
3. Contribute substantially to the audio and music aspects of their Major Qualifying Project, as determined by the project advisor(s).

### **Tracking sheet**

Tracking sheets for the IMGD (BA) major are used as guides for student advising. A tracking sheet for the proposed Audio & Music concentration appears below.

**Date:** February 13, 2020

**To:** The WPI Faculty

**From:** Committee on Academic Operations (Prof. Mathisen, Chair)

**Re:** Motion to add the permanent course PSY3400: Survey Design and Methodology

Approved by the Psychological Sciences program on 10/29/19

Approved by the Social Science & Policy Studies Department on 11/06/19

**Motion:** The Committee on Academic Operations recommends and I move that, that PSY3400 as described below, be added.

**Course/Catalog Description:**

PSY 3400 Survey Design and Methodology (Cat. II).

Surveys are everywhere. But good surveys based on sound social science are rare. Conducting a successful survey requires familiarity with the methods and techniques developed by psychologists and other social scientists through long experience to ensure the accuracy, reliability, and validity of survey data. This course will focus on the common mistakes of first time survey researchers and ways to avoid them. Topics covered will include alternatives to survey research, sampling, response rates, questionnaire design and implementation, question wording, pretesting, ethical issues in survey research, and communicating survey results. Special attention will be given to issues related to the use of on-line survey platforms. During the course students will be guided through the development, implementation, and analysis of a survey on a topic of their own choosing.

This course is an appropriate methodology course for psychology and other social science majors and can also be taken by students of all majors as preparation for a survey-based IQP or MQP.

Recommended background: background in psychological science such as social or cognitive.

Students who completed PSY340X cannot receive credit for PSY3400.

**Anticipated Instructor:** Prof. James Doyle

**Rationale:** This course offers students a review of evidence-based survey methods as well as gives them the practical experience necessary to develop their own survey projects from conceptualization through design and pretesting. For psychology majors it helps develop skills necessary for the successful completion of MQPs that include experiments on human subjects. For psychology minors it offers a different way for students to complete the capstone requirement beyond PSY3500, which is offered in alternate years. The program has enough students now that a methodologically oriented capstone course needs to be offered every year to enable students to complete their minor. The course also provides methodological preparation for students majoring in other fields who are planning to conduct survey research as part of their MQP or IQP. As an upper level capstone course aimed primarily at psychology students, enrollment is expected to be modest (there were 10 students in the most recent offering), but to grow as the psychology program continues to grow and as other social science students become aware of the opportunity once it is a permanent part of the curriculum.

**Note Changes to Catalog:** PSY 3400 Survey Design and Methodology shall be added to the catalog.

**Results of previous offerings:** The course has been offered on an experimental basis in terms A14, A16, and A18. Enrollments increased from 6 to 10 students in the most recent offering. The student course report results for questions 1, 2, 9, and 26b appear in the following table:

Course 340X				
Year and (N)	Q # 1	Q # 2	Q # 9	Q # 26b
2014 (N=6)	4.5	4.5	4.5	6-10*
2016 (N=6)	4.0	3.7	3.5	1-5*
2018 (N=10)	4.3	4.6	4	6-10*

\* These responses represent the mode.

It took some time for this course to find its audience. In 2016 in particular the course enrolled mostly non-psychology students, some of whom did not have a strong reason (e.g., an upcoming survey project) for being in the course.

However, the course was very favorably reviewed by students in its first and most recent incarnation. The larger enrollment and increased participation by psychology students in 2018 helped the instructor to more effectively incorporate group projects into the course and to form teams of students with complementary skills.

The course incorporates 4 homework assignments and associated discussions in which students learn about methodological do's and don'ts by critiquing and writing about the survey research projects of others. And throughout the term students work in teams in a workshop setting to design, develop, and evaluate a survey instrument on a topic of their own choosing. The learning outcomes of the course include the following:

By the end of this course students will:

1. Gain the knowledge and skills needed to conduct an ethical, rigorous, scientifically defensible survey.
2. Learn to be an informed critic of surveys they encounter in their daily and professional lives.
3. Develop an appreciation for the science behind methodological choices in the conduct of a survey.

The Psychology Program Review Committee has met with the instructor to review the course and is confident that these learning outcomes have been largely achieved.

**Implementation Date:** Implementation date for this action is term A of the 2021-2022 Academic year. It will offered every other year starting in A2022 (as per Category II courses) typically in A term.

**Resource Needs:**

Please summarize basic resources needed to deliver this course, including the following:

- Builds off the expertise of Professor Doyle

- 15-person classroom with basic electronic set up
- No special laboratory space needed
- No special library resources needed
- No special information technology needed

Prof. Doyle will teach this course as part of his regular teaching schedule.

**Impact on Distribution Requirements and Other Courses:**

No changes in the distribution requirements for the Psychological Sciences major are required by the introduction of this course. It counts toward the 4 unit distribution requirement in “Psychological Science” and may be used to fulfill the Note 1 requirement for “experimental design.” It is intended to serve an alternative methodological offering for psychology majors and minors in years when PSY3500 is not offered.

