

**WORCESTER POLYTECHNIC INSTITUTE**  
**April 8, 2021**

**To:** The WPI Faculty  
**From:** Tanja Dominko  
Secretary of the Faculty

The sixth Faculty meeting of the 2020-2021 academic year will be held on **Thursday, April 8th, 2021 at 3:15 pm via ZOOM.**

1. Call to Order
  - Approval of the Agenda
  - Approval of the Consent Agenda and the Minutes from 3-11-21
2. Committee Business:

CTAF and COG

- **Motion to extend the notification deadline for tenure-track faculty who opt out of the COVID-related extension of their pre-tenure probationary period.**
- **Motion to extend the probationary periods for new tenure-track faculty members**
- Motion to allow elected faculty governance committee members to vote on critical issues if a meeting of the entire faculty cannot be called.
- Motion to extend remote voting in emergency settings only

COG

- Motion to update Part Two - Section 7 of the Faculty Handbook to: include Assistant, Associate, and (full) Professors of Teaching; revise categories of nontenure-track faculty, and document terms of appointments, reappointments, and performance reviews for both *secured* and short-term nontenure-track teaching faculty members.
- Motion to add a fourth type of faculty grievance within the purview of the Faculty Review Committee.
- Motion to expand the formal definition of the WPI faculty, extend the responsibility for the governance of the faculty, and explicitly extend the full range of academic freedom to all members of the WPI faculty.

3. President's Welcome
4. Provost's Welcome
5. Secretary of the Faculty Welcome
6. New Business
7. Adjournment

**TABLE OF CONTENTS**  
**Faculty Meeting Materials, April 8, 2021**

	Page
1. Faculty Meeting Minutes: March 11, 2021	3
2. Consent Agenda motions	15
3. Committee Business	
<b>COG and CTAF</b>	
• Motion to extend the notification deadline for tenure-track faculty who opt out of the COVID-related extension of their pre-tenure probationary period.	93
• Motion to extend the probationary periods for new tenure-track faculty members	95
<b>COG</b>	
• Motion to allow elected faculty governance committee members to vote on critical issues if a meeting of the entire faculty cannot be called.	96
• Motion to extend remote voting in emergency settings only	97

**SEPARATE ATTACHMENT**

- Motion to update Part Two - Section 7 of the Faculty Handbook to: include Assistant, Associate, and (full) Professors of Teaching; revise categories of nontenure-track faculty, and document terms of appointments, reappointments, and performance reviews for both *secured* and short-term nontenure-track teaching faculty members.
- Motion to add a fourth type of faculty grievance within the purview of the Faculty Review Committee.
- Motion to expand the formal definition of the WPI faculty, extend the responsibility for the governance of the faculty, and explicitly extend the full range of academic freedom to all members of the WPI faculty.

WORCESTER POLYTECHNIC INSTITUTE  
Faculty Meeting Minutes  
March 11, 2021

**Summary:**

1. Call to Order
  - Approval of Agenda
  - Approval of the Consent Agenda and Minutes from January 28, 2021
2. Committee Business: CAP
3. Committee Reports: CITP
4. Other Reports: COACHE
5. President's Closing Remarks
6. Provost's Closing Remarks
7. SoF Closing Remarks
8. Adjournment

**Detail:**

1. Call to Order

The sixth Faculty meeting of the 2020-2021 academic year was called to order at 3:15pm via ZOOM by **Prof. Dominko** (BBT). **Secretary of the Faculty Dominko** welcomed everyone and reminded them that the meeting was being recorded. The consent agenda including the minutes from the last faculty meeting were approved.

2. Committee Business

CAP

**Prof. Dudle** (CEE) motioned on behalf of the Committee on Academic Policy (CAP) to adjust the overload policy for C and D terms. The Committee on Academic Policy recommends, and she moved to change the policy regarding the overload, so students be allowed to overload in C or D term by 1/3 without receiving prior advisor approval. The Registrar will email all faculty advisors the list of students who have chosen to overload. The only students that will require advisor approval would be first year students, students enrolled in full time project work, and students overloading by more than 1/3 in the spring semester. This is essentially the same policy that we had for A and B terms, and we are now just implementing it for C and D terms as well.

**Prof. Burnham** (PH) added that she sees the benefits of the proposal but wondered if the advisor mentioned refers to academic advisor or project advisor. She added that she is advising on IQP and would prefer to give the approval for an overload rather than someone who doesn't know what is going on. She wanted to make a friendly amendment to include approval of the project advisor. Prof. Dudle clarified that the advisor approval is academic advisor. This was the same approval process that was followed for A and B terms. Prof. Burnham expressed her concern that an academic advisor may not appreciate the high level of commitment she is expecting in D term with her students or that one team member overloading puts a lot of pressure on the other team members. Registrar Miles added that she does not know if this change can be made this quickly, but students are supposed to disclose if

they are overloading when they register for their project credits. Prof. Dudle added that CAP has been discussing the issues that stem from the approval of projects and the timeline and are drafting a policy. The current motion is only for C and D terms. The new policy would involve project advisors for project overload moving forward after this. There is some conflict in the catalog right now about who has to approve things, so we are trying to change this. We have essentially, put a policy in place that students in the global IQP program are not permitted to overload during ID 2050 or during the project itself. The students agreed to that policy when they sign our participants statement of agreement, so the students won't remember that, but they should know that they have already promised not to overload during those terms. The reason for this isn't exactly that students aren't capable of doing extra work, but that when students have conflicting academic demands it takes a real toll on the teamwork that they might do. This is really destructive of team dynamics and the teams end up trying to cover for the one who's overloading and that can lead to problems down the road, so we have very strongly encouraged project advisors to decline requests to overload. Prof. Burnham stated that she is happy with this proposal as it is temporary, and the students have agreed not to overload during their projects.

**This motion passed with 86 votes in favor and 34 against.**

Prof. Dudle motioned on behalf of CAP that the current test optional admissions policy be replaced with a test blind admissions policy that suspends the use of standardized test scores for undergraduate admissions review during an eight-year pilot period from the fall of 2021 to the spring of 2029.

In consultation with CAP, the office of undergraduate admissions and office of institutional research will collect data from the admissions process and metrics on student success. The office of undergraduate admissions will provide interim reports to CAP in A Term of the third and fifth years of the pilot, 2023 and 2025, with a final report in A Term of the eighth year, 2028. CAP will monitor and evaluate the success of the pilot and make a recommendation regarding admissions pilot policies by B Term 2028 with the expectation of bringing a motion to the faculty within the 2028-2029 academic year. Prof. Dudle explained that in Spring 2007, the WPI faculty approved the FLEX path option, which is our admissions policy that was set to terminate following the admission of the class of 2016. This policy kept the emphasis on demonstrated academic achievement over aptitude as determined by standardized test scores. In 2012, the WPI faculty approved a motion to continue this option indefinitely. The FLEX path option does give students the option not to submit test scores. There is currently a percentage of applicants that do not submit their scores, but the test blind policy just makes it uniform for all students. The market is ready for a test blind policy rather than just test optional since it has shown to be more equitable and provides a clear policy for students and guidance counselors to advise students as to what to include in their packet. Academic quality at WPI has increased with the test optional policy and WPI is virtually test blind already. A little more information on each of these in terms of market readiness and the obviously current pandemic has put us into a concern about testing availability, safety and security, however even prior to the pandemic, a number of universities had moved to test optional. 53% of test optional universities plan to make it a permanent policy and 75% are continuing for the fall of 2022. There are 69 colleges with test blind admissions for fall 2021 or beyond. There

has also been broad support from school counselors and community-based organizations for test blind admissions. Some early adaptors are California Institute of Technology, Cornell, the California State System, and the University of California system.

In terms of issues with equity, studies illustrate that test scores have problematic correlations with family income, race and ethnicity, gender and parental education. The undergraduate enrollment team over the past number of years, has taken a number of steps to broaden access to students in historically underserved groups by stem institutions. Test blind admissions policy simply aligns with the other actions that the University has been taking as a whole to broaden access. Currently, the test scores are used as a contextual piece of information. It is optional and is not used to rank students or make a cut off for students to get in or not getting in. In terms of clarity for students and guidance counselors who are advising high school students about applying, if you Google, “should I submit SAT scores to test optional schools” you'll get 10 million results. And this is a huge stress point for students wondering are my school scores high enough if I submit them will I do better if I don't submit them, are they going to count it against me. Should I take the test again all of those questions and so allowing students to submit scores creates the stress and anxiety for students and causes confusion about whether there are or not hidden rules of test optional schools. In terms of quality of applicants and quality of enrolled students since WPI went test optional, the overall high school GPA of applicants and enrolling students in both the groups that gave us their SAT's and didn't have increased. And at the same time, we have seen applications from groups historically underrepresented in STEM fields also increasing and students are succeeding at WPI. The Admissions Office does not consider moving to a test blind pilot study to be a risk to academic quality and the average high school GPA of applicants and the difference between the ones who submitted test scores, and the ones who didn't was 3.79 versus 3.86. There are legitimate concerns about broadening access in terms of early academic challenges and the first year can be more challenging for non-submitters in the groups that have been applying since we went optional. And the issue here is not that the students cannot succeed, they absolutely can succeed. The issue is that we simply have to be cognizant about providing programs to our students to give them the opportunity to succeed. And that means that the students are engaged fully in the Insight program and other resources. They are participating in diversity and inclusion programs and feeling welcome in the community. We need to be cognizant to continue the support services for our students to make sure that they do succeed. Even though there may be some challenges early on, graduation rate of submitters and non-submitters remain similar.

**Andrew Palumbo** (Assistant Vice President for Enrollment Management and the Dean of Admissions and Financial Aid) explained that test scores are not needed to make good admissions decisions. They have been proven to have problematic correlations with parental education, family income, gender, race and ethnicity. Standardizes test scores have a very narrow recommended use according to the organizations that design and profit off these tests. The College Board and ACT advise admissions professionals that the strict use of these tests should only be to add a slight improvement on the correlation between high school GPA and first year college GPA. These are saying that it only provides some additive predictive value. They do not make claims for more proven success metrics like graduation rate. College Board has the proprietary data to be able to do these studies and presumably if the evidence

supported a strong correlation, between SAT and graduation rates, they would be publishing about this correlation. In May of 2019 the College Board put out a national SAT validity study, which was based on more than 223,000 students. They found that using high school GPA and standardized tests together provided a nominally higher correlation than high school GPA alone. The high school GPA makes up 0.53 of this correlation and the test scores are adding 0.08. Mr. Palumbo clarified that there are misconceptions of what test scores measure and what they mean. This leads to the use of test scores for purposes that they are not designed for. The College Board does provide a predictive correlation to first year college GPA, which is important, but college admission isn't a clear algorithm that is based solely on GPA and a test score. This can be a pretty horrible way to select students, especially for a university like WPI that offers a distinctive educational experience. College admissions doesn't lose anything without the test scores because they already have enough valid criteria and contextual information without them. Admissions professionals also use evidence-based practices, well-established professional development, and a lot of engagement with relevant emerging research that informs the process. We regularly communicate what matters and also what's less important in our process to prospective students, parents, counselors and to the WPI community at large. We also proactively engage with academic departments regarding the recruitment for their programs and also we circle back to learn how first year students are faring, especially in critical courses like our calculus courses. Now, since adopting test optional admissions in 2007, the academic quality of students has increased. The elimination of standardized test scores has been a critical tool in what's been a multifaceted effort to broaden access for all students to high quality stem education and we've seen dramatic increase in the number of women and underrepresented students of color since 2007. Eliminating test scores was absolutely critical for increasing diversity of our student body, which studies show leads to better educational outcomes for all of our students. The WPI admissions criteria are grounded in evidence based practices and contextual information most critical to WPI or the strength of the high school program. Based on what's offered in the high school there's that context which is very important. High School performance, which is not just a GPA, but the 20 to 30 individual grades and assessments provided over a four-year period, provide insight into academic strengths and interests. Every applicant is reviewed by at least two admissions professionals and another third of all applicants are then reviewed by a larger admissions committee before ever receiving a decision. We've also spent several years operationalized in this critical use of context in a holistic admissions review, as well as training staff and adjusting process to address cognitive bias. There are three very relevant studies conducted by parties who probably have the most knowledge in the realm of testing and college admissions. So the first study is by the National Association of College Admissions Counseling, which came out in 2014. It's the largest academic study on the outcomes of institutions that have offered optional standardized testing policy. It included 33 universities and found that high school grades are much better predictor of future college performance. There are a few significant differences between submitters and non-submitters of testing that were observed and cumulative GPA and graduation rates, despite significant differences in SAP and ACT scores. College and university cumulative GPA is also close closely tracked high school GPA, despite wide variations and testing. Students with strong high school GPA is generally performed well in college, despite modest or low testing and one of the most important things here is non submitters are most likely to be first Generation Students, students of color, and women. The College board found that high school GPA is the

single greatest predictor of first year college GPA. And it's only again when you consider high school GPA and SAT, you get that 0.61 correlation but, again, virtually all of that comes from the high school GPA, which makes up 0.53. And there are also some critical omissions in this study. First of all, the College Board built the study to only consider GPA and SAT so they left out the second greatest correlation to student success, which is strength of the program and the rigor of the courses these students are taking high school. We would assume when pairing high school GPA with rigor we would get a much better correlation than high school GPA and test scores. Earlier this month the ACT published the outcomes of a recent study they conducted on the future of standardized testing use in college admissions specifically, three to five years. They reached out to enrollment leaders across the country to ask them, based on the conversations that are happening on their campus what they think is going to happen. And from the study this was an acknowledgement that the COVID related impact on standardized testing is likely long term and possibly permanent. Over 1,000 universities in 2019 were test optional and 20 plus percent are likely to become test blind in the next three to five years. Of those who in the past year opted to go test optional because of COVID, 10% of them are likely to become test blind and I think perhaps most of the most the most telling aspect of all of this is the schools that right now are requiring standardized test scores in a pandemic and fewer than 50% of students were able to receive test scores, about 20% of them are likely to become test blind. So, to put this into context, one year ago today, there was a single college that was test blind - Hampshire college. There now 69 universities. In the next three to five years, they're likely to be dozens, if not hundreds more.

Prof. Dudle explained that the motion goals are threefold: to increase the diversity of the applicant pool, maintain academic quality of our incoming students, and also maintain the retention rate and graduation rate of incoming students. If this motion passes, then what data will be collected and how it's going to be analyzed will be worked out between CAP and admissions. Starting this spring and moving into next fall, the data for the applicants and the enrolled students during the test blind pilot period would be compared with data from test optional admissions. In terms of looking at the success of the program in meeting the goals, there are interim and final reports that are required to CAP. Certainly if there were any issues with the pilot those would be brought up very early during the pilot program. If the pilot continued for the entirety without any large concerns, then the Faculty would be deciding as to whether to continue indefinitely or return to some different form of admissions. Prof. Dudle invited everyone to ask questions. One question that was in the chat asked what it means when we say WPI is virtually test blind already. This means that SAT scores are not used as a ranking or scoring system for our students. It is just used as contextual added information. It is not actually needed. This motion does not in any way affect AP tests or the ability for students to receive AP credit. It is just SAT and ACT scores.

**Prof. Kaminski** (CHE) stated that he is against the motion and asked about the scoring system used in admissions. He requested that a copy of this system be released stating which points are given for this or that and what the actual algorithm is used to decide if a student is admitted or not. How is the student ranked? Mr. Palumbo stated that there is concern with putting anything like this on paper because we are in a competitive landscape for recruiting a small group of students. If this information was to be passed to another school, this could create challenges for WPI. He stated that they are happy to have a conversation about this but

putting it in writing may suggest that there is a threshold or a scoring that admits a student, which is not the case. The scoring is really to contextualize where within the pool generally someone falls. This is done by the first reader that he described. The second reader coming in has a general understanding of where the first reader thought this person fell in the pool. This person can determine if they agree and see what other items they find. We don't have a set number of AP or honors classes. We are trying to contextualize for each student's personal experience or personal opportunities at their school.

**Prof. Fehribach** (MA) supported this motion and emphasized that this affects aptitude tests only, such as SAT and ACT. He added that the phrase test blind is a bit of a misnomer because we are not proposing to go test blind, regarding placement tests, AP exams, and other types of exams that measure how much somebody knows or doesn't know about a particular subject. This only affects these aptitude tests, which don't measure what you know, but rather in some sense, your ability to learn. Mr. Palumbo stated that we are falling into a very specific set of terminology used in the college admissions process. We would say we are test blind for admissions, specifically this means just the SAT and ACT. Scores for English proficiency would still stand. Prof. Fehribach asked what percentage of our applicants now provide scores and what percentage do not. Mr. Palumbo stated that three years ago 12% of students did not provide scores, 20% last year and this year that majority of the students did not have test scores due to COVID. A student on CAP brought up that he didn't necessarily want to send his scores, but he thought he kind of had to. This goes back to the confusion and lack of clarity on what test optional means.

**Prof. Roberts** (BBT) spoke in favor of the motion and stated that the TRT Council would like to express their disappointment that their community of TRT's cannot vote on such an important motion. This has implications that impact equity and affect our teaching. They were all in support of this motion as it promotes inclusion and reduces bias in the application process. They also want everyone to know that we are participating in these discussions over emails and in this meeting without the protections of security and academic freedom that the TTTs enjoy. The TRT Council does support this motion.

**Prof. Gericke** (CBC) spoke in support of this motion. He mentioned a past presentation that shows that we are providing significant upward mobility, but we are only reaching a fairly small pool. Going this route, which is proposed here will help us to reach more first-generation students than we reach right now.

**Prof. Cowlagi** (AE) expressed that he is unsure if he is in favor or opposed to this motion. He said that it seems that a test option policy acknowledges that underprivileged students may not perform as well as others on the standardized tests. It is unfair to score them based on those tests. A test blind policy however means the presumption is that any student who does well on a standardized test must necessarily come from a privileged background and therefore we must reject their standardized test all together. There may be many students who come from middle class families who wouldn't be considered privileged but do fine on tests. It seems unfair to not even give them the opportunity to provide their test scores along with the rest of their application. This denies them the chance to tell us that they are good at taking tests. He wants to understand the jump from a test optional to test blind. Mr. Palumbo explained that

previously most other schools required test scores. It seemed unfair if the students had to put in time to take these tests and we said we weren't going to look at them. We have a lengthy history that shows we can make good admissions decisions without test scores. It is important to take this step considering the environment in which we are operating in order to provide true equity. We are not suggesting that everyone who scores well on a standardized assessment is privileged. What this amounts to is a public clarification of the ethos and the values that WPI has in our admissions standards. I don't think this will actually change many decisions for students who would have tried to up their profile by having a strong test score because our test scores are really strong.

**Prof. Moncrief** (HUA) stated that she supports this for the reasons that were stated by her colleagues. She thanked several colleagues for pointing out the excessive sexism, racism, class and access issues that are so important here. She also thanked Mr. Palumbo for talking about power and privilege in such a clear and kind way.

**Prof. deWinter** (HUA) explained that she was listening to the opinions and contributed an article into the chat about why test option is perpetuating a lot of the same biases as test required. One of the things we need to remember is that in the US educational system, if you are middle class, you're privileged. It is not the middle class that we are talking about. We are talking about a much higher percentage of American, most of them people of color or people in urban or rural areas who do not have access to the type of training needed for these tests. She also called out the idea of Asian Americans, we have to be careful about the model minority. In fact, Asian Americans coming from lower class have the exact same problems, it is a middle-class activity and there are certain cultural activities that help to support familial relationships, so I speak strongly in favor of this pilot test we are debating things in which many people have researched and I hope that we research it here, to see if it is a good fit for WPI.

**Prof. DiMassa** (HUA) spoke in favor of this motion for the reasons outlined so far. He also spoke as the parent of a 6-year-old. Prof. DiMassa has no doubt his son will probably do well on tests, but he loves the notion that he won't have to devote this kind of time to prepping for the SAT because of what a colossal waste of time that is. He is so excited that WPI will contribute to this move away from these sorts of tests because he would much rather his son spend the time studying calculus or literature and not prepping for the SAT. Prof. DiMassa stated that he spent too much time doing this. He is in favor of real academic rigor over gamification of tests.

**Prof. Panchapakesan** (ME) expressed his concern about how this will impact the way the US will be stacked against the rest of the world in the future. He also expressed concern over the grade inflation in high school. When getting rid of test scores, you are just taking high school grades as the mark of student success. Mr. Palumbo explained that there is no proof that grade inflation is a thing. There is one study which has been touted publicly by the College Board and was conducted by a College Board researcher which used two completely different data sets and made some pretty unacademic assumptions about grades. Any discrepancies found are most likely due to the weighting of the AP courses. This is not happening with first-generation students, in low-income schools, or in rural schools where we are trying to broaden

access. This may only be happening in elite independent schools that are already advantages. Every high school provides us with a high school profile which gives more data and information to help us determine the context for that student within the school. The admissions process is not only about GPA, but it's about focusing on the actual learning outcomes that students have in the engagement in the broader world. What we're doing here is trying to better align our admission standards again through an evolution of decisions to match the mission values and goals of WPI.

**Prof. Sakulich** (CEE) stated that he is in favor of this motion. He took the SATs and got a perfect test score. He graduated with a GPA of 2.9 and graduated graduate school with a 3.2 GPA. None of these things determine if someone is going to be successful. He supports this motion since he feels SAT scores are meaningless.

**Prof. Kaminski** stated that he understands that the scores are already not really used too much in WPI admission. What this means is that admissions is not really going to change much, but what will change is that we will no longer have any data points to further really tell what's going on. I think it's going to be unfortunate, so we won't be able to sort of reverse engineer and see what has happened. Given that apparently there is a very holistic approach, why it's only the standardized test scores that are being eliminated. If we do in fact have a holistic approach, it makes sense to have these scores and use them if needed or not use them.

**The motion passed with 78 votes in favor and 20 votes opposed.**

Prof. Dudle explained that the next two motions are related and involve making revisions to the distribution requirements for the IMGD. This motion is for the BS major and the next motion is for the BA major.

