WORCESTER POLYTECHNIC INSTITUTE
February 17, 2022

To: The WPI Faculty
From: Mark Richman
           Secretary of the Faculty

The sixth faculty meeting of the 2021-2022 academic year will be held on **Thursday**, **February 17, 2022** at 3:15pm via Zoom (join after 3:00 pm at https://wpi.zoom.us/j/93981392432).

1. Call to Order   M. Richman

   - Approval of the Agenda
   - Consideration of the Minutes from Jan. 20, 2022 and the Consent Agenda

2. Committee Business:

   Committee on Governance (COG)   T. El-Korchi
   - Motion to modify the membership and election procedures for COG
   - Motion to establish an *ad hoc* Committee on Teaching and Research Faculty (CTRF)

   Committee on Financial and Administrative Policy (FAP)   D. Spanagel
   Committee on Governance (COG)   T. El-Korchi
   - Motion to revise the membership of the Comm. on Financial and Admin. Policy (FAP)

   Committee on Academic Policy (CAP)   O. Pavlov
   - Motion to provide undergrad. students Pass/NR grading options in C-, D-,and E-terms 2022

3. Committee Report:

   Committee on Academic Policy (CAP)   O. Pavlov
   - How might changes to criteria for satisfactory academic progress affect our students?   A. Heinricher

4. Special Reports (and brief discussion)

   Update on progress toward addressing the challenges of academic and home life   G. Smith
                                                                                         J. deWinter

   WPI faculty sentiment as reflected in the 2021 COACHE survey results   C. Demetry

5. New Business

6. Closing Announcements

7. Adjournment

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WORCESTER POLYTECHNIC INSTITUTE
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January 20, 2022

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2. Committee Business: COG; FAP/COG
3. Special Report: The Challenges of Academic and Home Life
4. President's Report
5. Provost's Report
6. Closing Announcements
7. Adjournment

Detail:

1. <u>Call to Order</u>
The fifth Faculty Meeting of the 2021-2022 academic year was called to order at 3:15pm via ZOOM by **Prof. Richman** (AE). The agenda for the meeting and the minutes from the December 2 meeting were approved as distributed.

2. <u>Committee Business</u>
<u>COG</u>
Prof. El-Korchi (CEAE), as Chair of COG, presented two related motions for discussion only. (See **Addendum #1** on file with these minutes.) Prof. El-Korchi explained these motions arise from the work begun last year to incorporate all fulltime teaching faculty in faculty governance. The first motion modifies the membership of COG to ensure representation of nontenure-track teaching faculty, while the second establishes an ad hoc committee to focus on issues specific to our teaching and research faculty. Our collective challenge is to balance fair representation in faculty governance with secure representation where it is most needed. The two motions are a result of a healthy collaboration between COG and representatives of our teaching and research faculty.

Prof. El-Korchi explained that the first motion increases the number of elected members on COG from five to six; guarantees that two of the six will be secured nontenure-track faculty members, while the remaining four and the Chair would be tenured. The motion also specifies that the President's appointment to COG be made in collaboration with the committee and allows the Chair of COG to serve at most two successive terms. The motion also modifies the election procedure for COG members and codifies several current practices. The second motion complements the first by establishing an ad hoc Committee on Teaching and Research Faculty (CTRF) for three years to address issues specific to teaching and research faculty. The committee membership would consist of three elected teaching faculty and the two nontenure-track faculty members on COG The charge and form of the committee will be re-evaluated after three years.

Prof. Billiar (BME) asked if research professors could be elected to serve on CTRF. **Prof. Richman** explained that research professors were members of our faculty, but because of the nature of their contracts, they are not in the group of secured nontenure-track faculty now part of our faculty governance system. The intention is to represent their interests by including them in CTRF's work and deliberations, while more general issues related to research will remain part of the charge of Committee on Graduate Studies and Research (CGSR).

Prof. Demetry (MME) asked why tenure-track teaching faculty would not be eligible to serve on COG. She also pointed out that she served for one year (1998-1999) as an untenured faculty member on COG. **Prof. El-Korchi** reiterated that the balance COG is trying to strike in collaboration with the TRT Council is between fair and secure representation. The counterpoint to guaranteeing that two members of COG will now always be untenured (when in the past typically none were untenured) is to guarantee that the other members are protected by tenure.

Prof. Roberts (BBT) explained that the sixteen members of the past and current TRT Councils collaborated closely with faculty governance to formulate these motions with careful consideration given to risk, balance, the goal of participating fully in faculty governance, and cohesion between the teaching and research track faculty. With respect to the second motion, CTRF will provide a formal framework within faculty governance to focus on issues relevant to teaching and research faculty. The first motion provides an accelerated track to representation within faculty governance at its highest level. Prof. Roberts thanked COG for collaborating with the TRT Councils on these motions and expressed support for them on behalf of the Councils.

Prof. Sturm (MA) agreed with the idea of placing TRT faculty members on COG, but believed that it was a drastic step to disallow tenure-track faculty from serving on COG without consulting with them first. **Prof. Richman** explained that in the interest of ensuring representation by nontenure-track faculty, which will make COG more vulnerable, restricting the remaining members to those with tenure was reasonable because of how rarely tenure-track faculty have served on COG in the past. COG had concluded that the restriction would have very little practical effect.

Prof. Heilman (CBC) clarified that his comments are not made on behalf of the TRT council. Given that our goal had been to establish a level of security that would allow full participation in governance, he was disappointed that there is still a perceived need to designate slots for nontenure-track faculty, which could restrict participation. Prof. Heilman also thought that if we have secured teaching faculty on COG, then he did not see a rationale for not also having tenure-track faculty, unless the worry is that too many on COG would be unsecured. In his view, these measures codify bad culture. Prof. Heilman also thought that it didn't make sense to call the committee CTRF if it does not include research professors. **Prof. El-Korchi** pointed out that COG deliberated at length with our TRT colleagues in arriving at the current proposal. As we work to change the culture, COG and the TRT Council agreed that rather than leaving it to the chance, it was important to ensure TRT representation on COG.

Prof. Boudreau (HUA) described the proposal as a consensus document in which no one gets everything they want, but as a package it makes sense. We need to balance the rights of the individual against the strength of the collective. It is not just about an individual's right to participate on COG, but also about what it means for untenured people to be on a committee that is, at times, very contentious. As a former department head and current member of the HUA DTC, she sees this as a legitimate concern. There are many other ways in which tenure-track faculty can participate in faculty governance that don't put them in this risky position. Prof. Boudreau asked that we give up the right of tenure-track faculty to serve on COG in order to enfranchise our non-tenure track colleagues and still protect the strength of COG.

Dean McNeill (ENG) asked why the number of the names on the ballot for tenured slots will be reduced from ten to either five or twice the number of vacancies or, whichever is greater. **Prof. Richman** explained the difficulties of getting ten people to agree to have their names on a ballot, particularly because there are usually only one or two vacancies. In view of the formal nomination process that proceeds the final election, a final ballot of five names for one or two vacancies will invariably include very strong candidates. So this change preserves the strength of the ballot, and at the same time it easier as a practical matter of time.

Prof. Ruiz (CS) agreed with the spirit of the motions but not with all the details. She sees that it would be a huge step backward if tenure-track faculty are not allowed to serve on COG. Prof. Ruiz was not concerned with protecting people, but rather ensuring that both tenured and tenure-track faculty have an equal voice. She was glad that when she was a tenure-track faculty member, she served on faculty governance committees because it put her in contact with other people and helped her learn more about the university. **Prof. El-Korchi** agreed in principle, but pointed out that in practice we have used our collective wisdom to protect our tenure-track faculty by not electing them to serve on COG because there are oftentimes very controversial discussions that must be had between faculty and administration.

Prof. Gericke (CBC) thought that the goal should be to have broad representation on COG. Excluding tenure-track faculty members from COG could send the message that we don't value their voices. He believed that ten names should appear on the ballot to give people from small departments a chance to run, and he thought that there had been a small turnover rate on COG in the last 10 to 15 years. He mentioned that the Secretary of the Faculty can be elected to COG immediately after their term has expired. In his view, no one should be allowed to serve as Chair of COG for more than one year to improve the operation of the committee. **Prof. Richman** pointed out that currently members are permitted to serve two non-consecutive years as Chair. The change to allow two consecutive years as Chair was made to provide continuity on issues that oftentimes take more than one year to resolve. At the same time, it does not extend the number of years that anyone can serve as Chair.

Prof. Richman requested that any additional feedback on these motions to be sent to Prof. El-Korchi or to any other member of COG so that it can be taken into consideration while the motions are revised for a vote next month.

FAP / COG
Prof. Fehribach (MA), as Chair of the Committee on Financial and Administrative Policy (FAP), presented a motion on behalf of FAP and COG that would increases the number of elected faculty members on FAP from three to five. COG will continue to appoint an additional faculty member to FAP. The reason for the motion is to accommodate FAP's increased workload and to provide more flexibility in distributing responsibilities among the faculty members on FAP. (See **Addendum #2** on file with these minutes.)

Prof. Spanagel (HUA), as current Secretary of FAP, added the roles that are divided among the four faculty members on FAP are work intensive and there is not a way to make up for a short-term absence. He thought it was essential to give the committee more options, including for potential Chairs, because FAP plays such an important role in communicating with administration.