The course could also be taken by other social science majors looking to add to their methodological expertise.

Like all courses in psychology, PSY3400 may be used toward the university-wide general education requirement in social science.

**The original experimental course proposal is appended below.**

March 31, 2014

To: William Clark, Chair, Committee on Academic Operations

From: Jim Doyle, Head, Department of Social Science and Policy Studies

Re: Proposed course changes in Psychology approved by SSPS on 3/3/14

**Proposal #2: New Experimental Course PSY340X**

The Social Science and Policy Studies Department requests approval to offer an experimental course, PSY340X, in term A14 and A15

Contact: Jim Doyle

Preferred term: A14

Expected enrollment: 15-20. This course is expected to draw all junior and senior psychology majors and minors, about 10 students. In the long run it is hoped the course will draw at least an equal number of students taking the course as preparation for a survey-based IQP.

Intended audience: This course is intended primarily to strengthen the methodological training of psychology and other social science majors and minors prior to or concurrent with the MQP. The course is also appropriate for nonmajors seeking to develop their skills in survey research. It is hoped that over time this course will become seen as necessary preparation for students conducting on-campus survey-based IQPs.

Course background needed: PSY 1402 or SOC1202 is recommended.

Anticipated Instructor: This course will be taught by Jim Doyle.

Catalog description:

***PSY 340X. Survey Design and Methodology***  
*Cat. II.*

Surveys are everywhere. But good surveys based on sound social science are rare. Conducting a successful survey requires familiarity with the methods and techniques developed by psychologists and other social scientists through long experience to ensure the accuracy, reliability, and validity of survey data. This course will focus on the common mistakes of first time survey researchers and ways to avoid them. Topics covered will include alternatives to survey research, sampling, response rates, questionnaire design and implementation, question wording, pretesting, ethical issues in survey research, and communicating survey results. Special attention will be given to issues related to the use of on-line survey platforms. During the course students will be guided through the development, implementation, and analysis of a survey on a topic of their own choosing.

This course is an appropriate methodology course for psychology and other social science majors and can also be taken by students of all majors as preparation for a survey-based IQP.

Recommended background: Social Psychology (PSY1402) or Introduction to Sociology and Diversity (SOC1202) or equivalent.

Rationale:

This course adds to the upper level offerings in psychology that are aimed primarily toward psychology majors and minors, as recommended by a recent departmental external review, and strengthens the methodological preparation of our students. It also fills a need for the many on-campus IQP students conducting survey-based projects, who currently have no opportunity to learn the basics of how to conduct a proper survey before embarking on their projects.

Resource requirements: No additional resources are needed to offer this course. A forthcoming proposal to drop 2 STS courses will free up some resources to be applied elsewhere. Existing library and IT resources are adequate. There are no special classroom requirements.

Assessment: This course will undergo the typical assessment procedures (instructor self-evaluation, student course evaluations). The Psychological Science Program Review Committee

will meet with the instructor after the first offering to review the success of the course in achieving its objectives. The report to CAO will include data from questions 1, 2, 9, and 26(a and b) from the student course reports.

**Date:** February 13, 2020

**To:** The WPI Faculty

**From:** Committee on Academic Operations (Prof. Mathisen, Chair)

**Re:** Motion to add a Diversity Science Concentration to the Psychological Science Major approved by Psychology Program Faculty and SSPS Faculty on October 9, 2019.

**Motion:** The Committee on Academic Operation recommends and I move, that a concentration in Diversity Science be added as described below.

**Rationale:** We propose to add a concentration in Diversity Science to the Psychological Science Major. Diversity Science is the psychological study of under-represented groups based on race, ethnicity, gender, disability, etc. Diversity Science typically focuses on stigma, stereotyping, prejudice, discrimination, and cultural variations. Diversity Science is becoming an important and integral part of psychological science research and teaching. Furthermore, a few schools have made a commitment to Diversity Science at the undergraduate level. For instance, UCLA has recommended resources for undergraduate students (see UCLA: <https://diversity.psych.ucla.edu/undergraduate-student-resources/>), and the University of Illinois has created a concentration in Diversity Science for their Psychological Science Major (see University of Illinois: <http://catalog.illinois.edu/undergraduate/las/psychology-bslas/diversity-science/>).

Currently, the University of Illinois is the only undergraduate program to officially offer a concentration in Diversity Science within the Psychological Science major. The WPI Psychological Science program would like to be the second major in the country to offer this distinctive concentration. The WPI Psychological Science program is well positioned to be an innovative, cutting edge leader in the integration of Diversity Science at the undergraduate level. Currently, Diversity Science is strength of our faculty, and an emphasis in our research programs. Professor Skorinko studies stigma, stereotyping, prejudice, discrimination, and cross-cultural variation and looks at diverse populations (including women, different cultural groups, and individuals with intellectual and developmental disabilities. Professor Rodriguez studies the stigma of weight and pregnancy. Professor Doyle studies how people understand complex societal problems and how these influences their personal and public decision making. In addition, we currently offer a number of courses that relate to Diversity Science. While these courses have good enrollment and students show interest in the topics, it is possible to major in Psychological Science without taking many of these Diversity Science related courses. Finally, WPI's project-based curriculum allows the Diversity Science concentration at WPI to be truly unique from any other programs that exist, and our Psychological Science program is well known for engaging undergraduates in project based learning and publishable research (see Special Issue on Engaging Undergraduates in Publishable Research Guest Co-Edited by Professor Skorinko: <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.00656/full>).