This motion involves adding items to the list of what counts in math and science requirements. Certain programs did not exist when the catalog was originally written, such as Architectural Engineering, and therefore are not listed as acceptable majors to fulfill engineering requirements. We are currently reviewing a draft motion to update the catalog, but we would like to give IMGD the opportunity to update their information now. This requires CAP and the Dean of Undergraduate studies approval. They are just trying to add majors to the list of things that qualify as engineering and natural sciences into the existing catalog such as architectural engineering, data science and neuroscience. The Dean of Undergraduate studies and CAP have already approved this.

**The motion passed with 70 votes in favor and 0 opposed.**

Prof. Dudle previously explained this motion as it is parallel to the previous motion. The Committee on Academic Policy moved that the revisions to the distribution requirements of the IMGD BA major in the academic year 2021-2022 as described in your packet be approved. These are the same changes as for the BS in terms of adding majors that didn't exist when the catalog was written.

**The motion passed with 66 votes in favor and 1 vote opposed.**

Prof. Fehribach motioned to extend the meeting for 15 minutes.

### 3. Committee Reports

#### CITP

**Prof. Shue** (CS) provided an update from the Committee on Information Technology Policy (CITP). As we've switched to remote instruction, given the pandemic, many of us have had to use different tool sets. One of those is for helping with proctored exams. A tool called Lock is being used at WPI to help ensure that we have academic integrity during our exam processes. CITP has been looking into these proctoring tools and we're going to be sharing the main considerations with those. CITP and CAP are collaborating on issuing a joint statement in this regard.

So as background, these products and services are there to help us ensure that our students are taking an exam and not using materials that are not approved, to be used, while taking the exam. Students install software on their computers in order to allow a remote service to be able to determine what's happening in the environment that students in. This is often using microphones and webcams to get an idea of what's happening in the room. They also have the ability to monitor the network traffic on the computers to ensure that students aren't chatting with other people to get help while they're taking an exam. If there are issues during this period of time, the tools indicate that they will flag incidents for further review by the course instructor. Sometimes these are done using human proctors, other times this is done with automated systems so the benefit to instructors are pretty clear. These are going to help us be able to outsource some of our proctoring to a third party and it frees up times for teachers and instructors. The benefit to students is that they're able to take these exams at home in their dorm rooms, without having to go someplace else for them. In some cases, we found that Honor Lock can dramatically decrease the amount of work for the teaching staff, this was particularly used by the mathematical sciences department, but these solutions are not perfect, whether you use Honor Lock or even Zoom with proctors from your teaching staff to help out. They're not perfect solutions. Students will find ways to essentially bypass the protections that that these services offer and it's important to know what their limitations are. There have been some problems with using these, particularly with uploading and downloading pdfs with canvas.

Students are concerned about how the services interact with their systems and with what they're recording in the student's environment. In one case, 5% of students identified privacy concerns with this and another percentage of students had difficulty using the services as a whole. From the privacy perspective it's really important for instructors to know that we are asking students to be proctored sometimes in sensitive environments. We're talking dorm rooms, bedrooms, places where students are at home and feel like they're entitled to privacy. We aren't talking about a normal classroom environment where everyone knows they're in public and being monitored is an accepted part of the academic experience. Because we are having this remote instruction, this is different, and we need to recognize that those differences can have significant implications for our students.

The next can be related to the data usage, so these tools are being installed on personally own computers, the students' own machines and they are recording network and video traffic of

those environments. WPI doesn't directly control what is being done with the data that's being used by these online proctoring services. We have agreements with them, but what the online proctoring services are doing isn't really within our control. In many cases, these services are using the data that they collect in order to improve the product offering. If we're talking about using machine learning artificial intelligence to be able to determine if someone is cheating or not, the students who are taking our exams are essentially being used to train those algorithms to improve that which is for commercialization and for profit. Students may or may not be willing to help those companies with their software improvements.

So CITP has worked on a statement regarding this, and we've shared it with the CAP. The two committees are collaborating to release a joint statement on the matter, but we felt that, given that the term is coming, and people are making course preparation decisions now that it was important for the community to recognize that there are significant concerns with using these tools and what the implications would be. If you have feedback on this, please reach out to one of the faculty members with CITP. CAP is also interested. So, we look forward to getting your feedback we appreciate the time that you are taking to help your students in the classes and being able to deal with this remote learning environment.

#### 4. Other Reports

##### COACHE Faculty Job Satisfaction Survey

**Prof. Demetry** (ME) presented on behalf of a coordinating group about the COACHE Faculty Job satisfaction survey. We participated in this in 2014 and 2017. This is a comprehensive survey about all aspects of faculty life. It's administered by a group at the Harvard graduate school of education. It enables us to do external benchmarking and better understand the range of experiences within our workplace, both our strengths and our weaknesses. We've had great response from our faculty thus far, in fact, we were the first institution to pass the 50% response rate milestone. So, thank you to all who've already completed the survey, but we're not done yet we have a month more while the survey is open, and we want to hear from each and every voice. So, toward that end, please contact me if you have not received an email invitation from COACHE. All full-time faculty should have received an invitation or several by this point. Second, we want to provide assurance that the results will be shared openly with the Community. And that's accompanied with the assurance of anonymity. No individuals will be identifiable in their responses. And also, we commit to using the data to start conversations, ask deeper questions, and ultimately decide what actions are most important for us to prioritize. And last, we the Faculty have a really proud history of making use of these data, we want everyone to realize that the data from 2014 led to lots of deliberation within faculty governance about our promotion policies for both TTT and TRT faculty. Ultimately, we approved new promotion criteria, new committee composition, and election procedures, a mentoring system for mid-career faculty, and we dug deeper into issues for TRT faculty. This data was also instrumental and helping us make a data driven argument for an NSF advanced grant, which has enabled us to enact those new policies in a thoughtful way. Thank you to all who have participated. Please participate if you have not yet. You have until April 12th and if you have any questions, please contact me, Prof. Dominko or Dean Heinricher with suggestions as well, thanks.

**Dean Heinricher** (UGS) thanked Prof. Demetry and everyone who has participated. He echoed the comment that we have gotten very good use out of COACHE in the past and added that he thinks it holds up as the paradigm of the best participation in this program. One of the advantages of this program in addition is the information that we get. We can partner and discuss our results as a community, but also discuss results with other universities. We will identify a small group of select peers for comparison.

#### 5. President's Closing Remarks

President Leshin began by explaining the importance of the COACHE survey. She explained that on her first day as President of WPI she was given the COACHE survey and learned that 0% of our women faculty were satisfied with our promotion to full process. This led to some early action items around changing the promotion criteria. In the 2017 survey we saw a clear disconnect between our TTT and TRT faculty, which has led to some of the discussions we are having today. She thanked everyone for participating.

President Leshin also added that it was exactly one year ago that we sent the notice to the students to inform them that we would not be able to return from spring break for at least two weeks. It has been an incredibly stressful year, but she thanked everyone and expressed her appreciation for all they are doing for one another including the students. President Leshin also thanked everyone who is sending ideas of specific ways that we can interact with our students. She explained that our COVID numbers are higher than they were in the fall, but we are very well equipped to manage it. We are nowhere near being at the edge of our ability to manage it. As of right now almost all the cases are students, but there is no evidence of transmission in classrooms, labs, or academic environments of any kind. President Leshin clarified that she is not asking anyone to go beyond what they are comfortable with, but she asked everyone to think about this since it means so much to the students.

In terms of vaccines, we were able to get through everyone who is 65 and older. If you got your first vaccine here, you would get your second one here too. We have not been able to ask for further vaccines.

CERT had their 71<sup>st</sup> meeting yesterday and continues to do incredible work. They are looking at things like summer, but we are turning our attention over to the fall. Everyone is eager to be back on campus and this depends on the vaccine projections that by mid-summer everyone who wants a vaccine will have one. This would mean we could be back to an almost normal state in the fall. There may still be some safety protocols or some level of testing. This all depends on how the next few months go. For those who cannot take a vaccine or have real concerns about coming back, we can continue to work together on accommodations. The message that will be going to students is that we expect to be largely back in the fall and that she looks forward to seeing everyone in person.

President Leshin added that we are doing very well with admissions, but we are coming up on the deposit deadline, so we need to make sure we are recruiting appropriately. She also added that there has been some confusion with the fall scheduling in terms of classes being labeled as hybrid, but this will be cleared up. President Leshin concluded by stating that she is thankful for everything that everyone is doing.

## 6. Provost's Closing Remarks

**Provost Soboyejo** welcomed everyone to the end of C Term. He thanked everyone and added that it is amazing that we were just worried about how we were going to land in this academic year, but everyone has come together and done amazing things to bring us this far. This includes faculty governance leaders, faculty, administration, staff and our board members. Provost Soboyejo added that he gets a lot of energy on days like this when he walks through campus as sees students who continue to express their delight to be back on campus. He realized that we had been missing this energy of campus and as President Leshin said, we are all eager to get back to campus in the coming academic year. He thanked everyone again for getting us this far including Prof. Dominko and President Leshin.

He reflected on the results of the tenure and promotion process and added that he was delighted that there were more women being promoted to full professor today than men since this shows that the processes that have been put in place by the faculty guided the deliberations in ways that provide real validation for the efforts of all our faculty. He congratulated those that have been promoted.

Provost Soboyejo also mentioned that the global team has been organizing events, recruiting a dean, and laying the foundations of our global school. They also started a new series called innovation with impact. The first of this new series announced the marriage of value creation, innovation and entrepreneurship. This is an exciting project because it focuses on the students and brings our alumni faculty together. He encouraged everyone to participate in these future events. He thanked Prof. Heinricher and Prof. Demetry for the work they do. Provost Soboyejo thanked the TRT Council for their work. He concluded by recommending that everyone take some time to enjoy their families and the start of spring on our beautiful campus in the heart of New England.

## 7. Secretary of the Faculty Closing Remarks

Prof. Dominko congratulated all the colleagues on tenure and promotion. She also thanked all faculty colleagues for their participation in faculty governance. Prof. Dominko thanked Prof. Spanagel and Prof. Richman who were willing to serve if elected as the next Secretary of the Faculty, and congratulated Prof. Richman for winning the election. It is reassuring that faculty continue to recognize the importance of faculty governance and are willing serve in faculty governance roles.

## 8. Adjournment

Meeting was adjourned at 5:02pm by **Prof. Dominko**.

Respectfully submitted,  
Tanja Dominko  
Secretary of the Faculty

**Addenda on file with these minutes:**

## CONSENT AGENDA MOTIONS

- CAO BME - Addition of BME 4503
  - CAO BME – Changes to BME Distribution Requirements:
  - Two Motions: (1) changes to notes in distribution requirements (2) engineering courses qualifying for BME
  - CAO DS – Updating DS Distribution Requirements by Replacing OI4420 with OIE 4430
  - CAO HUA – Revisions to MU 2723 Music Composition
  - CAO HUA – Addition of WR 2500 Writing in the life sciences
  - CAO HUA- Addition of WR 4210 Medical Writing
  - CAO HUA - Minor in Creative Writing
  - CAO HUA – Change of Course Description for Music Ensembles
  - CAO SSPS – Removal of PSY 2502
  - CAO SSPS- Cross-list of GOV 2319 with ENV
  - CAO SSPS – Addition of ENV 2710
  - CAO SSPS – Addition of PSY 3000 and Cross-list with GOV 3000
  - CAO SSPS – Addition PSY 4100
  - CAO SSPS – Addition of Special Topics Courses (ENV 2800 and ENV 4800)
  - CAO SSPS – Addition and cross-list of ENV 2500
  - CAO SSPS - Removal of ENV2400
- 
- CGSR Motion to approve new course ME 5390/MTE 5390 Solar Cells
  - CGSR Motion to approve new course ME 5385/MTE 5385/MFE 5385 Metal Additive Manufacturing
  - CGSR Motion to approve new course ME 5314 Microsystems Technology
  - CGSR Motion to approve new course ME 5359/MTE 559 Biomedical Materials
  - CGSR Motion to approve new course ME 5371/MTE 5843/MFE 5843 Fundamentals of Surface Metrology
  - CGSR Motion to change course description for ME 5370/MTE 5841/MFE 5841 Surface Metrology
  - CGSR Motion to approve new course ME 514 Fluid Dynamics
  - CGSR Motion to remove ME 5101 Fluid Dynamics and ME 5107 Applied Fluid Dynamics
  - CGSR Motion to approve new courses PSY 506: Learning and Creativity, PSY 507: Applied Multi-Level Modeling, and PSY 590: Special Topics in Psychological Science to the Learning Sciences and Technology Graduate Program

**Date:** April 8, 2021

**To:** WPI Faculty

**From:** Committee on Graduate Studies and Research (M. Rolle, Chair)

**Re:** Motion to approve a new graduate course ME 5390/MTE 5390 *Solar Cells*.

**Motion:** The Committee on Graduate Studies and Research recommends and I move that ME 5390/MTE 5390 (Solar Cells) be added, as described below.

**Proposed Course Description:**

**ME 5390/MTE 5390 Solar Cells (2 Credits)**

The objective of this course is to provide students with an understanding of the working principles, design, fabrication and characterization of established and emerging solar cell technologies. Students will be exposed to the electronic properties of semiconductor materials, which are the building blocks of solar cells, and the analysis of photo-generation and extraction of charges in these materials. The course will emphasize the influence of the atomic-, nano- and micro-scale structure of the materials on the solar cell performance. In addition, the challenges of economics and scalability that must be addressed to increase the deployment of solar cells will be discussed. Students cannot receive credit for this course if they have received credit for the Special Topics (ME 593/MTE 594) version of the same course.

**Expected enrollment:** 20-40 students

**Intended audience:** Graduate students in ME, MTE, ECE, CHE, CBC and PH

**Anticipated Instructor:** Prof. Pratap Rao

**Rationale:**

*The course has been approved by the faculty of both the ME program and the MTE program, and will be cross-listed between these two programs.*

Solar cells (photovoltaics - PVs) are the fastest-growing form of renewable energy, with installed capacity increasing by 30% each year. At the end of 2017, global installed PV capacity reached ~400 Gigawatts, suppling ~15% of global electricity demand. Employment in the PV industry expanded 17 times faster than the total US economy in 2017, according to the Solar Foundation. PV also continues to be an active area of research, with new PV materials and devices, including thin film, multijunction, hybrid organic-inorganic, and quantum dot PVs being areas of intense global research focus.

There is currently no existing course in the WPI curriculum specifically focusing on solar cell materials and devices, although faculty members in ME, MTE, ECE, CHE, CBC and PH have research interests that directly or indirectly involve solar cells. This proposed advanced course connects many topics in emerging areas of research, and is therefore appropriate for the graduate level. Students in ME, MTE, ECE, CHE, CBC and PH will potentially be interested in such an offering. This course can help students to find positions in industry that require knowledge related to solar cells.

This course has been offered four times by Prof. Pratap Rao (in D-14, D-16, D-18, and A-19) as a 2-credit Special Topics course (ME 593/MTE 594 Special Topics: Solar Cells) with both in-person and online sections. The enrollment and evaluations of this course for these offerings are shown below:

Year/ Term	Course Number	Course Name	Enrol.	Eval Q1	Eval Q2	Resp.
19/A	ME 593	Special Topics: Solar Cells	11	4.30	4.70	3
	MTE 594		3	-	-	0
18/D	ME 593	Special Topics: Solar Cells	15	4.00	3.80	5
	MTE 594		15	4.22	4.56	9
16/D	ME 593	Special Topics: Solar Cells	13	4.57	4.43	7
	MTE 594		24	4.74	4.58	19
14/D	ME 593	Special Topics: Solar Cells	5	3.50	4.00	2
	MTE 594		12	4.42	4.08	12

#### **Impact on Degree Requirements:**

This course is not a required course for any degree. However, it will help students satisfy degree requirements for taking ME and MTE course credits in the ME and MTE graduate programs.

#### **Resources and Anticipated Instructors:**

This course is included in the regular teaching load of Prof. Pratap Rao. A regular classroom capable of holding 20-40 students with a computer and projector is required.

#### **Implementation Date:**

Implementation date for this action is the 2021-2022 academic year.

**Date:** April 8, 2021

**To:** WPI Faculty

**From:** Committee on Graduate Studies and Research (M. Rolle, Chair)

**Re:** Motion to approve a new graduate course ME 5385/MTE 5385/MFE 5385 *Metal Additive Manufacturing*

**Motion:** The Committee on Graduate Studies and Research recommends and I move that ME 5385/MTE 5385/MFE 5385 (Metal Additive Manufacturing) be added, as described below.

**Proposed Course Description:**

**ME 5385/MTE 5385/MFE 5385 Metal Additive Manufacturing (2 Credits)**

Additive Manufacturing (AM), popularly known as 3D printing, is a technique in which parts are fabricated in a layer-by-layer fashion. The focus of this course is on direct metal AM processes that are used in aerospace, automobile, medical, and energy industries. The objective of the course is to enable students to understand the working principles of various additive manufacturing processes, assess the suitability of metal AM processes for different designs and applications, apply process design concepts to metal AM processes via analytical and finite element modeling approaches, and have an introductory-level understanding of design for AM. Through the course project, students will have the opportunity to experience hands-on design, manufacturing, and characterization of additively manufactured materials, and will work in an interdisciplinary team of mechanical, materials, and manufacturing engineers. The economics of the manufacturing process will also be addressed, with an emphasis on determining the major cost drivers and discussing cost minimization strategies. Students cannot receive credit for this course if they have received credit for the Special Topics (ME 593/MTE 594) version of the same course.

**Expected enrollment:** 20-40 students

**Intended audience:** Graduate students in ME, MTE, MFE, BME, and RBE

**Anticipated Instructor:** Prof. Sneha P. Narra

**Rationale:**

*The course has been approved by the faculty of the ME, MTE and MFE programs, and will be cross-listed between these programs.*

Additive Manufacturing (AM), colloquially known as 3D printing, has recently become an area of intense research in both the aerospace industry as well as academia. There is growing interest in using additive manufacturing for various alloy systems and industrial applications. The

global additive manufacturing market has surpassed \$10 billion according to SmarTech Analysis and is expected to reach \$23.3 billion by 2026 according to a report by Reports and Data. Major aerospace and automobile manufacturers are already utilizing metal and polymer printers to produce end products. For instance, GE aviation produced on the order of 30,000 fuel nozzles for their LEAP engine using a metal additive manufacturing process. Additive manufacturing also continues to be an active area of research in academia, national labs, and industry. Based on the latest publications and sessions organized at major materials and additive manufacturing conferences, it is reasonable to conclude that metal additive manufacturing is an intensively researched area and proved to be a promising technology for various industrial applications.

A recent search on various job portals shows over 1000 open positions with the keyword additive manufacturing. The employers are mainly looking for familiarity/exposure to the latest technologies and knowledge and experience with the manufacturing processes. This course aims to provide an intermediate level understanding of the metal additive manufacturing processes with a project component to provide hands-on experience with design, processing, postprocessing, characterization, and reporting.

There is currently no existing course in the WPI curriculum specifically focusing on metal additive manufacturing, although faculty members in ME, MTE, MFE, and BME have research interests that directly or indirectly involve additive manufacturing. This proposed advanced course connects many topics in emerging areas of research and is therefore appropriate for the graduate level. Students in ME, MTE, MFE, and BME will potentially be interested in such an offering. This course can help students to find positions in industry that require knowledge related to additive manufacturing.

This course has been offered twice by Prof. Narra (in C-19 and C-20) as a 2-credit Special Topics course (ME 593/MTE 594 Special Topics: Additive Manufacturing). The enrollment and evaluations of this course for these offerings are shown below:

Year/ Term	Course Number	Course Name	Enrol.	Eval Q1	Eval Q2	Resp.
20/C	MFE 594	Special Topics: Additive Manufacturing	7	3.70	4.00	7
	MTE 594		12	3.80	3.70	14
19/C	MFE 594	Special Topics: Additive Manufacturing	11	4.10	3.70	11
	MTE 594		16	3.80	3.70	14

The course has been approved by the faculty of both the ME program and the MTE program and will be cross listed between these two programs.

**Impact on Degree Requirements:**

This course is not a required course for any degree. However, it will help students satisfy degree requirements for taking ME, MFE, and MTE course credits in the ME, MFE, and MTE graduate programs.

**Resources and Anticipated Instructors:**

This course is included in the regular teaching load of Prof. Narra. A regular classroom capable of holding 20-40 students with a computer and projector is required. Access to the metal additive manufacturing equipment at the WPI's Sagamore facility and desktop printers in the Foisie Makerspace is critical for project component of the course.

**Implementation Date:**

Implementation date for this action is the 2021-2022 academic year.

**Date:** April 8, 2021  
**To:** WPI Faculty  
**From:** Committee on Graduate Studies and Research (M. Rolle, Chair)  
**Re:** Motion to approve a new graduate course ME 5314 *Microsystems Technology*

**Motion:** The Committee on Graduate Studies and Research recommends and I move that ME 5314 (*Microsystems Technology*) be added, as described below.

**Proposed Course Description:**

**ME 5314 Microsystems Technology (2 credits)**

This course will build on the fundamentals of semiconductor manufacturing and its applications in micromechanical systems. Microsystems technology explores the science of miniaturization (the science of making small things). The course will discuss top-down and bottom-up manufacturing techniques, lithography, pattern transfer using additive and subtractive techniques, wet bulk micromachining, surface micromachining, LIGA and micromolding, scaling laws, and applications of miniaturized devices. Some examples of micro-devices such as accelerometers, pressure sensors, chemical sensors and biomedical sensors will be discussed.

**Expected enrollment:** 20-30 students  
**Intended audience:** Graduate students in ME  
**Anticipated Instructor:** Prof. Balaji Panchapakesan

**Rationale:**

*The course has been approved by the faculty of the ME program.*

Currently, there is no strong class on semiconductor manufacturing and its applications in micromechanical systems at WPI, ME department. This constitutes over \$100 billion dollars in manufacturing sector led by companies such as Intel, Motorola, Applied Materials, Texas Instruments, Qualcomm, Apple to name a few. Microsystems technology have evolved from solid state integrated circuits technology, through the development of microfabricated sensors and then of smart sensors, to the invention of microfabricated movable mechanical parts and micromotors, and finally to the concept of the microsystem, viewed essentially as a silicon wafer incorporating the processing circuit and either a microsensor, or a microactuator, or one or more mechanical, or fluidic, or optical components, or their combination. Most engineering schools have a strong class in microsystems fabrication and applications, which enables students to get prized jobs in the semiconductor manufacturing industries. Generally, there is a theory and a laboratory component where students are taught how to use clean rooms and the processes to make small devices. These experiences in Microsystems Technology will enable WPI students to get jobs in this sector.