3. Special Report
Prof. Smith (CS), with Prof. deWinter, Prof. Stanlick, and Prof. Rao, gave a presentation focusing on the challenges of academic life and how they are exacerbated by home life situations for faculty. (See **Addendum # 3** on file with these minutes.) Faculty members are always trying to balance research, teaching, and service – in addition to addressing the student mental health crisis during the pandemic. Prof. Smith focused first on challenges faced by colleagues with chronic illness and the difficulties added by pandemic. Her second focus was on the challenges faced by academic colleagues raising children and the added burdens caused by the pandemic. **Prof. Stanlick** (DIGS) addressed the challenges and unique circumstances faced by colleagues with long-distance partners.

Prof. Smith explained that rather than adding more stress, we need to take actions and develop policies that will allow us to slow down and work less, reduce our own self-expectations, prioritize our home lives, mitigate the impact of COVID on vulnerable faculty, and model the kind of behavior that we want to see in our students. **Prof. deWinter** (HUA) identified the problems of working late, taking work home, not connecting with one another, and having no safety net of support. Without change, faculty have and will continue to become less invested in the university. **Prof. Smith** pointed out ways we could address these issues at WPI: adjusting tenure and promotion guidelines; learning how to mix virtual and in-person connections in a healthy way; relying on the strength of our governance structure to prioritize these issues; and providing times and days to relax to develop a culture of care for the faculty. **Prof. Rao** (MME) introduced the idea of improving work/life balance while at work by keeping lunchtimes free, prioritizing informal interactions, and converting meeting times to collaborative work times. **Prof. Smith** recommended building professional development into our work rather than having it add to it, developing policies for course releases and a safety net of financial support for grad students, and realigning our current work to include rather than add the responsibility of changing our faculty culture. We cannot fix our campus culture for students without also focusing on improving the quality of life for our faculty.

Prof. Fehribach (MA) recalled when the administration recently considered a policy that would not allow food to be served at any meeting, even if the meeting was at lunchtime. One step in the direction that is being discussed today would be a policy that required lunch to be served at lunchtime meetings.

Prof. Sanbonmatsu (HUA) agreed that this discussion is long overdue and he appreciated his colleagues for taking the time out of their own lives to articulate the issue for us. He would like to the faculty ask for the resources needed to improve faculty experiences because there are so many ways that faculty are not given resources that they need. He would also like the faculty to address the complex question of the work culture itself, which is related to capitalism and the possession of this university, in order to improve the quality of our lives.

Prof. Spanagel (HUA) added that, in keeping with suggestions made so far, an additional step that could be taken is not to have classes scheduled in some window of time during the week. We need to have some piece of the work week to create space for the social gatherings and informal meetings. He hoped that our additional classroom space will make that possible.

Prof. Crowe (HUA) emphasized the added difficulties of COVID and the sense of being overlooked as a parent of underaged kids who cannot get vaccinated when, at the same time, he is expected to teach in person and take on the greater the risks of exposing his kids at home.

Prof. Richman thanked Profs. Smith, deWinter, Rao, Stanlick, and Konrad for their timely and provocative presentation. He emphasized the importance of taking productive steps on this issue with the goal that to make WPI a unique institution with respect to how we address the concerns raised today. In order to build on the momentum of today's discussion, he asked that anyone interested in working on this complicated issue to come forward by contacting him or anyone in the group of today's presenters.

4. President's Report

President Leshin thanked the group for this conversation about how we align our fundamental values with actions and systems; she expressed hope that this discussion would advance the campus's wellness goals. She thanked CERT for its work during the break. She welcomed Lauren Turner, who started this week as Senior Vice President, T&I, and thanked Alicia Mills for nearly a year of service as Interim VP. In a COVID update, the President noted that WPI's positivity rate has declined to 1.9 percent over the past seven days, leaving the campus with much more manageable caseloads. She thanked the health team for its hard work and thanked IT for building the additional automation needed for tracking our higher loads. She reported that 90 percent of residential students had returned to campus on time for C-term. President Leshin noted that the Mental Health Task Force recently issued its phase one report (focused on students), with the next phase to focus on faculty and staff. She said to look for a "whole-of-campus" collaborative response involving many stakeholders. She noted that faculty governance would have an important seat at the table, with involvement from the Secretary of the Faculty and Committee Chairs. Finally, President Leshin announced the opening of the 100,00 square-foot Unity Hall, and the opening of the newly renovated Kaven Hall. She urged faculty to visit Unity Hall, which includes significant classroom space that might allow us to keep some open times in the schedule as suggested by the earlier presentation.

5. Provost's Report

Provost Soboyejo appreciated the depth of thinking that went into today's discussion about including our teaching and research faculty in governance. He thanked the faculty who led the discussion about work-life challenges. He expressed his belief that the wellbeing of our community is the biggest issue for us at this time and noted some concrete areas where we can make a difference as a community: 1) reducing academic pressure; 2) building a more welcoming community; and 3) increasing connections between one another. The Provost called for a coordinated effort as a family of faculty, faculty governance, staff, students and administration to make this our most important topic as a community. He is excited to build on the work of the Mental Health Task Force and the academic leadership of faculty governance and of Chrys Demetry, who are beginning to frame the issue and possible solutions. He is grateful to faculty governance for looking at how we can reduce student stress; he acknowledged the major role that faculty governance will play in identifying specific actions for the short,

medium, and long terms. WPI's response must be urgent and must be embedded in our community, including the proposed Center for Wellbeing. Urging everyone to continue acting with kindness, flexibility, and concern for each other, Provost Soboyejo expressed optimism that WPI can overcome our mental health challenges and reinvent ourselves as a place where everybody feels welcome and united.

6. Closing Announcements

Prof. Demetry (ME) reported that to reduce bias against underrepresented and marginalized populations, on February 8 and 10, the Women's Impact Network is funding multiple sessions of an interactive workshop called "Speaking Up: How Bystanders Can Change the Conversation about Social Bias." These workshops will be presented by Power Play, a group of actors who use applied theater for professional development and to foster social and organizational change. All faculty and staff across divisions are encouraged to participate. Because of the two-and-a-half hour time commitment, Prof. Demetry is asking supervisors to use this workshop in place of other meetings in February. Participants can expect to come away from this workshop with greater confidence to identify and intervene constructively in situations of bias and specific strategies that encourage dialogue.

Prof. Richman thanked everyone who presented as well as everyone who attended this meeting to discuss these important issues.

7. Adjournment
The meeting was adjourned at 4:55pm.

Respectfully submitted,

Mark W. Richman, Secretary of the Faculty

Addendum on file with these minutes:
1. Addendum #1 - COG - Motions to revise COG membership and establish CTRF - Minutes 1-20-22
2. Addendum #2 - COG-FAP - Motion to revise FAP membership - Minutes 1-20-22
3. Addendum #3 - Academic and Work Life Challenges - Minutes 1-20-22

Date: February 17, 2022
To: WPI Faculty
From: Committee on Governance (Prof. El-Korchi, Chair)
Re: Motion to modify the membership of and election procedures for the Committee on Governance to ensure nontenure-track faculty representation

Motion: The Committee on Governance recommends and I move that Part One, Bylaw One, (Membership, Duties and Responsibilities of Standing Committees of the Faculty), Section I (The Committee on Governance) of the Faculty Handbook be modified to update the membership of and election procedure for the Committee on Governance, as described below.

Description of the Motion:
The proposal would change Part One, Bylaw One, (Membership, Duties and Responsibilities of Standing Committees of the Faculty), Section I (The Committee on Governance) of the Faculty Handbook as follows: (Red text added and ~~strikethrough~~ text deleted since the Jan. 20 faculty meeting.)

Proposed Version:

Faculty Handbook: PART ONE; BYLAW ONE; Section I:

I. The Committee on Governance (COG) consists of **four** elected **tenured and tenure-track faculty members, two elected secured nontenure-track faculty members,** one **faculty member** appointed by the President **in collaboration with COG to balance committee representation**, and, *ex officio,* the Provost and the Secretary of the Faculty. **The full term for elected members is three years. The committee will select its Chair from its elected tenured members.** A **m**ember may not **serve as** Committee **C**hair in **more than two** successive years.

The election of COG members is conducted by the Secretary of the Faculty. Membership on this Committee is limited to no more than two **faculty m**embers from any one academic **department.** The election procedure is as follows. The Secretary prepares **separate** nominating ballot**s as needed: one** listing eligible **tenured and tenure-track faculty m**embers by **department;** and **one listing eligible secured nontenure-track faculty members by department.** Faculty **members** may select up to ~~five~~ **ten** names from **each** list. The **final election ballot will consist of the names of the f**aculty **m**embers receiving the largest number of nominations, who are also eligible and willing to serve**. The number of names on the final election ballot for tenured and tenure-track members will be six** ~~five~~ **or twice the number of vacancies to be filled, whichever is larger,** and will contain no more than two names from any one academic **department**. **The number of names on the final election ballot for secured nontenure-track members will be three or twice the number of vacancies to be filled, whichever is larger, and will contain no more than two names from any one academic department.** The**se** ballot**s are** distributed with voting instructions to all **voting f**aculty **members**. (**If the highest vote getters from both the tenured faculty election and the nontenure-track faculty election are from the same academic department as a continuing member of COG, then to promote diversity on the committee, the winner is the nontenure-track faculty member when the continuing member is tenured or tenure-track, and the winner is the tenured or tenure-track faculty**

member when the continuing member is nontenure-track.)