Therefore, we seek to make Diversity Science an official component to our undergraduate program and allow interested students the opportunity to concentrate their area of study in Diversity Science within Psychological Science. This concentration will continue to distinguish our undergraduate program from other programs in the country. The specific guidelines of the concentration are adapted from the University of Illinois guidelines and adapted to fit our needs

and strengths at WPI. Students will have the option of completing 6/3 units in Diversity Science through Psychological Science Courses or completing 5/3 units in Diversity Science through Psychological Science Courses and 1/3 unit from a related course that fits their specific area of interest. For instance, a student with an interest in Arabic studies can complete their Diversity Science concentration with 5/3 units in Psych Science and 1/3 in a course on the culture of Arabic nations (AB 2542).

### **Concentration Guidelines:**

1. Psychological Science Majors who are interested in psychological study of diversity can choose to complete a concentration in Diversity Science. To complete the concentration, students must complete 2 units of coursework from the approved list of courses related to diversity, equity, and inclusion.
2. All students completing this concentration will need to complete an MQP that relates to Diversity Science.
3. 5/3 units should come from Psychological Science and may include (see Note 1):
  - PSY 1404: Developmental Psychology
  - PSY 1412: Mental Health
  - PSY 2401: Psychology of Education
  - PSY 2406: Cross-Cultural Psychology: Human Behavior in Global Perspective
  - PSY 2407: Psychology of Gender
  - PSY 2408: Health Psychology
  - PSY 2410: School Psychology
  - PSY 2504: Human Sexuality
  - PSY 3000: Psychology and Law
  - PSY 2999, 3999, or 4999: Research in Psych Science
  - PSY 1800, 2800, 3800, 4800: Diversity Science Related Topics
  - a. Note 1: Only one course in this subset can be at the 1000-level
4. 1/3 unit can come from a related courses in another discipline that is related to the students area of interest or it may be an additional Diversity Science Psych Science course. Related courses need approval by the Diversity Science Advisor and may include courses such as:

- AB 2542: The Culture of Arabic-Speaking Countries
- DEV 1200: International Development and Society
- EN 1257: Introduction to African American Literature and Culture
- EN 2251: Moral Issues in the Modern Novel
- ENV: 1100: Introduction to Environmental Studies
- ENV 2700: Social Media, Social Movement, and the Environment
- GN 3513: Survey of German Civilization and Culture from 1871 to the Present
- HI 1311: Introduction to American Urban History
- HI 1312: Introduction to American Social History
- HI 1322: Introduction to European Cultural History
- HI 2341: Contemporary World Issues in Historical Perspective
- HU 2340: Popular Culture and Social Change in Asia

HU 2441: African History and Culture  
 ID 3525: Spanish American Film/Media – Cultural Issues  
 MU 3001: World Music  
 PY 2712: Social and Political Philosophy  
 PY 2716: Philosophy of Difference  
 PY 3712: Philosophy of Religion  
 RE 2721: Religion and Culture  
 RE 2723: Religions of the West  
 RE 2724: Religions of the East  
 SOC 1202: Introduction to Sociology and Cultural Diversity  
 SP 3523: Topics in Latin American Culture  
 SP 3528: Spanish Culture and Civilization  
 WR 3300: Cross-Cultural Communication

**Note Changes to Catalog:** Concentration in Diversity Science will be added to the Psychological Science Major description.

**Impact on Distribution Requirements and Other Courses:**

<b>Psychological Science Requirements</b>	<b>Minimum Units</b>
1. Psychological Science (Note 1)	3
2. Psych Science and/or Related Courses (Note 2)	4/3
3. Other Social Science (Note 3)	1
4. Basic Science, CS, and/or Engineering (Note 4)	5/3
5. Mathematics (Note 5)	1
6. Electives (Note 6)	1
7. MQP	1

This concentration fits within the Distribution Requirements for the Psychological Science Major. The concentration’s 5/3 Psychological Science requirement will fit under the Psychological Science 3-unit (12/3) distribution requirement. The concentration’s 1/3 Related Course requirement will fit under the 4/3 Psych Science and Related Courses requirement.

**Resource Needs:**

This concentration will not add any additional resources to the Psychological Science programs. All courses are already taught, and students interested in Psychology and Diversity Science are already taking these types of courses.

**Implementation Date:** Effective Fall 2021.

**Date:** February 13, 2020

**To:** The WPI Faculty

**From:** Committee on Graduate Studies and Research (Prof. Fischer, Chair)

**Re:** Motion to increase the credits for the current capstone course '*Graduate Qualifying Project (GQP)*' for Data Science (DS 598) from 3 credit to a (3 to 6) credit range.