For the past 40 years the US has been at the forefront of semiconductor manufacturing and sensor development. Fabrication experience is considered a plus with job salaries ranging from

\$84K to \$120K in this sector for graduate students. The employers are mainly looking for familiarity/exposure to the fabrication technologies and knowledge and experience with the

semiconductor manufacturing processes. This course aims to provide an intermediate to advanced- level understanding of the semiconductor manufacturing processes, and micro-sensor development with a laboratory project component to provide hands-on experience with design, processing, postprocessing, characterization, and reporting.

There is currently no existing course in the curriculum specifically focusing on microsystems technology, although faculty members in ME, MTE, MFE, EE, Physics and BME have research interests that directly or indirectly involve microsensor development. This proposed advanced course connects many topics in emerging areas of research and is therefore appropriate for the graduate level. Students in ME and other departments will potentially be interested in such an offering due to the high popularity of microsystems in the job market. Students will be able to design their own chips, fabricate them in the clean room and characterize them in Prof. Panchapakesan's Small Systems Laboratory. This course can help students to find positions in industry that require knowledge related to design, fabrication and characterization of microsystems.

#### **Impact on Degree Requirements:**

This course is not a required course for any degree. However, it will help students satisfy degree requirements for taking ME course credits in the ME graduate programs.

#### **Resources and Anticipated Instructors:**

This course is included in the regular teaching load of Prof. B. Panchapakesan. A regular classroom capable of holding 20-30 students with a computer and projector is required. Access to the clean room facility managed by Prof. Panchapakesan and characterization facilities at Prof. Panchapakesan's Small Systems Laboratory is required for project component of the course.

#### **Implementation Date:**

Implementation date for this action is the 2021-2022 academic year.

**Date:** April 8, 2021  
**To:** WPI Faculty  
**From:** Committee on Graduate Studies and Research (M. Rolle, Chair)  
**Re:** Motion to approve a new graduate course ME 5359/MTE 559 *Biomedical Materials*.

**Motion:** The Committee on Graduate Studies and Research recommends and I move that ME 5359/MTE 559 (Biomedical Materials) be added, as described below.

### **Proposed Course Description:**

#### **ME 5359/MTE 559 Biomedical Materials (2 Credits)**

This course is intended to serve as a general introduction to various aspects pertaining to the application of synthetic and natural materials in medicine and healthcare. This course will provide the student with a general understanding of the properties of a wide range of materials used in clinical practice. The physical and mechanical property requirements for the long term efficacy of biomaterials in the augmentation, repair, replacement or regeneration of tissues will be described. The physico-chemical interactions between the biomaterial and the physiological environment will be highlighted. The course will provide a general understanding of the application of a combination of synthetic and biological moieties to elicit a specific physiological response. Examples of the use of biomaterials in drug delivery, theranostic, orthopedic, dental, cardiovascular, ocular, wound closure and the more recent lab-on-chip applications will be outlined. This course will highlight the basic terminology used in this field and provide the background to enable the student to review the latest research in scientific journals. This course will demonstrate the interdisciplinary issues involved in biomaterials design, synthesis, evaluation and analysis, so that students may seek a job in the medical device industry or pursue research in this rapidly expanding field. Students cannot receive credit for this course if they have received credit for the Special Topics (ME 593/MTE 594) version of the same course, or for ME/BME 4814 Biomedical Materials.

**Expected enrollment:** 10-20 students

**Intended audience:** Graduate students in ME, MTE, ECE, CHE, CBC and PH

**Anticipated Instructor:** Prof. Satya Shivkumar

### **Rationale:**

*The course has been approved by the faculty of both the ME program and the MTE program, and will be cross-listed between these two programs.*

This course is a graduate version of ME/BME 4814 Biomedical Materials, and will be offered concurrently with ME/BME 4814 by Prof. Satya Shivkumar, as it has been since 2012. The enrolment has ranged from 5 to 35 students. This course is designed to accommodate graduate students and external online students.

The application of plastics, ceramics, glasses and metals in various clinical applications has rapidly expanded in recent times. The traditional use of these materials in

joint replacement, cardiovascular devices, wound care systems and a variety of other implants has been well established. More recently, several new technologies based on biomaterials including theranostics, drug delivery systems, smart materials and hydrogels are revolutionizing medical care. The field of biomaterials has been a constant source of employment for engineers. With an ageing population, the clinical use of medical devices and systems is expected to increase dramatically. This multidisciplinary field is an active area of research. The rapid advances in biology has enabled the development of exotic, targeted materials with multifunctional capabilities that can treat a range of complex diseases. Job opportunities and research prospects in this field are likely to increase significantly in the coming years.

There is currently no existing graduate level course in the WPI curriculum specifically focusing on the materials related concepts in biomedical materials, although several faculty members in BME, ME, MTE, CHE and CBC are actively involved in biomaterials related research. This proposed advanced course connects many topics in emerging areas of research, and is therefore appropriate for the graduate level. Students in ME, MTE, BME, CHE and CBC will potentially be interested in such an offering. This course can help students to find positions in industry that require knowledge related to Biomedical Materials.

#### **Impact on Degree Requirements:**

This course is not a required course for any degree. However, it will help students satisfy degree requirements for taking ME and MTE course credits in the ME and MTE graduate programs.

#### **Resources and Anticipated Instructors:**

Prof. Satya Shivkumar will continue to teach this course as a part his overall course offerings. This course is scheduled to be offered primarily to on-line students with biomedical interests. The on-line resources monitored through ATC such as Ensemble, Echo360 and now Zoom are required for the operation of this course.

#### **Implementation Date:**

Implementation date for this action is the 2021-2022 academic year.

**Date:** April 8, 2021  
**To:** WPI Faculty  
**From:** Committee on Graduate Studies and Research (M. Rolle, Chair)  
**Re:** Motion to approve a new graduate course ME 5371/MTE 5842/MFE 5842  
Fundamentals of Surface Metrology.

**Motion:** The Committee on Graduate Studies and Research recommends and I move that ME 5371/MTE 5843/MFE 5843 (Fundamentals of Surface Metrology) be added, as described below.

### **Proposed Course Description:**

#### **ME 5371/MTE 5843/MFE 5843 Fundamentals of Surface Metrology (2 Credits)**

Surface Metrology is about measuring, characterizing, and analyzing surface topographies or textures. This course covers conventional and developing measurement and characterization of roughness. It emphasizes research and covers a wide variety of applications, including, adhesion, friction, fatigue life, mass transfer, scattering, wear, manufacturing, food science, wetting, physical anthropology, and archeology. Surface metrology has applications in practically all engineering disciplines and sciences. Research principles are applied to critical evaluations of research methods. Students learn multiscale methods for discovering correlations between processing, textures, and behavior, and for discriminating surface textures supposed to be different because of their performance or manufacture. Results support product and process design, and quality assurance. Students create detailed project proposals on topics of their choosing, including literature reviews, preparation and testing of surfaces, measurements, characterizations, and analyses. Students cannot receive credit for this course if they have received credit for the Special Topics (ME 593/MTE 594/MFE 594) version of this course, or for ME 5370/MTE 5841/MFE 5841 Surface Metrology.

**Expected enrollment:** 12-15 students  
**Intended audience:** Graduate students in ME, MTE, MFE, ECE, CHE, CBC and PH  
**Anticipated Instructor:** Prof. Chris Brown

### **Rationale:**

*The course has been approved by the faculty of the ME, MTE and MFE programs, and will be cross-listed between these programs.*

This 2-credit term-long online course has been offered several times by Prof. Chris Brown. It was developed when the 3-credit semester-long blended course ME 5370/MTE 5841/MFE 5841 Surface Metrology had enrollments approaching 90. The enrollment for the 3-credit semester-long course has now been limited to around 20 students, and this 2-credit term-long course is offered online in every term that the 3-credit semester-long course is not being offered. Enrollments in the 2-credit term-long course have been in the range of 12-15

students each term. Therefore same number of students can be accommodated each year, with more individual attention and a better educational experience than was possible in such a large blended course.

Surfaces are important in engineering and science. They cover everything. Surface textures, or topographies, influence surface behavior, or performance, and are influenced by processing and use. Functional correlations between topographies and their processing and performance, and how to determine them when they are not known, are essential for evidence-based specification and tolerancing in designing products and processes. Measurement and characterization of surface topographies are important for quality assurance, forensics, physical anthropology, archaeology, and cultural preservation. Surface topographies can be important in physics, chemistry, and biology, as well as all branches of engineering. Yet, there are few courses in the world on how to measure, analyze and characterize surface topographies, and there is much still to be discovered.

Topographies often have irregular geometrical components that are challenging to characterize appropriately so that functional correlations and discriminations can be understood. This course includes discussion of fractals and multiscale geometric analyses and characterizations, and, to my knowledge, there are no other courses in the world that include these approaches to surface metrology. WPI's Surface Metrology is a world leader in these areas with many well cited publications (e.g., Scott, R.S., Ungar, P.S., Bergstrom, T.S., Brown, C.A., Grine, F.E., Teaford, M.F. and Walker, A., 2005. Dental microwear texture analysis shows within-species diet variability in fossil hominins. *Nature*, 436(7051), pp.693-695). This course should have a global reach.

### **Impact on Degree Requirements:**

This course is not a required course for any degree. However, it will help students satisfy degree requirements for taking ME, MTE and MFE course credits in these graduate programs.

This course is an important addition to WPI's online graduate programs in ME and augments our online offerings in MTE and MFE.

### **Resources and Anticipated Instructors:**

The instructor will be Prof. Chris Brown. This course is offered as an online CPE course.

### **Implementation Date:**

Implementation date for this action is the 2021-2022 academic year.

**Date:** April 8, 2021

**To:** WPI Faculty

**From:** Committee on Graduate Studies and Research (M. Rolle, Chair)

**Re:** Motion to change the course description for ME 5370/MTE 5841/MFE 5841 Surface Metrology.

**Motion:** The Committee on Graduate Studies and Research recommends and I move that the course description for ME 5370/MTE 5841/MFE 5841 Surface Metrology be changed as described below.

**Proposed Course Description (with changes underlined):**

**ME 5370/MTE 5841/MFE 5841. Surface Metrology (3 credits)**

This course emphasizes research applications of advanced surface metrology, including the measurement and analysis of surface roughness. Surface metrology can be important in a wide variety of situations including adhesion, friction, catalysis, heat transfer, mass transfer, scattering, biological growth, wear and wetting. These situations impact practically all the engineering disciplines and sciences. The course begins by considering basic principles and conventional analyses, and methods. Measurement and analysis methods are critically reviewed for utility. Students learn advanced methods for differentiating surface textures that are suspected of being different because of their performance or manufacture. Students will also learn methods for making correlations between surface textures and behavioral and manufacturing parameters. The results of applying these methods can be used to support the design and manufacture of surface textures, and to address issues in quality assurance. Examples of research from a broad range of applications are presented, including, food science, pavements, friction, adhesion, machining and grinding. Students do a major project of their choosing, which can involve either an in-depth literature review, or surface measurement and analysis. The facilities of WPI's Surface Metrology Laboratory are available for making measurements for selected projects. Software for advanced analysis methods is also available for use in the course. No previous knowledge of surface metrology is required. Students should have some background in engineering, math or science. Students cannot receive credit for this course if they have received credit for ME 5371/MTE 5843/MFE 5843 Fundamentals of Surface Metrology or the Special Topics (ME 593/MTE 594/MFE 594) version of Fundamentals of Surface Metrology.

**Rationale:**

*This change has been approved by the faculty of the ME, MTE and MFE programs.*

A new 2-credit term-long online course, ME 5371/MTE 5843/MFE 5843 Fundamentals of Surface Metrology, is being added. This course also has a Special Topics (ME 593/MTE 594/MFE 594) version. Students will only be allowed to receive credit for one of these: either ME 5370/MTE 5841/MFE 5841 Surface Metrology (the subject of the

present motion) OR ME 5371/MTE 5843/MFE 5843 Fundamentals of Surface Metrology (the new 2-credit course), OR the Special Topics (ME 593/MTE 594/MFE 594) version of the new 2-credit course.

**Impact on Degree Requirements:**

There is no impact on degree requirements. None of these courses are required for any degree. However, this change will help students satisfy degree requirements for taking ME, MTE and MFE course credits in these graduate programs.

**Resources and Anticipated Instructors:**

The instructor will continue to be Prof. Chris Brown. No additional resources are needed.

**Implementation Date:**

Implementation date for this action is the 2021-2022 academic year.

**Date:** April 8, 2021  
**To:** WPI Faculty  
**From:** Committee on Graduate Studies and Research (M. Rolle, Chair)  
**Re:** Motion to approve a new graduate course ME 514 Fluid Dynamics

**Motion:** The Committee on Graduate Studies and Research recommends, and I move that ME 514 (Fluid Dynamics) be added, as described below.

**Proposed Course Description:**

**ME 514 Fluid Dynamics (3 Credits)**

This course is an introduction to graduate-level fluid dynamics. Specific learning outcomes include deriving and understanding the governing equations of fluid mechanics; applying basic equations of fluid motion to understand inviscid fluids, Newtonian fluids, and incompressible fluids; analyzing potential flows using stream functions and potential functions; deriving exact solutions of fluid equations for special flow cases; and introducing the concept of boundary layers and deriving similarity solutions for boundary layer equations. (Prerequisites: undergraduate-level fluid dynamics.) Students cannot receive credit for this course if they have received credit for AE/ME 5101 or AE/ME 5107.

**Expected enrollment:** 20-40 students  
**Intended audience:** Graduate students in ME  
**Anticipated Instructor:** Prof. Aswin Gnanaskandan

**Rationale:**

*The course has been approved by the faculty of the ME department.*

This is a fundamental ME course. This course is a consolidation of two previously-offered courses: AE/ME 5101 Fluid Dynamics and AE/ME 5107 Applied Fluid Dynamics. These courses have been discontinued by the AE department, and are being consolidated into one course by the ME department. The target audience for the course is MS and PhD students in ME, especially students interested in a career in fluid dynamics industry or research.

**Impact on Degree Requirements:**

This course is not a required course for the ME MS or PhD programs, but is an essential part of an MS or PhD with specialization in the Thermal and Fluid Sciences area. This course will also prepare students who plan to take the Ph.D. Candidacy Exam in the Thermal and Fluid Sciences area.

**Resources and Anticipated Instructors:**

This course is included in the regular teaching load of Prof. Aswin Gnanaskandan. A regular classroom capable of holding 20-40 students with a computer and projector is required.

**Implementation Date:**

Implementation date for this action is the 2021-2022 academic year.

**Date:** April 8, 2021

**To:** WPI Faculty

**From:** Committee on Graduate Studies and Research (M. Rolle, Chair)

**Re:** Motion to remove ME 5101 (Fluid Dynamics) and ME 5107 (Applied Fluid Dynamics)

**Motion:** The Committee on Graduate Studies and Research recommends, and I move that ME 5101 (Fluid Dynamics) and ME 5107 (Applied Fluid Dynamics) be removed.

**Rationale:**

*The removal of these courses has been approved by the faculty of the ME department.*

AE/ME 5101 Fluid Dynamics and AE/ME 5107 Applied Fluid Dynamics were previously cross-listed in both AE and ME departments. These courses have been discontinued by the AE department. ME 5101 Fluid Dynamics and ME 5107 Applied Fluid Dynamics are being replaced by a single consolidated course, ME 514 Fluid Dynamics.

**Impact on Degree Requirements:**

None. This course is not a required course for any degree. Students who would have taken ME 5101 Fluid Dynamics (2 credits) and/or ME 5107 Applied Fluid Dynamics (2 credits), will now instead take ME 514 Fluid Dynamics (3 credits).

**Resources and Anticipated Instructors:**

None.

**Implementation Date:**

Implementation date for this action is the 2021-2022 academic year.

**Date:** April 8, 2021

**To:** WPI Faculty

**From:** Committee on Graduate Studies and Research (Prof. Marsha Rolle, chair)

**Re:** Motion to approve three new graduate courses PSY 506: Learning and Creativity; PSY 507: Applied Multi-Level Modeling and PSY 590: Special Topics in Psychological Science Approved by the Psychological and Cognitive Sciences Program, the Learning Sciences and Technology Program, and the Social Science and Policy Studies Department on 3/15/2021.

**Motion:** The Committee on Graduate Studies and Research recommends and I move that the following new graduate courses be added to the WPI Graduate Catalog, as described below.

**Proposed Course/Catalog Descriptions:**

*PSY 506 Learning and Creativity*

3 credits

This course will cover selected topics related to learning and creativity— including measurement, memory, semantic networks, sleep, analogies, problem-solving, divergent thinking, and insight moments. Students will critically review journal articles and other forms of media to gain a better understanding of the processes involved in learning and creative cognition. Students will also learn about prominent theories of learning and creativity and identify ways to utilize these frameworks to improve education and student experiences in the classroom.

**Rationale for PSY 506:** PSY 506: Learning and Creativity will allow Professor Shaw to teach a graduate course in the area of her expertise. It is currently being offered as a special topic (SS 590) with an enrollment of 14. Since this is the first iteration of the course and it is currently being taught, we do not have any course evaluations. However, we discovered that it was difficult for students to find the course as it was listed as SS 590 which is listed under the System Dynamics graduate program in the graduate catalogue, but not Learning Science and Technology. Overall, the course will add important content to the Learning Science and Technology graduate program.

*PSY 507: Applied Multi-Level Modeling*

3 credits

The purpose of this course is to examine current issues in learning sciences and education and introduce students to the analysis of nested data structures (e.g., students within classrooms). Longitudinal or repeated measures data can also be thought of as clustered data with measurement occasions nested within subjects. This course will focus on understanding the hierarchical (generalized) linear models and their assumptions, as well as practical aspects of developing models to address research questions and interpreting the findings. This course emphasizes practical, hands-on development, analysis and interpretation of hierarchical linear models. Readings will be drawn from book chapters on multilevel modeling and journal articles that utilize national longitudinal data sets to answer questions about student learning. The lab portion of this course will provide students with opportunities to learn and apply hierarchical linear modeling, mediation, and moderation to longitudinal data using two computer programs

(HLM and SPSS). Students who received credit for SS 590: Applied Multi-Level Modeling in 2018 or 2015 cannot also take PSY 507 for credit.

**Rationale for PSY 507:** Professor Ottmar has taught this course as a special topic twice in the past as it relates to an area of her expertise. SS 590: Applied Multi-Level Modeling was offered in the Spring of 2018 (6 enrolled) and in 2015. Bannerweb only allows you to go back to the 2016-2017 academic year, so official enrollments were not available for 2015. Course evaluations were also not available for these two offerings in Bannerweb or Oscar. We have found that with the course being listed as SS 590, it is confusing for students to find because it tends to get listed under the System Dynamics graduate program in the graduate catalogue, and not Learning Science and Technology. Overall, the course is an important addition to the Learning Science and Technology graduate program.

### *PSY 590 Special Topics in Psychological Science*

(1-3) credits

This course provides an opportunity for graduate students to learn about a special topic within Psychological Science. This course may be repeated for different topics.

**Rationale for PSY 590:** Currently, students in the Learning Science and Technology program take courses in different fields (e.g., C.S., PSY, Math, etc.). Most of the graduate programs from the Psychological Science program start with PSY; however, any special topics are SS 590. This is causing confusion for graduate students when registering for classes. Furthermore, SS 590 courses are being listed under System Dynamics, but not Learning Science and Technology aiding to the confusion. Therefore, we want to reduce confusion and streamline the process by adding PSY 590: Special Topics in Psychological Science. This will also better reflect the content being taught in the special topics courses.

**Impact on Degree Requirements:** PSY 506 will add an additional course that LST and interested NEU graduate students can take for their degree requirements. PSY 507 will make a course being taught as a special topics course a permanent course in LST. PSY 590 will not have a direct impact on degree requirements as SS 590 already exists. However, it will help LST and NEU graduate students find courses in their specializations, and it will better reflect the content of PSY special topics courses.

**Resources and Anticipated Instructors:** PSY 506: Learning and Creativity will be taught by Professor Stacy Shaw. She is already teaching this course as SS 590 in Spring 2021. PSY 507: Applied Multi-Level Modeling will be taught by Professor Erin Ottmar. She has already taught this course as SS 590 in 2018 and 2015. PSY 590 will be open to any instructor who wishes to provide a special topic in graduate education in psychological science.

**Implementation Date:** Implementation date for this action is the 2021-2022 academic year.

**Date:** April 8, 2021

**To:** WPI Faculty

**From:** Committee on Graduate Studies and Research (Prof. Marsha Rolle, chair)

**Re:** Motion to approve three new graduate courses PSY 506: Learning and Creativity; PSY 507: Applied Multi-Level Modeling and PSY 590: Special Topics in Psychological Science Approved by the Psychological and Cognitive Sciences Program, the Learning Sciences and Technology Program, and the Social Science and Policy Studies Department on 3/15/2021.

**Motion:** The Committee on Graduate Studies and Research recommends and I move that the following new graduate courses be added to the WPI Graduate Catalog, as described below.

**Proposed Course/Catalog Descriptions:**

*PSY 506 Learning and Creativity*

3 credits

This course will cover selected topics related to learning and creativity— including measurement, memory, semantic networks, sleep, analogies, problem-solving, divergent thinking, and insight moments. Students will critically review journal articles and other forms of media to gain a better understanding of the processes involved in learning and creative cognition. Students will also learn about prominent theories of learning and creativity and identify ways to utilize these frameworks to improve education and student experiences in the classroom.

**Rationale for PSY 506:** PSY 506: Learning and Creativity will allow Professor Shaw to teach a graduate course in the area of her expertise. It is currently being offered as a special topic (SS 590) with an enrollment of 14. Since this is the first iteration of the course and it is currently being taught, we do not have any course evaluations. However, we discovered that it was difficult for students to find the course as it was listed as SS 590 which is listed under the System Dynamics graduate program in the graduate catalogue, but not Learning Science and Technology. Overall, the course will add important content to the Learning Science and Technology graduate program.