Vacancies that occur during the academic year are filled for the unexpired term by **the next highest vote getter in the previous COG election who is willing to serve**.

The election of the Secretary of the Faculty is conducted by COG. The Secretary of the Faculty must be a tenured faculty member. The election procedure is as follows. COG prepares a nominating ballot listing all eligible faculty members by department and distributes it to all voting faculty members, with instructions to select up to five names from the list. The two faculty members receiving the largest number of nominations who are willing to serve are then placed on a final election ballot distributed to all voting faculty members.

COG is responsible for offering nominations and for conducting the election of **f**aculty **m**embers to standing and *ad hoc* Committees, except for the election of its own membership and that of the Committee on Tenure and Academic Freedom **and the Committee on Appointments and Promotions**. **Each** spring, COG will provide a ballot for the vacancies on each of the other standing Committees, after ascertaining the willingness of each nominee to serve. The ballot will also include names of those nominated by petition signed by five **f**aculty **m**embers. Ballots will be distributed to each **voting f**aculty member and returned to the Committee. The election procedure should be completed by the end of **D-Term**. **COG** has the jurisdiction to fill vacancies **that** may occur during the year in committees **that** come under its electoral jurisdiction. Such appointments will be only until the next annual election.

COG also receives from members of the WPI community requests for consideration of matters **that** do not appear to lie within the jurisdiction of existing Faculty Governance and the responsibilities of the Student Government, the Campus Judicial System, or the Administration. The Committee acts by attempting to resolve the issues itself, by referral to an appropriate person or group, or by creation of an *ad hoc* Committee.

COG is also responsible for the formulation of recommendations to the **f**aculty on changes and additions to the Faculty Rules and Bylaws, and the Faculty Committee structure, as well as for the resolution of questions of jurisdiction of the Faculty Committees relative to each other. The Chair of COG serves as one of the **f**aculty representatives to the Board of Trustees.

Current Version:

Faculty Handbook: PART ONE; BYLAW ONE; Section I:

I.   The Committee on Governance (COG) consists of five elected Faculty Members, one Member of the Faculty appointed by the President, and, *ex officio,* the Provost and the Secretary of the Faculty. Vacancies that occur during the academic year are filled for the unexpired term by special election from a ballot of candidates nominated at a Faculty Meeting. A Member may not be elected Committee chair in successive years.

The election of COG members is conducted by the Secretary of the Faculty. Membership on this Committee is limited to no more than two elected Faculty Members from any one academic discipline. The election procedure is as follows. The Secretary prepares a nominating ballot listing eligible Faculty Members by discipline and distributes it to all

Members of the Faculty, with instructions to select up to five names from the list. The ten Faculty Members receiving the largest number of nominations, who are also eligible and willing to serve, are then placed on an electing ballot which will contain no more than two names from any one academic discipline. This ballot is distributed with voting instructions to all Members of the Faculty.

COG is responsible for offering nominations and for conducting the election of the Secretary of the Faculty (when that office is vacant) and of Faculty Members to standing and *ad hoc* Committees, except for the election of its own membership and that of the Committee on Tenure and Academic Freedom. Starting in early spring, COG will provide a ballot for the vacancies on each of the other standing Committees, after ascertaining the willingness of each nominee to serve. The ballot will also include names of those nominated by petition signed by five Faculty Members. Ballots will be distributed to each Member of the Faculty and returned to the Committee. The election procedure should normally be completed by the end of Term C. This Committee has the jurisdiction to fill vacancies which may occur during the year in committees which come under its electoral jurisdiction. Such appointments will be only until the next annual election.

COG also receives from members of the WPI community requests for consideration of matters which do not appear to lie within the jurisdiction of existing Faculty Governance and the responsibilities of the Student Government, the Campus Judicial System, or the Administration. The Committee acts by attempting to resolve the issues itself, by referral to an appropriate person or group, or by creation of an *ad hoc* Committee.

COG is also responsible for the formulation of recommendations to the Faculty on changes and additions to the Faculty Rules and Bylaws, and the Faculty Committee structure, as well as for the resolution of questions of jurisdiction of the Faculty Committees relative to each other. The Chair of COG serves as one of the Faculty representatives to the Board of Trustees.

Summary of Proposed Changes:
The proposal includes the following substantive changes:

- Increases the number of elected COG faculty members from five to six;
- Guarantees that two of the six elected COG members will be secured nontenure-track faculty members, and modifies the election procedure accordingly;
- Requires that the Chair of the committee be protected by tenure;
- Specifies that the President's appointment be made in collaboration with COG to address the balance of the committee membership;
- Allows the committee Chair to serve two (but not three) successive years.

The proposal also modifies the election procedure for COG members and codifies several current practices:

- Redistributes the number of names that are required on the final election ballot(s) from ten on a single ballot to six on the ballot for tenured and tenure-track faculty members and at least three on the ballot for nontenure-track faculty members;
- Increases from five to ten the number of names that can be selected on the nominating ballot(s);

- Simplifies the procedure for filling vacancies on COG consistent with the procedure used to fill vacancies on other standing committees;
- Includes current procedures for electing the Secretary of the Faculty;
- Recognizes that elections for standing committees are normally and should be completed by the end of D-Term rather than by the end of C-Term;
- Updates language to clarify that COG no longer offers nominations for the Committee on Appointments and Promotions.

Rationale:

The substantive changes in the proposal modify the membership of COG to guarantee that two of its six elected members (and two of its nine members, overall) will be secured nontenure-track faculty members. This is consistent with WPI's goal that roughly 80 percent of the voting faculty will be tenured or on the tenure track while 20 percent will be secured nontenure-track teaching faculty. In the past, elected members on COG were nearly always tenured members of the faculty. Now that two slots on the committee will *always* be held by faculty members who are not protected by tenure, the proposal explicitly requires that the Chair of the committee be a tenured member of the faculty. In this way, the proposal achieves a balance of representation consistent with the faculty make-up while at the same time it balances concerns about the need for the Chair of the Committee on Governance, in particular, to address difficult and sometimes confrontational issues.

The proposal further addresses the general issue of balanced membership by adding that the President's appointment to COG should be made in collaboration with COG and with the issue of balance of primary consideration. The proposal also allows the committee Chair to serve two successive terms. This change improves the continuity of the committee that may be needed for issues that sometimes take more than one year to consider, while it does not increase the total number of years that a member could serve as Chair.

The proposal includes several less substantive changes, as well. It counters the added complexity of the election process by redistributing the number of names that are required on the final election ballot(s) from ten on a *single* ballot to six on the ballot for tenured and tenure-track faculty members and at least three on the ballot for nontenure-track faculty members. As redesigned, the ballots will *typically* have *at least three times* the number of candidates as vacancies, and the ballots will *always* have *at least* twice the number of candidates as vacancies. In addition, given the already elaborate two-stage COG election process (i.e. formal nomination followed by final election), the proposal eliminates an arcane and time-consuming procedure for filling vacancies on COG. In these two ways, the proposal both preserves the special nature of the COG election while respecting the enormous time required to assemble the COG ballots, the CTAF ballot, and the COAP ballot simultaneously and with coupled considerations.

Finally, the proposal simply codifies certain current practices: it explicitly includes current procedures for electing the Secretary of the Faculty; it recognizes that the elections for standing committees are normally and should be completed by the end of D-Term; and it updates language to clarify that COG no longer offers nominations for the Committee on Appointments and Promotions.

Implementation:

According to the proposal, as of AY 22-23, COG will have four elected TTT committee members and two elected NTT committee members who are all elected to serve three-year terms. Two members will be elected every year, and to stagger the terms of the NTT members, in every three-year cycle, a TTT/NTT pair will be elected twice and a TTT/TTT pair will be elected once.

Based on current COG membership, as of AY 22-23, COG will have one TTT member (Prof. Albano) with one year remaining on his term, and two TTT members (Prof. Dominko and Prof. Heineman) with two years remaining on their three-year terms.

In order both to pair up elected positions to get into the three-year cycle described above, this spring the faculty will elect one TTT member and one NTT member for three-year terms each, and one NTT member for a one-year term. Their terms will begin on July 1, 2022.

The following table shows terms of COG membership and how members will be elected beyond this spring.

Years remaining on three-year terms:

(**Bold red numbers** indicate newly elected members.
Members *normally* to be elected in the same year are shaded together.)

Member	AY 2022-23	AY 2023-24	AY 2024-25	AY 2025-26
TTT	1	**3**	2	1
NTT	**1**	**3**	2	1
TTT	2	1	**3**	2
TTT	2	1	**3**	2
TTT	**3**	2	1	**3**
NTT	**3**	2	1	**3**

Date: February 17, 2022
To: WPI Faculty
From: Committee on Governance (Prof. El-Korchi, Chair)
Re: Motion to establish the Committee on Teaching and Research Faculty as a formal faculty governance mechanism added to address issues related to teaching and research faculty

Motion: The Committee on Governance recommends and I move that, following the procedure described in Part One, Section Three, Subsection III of the Faculty Handbook, the Committee on Teaching and Research Faculty (CTRF) be added as a formal *ad hoc* Committee of the Faculty.

Description of the Motion:
The proposal would establish the Committee on Teaching and Research Faculty (CTRF) as a formal *ad hoc* Committee of the Faculty with charge and membership described as follows: (***Bold italic*** text added since the Jan. 20 faculty meeting.)