**Motion:** The Committee on Graduate Studies and Research (CGSR) recommends and I move that DS 598 '*Graduate Qualifying Project*' (GQP), as described below, could be repeated for credit, up to a total of 6 credits (instead of only once for 3 credit) to Data Science graduate students. This motion has been approved by the Data Science Steering Committee on November 19, 2019.

### Current Course Description

#### **DS 598. GRADUATE QUALIFYING PROJECT**

- This 3-credit graduate qualifying project, typically done in teams, is to be carried out in cooperation with a sponsor or industrial partner. It must be overseen by a faculty member affiliated with the Data Science Program. This offering integrates theory and practice of Data Science, and should include the utilization of tools and techniques acquired in the Data Science Program. In addition to a written report, this project must be presented in a formal presentation to faculty of the Data Science program and sponsors. Professional development skills, such as communication, teamwork, leadership, and collaboration, along with storytelling, will be practiced.

**Prerequisites:** DS 501, completion of at least 24 credits of the DS degree, or consent of the instructor.

Proposed Course Description: (changes marked are underlined).

DS 598: *Graduate Qualifying Project*.

This 3-credit graduate qualifying project, done in teams, can be taken a second time for credit with permission by the instructor, up to a total of 6 credits. The project is to be carried out in cooperation with a sponsor or industrial partner. It must be overseen by a faculty member affiliated with the Data Science Program. This offering integrates theory and practice of Data Science, and includes the utilization of tools and techniques acquired in the Data Science Program. In addition to a written report, this project must be presented in a formal presentation to faculty of the Data Science program and sponsors. Professional development skills, such as communication, teamwork, leadership, and collaboration, along with storytelling, will be practiced.

**Prerequisites:** DS students should have completed at least 24 credits of the DS MS degree, or consent of the instructor, before starting the GQP project class. DS students seeking to take this course a second time for credits, up to a total of 6 credits, must get the instructor's approval. Non-DS students must get the instructor's approval before taking this course for any number of credits.

Additional Catalog Changes.

On page 89 for DS program.

Current Catalog Entry:

**3-credit Graduate Qualifying Project.** (DS 598) This project is most commonly done in teams, and will provide a capstone experience in applying data science skills to a real-world problem. It will be carried out in cooperation with a sponsor or an industrial partner, and must be approved and overseen by a faculty member affiliated with the Data Science Program. A student that follows this practice-oriented project option must gain sufficient Data Science depth by selecting at least 2 courses beyond the required Data Science *core courses* from among the electives below within the *same* area of concentration.

Proposed Catalog Entry (changes are underlined):

**3-credit Graduate Qualifying Project.** (DS 598) This project is most commonly done in teams, and will provide a capstone experience in applying data science skills to a real-world problem. It will be carried out in cooperation with a sponsor or an industrial partner, and must be approved and overseen by a faculty member affiliated with the Data Science Program. The graduate qualifying project is typically taken for 3 graduate credits. With permission by the instructor, a student can take the course a second time for additional credit, up to a total of 6 graduate credits. This means that the student could take two offerings of the course concurrently in one semester or could register for three credits in one semester and another three credits in a subsequent semester. A student that follows this practice-oriented project option must gain sufficient Data Science depth by selecting at least 2 courses beyond the required Data Science *core courses* from among the electives below within the *same* area of concentration.

**Rationale:**

During this GQP project course, students investigate, design, develop and implement real-world challenging data science projects. During the last 5 years, based on the interest expressed by graduate students in Data Science and also in other majors, there is great student interest to participate in this unique industry collaboration. Data Science students have repeatedly asked if there is any possibility for them to engage in a project for a longer time period and/or for more credits than just 3 credits. The DS Faculty and students believe that this unique opportunity helps the students to sharpen their skills at solving real-world problems – including their critical thinking, problem solving skills, decision making and analytical skills.

The Data Science GQP faculty coordinators, having worked with more than 65 sponsored GQP projects over the past 5 years, are delighted to provide the additional opportunity to the talented WPI students. This additional GQP experience will further strengthening the student’s exposure to working in teams on industry-scale projects, gain confidence in job interviews as well as help them to learn which type of position is a great match for them after their graduation.

Since projects differ from semester to semester, a student upon approval by the instructor would now be able to experience either a second distinct project in a subsequent semester or a much larger project (equivalent in experience to 6 credits instead of 3 credits) in one single semester. In addition, in some cases, a project may continue across two semesters; and in this case such a student could experience the continuation of a more longer-term project over two semesters, if so desired. This student would typically then serve as lead for the new GQP team, given he or she would already have prior experience on the problem domain that the sponsor is interested in pursuing.

An additional reason for this motion of supporting a student to repeatedly take this GQP capstone course is to provide the opportunity to the industry sponsors to continue this relationship with WPI and a GQP students with a more dedicated time and/or for two semesters, if so desired.

**Intended Audience:**

The intended audience for ‘Graduate Qualifying Project’ is graduate students from Data Science, though students in closely related fields such as Computer Science or other areas related to a given industry project, who are interested in learning unique industry experience and practice.