*PSY 507: Applied Multi-Level Modeling*

3 credits

The purpose of this course is to examine current issues in learning sciences and education and introduce students to the analysis of nested data structures (e.g., students within classrooms). Longitudinal or repeated measures data can also be thought of as clustered data with measurement occasions nested within subjects. This course will focus on understanding the hierarchical (generalized) linear models and their assumptions, as well as practical aspects of developing models to address research questions and interpreting the findings. This course emphasizes practical, hands-on development, analysis and interpretation of hierarchical linear models. Readings will be drawn from book chapters on multilevel modeling and journal articles that utilize national longitudinal data sets to answer questions about student learning. The lab portion of this course will provide students with opportunities to learn and apply hierarchical linear modeling, mediation, and moderation to longitudinal data using two computer programs

(HLM and SPSS). Students who received credit for SS 590: Applied Multi-Level Modeling in 2018 or 2015 cannot also take PSY 507 for credit.

**Rationale for PSY 507:** Professor Ottmar has taught this course as a special topic twice in the past as it relates to an area of her expertise. SS 590: Applied Multi-Level Modeling was offered in the Spring of 2018 (6 enrolled) and in 2015. Bannerweb only allows you to go back to the 2016-2017 academic year, so official enrollments were not available for 2015. Course evaluations were also not available for these two offerings in Bannerweb or Oscar. We have found that with the course being listed as SS 590, it is confusing for students to find because it tends to get listed under the System Dynamics graduate program in the graduate catalogue, and not Learning Science and Technology. Overall, the course is an important addition to the Learning Science and Technology graduate program.

### *PSY 590 Special Topics in Psychological Science*

(1-3) credits

This course provides an opportunity for graduate students to learn about a special topic within Psychological Science. This course may be repeated for different topics.

**Rationale for PSY 590:** Currently, students in the Learning Science and Technology program take courses in different fields (e.g., C.S., PSY, Math, etc.). Most of the graduate programs from the Psychological Science program start with PSY; however, any special topics are SS 590. This is causing confusion for graduate students when registering for classes. Furthermore, SS 590 courses are being listed under System Dynamics, but not Learning Science and Technology aiding to the confusion. Therefore, we want to reduce confusion and streamline the process by adding PSY 590: Special Topics in Psychological Science. This will also better reflect the content being taught in the special topics courses.

**Impact on Degree Requirements:** PSY 506 will add an additional course that LST and interested NEU graduate students can take for their degree requirements. PSY 507 will make a course being taught as a special topics course a permanent course in LST. PSY 590 will not have a direct impact on degree requirements as SS 590 already exists. However, it will help LST and NEU graduate students find courses in their specializations, and it will better reflect the content of PSY special topics courses.

**Resources and Anticipated Instructors:** PSY 506: Learning and Creativity will be taught by Professor Stacy Shaw. She is already teaching this course as SS 590 in Spring 2021. PSY 507: Applied Multi-Level Modeling will be taught by Professor Erin Ottmar. She has already taught this course as SS 590 in 2018 and 2015. PSY 590 will be open to any instructor who wishes to provide a special topic in graduate education in psychological science.

**Implementation Date:** Implementation date for this action is the 2021-2022 academic year.

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Addition of Computational Biomechanics, BME 4503, as Approved by the BME UCC on 2/26/21.

**Motion:** The Committee on Academic Operation recommends, and I move, approval of the addition of BME 4503, Computational Biomechanics.

**Contact:** Prof. Songbai Ji

**Preferred term:** B

**Expected enrollment:** 40

**Course type:** Cat II

**Intended audience:** If the course becomes permanent: potentially all BME students with biomechanics focus as well as some ME students.

**Anticipated Instructor:** Prof. Songbai Ji

**Alternate Instructors:** Prof. Karen Troy, or Prof. Adam Lammert

**Course/Catalog Description:** BME 4503, Computational Biomechanics, and Course Category (Cat. II). Cat. II, once every other year

This course will focus on using computational modeling approaches, particularly, finite element models, to simulate, validate, and analyze the biomechanics involved in soft and hard tissue deformation and stress/strain analysis in quasi-static or impact conditions. First, students will be introduced to the process of setting specific analytical goals and establishing the need for a specific quantitative biomechanical model. Then, basic underlying principles of forward and inverse static/dynamics simulations are covered. Finally, multi-scale and multi-step models will be introduced. During the process, material models and property assignment will also be covered. Model building, testing, optimization and validation with experimental data will be discussed. An introduction to tools and techniques used in computational biomechanics will be provided.

Recommended background: Basic knowledge of solid mechanics (ES 2501, ES 2502, ES 2503, ME 3501 or equivalent), differential and integral calculus (i.e., MA 2051 or equivalent), MATLAB programming (BME 2211 Data Analysis).

**Rationale:** Computational modeling is virtually ubiquitous in numerous engineering domains, including biomechanics. However, a course dedicated to computational biomechanics is not currently available in the BME department. Currently, there are only two 4000-level courses offered in the Biomedical Engineering Department for students specializing in biomechanics. Therefore, a course in computational modeling aspects of biomechanics will significantly strengthen the educational opportunities for students in the department. Perhaps more importantly, this course will also provide the much-needed exposure to computational modeling for BME students with biomechanics focus. This will strengthen their qualification and competitiveness when they graduate and look for either industry or academic jobs.

*This course has been offered twice previously as an experimental course (BME 450x: Computational Biomechanics). The outcomes of these offerings are detailed below.*

**Learning Outcomes:** The students are expected to gain knowledge in computational modeling in the field of biomechanics. They will learn the whole process of model creation, optimization, validation, and result interpretation. This would serve as a stepping-stone toward their future endeavors in modeling and simulation in biomechanics. Computer labs will be conducted, which will further strengthen their computer programming and data analysis skills.

**ABET outcomes include:**

- Criterion 1: An ability to identify, formulate, and solve complex engineering problems at the interface of engineering and biology by applying principles of engineering, science, and mathematics.
- Criterion 7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

**Implementation Date:** Implementation date for this action is the 2021-22 Academic year.

**Resource Needs:**

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

- Instructor: Part of the regular teaching load for Prof. Songbai Ji
- Classroom: with whiteboard and/or computer/video projection equipment to accommodate up to 40 students.
- Laboratory: none.
- Library resources: no special needs.
- Information Technology: no special support
- Other: TA support for grading and student consultation

**Assessment:** The course will be assessed based on student feedbacks. Particularly, questions related to quality of the course (#1 on student course evaluation form) instructor's teaching (#2), the amount learned from the course (#9), and the amount of time spent on the course (#26), will be assessed. In addition, feedback and reflections from the instructor will also be evaluated, based on the level of difficulty, interest, and motivation for the class.

**Impact:** Computational modeling is virtually ubiquitous in numerous engineering domains, including biomechanics. However, a course dedicated to computational biomechanics is not currently available at the BME department. This makes it important to offer this proposed course.

**Course Prior Experience:**

This course was offered as an experimental course in D18 and D20 and a summary of student and instructor feedback follows.

1. Student feedback.

Verbal feedback from students at the end of the course was generally positive. Aspects they enjoyed were the final project that students can develop based on their own research interest and apply to real-world biomechanical problems. Aspects they did not like as much were the assumed high level of MATLAB skills.

2. Feedback from course evaluations taken directly from the on-line forms.

***What did you particularly like about the course?***

- I like the incorporation of Matlab, I thought this class really helped me learn more about Matlab coding.
- I liked how the class was very project based rather than exam based. It made us have to be able to apply the information rather than just regurgitate it
- I liked the final project
- I liked the material that we learned regarding how computational mechanics can be applied to the body.
- I personally enjoyed learning Abaqus and how to use this program to model different structures. I enjoyed the labs because the labs taught us how to use Abaqus, but all of the labs were just following Youtube tutorials and had very little to do with the lectures.
- I really appreciated the Professor and TA and how much they help students struggling with particular homework or project questions.
- I really liked how all of the homework was relevant and helpful in learning the material and did not feel like busy work.
- I also liked how the course schedule was updated often to make sure all of the changes were accounted for.
- I really liked the material in this class and having live zoom lectures was helpful. The pacing of the course was also good.
- Many actual practice on abaqus and MATLAB, flexible and challenging project

***What did you particularly dislike about the course?***

- A few of the assignments were very difficult, making them hard to complete. A poll for when office hours could have been would have been nice since I was unable to attend most of the professors office hours due to them being early (not on the east coast). I liked the idea of the discussion boards for when we need help, however things weren't always answered and often the professor seemed to refer students to lecture which wasn't helpful.
- Abaqus seemed to be a weird choice for the FEA software, Why not Ansys?
- Because of the online course style, the live session to play a youtube video is a bit hard to follow. I think this part can be change to an assignment, with instructions.
- I think explanations provided for the homework problems were confusing. It may have been a result of the online learning environment.
- I disliked that there was some disconnect between what we were learning in lecture and translating that to the modeling in abaqus
- I thought the homework assignments were really difficult and time consuming especially because we didn't always learn about the topics to the same extent. Also, with the labs, they should be taught by the professor or done on ones own time.

- MATLAB was not a required background and the homeworks heavily relied on a very advanced understanding of MATLAB. I was under the impression that the main point of this class was to learn Abaqus and unfortunately that was not the primary topic of the course. The homeworks were incredibly difficult if you only had a very basic understanding of Matlab.
- The course was a little bit heavy with Matlab, but I think he did a good job realizing that and helping students with their code.
- More example problems relevant to the homework would be helpful and maybe making a recommendation for students who want to take the class that they know MATLAB.
- Some more examples that more closely resemble the hw would be helpful

***Would you encourage a friend to take a course from this instructor? Why or why not?***

- If you are willing to do a lot of learning on your own then yes. This may have been because of the given situation as I know numerous people who have had positive experiences.
- The instructor struggled to sympathize with the students who did not have MatLab experience. So if the individual has good MatLab experience, I would say that this course would be enjoyable and worthwhile. But if the individual does not have this experience prior to taking the class, I would recommend taking an intro to Matlab course or not taking this course.
- Yes, If they have the time for the work.
- Yes, although the work could sometimes be a bit difficult and overwhelming, I learned a lot more than many classes that I've taken. It also allowed me to improve my Matlab skills.
- Yes, this is a very helpful course
- Yes. I think I learned a lot
- Yes.

3. Outcomes from questions 1, 2, 9 (now 7), and 26 (now 19) of course evaluations.

In general, the students' feedback on the course were positive with the following ratings on selected survey questions. However, this might be one of the more challenging course.

2020 D (fully online)		2018 D (regular in-person)	
Q1: 3.4		Q1: 3.9	
Q2: 3.4		Q2: 4.0	
Q7: 3.6		Q9: 4.3	
Q8: 4.6		Q10: 4.6	
Q19:		Q26:	
n=11		n=9	
0 hr/wk	0	0 hr/wk	0
1-5 hr/wk	0	1-5 hr/wk	2
6-10 hr/wk	4	6-10 hr/wk	3
11-15 hr/wk	3	11-15 hr/wk	1

16-20 hr/wk 4  
21+ hr/wk 0

16-20 hr/wk 3  
21+ hr/wk 0

4. Instructor feedback and reflections (e.g., did the course meet the learning objectives or outcomes) from experimental offerings if applicable.

During the second time this course was offered in D20, a few changes had to be made to accommodate the fully online offering due to COVID-19. Mostly, the lab sessions had to be relied more on on-line YouTube videos. Some feedback was that these videos were too fast to follow in a class. This may have negatively impacted the course rating compared to D18 offering. In the future, I will assign these videos as exercise outside of the class, but I will go through the examples in the class with the students, so that they can do the same tasks while in the class time to learn. This may be important for students who haven't had any prior experience in Abaqus software environment.

The final project was something that students consistently liked a lot. In my first offering in D18, I only had one project assigned to all student groups. Although the students liked the real-world project (related to brain impact simulation), having all of them working on the same project was not the best idea. Therefore, in my second offering, I had students first grouped based on their own interest in research (e.g., static problem vs. dynamic problem, organ-level model vs. cellular model) to collaborate on the final project. Each group then searched literature to identify an existing computational model of their like/choice. Their tasks were then to do their best to replicate the model and simulations. This practice turned out to be quite liked by the students. First, each group will find it enjoyable to work on a project of their choice. Second, different groups will work on different projects, and they could also see how other groups solve different problems so that they could learn from each other. In my future offerings, I will continue to follow this project-based teaching.

The greatest dislike in D20 was the heavy reliance on MATLAB, which did not seem to be an issue in D18 offering. Therefore, I have added a suggested prior course BME 2211 (Data Analysis using MATLAB) as a recommended background. In addition, I will lessen the reliance on MATLAB in my future offerings.

Finally, given that students may wish to acquire knowledge and skills from this course to apply to their MQP, it would best serve them if this course is moved from D-term to B-term.

#### **Instructor's Suggestions for Future Improvements:**

- Recommend students to have taken BME 2211 Data analysis course (in Matlab) before taking this course.
- Lessen the reliance on Matlab in homework and projects.
- Continue to group students with similar interest to collaborate on a final project. Depending on the class size, 2-3 students per group might be best.
- Consider replacing one of the homeworks to a mid-term mini project.

5. Population numbers:
  - a. D18 – 15 students
  - b. D20 – 17 students

**The experimental course proposal is given below for reference.**

**To:** Germano Iannacchione, Chair, Committee on Academic Operations

**From:** George Pins, Associate Head; Kris Billiar, Head; Dept. of BME

**Re:** Motion to add **Computational Biomechanics, BME 450X**, approved by the BME Dept faculty on 3/24/2107.

**Date:** 03/25/2017

The Department of Biomedical Engineering requests the approval of the following experimental course (*BME 450X, Computational Biomechanics*) in Academic Years 2017 and 20198 during D-terms.

Note: Experimental courses are approved for two offerings.

**Contact:** Prof. Songbai Ji

**Preferred term:** D

**Expected enrollment:** 40

**Course type:** Cat II

**Intended audience:** If the course becomes permanent: potentially all BME students with biomechanics focus as well as some ME students.

**Anticipated Instructor:** Prof. Songbai Ji

**Course/Catalog Description:** BME 450X, Computational Biomechanics, and Course Category (Cat.I or II). Cat. II, once every other year

This course will focus on using computational modeling approaches, particularly, finite element models, to simulate, validate, and analyze the biomechanics involved in soft and hard tissue deformation and stress/strain analysis in quasi-static or impact conditions. First, students will be introduced to the process of setting specific analytical goals and establishing the need for a specific quantitative biomechanical model. Then, basic underlying principles of forward and inverse static/dynamics simulations are covered. Finally, multi-scale and multi-step models will be introduced. During the process, material models and property assignment will also be covered. Model building, testing, optimization and validation with experimental data will be discussed. An introduction to tools and techniques used in computational biomechanics will be provided.

Recommended background: Basic knowledge of solid mechanics (ES 2501, ES 2502, ES 2503, ME 3501 or equivalent), differential and integral calculus (i.e. MA 2051 or equivalent).

**Rationale:** Computational modeling is virtually ubiquitous in numerous engineering domains, including biomechanics. However, a course dedicated to computational biomechanics is not currently available in the BME department. Currently, there are only two 4000-level courses offered in the Biomedical Engineering Department for students specializing in biomechanics. Therefore, a course in computational modeling aspects of biomechanics will significantly strengthen the educational opportunities for students in the department. Perhaps more importantly, this course will also provide the much needed exposure to computational modeling for BME students with biomechanics focus. This will strengthen their qualification

and competitiveness when they graduate and look for either industry or academic jobs.

**Learning Outcomes:** The students are expected to gain knowledge in computational modeling in the field of biomechanics. They will learn the whole process of model creation, optimization, validation, and result interpretation. This would serve as a stepping-stone toward their future endeavors in modeling and simulation in biomechanics. Computer labs will be conducted, which will further strengthen their computer programming and data analysis skills.

ABET outcomes include:

- An ability to apply knowledge of advanced mathematics (including differential equations and statistics), science, and engineering to solve the problems at the interface of engineering and biology (ABET criterion 3a).
- An ability to identify, formulate, and solve engineering problems (ABET criterion 3e).

**Resource Needs:**

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

- Instructor: Part of the regular teaching load for Prof. Songbai Ji
- Classroom: with whiteboard and/or computer/video projection equipment to accommodate up to 40 students.
- Laboratory: none.
- Library resources: no special needs.
- Information Technology: no special support
- Other: TA support for grading and student consultation

**Assessment:** The course will be assessed based on student feedbacks. Particularly, questions related to quality of the course (#1 on student course evaluation form) instructor's teaching (#2), the amount learned from the course (#9), and the amount of time spent on the course (#26), will be assessed. In addition, feedback and reflections from the instructor will also be evaluated, based on the level of difficulty, interest, and motivation for the class.

**Impact:** Computational modeling is virtually ubiquitous in numerous engineering domains, including biomechanics. However, a course dedicated to computational biomechanics is not currently available at the BME department. This makes it important to offer this proposed experimental course.

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Motion to change distribution requirements for Biomedical Engineering, as approved by the Biomedical Engineering Department on February 5, 2021

**Motion:** The Committee on Academic Operation recommends, and I move, that the Distribution Requirements and Courses Qualifying for Engineering Distribution Requirements for Biomedical Engineering be modified as described below.

**Motion #1:** Modification to the distribution requirements for Biomedical Engineering

**Existing Distribution Requirements:**

---

**Program Distribution Requirements for the Biomedical Engineering Major**

---

The normal period of residency at WPI is 16 terms. In addition to the WPI requirements applicable to all students (see page 7), a biomedical engineer needs a solid background in mathematics, physical and life sciences. The distribution requirements are satisfied as follows:

<b>BIOMEDICAL ENGINEERING</b>	<b>MINIMUM UNITS</b>
1. Mathematics (See Note 1)	6/3
2. Basic Science (See Note 2)	6/3
3. Supplemental Science (See Note 3)	1/3
4. Computer Science (Note 4)	1/3
5. Biomedical Engineering and Engineering (See Note 5)	14/ 3
6. MQP (See Note 6)	3/3

**NOTES:**

1. Mathematics must include differential and integral calculus, differential equations and statistics.
2. 2/3 unit from each of the following areas: BB, CH and PH. At least 1/3 unit of BB coursework must be 2000+ level.
3. 1/3 additional unit from BB, CH, PH or FY courses that satisfy BB, CH, or PH.
4. 1/3 unit in basic computer programming (BME 1004, or equivalent).
5. 14/3 unit of engineering coursework as specified in the WPI Catalog "Courses Qualifying for Engineering Department Areas" with the following distribution:
  - A. 3/3 unit of 2000+ level in engineering.
  - B. 2/3 unit of 3000+ level in engineering.
  - C. 9/3 units in Biomedical Engineering which must include the following:
    - a. 1/3 unit biomechanics or biofluids at the 2000+ level
    - b. 1/3 unit biomaterials or tissue engineering at the 2000+ level
    - c. 1/3 unit biosensors or bioinstrumentation at the 2000+ level
    - d. 1/3 unit experimental measurement and data analysis at the 2000+ level

- e. 2/3 unit of BME laboratories at the 3000+ level (four 1/6 unit labs)
- f. 1/3 unit BME engineering with living systems laboratory (BME 3111 or equivalent)
- g. 1/3 unit BME design (BME 3300 or equivalent)
- h. 1/3 unit BME elective

Notes:

- i. 2/3 unit in BME must be at or above the 4000-level, of which 1/3 unit must be at the 4000-level.
  - ii. Only 1/3 unit may be ISU (syllabus and final report required)
  - iii. MQP credits cannot be used to satisfy the 14/3 engineering coursework)
6. Must include a minimum of 1/3 unit Capstone Design Experience.

A. Each Biomedical Engineering student must complete a Capstone Design experience requirement. The Capstone Design experience is partially or fully accomplished by completing the Major Qualifying Project which integrates the past course work and involves significant engineering design. At the time of registration for the MQP, the project advisor will determine whether the MQP will meet the full 1/3 unit Capstone Design requirement or not. If not, the advisor will identify an additional 1/6 unit of coursework in the area of engineering design (BME 4300 or equivalent) to be taken in order to meet the ABET Capstone Design requirement.

These distribution requirements in *Biomedical Engineering* apply to all students matriculating at WPI AY2012 and after. Students who matriculated prior to AY2012 have the option of satisfying the degree requirements in the catalog current at the time of their matriculation.

### **Proposed Distribution Requirements:**

#### **Program Distribution Requirements for the Biomedical Engineering Major**

The normal period of residency at WPI is 16 terms. In addition to the WPI requirements applicable to all students (see page 7), a biomedical engineer needs a solid background in mathematics, physical and life sciences. The distribution requirements are satisfied as follows:

<b>BIOMEDICAL ENGINEERING</b>	<b>MINIMUM UNITS</b>
1. Mathematics (See Note 1)	6/3
2. Basic Science (See Note 2)	6/3
3. Supplemental Science (See Note 3)	1/3
4. Computer Science (Note 4)	1/3
5. Biomedical Engineering and Engineering (See Note 5,6,7,8)	14/ 3
6. MQP (See Note 9)	3/3

### **NOTES**

1. Mathematics must include differential and integral calculus, differential equations, and statistics.
2. 2/3 units from each of the following areas: BB, CH and PH. At least 1/3 unit of BB coursework must be 2000+ level.
3. 1/3 unit from BB, CH, CS, MA, PH or FY courses that satisfy BB, CH, CS, MA, or PH.