> The Committee on Teaching and Research Faculty (CTRF) is an *ad hoc* committee of the faculty that is concerned with and responsible for raising and addressing issues related *specifically* to teaching faculty and research faculty. It will be the responsibility of CTRF to apprise the appropriate faculty committees, including but not limited to COG, CTAF, and COAP, of any recommendations for new or modified policies proposed in their work. The committee works with COG and other appropriate committees both to bring such issues to the attention of the faculty and the administration, and to bring proposals for action by the entire faculty.

> The five-person CTRF includes three elected members who either hold secured nontenure-track appointments (<u>*and*</u> have either the titles Instructor, Senior Instructor, Assistant Teaching Professor, Associate Teaching Professor, full Teaching Professor, or Professor of Practice) or are tenure-track teaching faculty members (i.e. those with titles Assistant, Associate, or full Professors of Teaching). Elected members serve three-year terms. In addition, the committee includes the two elected nontenure-track faculty members serving on COG. The committee elects its Chair from among its three elected faculty members. ***The committee actively solicits the perspective of WPI's research professors and invites their representatives to participate in CTRF meetings as appropriate.***

> The committee will operate for three years as described above, publish minutes, and submit written annual reports of their academic-year activities to the Secretary of the Faculty within two weeks after the last day of each D-Term. Consistent with the procedures outlined in Part One, Section Three, Subsection III of the Faculty Handbook, after three years, the *ad hoc* committee will report to the faculty, whereupon - by action of the faculty - it will be extended for a designated time and purpose, reconstituted, eliminated, or established in an appropriate form as a permanent subcommittee of COG.

Rationale:
The proposal establishes a formal mechanism by which issues of concern *specific* to our teaching and research faculty members can be identified and addressed through our faculty governance

processes. The work of the proposed committee is needed in the short-term as we consider issues and develop appropriate policy changes that arise from having only recently expanded participation in faculty governance. Additionally, in the next three years, this committee can assure that issues specific to the teaching and research faculty will be addressed by those faculty members most affected by them. In order to get direct input from WPI's research professors while also accounting for their contract status and their job expectations, the committee is charged with soliciting the perspective of research professors and inviting their representatives to participate in CTRF meetings as appropriate.

At the same time, all campus-wide faculty issues, including those to be addressed by CTRF are best resolved with input from, and consideration by, the entire faculty. For this reason – as is the case when any issue overlaps the charge of several committees – the Committee on Teaching and Research Faculty will be responsible to work with COG and other appropriate governance committees, such as CTAF and COAP, to bring issues that CTRF identifies to the attention of and for action by the entire faculty.

Eligibility: The faculty members eligible to serve on the *ad hoc* committee are all full-time teaching faculty with the following titles: Instructor or Senior Instructor; Assistant, Associate, and (full) Teaching Professor; Professor of Practice; and Assistant, Associate, and (full) Professor of Teaching.

Implementation: Elections for this committee will be held by the end of D-Term 2022 with the elections for all faculty governance standing committees (except COG, CTAF, and COAP).

Date: February 17, 2022
To: WPI Faculty
From: Committee on Financial and Administrative Policy (Prof. Joseph Fehribach)
Committee on Governance (Prof. Tahar El-Korchi, Chair)
Re: Motion to revise the membership of the Committee on Financial and Administrative Policy (FAP)

Motion: The Committee on Governance (COG) and the Committee on Financial and Administrative Policy (FAP) recommend and I move that the current language describing Committee's membership, be revised (in Part One, Bylaw One, Section VI of the Faculty Handbook) as described below.

Details of the motion:
Current FAP Description: (Black text is unchanged; ~~strikethrough~~ words would be deleted, red would be added)

BYLAW ONE: MEMBERSHIP, DUTIES, AND RESPONSIBILITIES OF STANDING COMMITTEES OF THE FACULTY

VIII. <u>The Committee on Financial and Administrative Policy</u> (FAP) consists of ~~six~~ eight members in total: ~~three~~ five elected Faculty members (serving staggered three-year terms), the Chief Financial Officer, one additional administrative representative member designated by the President, and one additional Faculty member appointed by COG (for a one-year term, renewable for up to three consecutive years, in order to diversify the skills or perspectives needed by the committee, given the prospective composition of the committee that year). The Chair of FAP must be a tenured member of the Faculty. FAP informs the Faculty on administrative and financial matters that affect the Institute. FAP ascertains the interests and views of the Faculty concerning such matters, deliberates with appropriate access to institutional data, and works with the Administration to make recommendations that serve the best interests of the Institute.
(Amended by the Faculty, April 14, 2016; Amended by the Faculty, xxx)

Rationale:
The main purpose of expanding FAP's membership of Faculty members is to enable a more flexible and reasonable distribution of concurrent leadership roles that fall to the various FAP Faculty members. In addition to a Faculty member chairing FAP and attending other meetings as *ex officio* (Board of Trustees Budget and Finance, Administrative Policy Group, Annual Planning and Budget Process), FAP appoints one Faculty committee member to the Fringe Benefits Committee as the Chair – FBC, and another Faculty member to the Retirement Planning Committee – RPC. The remaining elected faculty member undertakes the role of the committee Secretary. Expanding the membership will allow for greater diversification of committee members and ensure sufficient membership to undertake additional committee responsibilities. The rationale for the additional sentence in the motion is that FAP agreed that it would be unfortunate if an untenured faculty member were expected to chair FAP.

Implementation:
If this motion is approved, the faculty will elect two new FAP members this year (2022) replacing one departing member, then two new FAP members next year, again replacing one departing member. At that point, FAP will have five elected members, and the Faculty will then elect the same number of new members each year as there are open seats due to departures from FAP. This would normally mean that there is a three-year cycle: elect two, elect two, elect one. This would mean that FAP would continue to have three elected members this year, then four elected members next year, and five elected members each year thereafter.

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Policy (Prof. Pavlov, Chair)
Re: Motion to give undergraduate students the option to receive Pass/NR grades in their courses during C-, D- and E-terms in 2022

Motion: The Committee on Academic Policy (CAP) recommends and I move that undergraduate students be given the option to receive a Pass/NR grades in their undergraduate or graduate courses taken in C-term, D-term, and E-term 2022, as described below.

<u>Description of the proposal</u>:
This motion ONLY applies to undergraduate students.

1. Students will have the option for one week after grades are posted to request that their grade for an individual course would be either P (Pass) or NR. This means grades of A/B/C would become P. Courses assigned a P grade will count towards degree requirements. After this deadline, students will neither be able to take advantage of this option nor reverse their decision.

2. The current "Grade/Change" process/paperwork shall disallow any attempt to have a faculty member change an existing grade to a P or to change a P grade to an A/B/C grade.

The policy adopts the following principles:

- The undergraduate student has the right to choose whether to be graded as "Pass/NR" or "A/B/C/NR" for any undergraduate or graduate course.
- The P grade has no known numeric equivalence. It means the student received at least a C grade.

<u>Rationale</u>:
In response to the COVID-19 pandemic, the March 26, 2020 joint COG/CAP motion introduced the P grade for D-term 2020. In the May 13, 2020 motion, that grading policy was extended for the summer 2020 courses. In response to the existing mental health crisis at WPI and upon the recommendation of the Mental Health & Well-Being Task Force (see its Report released on January 19, 2022), the current motion seeks to reintroduce the Pass/NR grading option for undergraduate students taking courses in C-term 2022, D-term 2022 and summer E-2022 terms.

Implementation: The registrar's office will provide a system for students to record their intentions and will announce to the campus when the system is ready to be used. This motion ONLY applies to undergraduate students completing a course in C-2022, D-2022 and Summer 2022 terms, which includes terms E1 (May 16th through June 30th) and E2 (July 11th through August 12th).

Appendix
Consent Agenda Motions

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to add MU 2640: African Drumming Ensemble

Motion: On behalf of the Department of Humanities and Arts, the Committee on Academic Operations recommends, and I move that *MU 2640: African Drumming Ensemble* as described below, be added as a Music Ensemble.

Proposed Course Description:
MU 2640: African Drumming Ensemble, Cat. I
The African Drumming Ensemble meets weekly and performs both on campus and at community venues. Students of all experience levels are welcome to join. Auditions are not required for this ensemble, nor is the ability to read music. Traditional West African percussion styles are the primary focus of the ensemble, but other styles of music are also part of the ensemble's repertory.

Recommended background: n/a

Anticipated Instructor: Jeremy Cohen

Rationale:
The African Drumming Ensemble has existed for over twenty years, previously functioning as an extra-curricular student activity under the title African Percussion and Dance Ensemble. Its rigorous yet inclusive approach has attracted students from a wide variety of backgrounds, musical and otherwise. The slight adjustment regarding the name of the ensemble is being made to reflect the content of the course, which no longer includes dance.

The purpose of this proposal is to validate the rigor and quality of the ensemble's work and create a way to keep a formal record of enrollment. Instituting the African Drumming Ensemble as a course, aligns it with comparable ensembles offered at WPI (such as MU2636 – Concert Band, MU2637 – Orchestra), providing visibility for the ensemble in the course catalog and on the transcripts of student participants.

This course would be applicable to any student at WPI.
Enrollment cap for this course will be 999 students, as is the cap for all other music ensembles. Expected enrollment for the course is 10 to 20 students.

Resource Needs: No new resources are required. The course will be held in Alden Hall. No laboratory or special information technology is required. No additional library support or resources are needed outside of standard required reading.