**Preferred Semesters:**

Fall and Spring Semesters

**Expected Enrollment:**

40 – 60 Students each year are already taking this course now. This change is expected to possibly add a handful of students each year to continue on for an additional 3 credits.

**Anticipated/Interested Instructor(s):**

Professors: Fatemeh Emdad and Chun-Kit Ngan

**Resource Requirements:**

Some additional resources are required, however, revenue in terms of WPI student tuition would be recouped for this effort. Profs. Fatemeh Emdad and Chun-Kit Ngan are slated to continue to offer this course both in fall and spring semesters, and there is room available for adding a few additional students to each semester. Additional resources would be required by Sia Najafi’s Research Computing team to support the IT needs of these company-sponsored projects.

**Impact on Core Area Requirements of the Data Science Program and Other Courses:**

Data Science students may take the additional 3-credit GQP course (for a total of 6 credits) as a free elective. Students in other majors, such as Computer Science, may take the 3-credit GQP course as an independent study project course with one of the instructors of the GQP course, if so desired.

**Effective Date:**

Academic year 2020 – 2021.

**Date:** February 13, 2020

**To:** The WPI Faculty

**From:** Committee on Graduate Studies and Research (Prof. Fischer, Chair)

**Re:** Motion to Modify Awarding of B.S./M.S. Credit in the Computer Science Program

**Motion:** The Committee on Graduate Studies and Research recommends and I move that the B.S./M.S. program requirements for Computer Science be adjusted as described below.

### **Description of changes to the WPI Graduate Catalog:**

On page 79 of the Graduate Catalog, the requirements for the B.S./M.S. credit are listed. This motion would alter the requirements as follows. Additions are indicated in *underlined italics* (with deleted text indicated by ~~strikethroughs~~).

Students may formally apply for admission to the B.S./M.S. program during or after taking their second 4000-level Computer Science course. Forms are available through the graduate admissions office or via their website. Students who have entered the B.S./M.S. program, or are considering it, qualify for B.S./M.S. credit for the courses listed below.

In order to receive *graduate B.S./M.S. credits* for a 4000-level course, the student must *earn a B course grade or higher. Course instructors may waive the course grade requirement at their discretion.* ~~complete a Course Selection Form; the instructor will indicate the conditions that the student must satisfy in order to receive B.S./M.S. credit for the course, such as earning a specific grade or doing additional assigned work.~~ Faculty may offer, at their discretion, an additional 1/6 undergraduate unit, or equivalently a 1 graduate credit, for completing additional work in the course. To obtain this credit, the student must register for 1/6 undergraduate unit of independent study at the 4000-level or a 1 graduate credit independent study at the 500-level, with permission from the instructor.

### **Rationale:**

The Computer Science department's current approach of instructor approval for two B.S./M.S. credits is leading to inconsistencies in the availability of the credit as well as introducing logistical issues, such as students requesting B.S./M.S. credit after the instructor departs WPI. This latter issue may occur for students who took an eligible 4000-level course before applying for admission, in accordance with the first paragraph of the above catalog language.

Other departments award B.S./M.S. credits automatically when a specified grade is met. As examples, the ECE and ME departments require students to earn at least a B in a 4000-level class (graduate catalog, page 97 for ECE, page 146 for ME). Neither department requires petitions nor do they require additional coursework to be performed.

The motion allows instructors to waive the grade requirement at their discretion. This can be performed using a standard undergraduate petition. Given this potential for a waiver, instructors

need not feel pressured to award higher grades to allow students to be eligible for B.S./M.S. credit.

This motion eliminates the need for departmental-level forms for the B.S./M.S. credit. This will greatly simplify the logistics of the B.S./M.S. program for students, faculty, and for the department.

This motion does not change the requirements for earning three M.S. credits for a 4000-level course.

The Computer Science faculty voted to approve this motion on December 3, 2019.

**Resource Impact:** No additional resources are required.

**Implementation Date:** The proposed policy would go into immediate effect upon approval.

**Date:** February 13, 2020

**To:** The WPI Faculty

**From:** Committee on Graduate Studies and Research (Prof. Fischer, Chair)

**Re:** Motion to change course description for MA 504 *Functional Analysis*

**Motion:** The Committee on Graduate Studies and Research recommends and I move that following catalog changes for the course description of MA 504 be approved.

*Current description*

MA 504 is not listed in the current catalog. In the past, it was listed together with MA 503, which has since been changed, and would not be affected by this motion.