4. 1/3 unit in basic computer programming (BME 1004, or equivalent).
5. 14/3 units of engineering coursework as specified in the WPI Catalog “Courses Qualifying for Engineering Department Areas” with the following distribution:
  - A. 3/3 units of 2000+ level in engineering.
  - B. 2/3 units of 3000+ level in engineering.
  - C. 9/3 units in Biomedical Engineering which must include the following:
    - i. 4/3 units of BME coursework at the 2000+ level
    - ii. 2/3 units of BME laboratories at the 3000+ level (four 1/6-unit labs)
    - iii. 1/3 unit of BME design (BME 3300 or equivalent)
    - iv. 1/3 unit of BME coursework at the 4000 level
    - v. 1/3 unit of BME coursework at the +4000 level
6. As part of the 14/3 units of engineering coursework, a subset of the courses must fulfill the following requirements:
  - A. For 5A-C, you must take at least one course in each of the BME core competencies (see “Biomedical Engineering Program Chart” for courses that can be used to fulfill the requirements):
    - i. 1/3 unit of biomechanics or biofluids at the 2000+ level
    - ii. 1/3 unit of biomaterials or tissue engineering at the 2000+ level
    - iii. 1/3 unit of biosensors or bioinstrumentation at the 2000+ level
    - iv. 1/3 unit of experimental measurement and data analysis at the 2000+ level
  - B. For 5C, a minimum of 1/6 unit must fulfill the living systems requirement (BME3111, BME 3012, BME 3503, BME 3813 or other courses specified in the Biomedical Engineering Program Chart)
7. No more than 1/3 unit of the 14/3 units of engineering coursework may be independent study (ISU) with a syllabus submitted to the Chair of the BME Undergraduate Curriculum Committee and a final report submitted to the ISU Instructor.
8. MQP credits cannot be used to satisfy the 14/3 units of engineering coursework
9. Must include a minimum of 1/3 unit of Capstone Design Experience. Each Biomedical Engineering student must complete a Capstone Design Experience requirement. The Capstone Design Experience is partially or fully accomplished by completing the Major Qualifying Project which integrates the past coursework and involves significant engineering design. At the time of registration for the MQP, the project advisor will determine whether the MQP will meet the full 1/3 unit of Capstone Design Experience requirement or not. If not, the advisor will identify an additional 1/6 unit of coursework in the area of engineering design (BME 4300 or equivalent) to be taken in order to meet the ABET Capstone Design requirement.

**Rationale:**

Changes to Note 3: These changes allow the subset of BME students that want to take an additional math or computer science course to gain more content depth to be able to do so within the 15 units graduation requirement without utilizing free electives to do so. For instance, the BME students interested in the biomechanics specialization would be able to take a linear algebra course to be better prepared for advance level biomechanics courses. Alternatively, the BME students interested in bioinstrumentation and medical imaging specialization would be able to take an additional computer science course to be better prepared for advance level courses focused on instrumentation development or automated image analysis.

Changes to Note 5 with the addition of Note 6, Note 7, and Note 8: The changes to the BME distribution requirements are designed to codify our rules to communicate changes more transparently of the courses that count for BME core knowledge courses and the living systems requirement. The courses counting towards the varying distribution requirements were updated during academic year 2019-2020 requiring changes to the undergraduate catalog to align with advising.

The change to Note 5 is within sub-note 5C where the BME core knowledge/breadth area requirement (biomechanics, biomaterials, biosensor/bioinstrumentation, and measurements/data analysis) has been removed and made into the new Note 6. This allows students to take a course outside of BME to count towards the BME core knowledge/breadth area requirement as defined in the Biomedical Engineering Program Chart and count it towards the 9/3 units of BME coursework or the 5/3 units engineering coursework depending on the course designation.

For clarity, the Notes inside of the Notes section were removed and made into Note 7 and Note 8.

The previous Note 6 is now Note 9 as a result of the above changes.

The changes are highlighted in yellow.

**Implementation Date:** Implementation date for this action is immediately, as this is only a clarification of existing distribution requirements.

---

**Motion #2:** Modification to the BME portion of the “Courses Qualifying for Engineering Distribution Requirements” section of the undergraduate course catalog

**Existing Courses Qualifying for Engineering Distribution Requirements:**

**BME:** All courses designated “BME” (except BME 1001, BME 1004 and BME 3110) and CE, CHE, ECE, RBE, and ME courses at the 2000-level or above (except RBE 3100).

**Proposed Courses Qualifying for Engineering Distribution Requirements:**

**BME:** All courses designated “BME” (except BME 1001, BME 1004, BME 3110, BME 532, BME 560, BME 562, BME 564, and BME 593; BME 595 requires departmental approval) and CE, CHE, ECE, RBE, and ME courses at the 2000-level or above (except RBE 3100).

**Rationale:**

The Biomedical Engineering Department faculty agree that the content in BME 532, BME 560, BME 562, BME 564 and BME593 do not meet the ABET criteria of an engineering courses at the undergraduate level in the BME Department.

The Biomedical Engineering Department faculty offer graduate level courses with the BME595 course designation as exploratory course offerings. The course BME595 may not meet the criteria of an engineering courses at the undergraduate level in the BME Department and Department approval should be received prior to taking a BME595 course and counting it towards an undergraduate engineering distribution requirement.

**Implementation Date:** Implementation date for this action is the 2021-22 Academic year.

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Motion to modify the Data Science Program list of disciplinary elective courses in the Undergraduate Catalog by replacing OIE 4420 with OIE 4430, as approved by the Data Science Undergraduate Committee on 2/12/2021 and approved by the Data Science Steering Committee on 3/16/2021

**Motion:** The Committee on Academic Operation recommends, and I move, that the Data Science Program list of disciplinary elective courses in the Undergraduate Catalog be modified by replacing OIE 4420 with OIE 4430.

**Explanation of Motion:** The Foisie Business School (FBS) has recently removed the course 4420 *Practical Optimization: Methods and Applications* and replaced that course with the new course 4430 *Advanced Prescriptive Analytics: From Data to Impact*. To keep the Data Science undergraduate degree disciplinary electives in line with FBS course offerings we wish to mirror the FBS course change in the description of the Data Science undergraduate program. The specific changes are:

- Page 66 column 1 changing “Business modeling and prediction (MIS 4084, OIE 4420)” to “Business modeling and prediction (MIS 4084, OIE 4430)”
- Page 66 column 2 changing “+OIE 4420 Practical Optimization: Methods and Applications” to “+OIE 4430 Advanced Prescriptive Analytics: From Data to Impact”
- Page 67 bottom right-hand box changing “+OIE 4420” to “+OIE 4430”
- Page 67 bottom of the page changing “Business modeling and prediction (MIS 4084, OIE 4420)” to “Business modeling and prediction (MIS 4084, OIE 4430)”
- Page 68 changing “OIE 4420” to “OIE 4430” in flow-chart
- Page 69 column 1 changing “OIE 4420 Practical Optimization: Methods and Applications” to “OIE 4430 Advanced Prescriptive Analytics: From Data to Impact”

**Rationale:** As the course 4420 *Practical Optimization* is no longer being offered, and the FBS has replaced this course with 4430 *Advanced Prescriptive Analytics: From Data to Impact*, the Data Science program has evaluated 4430 *Advanced Prescriptive Analytics: From Data to Impact* as an appropriate disciplinary elective for Data Science undergraduate students. We wish to update the undergraduate catalog to reflect this change.

**Impacts on Students:** The only impact on students will be a clarification of the disciplinary electives based upon current FBS offerings.

**Resource Needs:** No additional resources would be required.

**Implementation Date:** The implementation date is the 2022-2023 academic year.

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Motion to change the description and enrollment of MU2723 “Music Composition” approved by Department of Humanities & Arts on 02/05/2021.

**Motion:** The Committee on Academic Operations recommends, and I move, that the description and enrollment requirements for MU2723 “Music Composition” be modified as described below.

**Current Catalog Description:**

MU 2723. MUSIC COMPOSITION.

Cat. I

This course will investigate the sonic organization of musical works and performances, focusing on fundamental questions of unity and variety. Using a progressive series of composition projects, the class will examine aesthetic issues that are considered in the pragmatic context of the instructions that composers provide to achieve a desired musical result. The class will examine the medium of presentation - whether these instructions are notated in prose, as graphic images, or in symbolic notation. Weekly listening, reading, and composition assignments draw on a broad range of musical styles and intellectual traditions, from various cultures and historical periods.

The class will meet for two weekly sessions of one hour and fifty minutes. Each student will be assigned a performance ensemble. Each performance ensemble will have a weekly two-hour lab. In addition, each student will keep a weekly log (online) of his or her experiences as a composer.

**Proposed Catalog Description**

MU 2723. MUSIC COMPOSITION.

Cat. I

This course will investigate the sonic organization of musical works and performances, focusing on fundamental questions involved in the process of composition: How do I connect different ideas? How can I make a larger work out of smaller parts? How can I vary statements to create interest without compromising coherence? Where do I start? A progressive series of composition projects will build techniques in relevant areas including rhythm, harmony, melody, and form. Exercises in mechanics will be complemented by contemplation and discussion of artistic, aesthetic and philosophical ideas that are equally important in the compositional process. We will examine the relationship between musical works and how they are communicated as instructions to others (e.g. orally, as symbols, prose, graphic images, or computer programs). Weekly listening, reading, and composition assignments draw on a broad range of musical styles and intellectual traditions from various cultures and historical periods.

**Recommended background:** understanding of basic music theory through coursework (e.g. MU 1511, Introduction to Music or MU 1611, Fundamentals of Music) or equivalent experience.

**Enrollment:** 20, previously 50

**Rationale:** Removed language from the description that was unnecessary or excessively restrictive regarding the delivery of the course. Elaborated on the fundamental questions and activities that will be pursued. Added a recommended background section to ensure that students are comfortable with the basics of music theory in order to excel in compositional activities. In terms of the enrollment cap, composition is a highly individualized endeavor that is typically taught one-on-one or in small groups. It requires spending meaningful time with each person to understand what they want to say and to develop techniques in order for them to do so. The activities, interactions, and requirements are similar to those of creative writing, which are 2000-level courses at WPI with enrollment limits of 20. Establishing the same limit would show consistency in our rationale in the design of our courses across disciplines. A cap at 20 would also make the possibility of bringing acoustic performers into the course to work with the students more realistic. Enrollments in the course have been around this level in the recent past so we anticipate these changes will have minimal impact:

:  
B 2016 - 15  
B 2017 - 21  
B 2018 - 19  
B 2019 - 18  
B 2020 – 29

In addition, the course will be moved from AH B06 to the computer lab (AH B30), where each student will have access to notation software, software libraries containing myriad virtual instruments (which allow them to compose for a variety of different instrument combinations), and MIDI controllers that allow them tactile ways to interact with these programs and help them become more comfortable with the piano keyboard. These tools enable students to realize works that feature a variety of instrumentations and in doing so, encourage them to explore diverse styles and musical cultures. Some students want to compose for solo piano, some for horn band, and some for synthesizers and drum machines. They can't bring their ideas to fruition, to produce something that is sonically concrete, without the means to do so. These are the tools of the contemporary composer and it is imperative that we adapt our courses accordingly.

**Contact:** Scott Barton

**Resource Requirement:**

No new resources will be required.

**Implementation Date:**

AY 2021-2022

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Motion to add WR 2500 Writing in the Life Sciences, as approved by Department of Humanities and Arts on 02/05/2021.

**Motion:** The Committee on Academic Operation recommends, and I move, that WR2500 Writing in the Life Sciences, as described below, be added.

**Course/Catalog Description: WR2500 Writing in the Life Sciences, Cat.II**

Writing in the Life Sciences will provide students with an introduction to academic writing within the disciplines that comprise the Life Sciences.

Topics will include:

- Ethics and research integrity as it pertains to research design, documentation, reporting, and communicating results to specialist and non-specialist audiences
- Fundamentals of writing in the Life Sciences including definitions and technical vocabulary, technical style, documentation, revising and editing
- Human factors that influence health including social determinants of health and health disparities
- Important documents in the Life Sciences including literature reviews and synopses, laboratory reports, proposals, and research presentations.

The course will also include writing for non-specialist audiences and newer methods of science communication including social media.

Students may not receive credit for both permanent and experimental versions of the course.

**Recommended background:** One introductory course (1000 level) in professional writing in which students have translated scientific writing for diverse audiences (e.g.: WR 1011, Writing about Science & Technology). Foundational life sciences courses with emphasis in anatomy and physiology are also recommended.

**Anticipated Instructor:** Professor Brenton Faber

**Rationale:** WPI has invested heavily in expanding student opportunities in the life sciences, engineering, and social sciences (global public health). The institute has approximately 250 pre-health students and our graduates are attaining employment in medical device design, pharmaceutical research and production, medical data sciences, medical management, and public health. Other graduates are going on to excellent medical schools or graduate programs in medical research. Student interest and enrollment in life sciences courses and degrees remains robust. The Institute's expansion into the life sciences was also a key component in our ability to successfully diversify undergraduate enrollments. Writing in the Life Sciences was proposed to help align the HuA curriculum and specifically the professional writing curriculum with these new cross-campus Life Sciences initiatives.

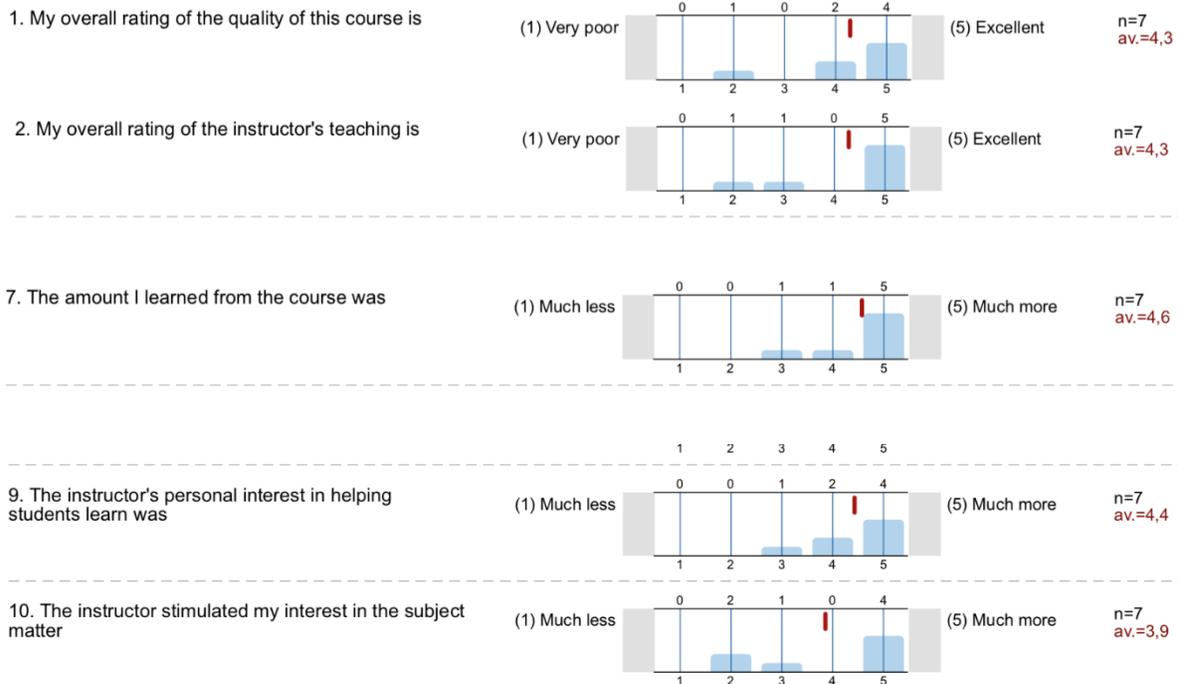
The course will provide a path to more advanced courses that focus on writing in health and medicine including Writing about Disease and Public Health, Medical Writing, Topics in Medical Humanities, and Inquiry Seminars. Research has shown that pedagogical activities that integrate writing and communication within disciplinary education achieve better educational outcomes. Integrating writing within the discipline also promotes convergence learning in which topics and knowledge from other fields are integrated to solve complex problems.

When appropriate, the course can meet ABET requirements:

- 3. An ability to communicate effectively with a range of audiences
- 4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- 8. An understanding of biology and physiology

The proposed course would enroll 20 students and is WR intensive.

**Summary from previously offered experimental courses.**



What did you particularly LIKE about this course/lab?

- He is awesome. Super understanding of The Covid situation and I love how passionate he is about the subject matter.
- I liked how mentimeter was used to keep the group engaged while on a long online call and it allowed us to participate anonymously and learn from it.
- I liked the fact that we had to write papers in the style of scientific writing and were taught how to do so. I also appreciate how the professor provided feedback on our writing and allowed us to resubmit the assignment with corrections. This given the students an opportunity to actually understand what he/she did wrong and to apply the corrections.
- I really liked that the writing I was doing was very similar to something I might end up writing in a job, and I could see myself actually using the writing techniques past just in courses
- The material presented in this course was fascinating and the professor was great.

What did you particularly DISLIKE about this course/lab?

- Assignments were a bit hard to manage in a week. It was doable, but made for some long nights and is tough depending on one's selection of courses per term. Also the zoom link was annoying to find each week but not too big of a deal.
- I really did not like how this entire class was flipped to read about and work only on COVID-19 material. At first I thought this may be interesting, but it ended up being frustrating. Our lives have changed because of COVID-19 and focusing on this especially in a writing class where you have to write long reports and read dense material was just not interesting and frustrating. It made the class not as enjoyable as it could have been if we would be able to write and read articles about material other than the on-going pandemic. I also did not like how the professor brought politics into the class the first week. We are students and should be taught from a neutral perspective no matter what is going on in the world.
- I understand that evaluating writing takes a lot of time, but I would have appreciated getting feedback back earlier so I could apply it to future assignments
- There was a significant amount of writing - parallel to some of the 3000 writing courses I have taken.
- Zoom 8 am lectures are not my favorite. Maybe make them more interactive so it "wakes" up people.

Can you suggest anything that the instructor could do to improve the quality of teaching?

- Have more variety in the material students should read or write about. Especially because this is a writing class were we are supposed to improve our writing it would have been nice to be able to pick the material and subject we could read about.
- No
- Nothing, I really appreciated how available the professor was for student help.
- Send out a zoom link each week or post it on canvas (I'm not sure if the one on the syllabus was for each week). There was a link for tuesdays and fridays which was a little confusing but eventually I developed a system

Would you encourage a friend to take a course from this instructor? Why or why not?

- 100% especially if you are pre med. you learn a lot about how to read and how to write a case study.
- I would definitely encourage a friend to take a course with Professor Faber! He was very fun throughout the course and responded to emails quickly. The assignments were lengthy so my friend would have to make sure they had some free time in their schedule to take this specific course.
- Yes, absolutely. This instructor gave assignments that helped me learn and use the material, gave enough instruction on how to do each assignment, and helpfully answered questions and kept students engaged online
- Yes, interesting material and the professor is by far one of the best professor's at WPI. The time commitment and dedication to the material is really shown through his teaching. Clearly the professor enjoys teaching writing, especially that related to medicine, which stimulates the subject matter. - JJP

- Yes. I do feel that the professor provides valuable lessons that improve ones writing. Ultimately the purpose of this class was to improve the students writing and I feel that this class did so.

### **3. Instructor feedback and reflections from experimental offerings if applicable.**

The course was offered in A term 2020 as an online “covid” course. The student feedback was mostly positive and provided useful suggestions for future versions. The course registration shows demand for the offering.

### **4. Population Numbers**

A term 2020: 16 (81% of enrolled students are women)

D term 2021: 20 (plus 5 on wait list) (90% of enrolled students are women)

Implementation Date: 2021-2022 Academic Year, A,D Term

Resource Needs: No new resources are required, the course is already part of Professor Faber’s teaching load.

Impact on Distribution Requirements and Other Courses: No direct impact on other courses.

### **Original Experimental Course Proposal**

**To:** Chair, Committee on Academic Operations

**From:** Professor B. Faber, Professional Writing, HuA

**Re:** Motion to list WR 250X.

Course approved by HuA on 9/13/19

**Date:** 10/24/19

The Professional Writing Program in the Humanities and Arts Department requests approval to cross list the experimental course WR *Writing in the Life Sciences* in Academic Years 2020 and 2021, A & D term. Cat II course.

**Contact:** Prof. Brenton Faber

**Preferred term:** A20, D20, A21, D21

**Expected enrollment:** 20 per course

**Course type:** Project based writing intensive seminar

**Intended audience:** PW, BME, BBT, BC, BCB, pre-health students, and students pursuing health careers or graduate study.

**Anticipated Instructor:** Prof. Faber

**Course/Catalog Description:** WR 250X, Writing in the Life Sciences. Writing in the Life Sciences will provide students with an introduction to academic writing within the disciplines that comprise the Life Sciences.

Topics will include:

- Ethics and research integrity as it pertains to research design, documentation, reporting, and communicating results to specialist and non-specialist audiences
- Fundamentals of writing in the Life Sciences including definitions and technical vocabulary, technical style, documentation, revising and editing

- Human factors that influence health including social determinants of health and health disparities
- Important documents in the Life Sciences including literature reviews and synopses, laboratory reports, proposals, and research presentations.

The course will also include writing for non-specialist audiences and newer methods of science communication including social media. The course does not meet BME engineering requirements but can be used toward the university's Humanities and Arts requirement.

**Recommended background:** One introductory course (1000 level) in professional writing in which students have translated scientific writing for diverse audiences (e.g.: WR 1011, Writing about Science & Technology). Foundational life sciences courses with emphasis in anatomy and physiology are also recommended.

**Rationale:** WPI has invested heavily in expanding student opportunities in the life sciences and engineering. The Institute currently has approximately 240 students enrolled as “Pre-Health,” and the enrollments in BME and BBT are among the top ten majors at WPI (2018 data, WPI Institutional Research). Student interest in medicine and life science topics and applications in other majors remains robust. The Institute's expansion into the life sciences was also a key component in our ability to successfully diversify undergraduate enrollments. Professional writing course offerings have not formally changed to meet the needs of these students.

The course will provide a path to more advanced courses that focus on writing in health and medicine including WR 3214 “Writing about Disease and Public Health,” the experimental course WR 421X “Medical Writing” and Inquiry Seminars in the “Human Dynamics of Medicine,” and “Rhetoric and Motivation in Exercise Physiology.” Research has shown that pedagogical activities that integrate writing and communication within disciplinary education achieve better educational outcomes. Integrating writing within the discipline also promotes convergence learning in which topics and knowledge from other fields are integrated to solve complex problems.

The course is intended to address ABET requirements:

3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
8. An understanding of biology and physiology

### **Assessment & Resources Needed**

The primary instructor (Faber) intends to move from teaching WR1011, Writing about Science and Technology to Writing in the Life Sciences. A new instructor will be required for WR1011. We anticipate that this need will be filled by available WR faculty and a new faculty hire this year.

### **Outcomes**

After completing this course, students will be able to:

- Understand and articulate ethical conduct in designing, conducting, reporting, and communicating life sciences research
- Complete discipline-specific projects that conform to specific norms within the life sciences for language, evidence, argumentation, and formal features (citations, style, figures, equations)
- Articulate an introductory understanding of the human factors that influence health including health disparities and social determinants of health
- Recognize, critique, and produce scientific documents in ways that demonstrate an appropriate understanding of audience, purpose, and context within the life sciences
- Explain the rationale for non-specialist and translational scientific writing and complete such activities as research advocates.