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

Implementation Date: Academic Year 2022-2023.

Contact: Prof. Scott Barton

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to add MU 2641: Percussion Ensemble

Motion: On behalf of the Department of Humanities and Arts, the Committee on Academic Operations recommends, and I move that *MU 2641: Percussion Ensemble* as described below, be added as a Music Ensemble.

Proposed Course Description:
MU 2641: Percussion Ensemble, Cat. I
The Percussion Ensemble is an audition-based, select ensemble. The Percussion Ensemble performs a wide stylistic range of music from opera overtures to twentieth century minimalist compositions, to Caribbean songs. The ensemble meets weekly and performs on campus during the school year. Students must know how to read music. Permission of the instructor is necessary to register.

Recommended background: n/a

Anticipated Instructor: Pieter Struyk

Rationale:
The Percussion Ensemble has existed for twenty years, previously functioning as an extra-curricular student activity. The purpose of this proposal is to validate the rigor and quality of the ensemble's work and create a way to keep a formal record of enrollment. Instituting the Percussion Ensemble as a course, aligns it with comparable audition-based ensembles in the choir, jazz, and orchestra programs (MU2638 - Chamber Choir, MU2634 - Jazz Ensemble, MU2639 – String Quartet). This course would be applicable to any percussionist at WPI.
Enrollment cap for this course will be 999 students, as is the cap for all other music ensembles. Expected enrollment for the course is 4 to 12 students.

Resource Needs: No new resources are required. The course will be held in Alden Hall. No laboratory or special information technology is required. No additional library support or resources are needed outside of standard required reading.

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

Implementation Date: Academic Year 2022-2023.

Contact: Prof. Scott Barton

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to add RE 3723 Religion, Gender & Sexuality

Motion: On behalf of the Department of Humanities and Arts, the Committee on Academic Operations recommends, and I move that *RE 3723 Religion, Gender & Sexuality* as described below, be added.

Proposed Course Description:
RE 3723. Religion, Gender & Sexuality. **Cat. II**
Patriarchal religious traditions are often characterized by masculine images of the Divine, cisgendered male religious authority, male-authored scriptures and a heteronormative gendered division of religious practices. As a result, men and cultural masculinity are differently valued than women and cultural femininity; this male-female binary leaves little room for practitioners who identify as nonbinary. In this discussion-focused course, we will engage representations of gender and sexuality in different traditions and their impact on larger social contexts from philosophical, theological and ethnographic perspectives. Among the questions we will explore: Why does the idea of a female or feminine YHWH, God or Allah bother us? Can feminine representations (such as the Devi, Shakti or Shekhinah) or nonbinary representations (such as two-spirit people in indigenous communities) facilitate gender equity? Do mystical traditions (such as the Zohar or Sufism) encourage gender fluidity? How do religions influence sexuality; how does sexuality intersect with creation myths and cosmogonies? Why is a Buddhist nun expected to bow to a Buddhist monk; why does the Catholic Church not recognize women, nonbinary and / or queer priests? This combination of theoretical and methodological conversations will offer students a forum in which to recast assumptions about individual and collective identity that permeate our cultural systems and structures.
Recommended background: None. Students cannot receive credit for both RE 3723 and 2019-2020 and 2020-2021 Sections of RE 3721.

Anticipated Instructors: Rebecca Moody, Adrien Stoloff

Rationale:
The questions we propose addressing in this seminar are central to the academic study of religion and are also increasingly central to WPI students' personal and intellectual identities. We have twice taught a version of this course under the designation RE 3721 (Topics in Religion) with positive student feedback and course evaluations. Because these questions are so central to both contexts, though, they cannot be relegated to a special topics class but should become a regular offering for those pursuing an HUA depth field or a minor in religion.

WPI students have also shown a strong and sustained interest in other courses with focused attention to gender and sexuality within the philosophy and religion unit, such as PY/RE 2716 (Gender, Race, and Class); RE 3723 would fit nicely alongside PY/RE 2716, both of which would count toward an HUA requirement and minor in PY/RE and GSWS (Gender, Sexuality & Women's Studies). RE 3723 will also align neatly with courses such as HU 1500 (Introduction to Gender,

Sexuality & Women's Studies), HU 2501 (STEMinism) and HU 2502 (Global Feminisms). Finally, a number of students annually complete ISUs with gender-specific content, complete their HUA requirement in GSWS and complete a GSWS minor. With all of this in mind, we would now like to give the course greater visibility by affording it its own course name and catalog description.

The intended audience for this course includes:
- Students with an interest in philosophy and religion,
- Students with an interest in gender, sexuality and women's studies,
- Students with an interest in international and global studies,
- Students completing the HUA Requirement in PY/RE, GSWS and / or Middle East and North Africa Studies and the China Hub,
- Students minoring in philosophy and religion, and
- Students minoring in Gender, Sexuality & Women's Studies.

In addition, this course is an important step toward providing an academic space for WPI's growing population of female, nonbinary, and minority students as well as broadening the educational offerings for other students.

Finally, this course supports WPI's commitment in its Strategic Plan to develop a "strong, inclusive community" and cultivates classroom experiences that practice and prioritize a "diversity of thought, culture, and perspective."

Resource Needs: No new resources are required. The department already has two full-time faculty with teaching and research interests appropriate for this course. Classroom needs are typical for HUA courses. No special information technology is required. Library resources are adequate to offer this introductory course. The expected enrollment is 20, and the course type is Discussion.

Impact on Distribution Requirements and Other Courses: No impact on existing distribution requirements.

Implementation Date: Academic year 2022-2023

Contact: Prof. Rebecca Moody

Addendum: Data from Course Evaluations for RE 3721 (Topics in Religion) when taught as Religion, Gender & Sexuality

A-term 2019
- Question 1: 4.7
- Question 2: 5
- Question 7: 4.6
- Question 19: 2.6

B-term 2020
- Question 1: 4.9
- Question 2: 5
- Question 7: 4.5
- Question 19: 2.9

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to change course number MU 2510 - Music in Time of Conflict to MU 3510

Motion: On behalf of the Department of Humanities and Arts, the Committee on Academic Operations recommends, and I move that the course number of *MU 2510 - Music in Time of Conflict* be changed to *MU 3510*.

Catalog description and course title will remain the same. The only change is the course number change.

Rationale:
Foundational music courses (e.g. MU 1611 - Fundamentals of Music) are offered at the 1000 and 2000 level. The existing courses named in this proposal address higher-level concepts that would be more accurately set with a 3000-level distinction. Specifically, the concepts in these courses involve aspects of music theory, history, aural skills, and cultural contexts that don't explicitly require students to take prerequisite courses, but students would most likely benefit from such a sequence. We seek to move these courses from 2000-level to 3000-level in order to better reflect these courses in the context of this sequence.

The 3000-level distinction inherently also limits the enrollment cap at 20 students instead of 50 like 2000-level courses. These courses don't traditionally reach this enrollment maximum, but, regardless: this cap reduction will strengthen these courses by ensuring that classes remain relatively small in size. Pedagogically, music courses that include an Aural Skills / Ear Training component (like these courses), necessitate a smaller class size to facilitate the nature of this unique practical instruction. Average class sizes at comparable institutions for courses like these are capped at 8-12 students.

Resource Needs: No new resources are needed.

Impact on Distribution Requirements and Other Courses: There will be no impact on distribution requirements or other courses.

Implementation Date: Academic year 2022-2023

Contact: Prof. Scott Barton

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to change course number MU 2730 - Jazz Theory to MU 3730

Motion: On behalf of the Department of Humanities and Arts, the Committee on Academic Operations recommends, and I move, that the course number of ***MU 2730 - Jazz Theory*** be changed to MU 3730.

Rationale:
Foundational music courses (e.g. MU 1611 - Fundamentals of Music) are offered at the 1000 and 2000 level. The existing courses named in this proposal address higher-level concepts that would be more accurately set with a 3000-level distinction. Specifically, the concepts in these courses involve aspects of music theory, history, aural skills, and cultural contexts that don't explicitly require students to take prerequisite courses, but students would most likely benefit from such a sequence. We seek to move these courses from 2000-level to 3000-level in order to better reflect these courses in the context of this sequence.

The 3000-level distinction inherently also limits the enrollment cap at 20 students instead of 50 like 2000-level courses. These courses don't traditionally reach this enrollment maximum, but, regardless: this cap reduction will strengthen these courses by ensuring that classes remain relatively small in size. Pedagogically, music courses that include an Aural Skills / Ear Training component (like these courses), necessitate a smaller class size to facilitate the nature of this unique practical instruction. Average class sizes at comparable institutions for courses like these are capped at 8-12 students.

Resource Needs: No new resources are needed.

Impact on Distribution Requirements and Other Courses: There will be no impact on distribution requirements or other courses.

Implementation Date: Academic year 2022-2023.

Contact: Prof. Scott Barton

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to remove PY/RE 2731 Suffering, Healing, Values

Motion: On behalf of the Department of Humanities and Arts, the Committee on Academic Operations recommends, and I move that PY/RE 2731: Suffering, Healing, Values be removed from the undergraduate catalog.