Old Catalog description of MA 503-504:

**MA 503-504. Analysis I and II**

Topics covered include open and closed sets, compactness, continuity, upper and lower semicontinuity, Lebesgue measure, integration, functions of bounded variation, absolute continuity, the fundamental theorem of calculus for Lebesgue integrals, Banach spaces, classical  $L_p$  spaces, the Hölder and Minkowski inequalities, the Riesz-Fischer theorem, and the Riesz representation theorem. (Prerequisite: basic knowledge of undergraduate analysis is assumed.)  
Revised (and current) Catalog description of MA 503

**MA 503. Lebesgue Measure and Integration**

This course begins with a review of topics normally covered in undergraduate analysis courses: open, closed and compact sets;  $\liminf$  and  $\limsup$ ; continuity and uniform convergence. Next the course covers Lebesgue measure in  $\mathbb{R}^n$  including the Cantor set, the concept of a sigma-algebra, the construction of a nonmeasurable set, measurable functions, semicontinuity, Egorov's and Lusin's theorems, and convergence in measure. Next we cover Lebesgue integration, integral convergence theorems (monotone and dominated), Tchebyshev's inequality and Tonelli's and Fubini's theorems. Finally  $L^p$  spaces are introduced with emphasis on  $L^2$  as a Hilbert space. Other related topics will be covered at the instructor's discretion. (Prerequisite: Basic knowledge of undergraduate analysis is assumed.)

*Revised description*

MA 504. Functional Analysis (3 credits)

This course will give a comprehensive presentation of fundamental concepts and theorems in Banach and Hilbert spaces. Whenever possible, the theory will be illustrated by examples in Lebesgue spaces. Topics include: The Hahn-Banach theorems, the Uniform Boundedness principle (Banach-Steinhaus Theorem), the Open Mapping and Closed Graph theorems, and weak topologies and convergence. Additional topics will be covered at the instructor's discretion. (Prerequisite: MA 503 or equivalent.)

**Rationale:** MA 504 used to cover basic topics in Functional Analysis, although without a clear catalog description. The math department stopped offering this course approximately ten years ago, when the department's PhD program was much smaller. In recent years, the department has seen a need to offer Functional Analysis as a topics course, and most years when this topics

course has not been offered, faculty have felt the need to offer independent studies. Furthermore, it is a standard offering in strong applied math programs nationally. By fixing the course title and clarifying the description, the math department can run the course as needed, and also attract undergraduates and graduate students from other departments.

**Impact on Degree Requirements:** None.

**Resources and Anticipated Instructors:** No additional resources are required.

**Implementation Date:** Implementation date for this action is the 2020-2021 academic year.

## Committee Business

**Date:** February 13, 2020

**To:** The WPI Faculty

**From:** Committee on Governance (Prof. Gaudette, Chair)

**Re:** Motion to elevate the Aerospace Engineering Program to an independent Aerospace Engineering Department

**Motion:** The Committee on Governance recommends, and I move that the WPI faculty endorse the Administration's proposal to elevate the Aerospace Engineering Program to the status of an independent Aerospace Engineering Department at WPI.

### **Rationale**

At the COG meeting of January 27, 2020, Provost Soboyejo provided a detailed proposal and the rationale for elevating the Aerospace Engineering Program (AEP) to a new independent Aerospace Engineering Department. The proposal was presented by the Provost on behalf of the WPI Administration. The proposal has been endorsed by all nine (9) faculty members who would become members of the Aerospace Engineering Department (AED), ME faculty, and the Head of the Mechanical Engineering Department. COG discussed the proposal on February 3, 2020 and endorsed the proposal unanimously.

The full detailed AED proposal is attached as an appendix to this motion. It describes the status of current Aerospace Program at WPI, the distinguishing features of the proposed Aerospace Engineering Department, the ways in which the proposed department will continue to align with WPI's mission, the administrative structure and external outreach of the proposed AED, resources required, and the positive impact that an independent Aerospace Engineering Department will have on the Mechanical Engineering Department at WPI.

### **Background**

The Aerospace Engineering Program (AEP) at WPI awarded its first B.S. degree in 2005, was accredited by ABET in 2009, and awarded its first M.S. and Ph.D. degrees in 2014. The AEP currently enrolls over 260 undergraduate students and nearly 40 graduate students. There are now nine (9) core-faculty associated with the AEP with one ongoing search, all with current full-time appointments in the Mechanical Engineering Department (MED). It is the 7<sup>th</sup> largest field of study at WPI (based on the students in its BS, MS and PhD degrees). The program has become nationally recognized and is currently ranked 7<sup>th</sup> out of 52 in the 2019 College Factual Best Aerospace & Aeronautical Engineering Colleges in the U.S. Within only four years of its introduction, the AE graduate program was ranked 39<sup>th</sup> in the 2019 US News and World Report Rankings, tied with schools such as George Washington University, Washington University St. Louis, and Syracuse University.

The AEP has established a diverse funding portfolio in aeronautics and astronautics, and an infrastructure that includes close to 6,000 sqf of specialized facilities. While organizationally the AEP is part of the MED, it has a Program Director, dedicated staff, a cost center, TA allocation, and an overall independent administrative and faculty-governance functionality comparable to other engineering departments at WPI.

Discussions between the AEP faculty, the MED Head and the administration about the establishment of an independent AED began in 2012. In a series of procedural steps, the proposal was also approved unanimously by the ME Department (11/17/2015) and the ME External Advising Board (5/2016) as a motion to “*Elevate the Aerospace Engineering program to the status of an academic department (AE).*” During the Fall of 2019 the Provost and Dean of Engineering conducted a series of meetings with the leadership of the AEP and MED, and led the development of the final proposal. This process culminated by the administration’s decision to establish the AED. The current proposal has been endorsed by all current faculty (8 TTT and 1 NTT) members of the AEP and the MED Head.