**Evaluation**

Course success will be evident in student enrollment, quality of projects completed, and in improved student preparation for advanced scientific writing projects in humanities inquiry seminars, IQPs, MQPs. and continued course work. Evaluation will also consider student course evaluations, especially responses to questions 1, 2, 7, 8, and 9.

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Motion to add WR 4210 Medical Writing approved by Department of Humanities and Arts on 02/05/2019.

**Motion:** The Committee on Academic Operation recommends, and I move, that WR4210 Medical Writing as described below, be added

**Course/Catalog Description: WR4210, Medical Writing, Cat.II**

**Medical Writing will** provide students with advanced opportunities to create clinically-oriented documents about disease, treatment, and medical research. Students will learn how to develop, structure, and present medical reports that integrate anatomy and physiology, disease history (including associated human and environmental factors), epidemiology, clinical presentation, differential diagnosis, and prognosis. The course will operate as a series of student projects in which students create scientific documents from major disease categories. The course will be focused on disease characterization for more advanced audiences and preparation for future graduate and professional writing in medicine or the life sciences.

**Recommended background:** Prior courses or projects (GPS, IQP) in health, medicine, or science writing. Exposure to anatomy and physiology would be helpful. The course is designed for 3<sup>rd</sup> and 4<sup>th</sup> year students with a strong interest in pursuing careers or continued education in medicine or public health.

Students may not receive credit for both permanent and experimental versions of this course.

**Anticipated Instructor:** Professors Brenton Faber, Shana Lessing

**Rationale:** WPI has invested heavily in expanding student opportunities in the life sciences, engineering, and social sciences (global public health). The institute has approximately 250 pre-health students and our graduates are attaining employment in medical device design, pharmaceutical research and production, medical data sciences, medical management, and public health. Other graduates are going on to excellent medical schools or graduate programs in medical research. Student interest and enrollment in life sciences courses and degrees remains robust. The Institute's expansion into the life sciences was also a key component in our ability to successfully diversify undergraduate enrollments. Medical Writing was proposed to help align the HuA curriculum and specifically the professional writing curriculum with these new cross-campus Life Sciences initiatives. The course has been offered 3 times. The most recent offering, B 2020, introduced case studies as a major pedagogical component and placed the course in the fall rather than spring term. We realized that the spring term placement competed with many students' IQPs and that a fall term placement was better aligned with 3<sup>rd</sup> and 4<sup>th</sup> year schedules.

The program has long offered WR 3214, "Writing about Disease and Public Health" with strong enrollments. Disease and Public Health focuses on translating technical science for non-technical audiences, public health and policy topics, and health education. Medical Writing will be focused

on disease characterization for more advanced audiences and preparation for future graduate and professional writing in medicine or the life sciences.

The proposed course would enroll 20 students and is WR intensive.

### **Summary from previously offered experimental courses.**

#### **2001902\_C-WR\_421X\_-XC01\_MEDICAL\_WRITING**

What did you particularly LIKE about this course/lab?

- I enjoyed that the professor brought in outside stories and shared them with us. Professor Faber is a very smart guy that works in the medical field and was able to understand our perspective as future medical school students.
- I enjoyed the reading list associated to one of the projects
- I liked the different projects that we did. They were all different, yet still encompassed medical writing. It was interesting to see all the different areas that incorporate medical writing. Meeting twice a week gave enough time to start and work on things individually, while also getting feedback from other students. I also really liked having time to meet with Professor Faber one on one during class to check with progress and ask questions. The real-life examples and going through other writers' work was also helpful in learning how to write within the genre.
- I liked the project based style
- I really liked the assignments for this course, they were writing assignments I was actually excited to write because they allowed my to be creative instead of giving strict guidelines for what needs to go into each paper.
- Overall excellent class!
- The best part about this class was approaching medical writing from an audience-oriented perspective. As a class, we progressed from writing in the context of medical students and interns to writing for patients and their families and finally to writing educational book reviews for medical professionals. Next we examined how to write case studies, almost like mystery columns. This exercise, along with the reading by Lisa Sanders, enabled the class to develop an understanding of how doctors take medical histories, perform physicals, and order labs to address a specific patient's symptoms. Overall, we learned from the case studies how to follow a physician's protocol to rule out false diagnoses and identify the real disease.
- The focus of your assignments can be very flexible depending on what you want to write about.
- The freedom we had to choose our assignment topics and the way in which we chose to structure our writing assignments.
- The professor was very encouraging and made it easy to be interested in the subject matter.
- The wide range of medical literature and materials presented, as well as the instructor's knowledge and passion for the content we were taught.
- it forced me to go out of my comfort zone

What did you particularly DISLIKE about this course/lab?

- A different project that focused on medical writing would be nice
- I wish there was more medical writing in the sense of like taking patient information. Like the paper work after completing a call as an EMT.
- None
- Nothing! I had some minor issues because I am a non pre-medical student taking the course to fulfill a requirement; however, the content was presented in a fair and approachable manner, and the instructor was able to offer alternative learning materials for those of us who did not specialize in medicine.
- There was nothing I particularly disliked
- it forced me to go out of my comfort zone

Can you suggest anything that the instructor could do to improve the quality of teaching?

- He is a great professor and stimulated my interest. I think the quality of his teaching was perfect!
- I think sending reminders of due dates/ readings might be helpful in the future, especially since we didn't work off the originally planned schedule.
- None

- Possibly more student examples
- The MedScape style article was really difficult. Writing an article in the style of MedScape while using the material from MedScape was soul sucking because the work we were doing was clearly redundant.

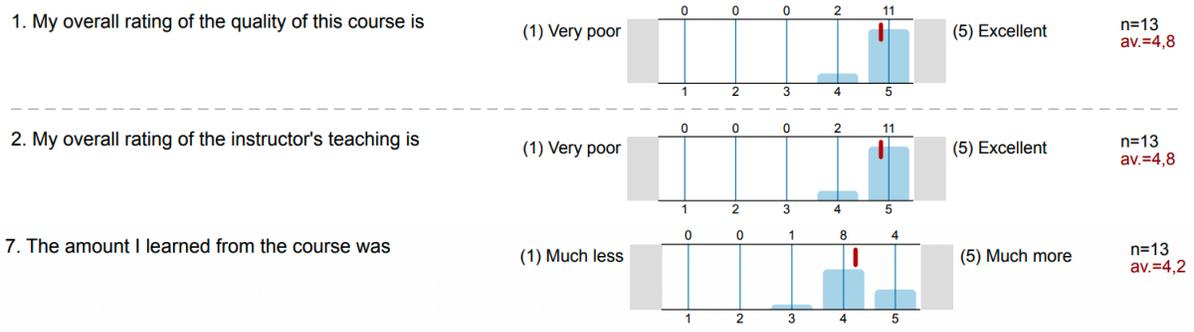
The book review assignment was really cool. I enjoyed hearing about the books of other students, and getting to read a curated book of our choosing.

- This is an experimental course, so the course structure and goals are probably still in flux a bit. One suggestion I would have is to have very, very clear objectives at the beginning so that we can understand what kind of medical material we will be writing about or learning about; I found myself a bit confused about what the exact learning goals were at the beginning.

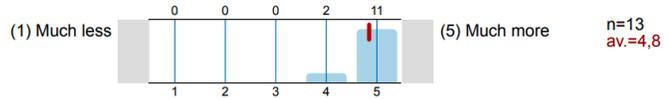
Would you encourage a friend to take a course from this instructor? Why or why not?

- Absolutely! The instructor is incredibly passionate about rhetoric and medicine, and brings a wealth of knowledge and personal experience to his classroom.
- Definitely! The class was excellent overall and a really fun way to explore a different writing style!
- I definitely encourage people interested in the life sciences to take this course because it builds your ability to understand how technical coursework fits in to the progression of disease and medical treatment. At the same time, this course benefits those interested in medical school or becoming a technical writer because you strengthen your skills to communicate complex scientific topics with a spectrum of audiences related to the field. You learn how medical professionals and patients need the same information regarding a specific disease, but this information is tailored for different purposes based on how these audiences think. Definitely encourage people take this course.
- I would encourage a friend to take this course, I feel it provided a great look into the genre of medical writing and was a fun course to take.
- I would. All the courses I have taken with this instructor have been some of the most enjoyable at WPI because of the subject matter and teaching style.
- Yes
- Yes definitely! Anyone who is premed track or has an interest in any aspect of the medical field should be encouraged to take this course because it exposes us to the aspect of medical writing which consists of patient pamphlets and online information as well as book reviews.
- Yes it was very helpful
- Yes, Professor Faber is has been a great instructor for every class I've taken with him. I really appreciate his focus on helping students do what they want to do, rather than imposing his own ideas/ limitations on his students.
- Yes, this course was very flexible and the professor does care about the students' and works with them to ensure all projects are completed fairly
- Yes. Faber is amazing.
- Yes; the instructor is extremely helpful. He knows how to explain things in both writing and medical terms.

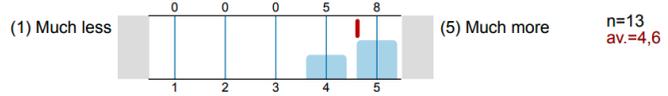
## Quantitative Assessment



9. The instructor's personal interest in helping students learn was



10. The instructor stimulated my interest in the subject matter



## WR 421X – C01 Medical Writing for 202002\_C

What did you particularly LIKE about this course/lab?

- I liked the interactive pieces to it!
- I liked the mentimeters I actually looked forward to those.
- I really enjoyed the disease case studies we worked on in class. They were super fun, interesting, and a great introduction to the medical field.
- We started each class with a medical case presentation; this was incredible and helped me learn so much about diagnostic steps and taking a holistic approach to medicine.
- case studies

What did you particularly DISLIKE about this course/lab?

- I didn't like the harsh grading
- NA
- Nothing; this class is incredible; would highly recommend even if you're not looking to go into a field of medicine.
- The course overall was pretty unorganized and Professor Faber didn't make use of the Canvas site, which just made it difficult to keep track of with my other two classes.

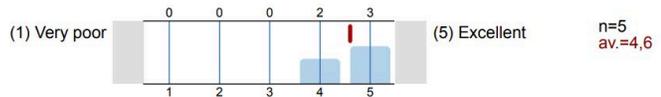
Can you suggest anything that the instructor could do to improve the quality of teaching?

- More organization would be helpful
- Nope, he was great!
- Professor Faber could make use of the Canvas site to help improve the organization of everyone in the class.

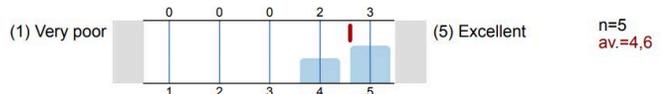
Would you encourage a friend to take a course from this instructor? Why or why not?

- I would encourage a friend to take a course from Professor Faber, he is super funny, keeps class intriguing and is super understanding and caring of his students.
- Yes
- Yes! It was fun!
- yes it was a good class especially if you are interested in anything related to healthcare or medicine.

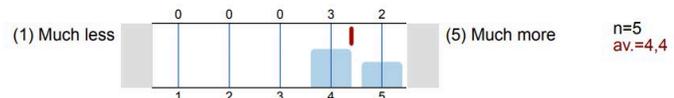
1. My overall rating of the quality of this course is



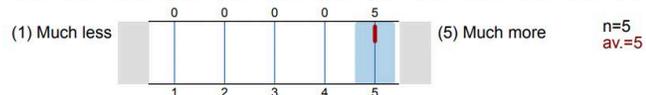
2. My overall rating of the instructor's teaching is



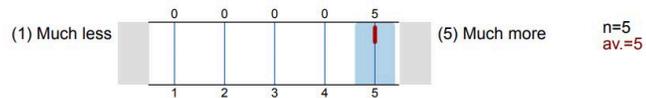
7. The amount I learned from the course was



9. The instructor's personal interest in helping students learn was



10. The instructor stimulated my interest in the subject matter



## WR 421X – B01 Medical Writing for 202101\_B (Online Course Due to COVID-19)

What did you particularly LIKE about this course/lab?

- I liked how due dates were flexible, I also enjoyed the last project (case presentation)
- I particularly enjoyed the way this class was structured. You learn through interactive activities and your brain is constantly working to find an answer to his case studies which are integrated into the class (and are so fun!!). Each assignment was very clearly laid out and his feedback is very helpful throughout the class.
- I really liked the case studies. The case studies acted as a mystery where I got to learn about more diseases in the process.
- The assignments were very in depth and the feedback during the Friday classes were very effective in guiding the student
- This was probably my favorite course that I have taken at WPI so far. It was very engaging and the assignments were challenging while enjoyable. I thought that teaching through case studies was very helpful! I also really enjoyed the RCT project and think it should remain in the course.
- WR 421X is an amazing class. Students not only learn so much but they are given the opportunity to explore their specific interest. I enjoyed the use of Menti.

What did you particularly DISLIKE about this course/lab?

- I particularly did not enjoy writing the RCT
- N/A
- Not to the fault of the professor at all but I would have loved this class even more in person. The professor organized it well for hybrid and eventually virtual, however discussions are always more fun and comprehensive in person.
- Nothing
- There was nothing I disliked in the course.

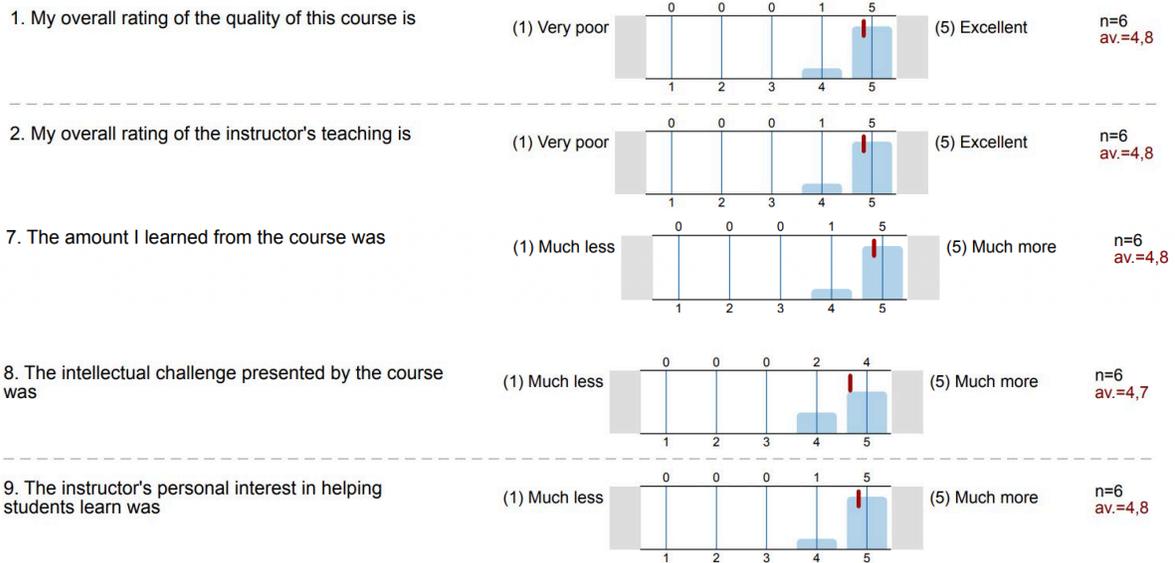
Can you suggest anything that the instructor could do to improve the quality of teaching?

- I guess the only thing I would say would be possibly returning assignments earlier however assignments were detailed and needed proper assessment so this is not very much of a complaint.
- I'd suggest putting all of the PowerPoints on canvas.
- Professor Faber did an amazing job teaching the class.
- There is nothing I can suggest.
- Timely feedback on the writing assignments, I know it's difficult with your busy schedule

Would you encourage a friend to take a course from this instructor? Why or why not?

- I would absolutely encourage a friend to take a course from this instructor! The professor's lectures are engaging and I always looked forward to going to class. The professor creates an extremely positive environment where I felt confident to participate, and the students were definitely able to learn from each other because of this. I cannot say enough good things about this professor.
- I would encourage my friend to take this course especially if they were considering medical school.
- Yes! If you are interested in medical/scientific writing or the pre-med course this is the perfect class. It really gets you involved and interested in the assignments/topics and you will definitely enjoy it!
- Yes, I would you encourage a friend to take a course from this instructor. Professor Faber is invested, engaging, and a knowledgeable professor.
- Yes, without a doubt, great class and learned a lot

- yes, it's a great course and it is very helpful for future writing/ medical writing



### **3. Instructor feedback and reflections from experimental offerings if applicable.**

The course was considerably revised after the first offering and then again (in part to accommodate online instruction) after the second. I think the student comments and evaluations demonstrate improvement and that the course is meeting student expectations while remaining rigorous and challenging. Moving the course to fall term improved enrollments. The course meets an important need in WPI's life sciences and pre-medical curriculum and has room to grow as it becomes better known across campus. The course is part of a group of HuA courses that are contributing to HuA scholarship in medical humanities and the societal dynamics of medicine.

### **4. Population Numbers**

C Term 2019: 18

C Term 2020: 7

B Term 2020: 13

Implementation Date: 2021-2022 Academic Year, B Term

Resource Needs: No new resources are required, the course is already part of Professor Faber's teaching load. Professor Lanning can also teach the course.

Impact on Distribution Requirements and Other Courses: No direct impact on other courses. The original experimental course proposal is included below:

**To:** Chair, Committee on Academic Operations  
**From:** Professor B. Faber, Professional Writing, HuA  
**Re:** Motion to add 421X approved by HuA on 2/9/2018  
**Date:** 2/9/18

The Professional Writing Program and Department of Humanities and Arts requests the approval of the following experimental course WR421X *Medical Writing* in Academic Years 2019 and 2020 during C term

**Contact:** Prof. Brenton Faber

**Preferred term:** C19, C20

**Expected enrollment:** 25

**Course type:** Project based seminar

**Intended audience:** If the course becomes permanent: PW, BME, BBT, BC, BCB, pre-health students (MD, DVM), and other students interested in health careers or graduate study.

**Anticipated Instructor:** Prof. Faber

**Course/Catalog Description:** WR 421X, Medical Writing Cat II). Medical Writing will provide students with advanced opportunities to create scientific documents characterizing disease, treatment, and medical research. Students will learn how to develop, structure, and present medical reports that integrate anatomy and pathophysiology, disease history including

associated human and environmental factors, epidemiology, clinical presentation, differential diagnosis, relevant diagnostic tests, treatments, and long and short term prognosis. The course will operate as a series of student projects in which students create scientific documents from major disease categories.

**Recommended background:** Two courses in professional writing in which students have translated scientific writing for diverse audiences and have practiced designing and writing technical, scientific, or policy documents (e.g.: WR 1011, Writing about Science & Technology; WR 3210, Technical Writing; WR 3214, Writing about Disease & Public Health; WR 2310, Visual Rhetoric). Foundational life sciences courses with emphasis in anatomy and physiology are also recommended.

**Rationale:** WPI has invested heavily in expanding student opportunities in the life sciences and engineering. The school currently has approximately 240 students who have designed themselves as “Pre-Health” on enrollment. Student interest and enrollment in life sciences courses and degrees remains robust. The Institute’s expansion into the life sciences was also a key component in our ability to successfully diversify undergraduate enrollments. Professional writing course offerings have not formally changed to meet the needs of these students. Informally, Prof. Faber has been offering medical writing independent studies for the past 3 years with 2-3 students each term, medical writing projects as HU3900 options for 4-5 students each year, and 1-2 MQPs each year focused on medical writing.

The program has long offered WR 3214, “Writing about Disease and Public Health” with strong enrollments. Disease and Public Health focuses on translating technical science for non-technical audiences, public health and policy topics, and health education. Medical Writing will be focused on disease characterization for more advanced audiences and preparation for future graduate and professional writing in medicine or the life sciences.

### **Assessment & Resources Needed**

As the experimental course would consolidate and formalize independent studies already being offered, no additional resources will be required.

### **Outcomes**

After completing this course, students will be able to:

- Describe disease in a comprehensive way including relevant anatomy and pathophysiology, disease history including associated human and environmental factors, epidemiology, clinical presentation, differential diagnosis, relevant diagnostic tests, treatments, and long- and short-term prognosis.
- Complete short and lengthy scientific papers that conform to disciplinary norms for language, evidence, argumentation, and formal features (citations, style, figures, equations).
- Recognize, critique, and produce scientific documents in ways that demonstrate an appropriate understanding of audience, purpose, and context.
- Explain the relevant advantages and disadvantages of specialized versus translational scientific writing for tactical and strategic rhetorical purposes.
- Be able to place medical discourse within historical and theoretical studies of rhetoric.

### **Evaluation**

Course success will be evident in student enrollment, quality of projects completed, and in improved student preparation for advanced scientific writing projects in MQPs, graduate and professional school applications, publishable research and conference papers, and continued course work. Evaluation will also consider student course evaluations, especially responses to questions 1, 2, 7, 8, and 9.

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Addition of a HUA Minor in Creative Writing (CW), as approved by Department of Humanities and Arts, 02/19/2021

**Motion:** The Committee on Academic Operation recommends, and I move, that a minor in creative writing be introduced into the WPI curriculum, as described below.

### **Minor in Creative Writing (CW) - Catalog Description:**

The following catalog description for the minor is proposed for the undergraduate catalog in the section with other minors in Humanities and Arts, (2020-21 UG catalog, p. 80):

The minor in creative writing includes offerings in the genres of fiction, creative nonfiction (literary journalism, memoir, personal essay), playwriting, and poetry. Creative writing combines the study of literature with the practice of artistic creation. Students will complete two literature courses and three courses in creative writing plus a capstone experience. In order to enroll in the creative writing minor, interested students should speak with one of the creative writing faculty in the Department of Humanities and Arts (Prof. Aguilar, Prof. Cocola, Prof. Ephraim, Prof. Harmon, or Prof. McIntyre), complete a minor designation form, and select a minor advisor from the creative writing faculty.