Current course description:
PY/RE 2731. Suffering, Healing, Values. Cat. II
This course examines medicine, not from a scientific or professional view, but from a specifically humanistic approach. Using essays, films, fiction, poetry and plays, we will aim to make explicit the moral values most deeply held by practitioners in the healing professions. What other kinds of values can get in the way of those most deeply held aims? What are the responsibilities of a medical professional in today's society? What are the sources of those responsibilities? The course will focus both on professional and personal dilemmas and will help students think through some moral problems that are likely to confront them in their professional and personal lives. The class should also help prepare students to navigate through the tough moral issues they are likely to face, either as a medical professional, a citizen, a parent, a child of parents, or as potentially a sick person themselves. This class proposes to grant students the reflective time to read some of the most eloquent authors on suffering, caretaking, and sickness (for example, Oliver Sacks, Jerome Groopman, Susan Sontag, Leo Tolstoy, Virginia Woolf, Tony Kushner, Tracy Kidder, Perri Klass, etc.) and to express their reflections on these resources in effective communication. Recommended Background: PY/RE 1731 or an introductory level literature course. This course will be offered in 2016-17, and in alternating years thereafter.

Rationale:
This course no longer fits the needs of the PY/RE curriculum, as its content is largely duplicated in PY 2713: Bioethics (Cat. II), HU 3900 (Cat. I) inquiry seminars offered in Bioethics and Medical Humanities, as well as recent HU course additions in the medical humanities, namely: HU 1222: Introduction to the Medical Humanities (Cat. II) and HU 2222: Topics in Medical Humanities (Cat. II).

Resource Needs: No changes to resource requirements

Impact on Distribution Requirements and Other Courses: In the 2022-23 UG catalog, this course should be deleted in lists of related or recommended courses for the HUA Major in Humanities Studies of Science and Technology (2020-21 Catalog, page 79) and the Minor in Global Public Health (2020-2021 Catalog, page 88).

Implementation Date: Academic Year 2022-2023

Contact: Prof. Joseph Cullon

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to add MA 4222 Top Algorithms in Applied Mathematics as a Data Science Program elective

Motion: On behalf of the Data Science Program, the Committee on Academic Operations recommends, and I move, that MA 4222 *Top Algorithms in Applied Mathematics* be added to the undergraduate catalog as a Data Science disciplinary elective course*.*

Description of Motion:
The Department of Mathematical Sciences (MA) has recently added the new course MA 4222 *Top Algorithms in Applied Mathematics.* To keep the Data Science undergraduate degree disciplinary electives in line with MA course offerings, we wish to mirror the MA course change in the description of the Data Science undergraduate program. The specific changes are:

- Page 66 column 2 adding "MA 4222 Top Algorithms in Applied Mathematics" to the Disciplinary Elective Courses in MA
- Page 67 bottom middle box adding "MA 4222" to the list of Mathematics Courses
- Page 68 adding "MA 4222" in flow-chart: Please replace page 68 flow chart with the updated flow chart (attached pptx).
- Page 69 column 2 adding "MA 4222 Top Algorithms in Applied Mathematics" in the list of Mathematical Sciences Courses

Rationale:
As the course MA 4222 *Top Algorithms in Applied Mathematics* is added in the MA course offering*,* the Data Science program has evaluated *MA 4222 Top Algorithms in Applied Mathematics* as an appropriate disciplinary elective for Data Science undergraduate students. We wish to update the undergraduate catalog to reflect this change.

Resource Needs: No additional resources would be required.

Impact on Distribution Requirements and Other Courses: The only impact will be a clarification of the disciplinary electives based upon current MA offerings.

Implementation Date: Academic year 2022-2023

Contact: Prof. Elke Rudensteiner

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to modify the distribution requirements for a Minor in Data Science

Motion: On behalf of the Data Science (DS) program, the Committee on Academic Operations recommends, and I move that requirements for the the DS Minor be modified as described below.

Description of the Motion:
Current requirements for the Minor in Data Science:

The **Minor in Data Science** will consist of 2 units, all of which must be selected from the list of approved Data Science major courses. These 2 units must be selected to include the following:

- Three courses, one from each of the three areas (Business, Computer Science, Mathematical Sciences) at the 2000 level or above from the list of disciplinary courses approved for the Data Science major.
- At least two courses out of the DS series DS 1010, DS 2010, and DS 3010.
- At least one course at the 3000 level or above selected from the list of disciplinary courses approved for the Data Science major.

The Minor in Data Science is open to all undergraduate majors at WPI. Students majoring in Business, Computer Science, or Mathematical Sciences should consult WPI rules on minors for double-counting courses.

Proposed requirements for the Minor in Data Science:

The **Minor in Data Science** will consist of 2 units, all of which must be selected from the list of approved Data Science major courses. These 2 units must be selected to include the following:

- Three courses, one from each of the three areas (Business, Computer Science, Mathematical Sciences) from the list of disciplinary courses approved for the Data Science major.
- At least two courses out of the DS series DS 1010, DS 2010, and DS 3010.
- At least one course at the 3000 level or above selected from the list of disciplinary courses approved for the Data Science major.
- At most one course across all requirements may be taken at the 1000-level.

The Minor in Data Science is open to all undergraduate majors at WPI. Students majoring in Business, Computer Science, or Mathematical Sciences should consult WPI rules on minors for double-counting courses.

Rationale:
The current version restricted students to only have the option of taking DS 1010. This motion gives students flexibility for taking either DS 1010 or another 1000 level course.

Resource Needs: No additional resources are needed beyond what is needed to offer the DS minor.

Impact on Distribution Requirements: Change to DS minor requirements described above.

Implementation Date: Academic Year 2022-2023

Contact: Prof. Elke Rudensteiner

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to modify the course description of CE 4060: Environmental Engineering Laboratory

Motion: On behalf of Civil, Environmental, and Architectural Engineering Department, the Committee on Academic Operations recommends, and I move that the course description for CE 4060 Environmental Engineering Laboratory be modified as described below.

Description of Proposed Changes:
Current course description:
CE 4060. Environmental Engineering Laboratory. Cat. I
This course familiarizes students with the laboratory studies used to obtain the design parameters for water and wastewater treatment systems. The topics include laboratory experiments dealing with physical, chemical, and biological treatment systems. Recommended background: CE 3060 and CE 3061.

Proposed course description:
CE 4060. Environmental Engineering Laboratory. Cat. I
In this course, students learn how to perform analytical methods and conduct laboratory experiments relevant to natural and engineered treatment systems in environmental engineering. Topics in water, wastewater, air, and environmental health are included. The course focuses on data acquisition, analysis, and interpretation as well as technical report writing. Recommended background: CE 3059, CE 3060, and CE 3061.

Rationale:
We propose these revisions to satisfy ABET requirements, expand topic coverage in the course, more accurately reflect course content, and more accurately reflect background recommendations. In the most recent ABET review of the Environmental Engineering program, strength of compliance was noted as lacking with regard to "hands-on laboratory experimentation, and analysis and interpretation of the resulting data in more than one major environmental engineering focus area, e.g., air, water, land, environmental health." To resolve this issue, the Environmental Engineering program revised the content of CE 4060 to include experimentation in the "air" focus area. Additionally, the description of this course had not been updated in many years, and was outdated (referring exclusively to design parameters and treatment systems, when the class more broadly includes natural environmental systems as well). Lastly, the recommended background was updated to include CE 3059, which covers air quality topics relevant to the newly introduced laboratory experiment.

Resource Needs: No new resources are required.

Impact on Distribution Requirements: No impact

Implementation Date: Academic year 2022-2023

Contact: Prof. Jeanine D. Dudle

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to modify the course description of RBE 3001 Unified Robotics III

Motion: On behalf of Robotics Engineering Department, the Committee on Academic Operations recommends, and I move that the description for *RBE 3001 Unified Robotics III* be modified as described below.

Description of Proposed Changes:
Current course description:
RBE 3001. Unified Robotics III. Cat. I
Third of a four-course sequence introducing foundational theory and practice of robotics engineering from the fields of computer science, electrical engineering and mechanical engineering. The focus of this course is actuator design, embedded computing and complex response processes. Concepts of dynamic response as relates to vibration and motion planning will be presented. The principles of operation and interface methods various actuators will be discussed, including pneumatic, magnetic, piezoelectric, linear, stepper, etc. Complex feedback mechanisms will be implemented using software executing in an embedded system. The necessary concepts for real-time processor programming, re-entrant code and interrupt signaling will be introduced. Laboratory sessions will culminate in the construction of a multi-module robotic system that exemplifies methods introduced during this course.
Recommended background: RBE 2002, ECE 2049, CS 2102 or CS 2103, MA 2051, and MA 2071.

Proposed course description:
RBE 3001. Unified Robotics III. Cat. I
This is the third of a four-course sequence introducing foundational theory and practice of Robotics Engineering. The focus of this course is on analysis & control of robotic arms, robotic manipulation, and integration of complex robotic systems, i.e., the coordinated motion of multiple actuators to execute complex manipulation tasks in the physical space. Concepts of transformations along with position and velocity kinematics will be presented, and fundamental concepts of trajectory planning, robot forces and dynamics, computer vision, and control will be introduced. Theoretical methods learned in the classroom will be applied during practical laboratory sessions, which will culminate in the construction and programming of a vision-guided, multi degree of freedom robotic manipulator.
Recommended background: RBE 2002, ECE 2049, CS 2102, MA 2051, MA 2071, Experience implementing algorithms using C/C++, Java, Python, MATLAB or other programming/scripting languages.