### **Benefits of Establishing an Aerospace Department**

An independent Aerospace Engineering Department (AED) would immediately establish WPI as one of only five universities (along with MIT, Penn State, U. Maryland, and the US Naval Academy) with stand-alone AE departments in the Northeast, and would be prominently placed in a select group of about 80 (single- and double-named) aerospace engineering departments in the U.S. As such, it will position WPI as a leader in aerospace engineering education and research.

In this dedicated academic configuration, the AED will attract a larger and stronger pool of applicants to WPI than is possible today, both at the undergraduate and graduate levels. The AED has significant opportunities for growth due to:

- the strong demand for AE graduates at all levels, from B.S. to Ph.D.;
- a strong outlook in AE research for emerging civilian and defense applications; and
- a robust aerospace industry with more than 200 establishments in the Northeast alone.

The AED will offer a modern aerospace curriculum of 36 AE undergraduate and graduate courses that incorporate the research expertise of the AE faculty. As a brand new initiative, the AED will develop the first all-online, M.S. degree in aerospace engineering. Along with the ongoing expansion of its BS/MS program, this will lead to new opportunities for tuition revenue from local students, from those across the country and beyond, as well as from close to 200 major aerospace employers in our region.

The AED will further establish WPI’s identity as a research university and will enhance the stature of WPI’s School of Engineering. An independent AED represented at national meetings by its Head, will lead to greater recognition from peer institutions, college ranking services, and sponsors.

The new AED will provide its students and faculty a distinct community at WPI, with the tools, resources, and visibility available only to academic departments. The AED will allow the AE faculty to realize their full professional potential, will make it easier to recruit new faculty members, and will implement WPI’s established departmental processes for evaluation, tenure and promotion within a cohesive community. At the same time, because of the organizational progress made to date, AED will require very modest additional institutional investment.

The AED will become the visible focal point for aerospace education and research at WPI. It will support and grow research in rapidly emerging areas through strategic planning, strategic faculty

hiring and careful coordination of faculty efforts. Aeronautics research will involve emerging technologies in advanced jet propulsion concepts, flow control, autonomy, unmanned aerial vehicle (UAV) applications, and structural materials. In addition, the AED will seek new opportunities to promote research in advanced renewable energy concepts and green aviation. Astronautics research will involve emerging spacecraft technologies supporting microspacecraft design, electric micropropulsion, controls, spacecraft/environment interactions, and mission analysis. The AED will aggressively pursue participation as partners in national and international space programs and missions, a task that will be facilitated significantly by recognition as an established department. We anticipate an immediate positive impact through research collaboration with other engineering and science departments.

The establishment of an AED will also have a positive impact on the Mechanical Engineering Department (MED). Reduced to a more manageable size, the more focused ME department will still constitute the largest engineering department at WPI, housing three distinct academic programs, one undergraduate degree program and seven graduate degree programs.

### **Five-year Projections:**

By AY 2023-24, the Aerospace Engineering Department is expected to award approximately 70 B.S., 45 M.S. and 3 to 4 Ph.D. degrees annually. In the same time period, research expenditures are also projected to increase by roughly 100 percent from the FY 2019 level. In order to accommodate and accomplish this growth, the number of faculty members in the AED is projected to grow from 9 FTEs (8 TTTs and 1 NTT) currently to 11 FTEs (10 TTTs and 1 NTT) in AY 2021-22. The size of such a student body and faculty is consistent with that of other departments at WPI.

### **Resources Committed to Establish the AE Department**

#### **Faculty**

- 1 TTT to join in 2020-21 (search in progress) in areas of aerospace structures;
- 1 TTT to join in 2021-22 (search in 2020-21) in areas of aeronautics / space science;

Beyond 2021-22, faculty hiring will be determined with Aerospace Engineering participating with regular departmental status in the annual planning and budget process.

#### **Office Space**

- Two faculty offices (TBD location in HL);
- AED office for dept. head and administrative assistant (TBD repurposed space in HL).

### **Implementation and Evaluation**

The Aerospace Engineering Department at WPI will be formally established on July 1, 2020. An internal search for the AED Head position will begin immediately and conclude well before July 1, 2020. The department will continue to offer B.S., M.S., and Ph.D. degrees in aerospace engineering.

No immediate (AY 2020-21) changes are recommended to staffing or for internal funding levels. Future infrastructure investments, faculty hires, and other additional resource needs will be discussed as they arise as part of the annual budget process where an independent AED will have its formal inputs.

All current faculty members (8 TTT and 1 NTT) of the AEP will join the AED. The TTT faculty

member to be selected from the ongoing faculty search in Aerospace Structures will also be a full member of the new AED, which will bring the total number of full-time AED faculty members to ten by July 1, 2020.

As part of the 2- and 4-year reviews of the Department Head, the Dean will evaluate performance of the AED relative to the projections to confirm the continuing health and progress as an independent department.