The creative writing minor consists of a total of two units of course work (6/3) distributed in the following way (Note: courses with the same number, such as EN2219, can be repeated in different genres):

1. 3/3: At least three courses (one unit) in creative writing (fiction, creative nonfiction, playwriting, or poetry) including one course at the 3000 level, chosen from the following list:

EN1219 Introduction to Creative Writing  
EN2219 Creative Writing: Creative Nonfiction  
EN2219 Creative Writing: Fiction  
EN2219 Creative Writing: Poetry  
TH2219 Playwriting  
EN3219 Advanced Creative Writing  
EN3219 Advanced Creative Writing: Fiction

Toward the one unit of work in creative writing, in consultation with a minor advisor, students might include one course from a related discipline like IMGD or Professional Writing, such as:

IMGD1002 Storytelling in Interactive Media and Games  
IMGD/WR2400 Writing Characters for Interactive Media and Games  
IMGD/WR3400 Writing Narrative for Interactive Media and Games

WR2010 Elements of Style

2. 2/3: Two literature courses, at least one of which must be at the 2000 level or higher:

TH1221 Introduction to Drama  
EN1222 Shakespeare in the Age of Elizabeth  
EN1242 Introduction to English Poetry  
EN1251 Introduction to Literature  
EN1257 Introduction to African American Literature and Culture  
EN2221 American Drama  
EN2225 The Literature of Sin  
EN2226 Infected Shakespeare  
EN2234 Modern American Novel  
EN2237 Literature and the Environment  
EN2242 Popular Fiction: Reading in Installments  
EN2243 Modern British Literature  
EN2244 19<sup>th</sup> Century English Literature  
EN2251 Moral Issues in the Modern Novel  
EN2252 Science and Scientists in Modern Literature  
EN2271 American Literary Histories  
EN2281 World Literatures  
EN3222 Forms in World Drama  
EN3223 Forms in Modern Drama  
EN/TH3225 Shakespeare in Performance  
EN3226 Strange and Strangers  
EN3231 Supernatural Literatures  
EN3234 Modern American Poetry  
EN3238 American Authors  
EN3248 The English Novel  
EN3271 American Literary Topics  
SP3531 Contemporary US Latino Literature & Culture

3. 1/3: One capstone experience, either a 1/3 unit independent study in creative writing or a 3000 level course approved by the student and advisor. The capstone course must be taken last.

WPI policy requires that no more than one unit of course work can be doubled counted toward other degree requirements. Thus, students may count three courses taken to fulfill the Humanities and Arts Requirement for the minor as well, as long as one unit of the minor does not double-count. In other words, students must take three courses for this minor that do not count for another degree requirement.

**Recommended Background:** None. Students who have completed – or are in the process of completing – their HUA course requirements will learn and develop the necessary skills and methods with which to successfully complete this minor.

**Contact Instructors:**

- Kate McIntyre ([klmcintyre@wpi.edu](mailto:klmcintyre@wpi.edu)) (primary contact)
- Joe Aguilar ([jraguilar@wpi.edu](mailto:jraguilar@wpi.edu))
- Jim Cocola ([jcocola@wpi.edu](mailto:jcocola@wpi.edu))
- Michelle Ephraim ([mephraim@wpi.edu](mailto:mephraim@wpi.edu))
- Joshua Harmon ([jharmon@wpi.edu](mailto:jharmon@wpi.edu))

**A. Rationale**

This proposal is for the creation of a minor in creative writing based in and endorsed by the Department of Humanities and Arts.

WPI offers English courses in both literature and creative writing. Currently, the catalog description of the English minor is geared toward literature coursework. A few students each year choose to self-design a creative writing minor. The establishment of a creative writing minor will allow students a clear, intentional path through creative writing coursework. The minor will incorporate current offerings in creative writing along with a backbone of literary study to address the recommendation of the Association of Writers and Writing Programs (AWP) that “major and minor courses of study should include traditional classes in literature.” The AWP also advises that a minor in creative writing should offer “introductory, intermediate, and advanced classes and workshops” (“Guidelines”). WPI currently offers a 1000-level introductory, multi-genre class; workshops in four genres at the intermediate 2000-level (fiction, nonfiction, playwriting, and poetry); and 3000-level workshops and inquiry seminars across genres. Therefore, the path for a minor is already in place, and the courses that will make up the minor are already offered at WPI. This proposal simply codifies that path so students can enter it.

WPI’s support for creative writing is part of a larger nationwide trend in English instruction. A recent study by the Association of Departments of English shows that student interest in creative writing “continues to be high or rising at all types of institutions.” The executive director of the Modern Language Association, Paula Krebs, says the study results speak to the “increasing importance of writing in the English major” (“A Changing Major”). A creative writing minor also addresses WPI student interest, as evidenced by the popularity of creative writing workshops in 2017 through 2021: of 536 available seats in creative writing courses offered at WPI, 537 seats were filled.

Furthermore, creative writing offers curricular innovation that is uniquely suited for WPI, because it addresses one of the 14 Grand Challenges for Engineering, as described by the National Academy of Engineering: “Advance personalized learning” (“Advance”). While engineers might take a quantitative, algorithm-based approach to the challenge, professors in creative writing workshops use a qualitative approach to individually support each writer. Creative writing workshops create small learning communities in which student writers collaborate and learn from each other and the professor, one-on-one. Creative writing pedagogy offers a new perspective and counterpoint to a technology-driven approach to this Grand Challenge.

Finally, peer institutions like Case Western Reserve, Rensselaer Polytechnic Institute, Carnegie Mellon, and Rochester Institute of Technology offer minors in creative writing, suggesting that demand for coursework in the literary arts is robust and sustainable at tech schools. The creative writing minor will open up possibilities for cross-disciplinary work with established programs on campus like IMGD and Professional Writing. Campus-wide, students across disciplines can benefit from a program of study that foregrounds close attention to language and editing, essential skills for communicating complicated information clearly and elegantly.

#### References:

“Advance Personalized Learning.” National Academy of Engineering,

[www.engineeringchallenges.org/challenges/learning.aspx](http://www.engineeringchallenges.org/challenges/learning.aspx).

“A Changing Major: The Report of the 2016–17 ADE Ad Hoc Committee on the English Major.” ADE Ad Hoc Committee on the English Major, 2018.

[www.ade.mla.org/content/download/98513/2276619/A-Changing-Major.pdf](http://www.ade.mla.org/content/download/98513/2276619/A-Changing-Major.pdf).

“Guidelines for Creative Writing Programs & Teachers.” AWP,

[www.awpwriter.org/guide/directors\\_handbook\\_recommendations\\_on\\_the\\_teaching\\_of\\_creative\\_writing\\_to\\_undergraduates](http://www.awpwriter.org/guide/directors_handbook_recommendations_on_the_teaching_of_creative_writing_to_undergraduates).

**Implementation Date:** Academic year 2021-2022.

**Resource Needs:** No new resources needed at this time because the minor is composed of existing courses already offered regularly. In the future, if demand for the minor grows, we might need to have a discussion about next steps, which could include a shift in creative writers’ course scheduling or even a hire.

#### **Descriptions of Creative Writing Courses:**

English 1219 Introduction to Creative Writing. In this introductory course, students will learn about the craft of writing poetry, creative nonfiction, and fiction. They will study contemporary published poems, essays, and stories written by international masters and use these texts as inspiration for their own creative work across genres. They will also read and respond to the work of their peers. Through an equally balanced studio/research approach, this course will develop students’ skills as literary critics and creative writers.

English 2219 Creative Writing. This foundational course in creative writing aims to help students develop or improve the skills of written expression, emphasizing presentation and discussion of original work. Offerings may include generally themed courses covering multiple genres of interest or more specialized workshops in single genres of focus such as fiction, poetry, playwriting, or short prose forms.

Theatre 2219 Playwriting. Playwright. Wright – a maker. She creates a world on the stage through action, dialogue, and character. In this course, students will learn to write for the theatre – to make plays – through study, discussion, and practice. Working from foundational ideas of the well-made play, it will draw upon various analytic theories of theater to examine the structure

of plays. Through exercises and studio-type critique, students will create and develop their own plays.

English 3219 Advanced Creative Writing. This advanced seminar in creative writing includes sustained attention to the writing of fiction, poetry, and short prose forms among other genres, culminating in final project (essay, play, poem, story, or some combination thereof) determined by individual interest and in consultation with the instructor. Investigation will also focus on the reading and discussion of exemplary works across genres, with an emphasis on contemporary practice. In the process, regular writing exercises and class visits from established authors will help to create a community of writers grounded in diverse methods.

**Impact on Distribution Requirements:** None. This proposal has been reviewed by the following departments:

- Humanities & Arts

Attached Appendices:

1. Creative Writing Enrollments, 2017-2021
2. Creative Writing Offerings by Genre/Level, 2017-2021
3. Creative Writing Minor at Comparable Institutions

**Contact:** Kate McIntyre

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Change in the description for Music Ensembles Courses, as approved by Department of Humanities & Arts on 02/05/2021.

**Motion:** The Committee on Academic Operation recommends, and I move, that the description for Music Ensembles Courses be changed as described below.

**Existing title, description and course offering schedule:**

MUSIC ENSEMBLES

Students who sing or play a traditional band or orchestra instrument at the intermediate level or better may enroll for any of the ensembles listed below. Students will register at the beginning of A term and receive 1/6 unit at the end of B term for participation in both terms. Students may also register at the beginning of C term and receive 1/6 unit at the end of D term for participation in both terms. Students may apply up to 1/3 unit of performing ensembles to the Humanities and Arts course requirement.

**Proposed title, description, and course offering:**

MUSIC ENSEMBLES

Students who sing or play a traditional band or orchestra instrument at the intermediate level or higher may enroll for any of the ensembles listed below. Students register for ensembles by semester, which is the equivalent of two consecutive terms. Fall semester is the combination of A/B Terms and Spring semester is the combination of C/D Terms. Students register for either 1/6 unit credit *or* 0 unit credit, per semester. Those registered for 1/6 unit credit will be graded on the A, B, C, NR, and I grading system. Those registered for 0 unit credit will be graded on the Pass and NR grading system. Students may apply up to 1/3 unit of performing ensembles to the Humanities and Arts course requirement.

**Explanation of Motion:**

This proposal is to change the general description for all Music Ensembles, as listed below:

MU 2631 – Glee Club

MU 2632 – Alden Voices

MU 2633 – Brass Ensemble

MU 2634 – Jazz Ensemble

MU 2635 – Stage Band

MU 2636 – Concert Band

MU 2637 – Orchestra

MU 2638 – Chamber Choir

MU 2639 – String Quartet

No other changes will be made to these courses, such as the course title, content, or scheduling, beyond those listed above. Therefore, it is not necessary to propose dropping this course and adding a new one.

**Rationale:**

The purpose of this proposal is to include a 0 unit credit option for those participating in Music Ensembles. Previously, there was only an option to take these courses for 1/6 unit credit, with a limit for how many units could count towards the Humanities and Art Requirement or Music Minor. However, many students participate in Music Ensembles well beyond these limitations. Consequently, the proposal to add a 0 unit credit option will provide a way to accurately reflect total enrollment and participation in all Music Ensembles. This change will provide clarity for the Registrar and Humanities and Arts Department for better understanding enrollments in these course offerings.

**Impacts on students:**

This change will allow all students participating in the Music Ensembles to have their participation reflected on their transcripts.

**Resource Needs:**

No new resources are needed.

**Implementation Date:** 2021-22 Academic Year

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Motion to remove PSY2502: Psychophysiology from the undergraduate catalog, approved by Psychological and Cognitive Sciences Program on 12/9/2020, approved by Social Science and Policy Studies Department on 3/10/2021

**Motion:** The Committee on Academic Operation recommends, and I move, that PSY2502: Psychophysiology be removed from the undergraduate catalog.

**Title and Description of Course to be Removed:**

PSY2502: Psychophysiology , Cat II

“Mind-Body” connection may be an overused term, but in social science research, there is a growing use of physiological measures to infer psychological states, that is, to “get under the skin.” Sophisticated physiological measures are now commonly used to examine psychological processes. We will review the biological measures (e.g., sympathetic and parasympathetic nervous system, facial electromyography, and neuroendocrine monitoring) that can provide insight into emotional, cognitive, attitudinal, and motivational responses to psychological events, such as social rejection or helping others. The primary focus of the course is to investigate how psychophysiology can be applied to the study of social psychological phenomena, specifically (e.g., how can prejudice or related biases in attitudes be measured ‘under the skin’, social evaluation, lie detection, emotion regulation, stress of conformity, the benefits of prosocial behavior). Recommended background: Introduction to Psychological Science (PSY 1400), Social Psychology (PSY 1402), and/or Experimental Design and Analysis (PSY 3500).

**Rationale:** PSY 2502: Psychophysiology was developed for a different faculty member at a different time in the Psychological Science Program. In reality, psychophysiology is an advanced topic and the course’s in-depth focus on integrated psychophysiology, advanced methods, and higher-level synthesis makes this course harder to teach at a 2000 level. This course will be replaced by a new course PSY4110. This change will allow for Psychological Science Majors and Minors to have their progression to more advanced coursework reflected on their transcripts and will offer more options for our BS/MS students.

Note: Students who have taken PSY2502 cannot receive credit for PSY4110.

**Note changes to catalog:** PSY2502 will be replaced with PSY4110 throughout the catalog.

**Impact on Distribution Requirements and Other Courses:** Psychological Science Majors pursuing a Psychobiology concentration can take PSY2502 as one of their courses. This option will be replaced with PSY4110. Students will not receive credit for both PSY2502 and PSY4110.

**What term is this course typically offered and is it Cat. I or Cat. II?** C term; Cat II

**If there is a course to replace this, which one?** PSY4110

**There are no changes to resource requirements.**

**Implementation Date:** Effective academic year 2021-2022

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Cross-listing GOV2319 with ENV 2319, as approved by the Social Science and Policy Studies Department on February 18, 2021.

**Motion:** The Committee on Academic Operation recommends, and I move, that GOV2319, Global Environmental Politics, be cross-listed with ENV.

**Existing title, description and course offering schedule:**

GOV2319. Global Environmental Politics. Cat. II

It is apparent that environmental problems have outgrown national policy frameworks. Thus, institutions have emerged at the international and transnational levels to coordinate collective problem solving. But governance involves more than just the practicality of problem solving; it also involves uncertainty, controversy, power and politics. This course will examine the ways in which global environmental governance has been conceived: from establishing international institutions and agreements, to less tangible ways of interacting. We will examine themes such as scales of governance (from the United Nations to communities), policy networks, the role of NGOs, think tanks and special interests and the role of knowledge in global environmental debates. Students will then use this conceptual and theoretical basis to analyze major global environmental issues including: deforestation; biodiversity; endangered species; and climate change. The goals of this course are to gain an understanding of the main positions in global environmental debates; critically analyze these positions; and gain insight into the politics of global environmental policy and governance. Recommended Background: GOV 1303 or GOV 1320 . This course will be offered in 2015-16, and in alternating years thereafter.

**Proposed title, description, and course offering:**

GOV/ENV2319. Global Environmental Politics. Cat. II

It is apparent that environmental problems have outgrown national policy frameworks. Thus, institutions have emerged at the international and transnational levels to coordinate collective problem solving. But governance involves more than just the practicality of problem solving; it also involves uncertainty, controversy, power and politics. This course will examine the ways in which global environmental governance has been conceived: from establishing international institutions and agreements, to less tangible ways of interacting. We will examine themes such as scales of governance (from the United Nations to communities), policy networks, the role of NGOs, think tanks and special interests and the role of knowledge in global environmental debates. Students will then use this conceptual and theoretical basis to analyze major global environmental issues including: deforestation; biodiversity; endangered species; and climate change. The goals of this course are to gain an understanding of the main positions in global environmental debates; critically analyze these positions; and gain insight into the politics of global environmental policy and governance. Recommended Background: None, but ENV1100 would be helpful.

**Explanation of Motion:** This course has been offered five times since 2011, has consistent enrollment and positive student reviews. It has been offered as a GOV course since its inception, but we now move to crosslist the course with ENV to better and more completely reflect the course content and the way in which it satisfies program/social science requirements. This motion was approved by the faculty of Social Science and Policy Studies on February 18, 2021.

**Rationale:** We propose this change for several reasons. First, the ENV prefix describes the course content, which is focused on environmental policy, power and politics, and draws on core concepts introduced in ENV1100. The course was developed and is taught consistently by core, full time ENV faculty (Laureen Elgert). Finally, the course will become required content for new programs and concentrations in Environmental and Sustainability Studies that are part of the department's strategic planning.

**Impacts on students:** No change in impact to students.

**Resource Needs:** No new resources are required. This course will continue to be taught by Laureen Elgert.

**Implementation Date:** Academic year 2021-22.

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Addition of ENV2710, Designing for Climate Resilience and Justice, as approved by the faculty of Social Science and Policy Studies on February 18, 2021.

**Motion:** The Committee on Academic Operation recommends, and I move, that ENV 2710, Designing for Climate Resistance and Justice be added.

**Course/Catalog Description: ENV 271X. Designing for Climate Resilience and Justice.**  
Cat.II

Resilience is the capacity to adapt to changing conditions and to bounce back after a disaster. Through resilience we can live, and even thrive, in the face of natural disasters. Resilience involves adaptation to the wide range of regional and localized impacts that are expected with a warming planet: more intense storms, greater precipitation, coastal and valley flooding, longer and more severe droughts in some areas, wildfires, melting permafrost, warmer temperatures, and power outages. Resilient design is the intentional design of buildings, landscapes, communities, and regions in response to these vulnerabilities. In this course, we will work to better understand what is at risk in a changing climate with more extreme and frequent disasters, the role people/companies and policies play in these disasters, who is most at risk and why, and develop resilient designs focused on practical, innovative, on-the-ground, and just solutions.  
Recommended background: None

**Recommended background:** None.

**Anticipated Instructors:** Lisa Stoddard, other ENV affiliated faculty

**Implementation Date:** AY21/22

**Resources Required:** Prof. Stoddard has taught this course twice and has an interest in continuing to teach the course. No new resources are required. No labs are required.

**Intended Audience:** This course is intended for any WPI student who is interested in climate adaptation/resilience, and particularly for ESS majors and minors.

**Rationale for Adoption:** The course ENV 271X was taught in C20 on an experimental basis to 19 students each time. 29 students are registered for a second offering in C21. Student interest in the course and topics covered were strong and end-of-course student evaluations were positive:

*END-OF-COURSE STUDENT EVALUATIONS*

<b>Term</b>	<b>Enrollment</b>	<b>Q1</b>	<b>Q2</b>	<b>Q9</b>	<b>Expected Grade</b>	<b>Ave. Hours Spent Outside Class</b>
2020 C	19	4.5	4.5	4.5	9 A; 1 B	3.2 (Range 1-20)

19. On average, what were the total hours spent in each 7-day week OUTSIDE of formally scheduled class time in work related to this course (including studying, reading, writing, homework, rehearsal, etc.)?

n=11 av.=3,2

0 hr/wk 0

1-5 hr/wk 2

6-10 hr/wk 6

11-15 hr/wk 2

16-20 hr/wk 1

21 hr/wk or more 0

*STUDENT COMMENTS:*

Content I wouldn't say I liked (It's scary as hell), rather it's such a vital topic in this day and age, and was so well taught. Should be required for all STEM majors.

- I loved the balance of in-class discussion to lecturing, really got me involved in the topic, and made for a very lively time.
- The guy (totally forgetting his name) from Appleseed Permaculture was great.
- Had a big impact on my mindset outside of class. I found myself thinking about climate issues far more than I had before, and I think it is
- very good for it to be on my mind all the time: I am thinking about ways I can improve my own carbon footprint.
- I LOVED this course. This is exactly the kind of things I want to be doing in my career, and this class gave good assignments in terms of
- comprehensive design.
- I enjoyed how engaging this course was. It had many elements that made me interested in the material.
- I like that this course gave the students the freedom to explore different climate issues and strategies to combat them by choosing specific
- communities of interest.

- I liked how assignments were divided up in a group and then we worked together in class.
- I liked the holistic thinking incorporated into the class. The instructor emphasized the importance of questioning things you hear about
- climate change and always consider every group or demographic into our design plans.
- I really enjoyed the topic, the use of in class time, and most of the assignments. I also really liked the guest speaker we had.
- I thought the topic of this course was interesting. I liked how it brought humanitarian engineering into the classroom.
- Professor Stoddard is amazing. She was always incredibly helpful and accommodating and is a great teacher. She really put the effort into
- making sure each student's voice was heard and that the class was being taught in a productive way.

## **Original Experimental Course Proposal**

**To:** Chair, Committee on Academic Operations

**From:** Robert Krueger, Environmental and Sustainability Studies Program

**Re:** Motion to add experimental course in Designing for Climate Resilience and Justice Program Review Committee on 11/15/2018.

**Date:** 12/3/2018 [Date submitted to CAO]

The Environmental and Sustainability Studies Program requests the approval of the following experimental course ENV 271X Designing for Climate Resilience and Justice in Academic Years 2019 and 2020 during D term.

**Contact:** Prof. Robert Krueger

**Preferred term:** D 2020

**Expected enrollment:** 25

**Course type:** Cat II

**Intended audience:** All WPI undergrads taking SS requirements, ENV students, and others interested in design thinking.

**Anticipated Instructor:** Prof. Lisa Stoddard

**Course/Catalog Description:** ENV 271X, Designing for Climate Resilience and justice, Cat. II).

Resilience is the capacity to adapt to changing conditions and to bounce back after a disaster. Through resilience we can live, and even thrive, in the face of natural disasters. Resilience involves adaptation to the wide range of regional and localized impacts that are expected with a warming planet: more intense storms, greater precipitation, coastal and valley flooding, longer and more severe droughts in some areas, wildfires, melting permafrost, warmer temperatures, and power outages.

Resilient design is the intentional design of buildings, landscapes, communities, and regions in response to these vulnerabilities. In this course, we will work to better understand what is at risk in a changing climate with more extreme and frequent disasters, the role people/companies and policies play in these disasters, who is most at risk and why, and develop resilient designs focused on practical, innovative, on-the-ground, and just solutions.

Recommended background: None

**Rationale:** This course will, 1) add to course offerings on climate change and resilience; 2) engage engineers through design and real world case studies; and 3) adds to student's global competency.