Rationale:
RBE 3001 is the third of a sequence of four foundational undergraduate courses in robotics – the other three courses in the sequence are RBE 2001, Unified Robotics I: Actuation, RBE 2002, Unified Robotics II: Sensing, and RBE 3002, Unified Robotics IV: Navigation. The course description of RBE 3001 contained in the undergraduate catalog was written several years ago

and it is now outdated. This motion seeks to re-align catalog description of the course with its actual content, which was established by the RBE faculty through a recent course redesign.

Resources needs: No additional resources are required.

Impact on Distribution Requirements: None

Implementation Date: Academic Year 2022-2023

Contact: Prof. Jing Xiao

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to modify the Business requirements for the Actuarial Mathematics major

Motion: On behalf of the Department of Mathematical Sciences, the Committee on Academic Operations recommends, and I move that the Business requirements for the Bachelor of Science degree in Actuarial Mathematics be modified as described below.

Description of Proposed Changes:
Current Note 7 (under the distribution requirements for the Actuarial Mathematics Major):
"Business courses must be chosen from courses with any of the following prefixes: ACC, BUS, or FIN. BUS 2060, BUS 2070, and FIN 3300 are recommended."

Proposed Note 7 (under the distribution requirements for the Actuarial Mathematics Major):
"Business school courses must be chosen from courses with any of the following prefixes: ACC, BUS, or FIN. BUS 2060, BUS 2070, and FIN 3300 are recommended. Business school courses may not include FIN 1250."

Rationale:
This motion will eliminate a 1000-level finance course, and align the Actuarial Mathematics requirements with the Mathematics requirements with respect to business school courses (FIN 1250 was already listed as not meeting the requirement for a business course for Mathematics majors).

Resource Needs: No new resources are required.

Impact on Distribution Requirements: Described in the change of Note 7.

Implementation Date: Academic Year 2022-2023.

Contact: Prof. Sarah Olson

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to modify the CS requirements for the Actuarial Mathematics and Mathematical Science majors

Motion: On behalf of the Department of Mathematical Sciences, the Committee on Academic Operations recommends, and I move that the Compute Science requirements for the Bachelor of Science degree in Actuarial Mathematics and the Bachelor of Science degree in Mathematical Science be modified as described below.

Description of Proposed Changes:
We propose changing the Actuarial Mathematics requirement indicating "Computer Science, 2/3 units", as described in the Undergraduate Catalog section outlining "Program Distribution Requirements for the Actuarial Mathematics Major", to "Computer Science or Data Science, 2/3 units" and that a Note be added to indicate "Computer Science and Data Science courses can contain only one of DS 1010, CS 2022 and CS 3043".

We propose changing the Mathematical Sciences requirement indicating "Computer Science, 2/3 units", as described in the Undergraduate Catalog section outlining "Program Distribution Requirements for the Mathematical Sciences Major", to "Computer Science or Data Science, 2/3 units" and that a Note be added to indicate "Computer Science and Data Science courses can contain only one of DS 1010, CS 2022 and CS 3043".

Rationale:
Data science is an important, growing field, and our students will encounter it as they begin their working careers. Accordingly, the Department of Mathematical Sciences wishes to provide students with additional flexibility in meeting their computational requirement.

Resource Needs: No new resources are required.

Impact on Distribution Requirements: Described in the Description of Proposed Changes

Implementation Date: Academic Year 2022-2023

Contact: Prof. Sarah Olson

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to revise Aerospace Engineering course numbers and titles

<u>**Motion:**</u> On behalf of the Aerospace Engineering Department, the Committee on Academic Operations recommends, and I move that the Aerospace Engineering course numbers, course titles and recommended course backgrounds be modified, as described below.

<u>**Description of Proposed Changes:**</u>
Fluid Dynamics
Current course number and title: AE 3602 Incompressible Fluid Dynamics
Proposed course number and title: AE 2110 Introduction to Incompressible Fluid Dynamics
Add: Students may not receive credit for both AE 2110 and AE 3602.

Current course number and title: AE 3410 Compressible Fluid Dynamics
Proposed course number and title: AE 3110 Fundamentals of Compressible Fluid Dynamics
Add: Students may not receive credit for both AE 3110 and AE 3410.
In Recommended Background, **replace** AE 3602 with AE 2110

Current course number and title: AE 3711 Aerodynamics
Proposed course number and title: AE 3120 Fundamentals of Aerodynamics
Add: Students may not receive credit for both AE 3120 and AE 3711.
In Recommended Background, **replace** AE 3602 and AE 3410 with AE 2110 and AE 3110.

Propulsion and Energy
Current course number and title: AE 4711 Fundamentals of Air-breathing Propulsion
Proposed course number and title: AE 4210 Fundamentals of Air-Breathing Propulsion
Add: Students may not receive credit for both AE 4210 and either AE 4710 or AE 4711.
In Recommended Background, **replace** AE 3410 with AE 3110.

Current course number and title: AE 4719: Rocket Propulsion
Proposed course number and title: AE 4220 Fundamentals of Rocket Propulsion
Add: Students may not receive credit for both AE 4220 and AE 4719.
In Recommended Background, **replace** AE 3410 with AE 3110

Flight Dynamics and Control
Current course number and title: AE 3713 Introduction to Aerospace Control Systems
Proposed course number and title: AE 2310 Introduction to Aerospace Control Systems
Add: Students may not receive credit for both AE 2310 and either AE/ME 3703 or AE 3713.

Current course number and title: AE 2713 Astronautics
Proposed course number and title: AE 2320 Introduction to Orbital Mechanics
Add: Students may not receive credit for both AE 2320 and AE 2713.

Current course number and title: AE 4733 Guidance, Navigation, and Communication
Proposed course number and title: AE 3310 Fundamentals of Navigation and Communication
Add: Students may not receive credit for both AE 3310 and AE 4733.
In Recommended Background, **replace** AE 3713 with AE 2310.

Current course number and title: AE 4723 Aircraft Dynamics and Control
Proposed course number and title: AE 4310 Fundamentals of Aircraft Dynamics and Control
Add: Students may not receive credit for both AE 4310 and AE 4723.
In Recommended Background, replace AE 3713 with AE 2310

Current course number and title: AE 4713 Spacecraft Dynamics and Control
Proposed course number and title: AE 4320 Fundamentals of Spacecraft Dynamics and Control
Add: Students may not receive credit for both AE 4320 and AE 4713.
In Recommended Background, **replace** AE 2713 with AE 2320, and **replace** AE 3713 with AE 2310.

Materials and Structures
Current course number and title: AE 2712 Introduction to Aerospace Structures
Proposed course number and title: AE 2410 Introduction to Aerospace Structures
Add: Students may not receive credit for both AE 2410 and AE 2712.

Current course number and title: AE 3712 Aerospace Structures
Proposed course number and title: AE 3420 Fundamentals of Aerospace Structures
Add: Students may not receive credit for both AE 3420 and AE 3712.
In Recommended Background, **replace** AE 2712 with AE 2410

Current course number and title: AE 4717 Fundamental of Composites
Proposed course number and title: AE 3430 Fundamentals of Composite Materials
Add: Students may not receive credit for both AE 3430 and AE 4717.
In Recommended Background, **replace** AE 2712 with AE 2410

Current course number and title: AE 4712 Structural Dynamics
Proposed course number and title: AE 4410 Fundamentals of Structural Dynamics
Add: Students may not receive credit for both AE 4410 and AE 4712.
In Recommended Background, **replace** AE 3713 with AE 2310, replace AE 3712 with AE 3420

Aerospace Design
Current course number and title: AE 4770 Aircraft Design
Proposed course number and title: AE 4510 Aircraft Design
Add: Students may not receive credit for both AE 4510 and AE 4770.
In Recommended Background, **replace** AE 3711 with AE 3120, **replace** AE 3712 with AE 3420, **replace** AE 4711 with AE 4210, **replace** AE 4723 with AE 4310

Current course number and title: AE 4771 Spacecraft and Mission Design
Proposed course number and title: AE 4520 Spacecraft and Mission Design
Add: Students may not receive credit for both AE 4520 and AE 4771.
In Recommended Background, **replace** AE 2713 with AE 2320, **replace** AE 4713 with AE 4320, **replace** AE 4733 with AE 3310, **replace** AE 3712 with AE 3420, **replace** AE 4719 with AE 4220

Rationale:

This motion does not introduce new courses but changes existing course numbers and titles as follows:

EXISTING NUMBER and NAME	NEW NUMBER and NAME
Fluid Dynamics	
AE 3602 Incompressible Fluid Dynamics	AE 2110 Introduction to Incompressible Fluid Dynamics
AE 3410 Compressible Fluid Dynamics	AE 3110 Fundamentals of Compressible Fluid Dynamics
AE 3711 Aerodynamics	AE 3120 Fundamentals of Aerodynamics
Propulsion and Energy	
AE 4711 Fundamentals of Air-breathing Propulsion	AE 4210 Fundamentals of Air-breathing Propulsion
AE 4719 Rocket Propulsion	AE 4220 Fundamentals of Rocket Propulsion
Flight Dynamics and Control	
AE 2713 Astronautics	AE 2320 Introduction to Orbital Mechanics
AE 3713 Introduction to Aerospace Control Systems	AE 2310 Introduction to Aerospace Control Systems
AE 4733 Guidance, Navigation, and Communication	AE 3310 Fundamentals of Navigation and Communication
AE 4723 Aircraft Dynamics and Control	AE 4310 Fundamentals of Aircraft Dynamics and Control
AE 4713 Spacecraft Dynamics and Control	AE 4320 Fundamentals of Spacecraft Dynamics and Control
Materials and Structures	
AE 2712 Introduction to Aerospace Structures	AE 2410 Introduction to Aerospace Structures
AE 3712 Aerospace Structures	AE 3420 Fundamentals of Aerospace Structures
AE 4717 Fundamental of Composites	AE 3430 Fundamentals of Composite Materials
AE 4712 Structural Dynamics	AE 4410 Fundamentals of Structural Dynamics
Aerospace Design	
AE 4770 Aircraft Design	AE 4510 Aircraft Design
AE 4771 Spacecraft and Mission Design	AE 4520 Spacecraft and Mission Design