**Date:** February 13, 2020

**To:** WPI Faculty

**From:** Committee on Academic Operations and Committee on Academic Policy

**Re:** Motion to modify policy allowing Commencement participation for undergraduate students who have not yet completed their requirements.

**Motion:** The Committee on Academic Policy and the Committee on Academic Operations recommend, and I move that the Undergraduate catalog section on Commencement Policy be modified as described below.

**Current language:** (pg. 200, 2019-2020 catalog)

The policy for allowing certain undergraduate students who have not completed all degree requirements to participate in Commencement exercises is:

1. Undergraduate students who have not met all degree requirements will be eligible to participate in Commencement exercises only if all of the following are true:
  - a. At the end of D term, the student is within 1/3 unit of one activity in all requirements for graduation.
  - b. The student has completed at least 2 of the 3 WPI Project Requirements (Humanities and Arts Requirement, IQP, and MQP).
2. Undergraduate students who meet these conditions will be permitted to participate in Commencement exercises but will not receive their diploma. The names of such students will not be included in the Commencement program. The actual degree will be conferred only after all degree requirements have been completed.
3. All WPI undergraduate students will be notified of these policies and procedures each B term.
4. Undergraduate students seeking an exception to this policy have the right to petition the Committee on Academic Operations for a waiver due to extenuating circumstances. Petitions must be received no later than noon (12 p.m.) the Wednesday before Commencement Day

**Proposed revisions** (additions underlined and deletions ~~struck through~~):

The policy for allowing certain undergraduate students who have not completed all degree requirements to participate in Commencement exercises is:

1. Undergraduate students who have not met all degree requirements will be eligible to participate in Commencement exercises only if all of the following are true:
  - a. At the end of D term, the student is within ~~1/3~~ 1 unit of completing one activity ~~in~~ all requirements for graduation.
  - b. The student has completed at least 2 of the 3 WPI Project Requirements (Humanities and Arts Requirement, IQP, and MQP).
2. Undergraduate students who meet these conditions will be permitted to participate in Commencement exercises but will not receive their diploma. The names of such students will not be included in the Commencement program. The actual degree will be conferred only after all degree requirements have been completed. The student will not be eligible to participate in any future commencement ceremonies for this degree.
- ~~3. All WPI undergraduate students will be notified of these policies and procedures each B term.~~

~~3. 4. Undergraduate students seeking an exception to this policy have the right to petition the Committee on Academic Operations for a waiver due to extenuating circumstances. Petitions must be received no later than noon (12 p.m.) the Wednesday before Commencement Day. There are no exceptions to this policy.~~

**Note on change to item 2:** This has always been the practice but this language should be written into the catalog for clarity.

**Rationale:** The Committee on Academic Operations is responsible for reviewing and making decisions on petitions for students who do not meet the minimum requirement for participation. CAO determined that a review was in order; when the policy was originally written, WPI held two ceremonies each year but have since moved to one, and this has had an impact on the petition process. The policy was discussed in A-term 2018 and again A-term 2019.

Benchmarking and a review of walkers (those who had to petition and those who did not) and ultimate graduation status were submitted by the Registrar.

Benchmark institutions handle this in a variety of ways – there is no clear best practice. Some do not offer any option for participation without completion of requirements; some allow anyone slated to finish in the subsequent summer; others are similar to our current policy, but with no exceptions.

CAO reviewed students who had participated in commencements for 2017, 2018, and 2019. Students who did not have to petition to participate because they were only 1/3 out were highly likely to complete in the subsequent summer or fall. Results for petitioners were mixed, but a majority had graduated within one year of the commencement they participated in. There were cases in both groups that had yet to earn a degree. In general, petitions that were granted were in cases where students were 2 – 3/3 away from graduating. Students further away were generally denied.

The committee observed that the petition process causes anxiety for students, and the very short turn-around time for the committee heightens the anxiety for all involved. While we do see some petitions early in the semester (typically from students who know they will not meet the conditions already), most stem from NR's received in D-term, so conditions are emotionally fraught. Registrar's Office staff state that when there was no participation policy and only students who had completed were eligible, students and their parents, although understandably upset, understood the rule. Petitions are always difficult to decide – each reviewer has their own definition of extenuating circumstances, and there is further room for inconsistency as committee membership changes. Removing the exception clause allows for a clear line that can be understood by students and parents, and the rule becomes easier to communicate and consistently enforce by the Registrar staff.

While we could achieve this clarity and consistency by simply removing the participation rule all together, CAO recognizes that the current policy has allowed many students and their parents to have a memorable commencement experience, and most of the students have subsequently earned their degrees. In reviewing previous approvals, the most common allowance is for 2/3 or 3/3 remaining. Sometimes this is for NRs earned, but also comes into play for students participating in co-ops. We feel that allowing one unit, the typical load of one term, to be

remaining is generous enough to fit most of the exceptions we are currently making and, in hand with allowing no exceptions, can be reasonably explained and enforced.

We chose to remove item 3 regarding the notification of these policies and procedures because it should not be required to remind students about the existing policies that are clearly outlined in the catalog.