**Resource Needs:**

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

- Information on the instructor: Prof Lisa Stoddard, who is available to teach this course.
- Classroom room for 25 students and no special technology
- Laboratory (computer or otherwise): N/A
- Library resources (including staff support as well as print and electronic resources): N/A
- Information Technology (special software or support from the Academic Technology center): N/A

**Assessment:** This course will be assessed through WPI student feedback forms, mid-term evaluations, and student reflections.

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Motion to add GOV 3000 and cross-list with PSY 3000, Psychology and Law, with GOV 3000, as approved by SSPS Department on 3/15/2021.

**Motion:** The Committee on Academic Operation recommends, and I move, that GOV3000 be added and cross-listed with PSY 3000: Psychology and Law.

**Course/Catalog Description:**

GOV 3000/PSY 3000: Psychology and Law

Cat II

How does the courtroom work and where does psychology come into play? Is it really “innocent until proven guilty”? Do people confess to crimes they never committed? How accurate are eyewitnesses? In this course, we will discuss and examine questions like these and many more. This course examines empirical research in the interface of psychology and law. We will learn about standard practices in the criminal justice system and empirical psychological research devoted to understanding these practices. As a discussion-based course, we will tackle topics such as: courtroom procedures, confessions, death penalty, deception, decision making, deliberations, eyewitnesses, expert testimony, jury selection, memory, police, and pretrial publicity. We will also explore how and when psychologists can impact legal guidelines and policies.

**Instructor:** Jeanine Skorinko

**Rationale:** PSY 3000: Psychology and Law was originally created to offer an upper-level seminar for Psychological Science and Society, Technology, and Policy major and minor students. It is by its very nature the integration of psychological science, law, policy, and government. In the original motion to add PSY 3000 part of the rationale was “This course will also compliment the Society, Technology, and Policy undergraduate program as well.” However, we are seeing very little enrollment by STP students. In its first offering, we had one STP student. In the second offering, there were no STP students. The course would benefit from perspectives and interactions of both groups of students. Cross listing would enable us to better recruit students from Psychological Science and Society, Technology, and Policy as they will see the course offering in their area of specialty and will be able to see how the course could fit their distribution requirements. It will also provide an upper-level course for STP students.

Note: Students cannot receive credit for both PSY 3000 and GOV 3000.

**Note changes to catalog:** GOV 3000 shall be added to the catalog and cross-listed with PSY 3000.

**Impact on Distribution Requirements and Other Courses:** None. PSY 3000 is already part of the PSY major and minor distributions requirements. It was already an accepted course for the STP program.

**Implementation Date:** Implementation date for this action is the 2021-2022 Academic year for its next offering.

**Resource Needs:**

There are no new resources needed to deliver this course. Jeanine Skorinko currently teaches the course.

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Motion to add PSY 4110: Psychophysiology, approved by Psychological and Cognitive Sciences Program on 12/9/2020, and by the Social Science and Policy Studies Department on 3/10/2021

**Motion:** The Committee on Academic Operation recommends, and I move, that PSY4110 Psychophysiology be added as described below.

**Course/Catalog Description:**

PSY 4110: Psychophysiology

The field of Psychophysiology seeks to answer two key questions: (1) How do psychological factors – like our feelings, attitudes, relationships, behaviors, and social environments – get “under the skin” to affect our physiology? (2) How can we infer someone’s psychological state based on a physiological measurement? For instance, how do different stimuli affect our heart rate? And in turn, if someone’s heart is beating faster, might we infer that they are nervous or that they are excited? In this course, we will cover fundamental stress physiology (e.g., the nervous system, neuroendocrinology, the immunity system etc.), advanced methodologies for assessing psychophysiological constructs (e.g., electromyography, neuroimaging, biospecimens), and both foundational and emerging findings from the field. Ultimately, this course will teach students to make strong inferences about the links between the psychological experience and the body’s physiological reactivity and to understand the broader implications of these links.

Recommended Background: PSY1402: Social Psychology and/or PSY2408: Health Psychology.

Note: Students may not receive credit for both PSY2502 and PSY4110.

This course will be offered in 2021-2022 and in alternate years thereafter.

**Anticipated Instructor:** Angela Rodriguez (currently teaches PSY2502)

**Rationale:** Initially, PSY 2502 was developed for a different faculty member at a different time in the Psychological Science Program. In addition, we have seen an increase in majors and minors in the psychological science undergraduate program. Therefore, we are seeking to expand our offerings to include more advanced and more methodological courses. PSY 4110 will accomplish these goals. Offering this course at the 4000 level will more accurately reflect the course material that Professor Rodriguez would like to teach in this course. The course will now cover higher-level topics in the field of psychophysiology, in-depth and hands-on practice into this advanced methodology, and integrations between psychology, physiology, biology, neuroscience, and other fields. The change from PSY 2502 to PSY PSY4110 will also allow undergraduates to progress through more advanced topics in the field, and progress through our methodological sequence (PSY 3400; PSY 3500; PSY 4110). This sequencing is akin to how

peer institutions designate their more advanced psychology courses. This designation will therefore better position our students to obtain admission to graduate programs.

**Note Changes to Catalog:** PSY 4110 shall replace PSY2502 throughout the catalog.

**Impact on Distribution Requirements and Other Courses:** Psychological Science Majors pursuing a Psychobiology concentration can take PSY2502 as one of their courses. This option will be replaced with PSY4110. Students will not receive credit for both PSY2502 and PSY4110. No changes to Psychology Minor requirements.

**Implementation Date:** Effective academic year 2021-2022.

**Resource Needs:** This renumbering will not require any additional resources. Angela Rodriguez currently teaches PSY2502 and will now teach PSY4110 instead.

**There was no experimental course.**

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Motion to add two courses in Special Topics in Environmental and Sustainability Studies Series: ENV 2800 and ENV 4800, as approved by the faculty of Social Science and Policy Studies on February 28, 2021.

**Motion:** On behalf of the Environmental and Sustainability Studies Program, we move that two courses in Special Topics in Environmental and Sustainability Studies, ENV 2800 and ENV 4800 as described below, be added.

**Course/Catalog Description:**

**ENV 2800: Special Topics in Environmental and Sustainability Studies Cat.III**

(Credits will be assigned by the instructor ranging from 1/6-1/3 unit)

This course provides an opportunity for students with little to no background in Environmental and Sustainability Studies to learn about a special topic in the area. This course may be repeated for different topics.

**ENV 4800: Special Topics in Environmental and Sustainability Studies Cat.III**

(Credits will be assigned by the instructor ranging from 1/6-1/3 unit)

This course provides an opportunity for students with a solid background and interest in Environmental and Sustainability Studies to learn about a special topic in the area. Recommended background: one 2000-level Environmental and Sustainability Studies courses (or equivalent). This course may be repeated for different topics.

Note: Specific course description will be added to the online course listing once the topic is decided and the course is offered.

**Anticipated Instructor(s):** Professors Elgert, Stoddard, Krueger, and other interested faculty.

**Rationale:** These courses will enable ESS core faculty, affiliated faculty and visiting faculty to offer courses on timely and relevant subjects as their expertise permits and as Department requirements, resources, and capacities allow. Environmental and Sustainability Studies has offered a number of experimental courses over the past years, in addition to ISPs on special topics. Adding these courses will provide a formalized opportunity for faculty to teach topics that they are interested in, have expertise in, are of particularly timely relevance, and that students will be interested in.

By offering Special Topics at the 2000 level and the more senior 4000 level, we should see students from a variety of disciplines on-campus enroll in different leveled Special Topics courses. These course offerings will also provide us the opportunity to get more students interested in Environmental and Sustainability Studies at varying levels. Upper-level Special Topics courses will provide a much needed opportunity for Environmental and Sustainability Studies majors and minors to get a seminar-like experience in an advanced topic in the area. Furthermore, 4000 level courses will facilitate cooperation between ESS and the new MA in

Community Climate Adaptation (CCA), commencing in AY21/22, by adding supplementary (graduate level) work and cross listing as graduate programs in CCA.

Other programs and departments on campus have Special Topics courses after which this proposal is modeled after. Psychological Science implemented this change in Spring, 2018. Implementing the same change in ESS will help also to establish consistency between SSPS programs.

**Note Changes to Catalog:** ENV 2800: Special Topics in Environmental and Sustainability Studies, and ENV 4800: Special Topics in Environmental and Sustainability Studies will be added.

**Impact on Distribution Requirements and Other Courses:** This will provide an additional course for students of all backgrounds to take interesting courses in Environmental and Sustainability Studies and will provide additional opportunities for Environmental and Sustainability Studies majors and minors to take.

**Resource Needs:**

This course does not require new resources as it relies on current faculty in SSPS and current practices within the department. Faculty load will be carefully considered when determining when a Special Topics course is offered and how many are offered an academic year.

**Implementation Date:** Fall, 2021.

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Addition of ENV 2500 and cross-listing with PSY 2500, as approved by the Program Review Committees for Psychological & Cognitive Sciences and International Development, Environment, & Sustainability and the Social Science & Policy Studies Department, on 3/10/2021

**Motion:** The Committee on Academic Operation recommends, and I move, that ENV 2500, Environmental Problems and Human Behavior, be added and cross-listed with PSY 2500.

**Proposed title, description, and course offering:**

**ENV/PSY2500. PSYCHOLOGY FOR SUSTAINABILITY**

Cat. II

This course applies psychological theory and research to understand the causes of human behavior that degrades natural systems and to identify and promote more sustainable actions and policies. Topics will include: social dilemmas and cognitive limitations as root causes of environmental problems; psychological methods for studying sustainability; the potential for and limitations of changing individual environmental cognition and behavior; environmental knowledge, attitudes, and values; motivations for sustainable behavior; and the relationship between environmental quality and human health and mental health. Students will gain experience applying social and cognitive behavior change strategies to reduce their own environmental impact.

Suggested background: introductory psychology and/or environmental studies. Students may not receive credit for both ENV2400 and ENV/PSY2500. This course will be offered in 2021-22, and in alternating years thereafter.

**Anticipated Instructor:** Jim Doyle, Associate Professor of Psychology

**Rationale:**

This new course is based on ENV2400, which has a long history at WPI. It was taught to enrollments of about 20 students for more than 20 years under various prefixes, titles, and descriptions, evolving as the then relatively new and ill-defined research area focusing on the relationship between human cognition and behavior and environmental problems grew and developed. The revised course description for ENV/PSY 2500 is updated to recognize that the psychology of sustainability is now a well-defined and recognized subfield, which covers a standard set of core topics. The new title comes from the textbook now used in the course [Scott, B. A., Amel, E.L., Koger, S.M., and Manning, C.M. (2016). Psychology for Sustainability, 4<sup>th</sup> ed. New York: Routledge].

The course is a true hybrid of psychology and environmental studies. ENV2400 was taught for many years under the PSY prefix, and enrolled mainly psychology students. In order to attract more environmental studies students, the prefix was changed to ENV. Now it enrolls only

environmental studies students. The course would benefit from the perspectives and interactions of both groups of students. Cross listing seems the only practical way to achieve that, by making clear to both psychology and environmental studies students how the course could fit into their distribution requirements.

**Implementation Date:** Implementation date for this action is the 2021-2022 academic year.

**Resource Needs:**

There are no changes to resource needs for the course.

**Date:** April 8, 2021

**To:** WPI Faculty

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

**Re:** Removal of ENV 2400: Environmental Problems and Human Behavior, as approved by Psychological and Cognitive Sciences Program on 12/9/2020 and the Social Science and Policy Studies Department on 3/10/2021

**Motion:** The Committee on Academic Operation recommends, and I move, approval of the addition of Removal of ENV 2400, Environmental Problems and Human Behavior

**Course description: Environmental Problems and Human Behavior Cat. II**

This course examines how people think about and behave toward the environment.

Environmental problems can ultimately be attributed to the environmental decisions and actions of human beings. These behaviors can in turn be understood as resulting from the nature and limitations of the human mind and the social context in which behavior takes place. Knowledge of the root causes of environmentally harmful behavior is essential for designing effective solutions to environmental problems. The goals of the course are (1) to provide students with the basic social science knowledge needed to understand and evaluate the behavioral aspects of such important environmental problems as air and water pollution, global warming, ozone depletion, preserving biological diversity, and hazardous waste and (2) to help students identify and improve shortcomings in their knowledge and decisions related to the environment. Topics will include, but not be limited to: environmental problems as “tragedies of the commons”; public understanding of global warming and global climate modeling; folk biology; risk perception; intelligent criticism of environmental claims; making effective environmental choices; strategies for promoting pro-environmental behavior; and human ability to model and manage the global environmental future.

Recommended background: ENV 1100. Suggested background: PSY 1400, PSY 1401, or PSY 1402. Students may not receive credit for both PSY 2405 and ENV 2400. This course will be offered in 2019-20, and in alternating years thereafter.

**Rationale:** This course has a long history at WPI, having been taught to enrollments of about 20 students for more than 20 years under various prefixes, titles, and descriptions, evolving as the then relatively new and ill-defined research area focusing on the relationship between human cognition and behavior and environmental problems grew and developed. Currently, the course mainly enrolls ENV students. However, the course would benefit from the perspectives and interactions of ENV and PSY students. Therefore, we wish to drop ENV 2400 in order to create a new course ENV 2500: Psychology for Sustainability and cross list it with PSY 2500.

Note: Students cannot receive credit for both ENV 2400 and ENV 2500/PSY 2500.

**Changes to catalog:** ENV 2400 will be replaced with ENV 2500/PSY2500 throughout the catalog.

**Impact on Distribution Requirements and Other Courses:** Students will not receive credit for ENV 2400 and ENV 2500/PSY 2500.

**What term is this course typically offered and is it Cat. I or Cat. II?** Fall; Cat II

**If there is a course to replace this, which one?** ENV 2500/PSY 2500

**There are no changes to resource requirements.**

**Implementation Date:** Effective academic year 2021-2022

## COMMITTEE BUSINESS

**Date:** April 8, 2021

**To:** The WPI Faculty

**From:** Committee on Tenure and Academic Freedom (Prof. Doyle, Chair) and Committee on Governance (Prof. Boudreau, Chair)

**Re:** Motion to extend the notification deadline for tenure-track faculty who opt out of the COVID-related extension of their pre-tenure probationary period.

**Motion:** The Committee on Tenure and Academic Freedom and the Committee on Governance recommend and I move that the deadline for opting out of a COVID-19-related extension to the pre-tenure probationary period be extended to not later than May 1, twenty-five months before the date that tenure materials are currently scheduled to be submitted, for all probationary faculty *except* those whose tenure review year was originally scheduled for AY21-22.

### **Description of the proposed motion:**

The proposed motion extends the deadline for opting out of the COVID-19-related probationary period extension (approved by the faculty in April 2020) from May 4, 2021, to not later than twenty-five months before the current deadline for submitting their tenure materials, or May 1 prior to the original (pre-COVID) tenure decision year. An exception is made for faculty originally scheduled to go up for tenure review during AY21-22, whose opt-out deadline remains May 4, 2021.

### **Rationale:**

In April 2020 the Faculty approved a motion to extend the probationary period for Tenure-Track Faculty for one year due to hardships associated with COVID-19 and with the right to opt out. At the time, not anticipating that COVID-19 would affect campus operations for such an extended period, the faculty included a May 4, 2021 deadline for opting out. Today it is apparent that campus operations, daily life, and the faculty's teaching, service, and research commitments have been disrupted well beyond our expectations in April 2020. However, the effects of these disruptions on a faculty member's research or teaching profile may take some time to become clear to the individual faculty member. This motion allows some probationary faculty (those whose current tenure year is AY23/24 or later) more time to make this decision and ties their opt-out deadline to their existing tenure clocks rather than to a single arbitrary deadline for untenured faculty at all stages of the probationary period.

Opt out deadlines at other universities vary widely, but giving probationary Faculty more than one year to decide is fairly common. The expectation is that by allowing candidates more time to decide whether or not to opt out of the COVID extension, when possible, they will be able to make better informed decisions in their best interests. At the same time, candidates and departments may benefit from a period of certainty, near the end of the probationary period, about when the deadline for submitting tenure materials will be. The current motion tries to strike a balance between these competing interests.

The table below shows impact of the motion on probationary Faculty with different tenure years, including years spent at WPI, their starting year, their previous (pre-COVID) tenure year, their current tenure year (with the COVID extension), and the opt out deadline that would apply to them.

Candidates go up for tenure in their 6<sup>th</sup> year on the tenure clock, and submit their tenure materials at the end of their 5<sup>th</sup> year on the clock. With the motion approved by the Faculty last Spring, unless and until they opt out, the tenure clocks of all probationary Faculty have been extended by one year (their current clock). So a candidate who normally would submit at the end of their 5<sup>th</sup> year at WPI and go up for tenure in their 6<sup>th</sup> year, is now scheduled to submit at the end of their 6<sup>th</sup> year at WPI, and go up in their 7<sup>th</sup> year. If this motion passes, candidates could decide to opt out of the COVID extension at any time up until the end of their 4<sup>th</sup> year on their current clock.

For example, a candidate starting at WPI in AY19/20 on a standard tenure clock is now in their 2<sup>nd</sup> year at WPI. Their current tenure year (with the COVID extension) is AY25/26. Their previous tenure year (pre-COVID) was AY24/25. Their opt out deadline would be 5/1/23, at the end of their 4<sup>th</sup> year on their current tenure clock. If they were to opt out, they would submit their tenure package in June of '24 and go up for tenure in AY24/25.

Candidates who have already reached the 4<sup>th</sup> year on their previous tenure clock would not under this proposal receive more time to decide whether or not to opt, beyond the year they were granted last year. For example, a candidate starting at WPI in AY17/18 on a standard tenure clock is now in their 4<sup>th</sup> year at WPI. Their current tenure year (with the COVID extension) is AY23/24. Their previous tenure year (pre-COVID) was AY22/23. Their opt out deadline remains May 4 of this year.

Year at WPI	6	5	4	3	2	1
Starting Year	15/16	16/17	17/18	18/19	19/20	20/21
Previous Tenure Year	20/21	21/22	22/23	23/24	24/25	25/26
Current Tenure Year (with COVID extension)	21/22	22/23	23/24	24/25	25/26	26/27
Opt out deadline	N/A	5/4/21	5/4/21	5/1/22	5/1/23	5/1/24

Note: This table assumes a candidate hired with the standard tenure clock that has had no clock stoppages other than due to the COVID pandemic.

**Date:** April 8, 2021  
**To:** The WPI Faculty  
**From:** Committee on Tenure and Academic Freedom (Prof. Doyle, Chair)  
Committee on Governance (Prof. Boudreau, Chair)  
**Re:** Motion to extend the probationary periods for new tenure-track faculty members

**Motion:** The Committee on Tenure and Academic Freedom and the Committee on Governance recommend and I move that the probationary periods for tenure-track faculty members who started at WPI in AY20/21 be extended by one year due to hardships associated with the COVID-19 pandemic, and that each faculty member in this group be given the choice to opt out of the extension by providing written notice to the Provost's Office by no later than May 1, twenty-five months before the date that tenure materials would be scheduled to be submitted on their newly extended tenure clock.

**Description of the proposed motion:**

Tenure-Track Faculty starting in AY20/21 will be given an additional year to their tenure clock, as was granted to probationary Tenure-Track Faculty starting AY19/20 or earlier by Faculty vote in April 2020. This motion extends that option to faculty who started at WPI in AY20/21.

**Rationale:**

In April 2020 the Faculty approved a motion to extend the probationary period for Tenure-Track Faculty for one year due to hardships associated with COVID-19, with the right to opt out. The current motion extends the policy to cover new Tenure-Track Faculty hired to start this academic year. With significant COVID-19 pandemic disruptions to scholarship, teaching, and other faculty activities continuing throughout AY20/21, CTAF and COG believe our newest Tenure-Track Faculty should have the same opportunity as other Tenure-Track Faculty to adapt their scholarship and teaching to new realities and to better prepare their tenure cases.

Under this proposal the tenure year for candidates who started at WPI during AY20/21 will be AY26/27, unless and until they decide to opt out of the COVID extension. If they opt out, their tenure year would be AY25/26. The deadline for opting out would be 5/1/24, the end of their 4<sup>th</sup> year at WPI.

**Date:** April 8, 2021

**To:** The WPI Faculty

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

**Re:** Motion to allow elected faculty governance committee members to vote on critical issues if a meeting of the entire faculty cannot be called.

**Motion:** The Committee on Governance (COG) recommends and I move that if a faculty meeting cannot be convened in a timely manner for any reason, **all the elected members of faculty governance committees** will have the power to vote on critical issues on an interim basis through the end of B term 2021, with a required quorum of at least 25%. Any such vote would be revisited by the faculty at the earliest possible convenience.

**Description of the proposed motion:** The proposed motion extends a motion approved by the faculty in August 2020, which expired in January 2021.

**Rationale:** As noted in April and again in August 2020, in the current crisis, emergency situations may arise where faculty approval is urgently needed. In emergency cases where the next scheduled faculty meeting is not soon enough for a decision, a vote by a majority of elected faculty governance members can serve as an interim decision by the faculty. This group is large enough to represent the campus while also being small enough to quickly convene.

**Date:** April 8, 2021  
**To:** The WPI Faculty  
**From:** Committee on Governance (Prof. Boudreau, Chair)  
**Re:** Motion to extend remote voting in emergency settings only

**Motion:** The Committee on Governance (COG) recommends and I move that faculty meetings may, if necessary, continue to be conducted remotely, including synchronous remote voting, through the end of B term 2021.

**Description of the proposed motion:** The motion extends current interim policy allowing remote faculty meetings and synchronous remote voting through the start of A term.

**Rationale:** In April and August 2020, the faculty approved motions to hold faculty meetings remotely. The most recent motion expired in January and was never renewed. This motion updates current policy to reflect current practice and to allow the continuation of remote faculty meetings and voting through the end of the current academic year.

The original rationale for holding remote meetings remains the same: Given WPI's hybrid mode of course delivery and ongoing efforts to keep the campus population safe during the COVID-19 pandemic, faculty meetings may, if necessary, continue to be held remotely through the end of B term 2021. Although getting back to in-person faculty meetings remains our strong preference for conducting faculty business, our ongoing experiment with synchronous remote voting at faculty meetings has been successful, allowing for faculty meeting operations to continue during the emergency situation. This resolution extends that practice through the end of the summer. If necessary, faculty can consider a separate motion to extend the practice at a later time.