Current course names and numbers have been inherited from the years when Aerospace Engineering was a program within the Mechanical Engineering (ME) Department. The new name and numbers make it easy for a student to ascertain the area and level of the course. For example, "Introduction" is reserved for 2000-level courses, "Fundamentals of" is reserved for 3000- and 4000-level courses. The first digit of the new course numbers reflects the approximate level at which the course has been historically offered. The second digit of the new number designates one of the five curricular areas of courses within the Aerospace Engineering Department (AED): (1) Fluid Dynamics; (2) Propulsion and Energy; (3) Flight Dynamics and Controls; (4) Materials and Structures; (5) Aerospace Design (0) General Engineering Topics. These curricular areas are consistent for both the undergraduate and graduate AE programs. The new numbers will help students move through the undergraduate program and into the graduate program in a seamless way. There are no revisions being made to the course descriptions from the current ones. The renumbering leads to seven 4000-level, five 3000-level, and four 2000-level AE courses.

Resource Needs: No additional resources are needed because there is no net increase in the number of courses taught by AE faculty.

Impact on Degree Requirements: The revised distribution requirements are addressed in the motion that follows this one.

Implementation Date: Academic Year 2022-2023

Contact: Prof. Nikolaos Gatsonis

Date: February 17, 2022
To: WPI Faculty
From: Committee on Academic Operations (Prof. Titova, Chair)
Re: Motion to revise the Aerospace Engineering Major distribution requirements to reflect changes in course numbers and titles

Motion: On behalf of the Aerospace Engineering Department, the Committee on Academic Operations recommends, and I move, that the sections of the undergraduate catalog listing the program distribution requirements for the Aerospace Engineering Major be modified as follows:

Current requirements for the Major in Aerospace Engineering:

Requirements	Minimum Units
1. Mathematics and Basic Sciences (Notes 1,2,3,4)	10/3
2. Engineering Topics (Notes 5, 7)	16/3
3. Major Engineering Design Experience (Including MQP) (Note 6)	4/3

NOTES:

1. Must include a minimum of 6/3 units of mathematics (prefix MA) with topics in: differential, integral, vector, multivariable calculus, differential equations, and linear algebra.
2. Must include a minimum of 2/3 units in physics (prefix PH) with topics in: mechanics, electricity and magnetism.
3. Must include 1/3 units in space environments (fulfilled by PH/AE 2550 Atmospheric and Space Environments as a Math and Basic Science course or other equivalent course with approval of the AE Program Undergraduate Committee).
4. Must include 1/3 unit in chemistry (prefix CH).
5. Must include 16/3 units of Engineering Topics, distributed as follows:
   1. 14/3 units of Aeronautical Engineering
      1. 2/3 units of Aerodynamics, with topics in: compressible fluid dynamics, subsonic and supersonic aerodynamics.
      2. 2/3 units of Aerospace Materials, with topics in: introductory materials science, and advanced materials.
      3. 3/3 units of Structures, with topics in: stress analysis, aerospace structures, and structural dynamics.
      4. 3/3 units of Propulsion, with topics in: thermodynamics, incompressible fluid dynamics, and air breathing propulsion.
      5. 3/3 units of Flight Mechanics, and Stability and Control, with topics in: dynamics, control theory, and aircraft dynamics and control.
      6. 1/3 unit of Experimentation.
   2. 2/3 units in Astronautical Engineering
      1. 1/3 unit of Orbital Mechanics (fulfilled by AE 2713 Astronautics)
      2. 1/3 unit of Telecommunications (fulfilled by AE 4733 Guidance, Navigation and Communication).

6.   Must include 4/3 Units of Major Engineering Design Experience devising an aerospace system, component, or process to meet desired needs that incorporates appropriate engineering standards and multiple constraints, is based on the knowledge and skills acquired in earlier course work, and includes integration of aeronautical or astronautical topics (fulfilled by 1/3 Unit in AE 4770 Aircraft Design and 3/3 Units in MQP).
 or
7.   Must include 16/3 units of Engineering Topics, distributed as follows:
  1. 4/3 units of Astronautical Engineering
        1. 2/3 units of Orbital Mechanics, with topics in: dynamics and space flight mechanics.
        2. 2/3 units of Attitude Determination and Control, with topics in: control theory, and spacecraft dynamics and controls.
        3. 1/3 units of Telecommunications, with topics in: guidance, navigation and communication.
        4. 4/3 units of Space Structures, with topics in: introductory material science, stress analysis, aerospace structures, and structural dynamics
        5. 4/3 units of Rocket Propulsion, with topics in: thermodynamics, incompressible fluid dynamics, compressible fluid dynamics, and rocket propulsion.
        6. 1/3 units of Experimentation
  2. 2/3 units in Aeronautical Engineering
        1. 1/3 units of Aerodynamics (fulfilled by AE 3711 Aerodynamics).
        2. 1/3 units of Flight Mechanics, and Stability and Control (fulfilled by AE 4723 Aircraft Dynamics and Control).
8.   Must include 4/3 units of Major Engineering Design experience devising an aerospace system, component, or process to meet desired needs that incorporates appropriate engineering standards and multiple constraints, is based on the knowledge and skills acquired in earlier course work, and includes integration of aeronautical or astronautical topics (fulfilled by 1/3 Unit in 4771 Spacecraft and Mission Design and 3/3/ Units in the MQP).
9.   Great Problem Seminar (GPS) courses can only be used to fulfill the HUA, SSPS or the Free Elective requirement.

Proposed requirements for the Major in Aerospace Engineering:

Requirements	Minimum Units
1. Mathematics and Basic Sciences (Notes 1,2,3,4)	10/3
2. Engineering Topics (Note 5)	20/3

NOTES:
1.   Must include a minimum of 6/3 units of mathematics (prefix MA) with topics in: differential, integral, vector, multivariable calculus, differential equations, and linear algebra.
2.   Must include a minimum of 2/3 units in physics (prefix PH) with topics in: mechanics, electricity and magnetism.

3.   Must include 1/3 unit in space environments (fulfilled by PH/AE 2550 Atmospheric and Space Environments as a Math and Basic Science course or other equivalent course with approval of the AE Program Undergraduate Committee).

4.   Must include 1/3 unit in chemistry (prefix CH).

5.   Must include 20/3 units of Engineering Topics, distributed as follows:

   11/3 Units in Core Aerospace Engineering
   1. 2/3 units of Fluid Dynamics, with topics in: incompressible fluid dynamics; compressible fluid dynamics.
   2. 2/3 units in Propulsion and Energy, with topics in thermodynamics; heat transfer.
   3. 4/3 units in Materials and Structures, with topics in: materials; aerospace structures; structural dynamics.
   4. 2/3 units in Flight Dynamics and Controls, with topics in: dynamics; controls; aircraft dynamics and control.
   5. 1/3 unit in General Engineering, with topics in: Experimentation.

   9/3 units from either the Aeronautics Track or the Astronautics Track
   Aeronautics Track
   1. 1/3 unit in Fluid Dynamics with topics in: aerodynamics
   2. 1/3 unit in Propulsion and Energy, with topics in: air breathing propulsion.
   3. 1/3 unit in Materials and Structures, with topics in: composites.
   4. 1/3 unit in Flight Dynamics and Controls, with topics in: aircraft dynamics and control.
   5. 4/3 units in Aerospace Design: with topics in aircraft design; and MQP
   6. 1/3 unit in Astronautics Elective, with topics in: orbital mechanics or rocket propulsion or spacecraft dynamics and control

   Astronautics Track
   1. 1/3 unit in Propulsion and Energy, with topics in: rocket propulsion.
   2. 3/3 units in Dynamics and Control, with topics in: orbital mechanics; spacecraft dynamics and control; navigation and communication.
   3. 4/3 units in Aerospace Design: with topics in spacecraft and mission design; and MQP.
   4. 1/3 unit in Aeronautics Elective, with topics in: aerodynamics or air breathing propulsion or composite materials.

6. Great Problem Seminar (GPS) courses can only be used to fulfill the HUA, SSPS or the Free Elective requirement.

A program chart with courses that meet the AE distribution requirements is as follows:

AEROSPACE ENGINEERING PROGRAM CHART

Core Aerospace Engineering (11/3 units)

FLUID DYNAMICS (2/3 units)

AE 2110 Introduction to Incompressible Fluid Dynamics
AE 3110 Fundamentals of Compressible Fluid Dynamics

PROPULSION AND ENERGY (2/3 units)

ES 3001 Introduction to Thermodynamics
ES 3003 Heat Transfer

MATERIALS AND STRUCTURES (4/3 units)

ES 2001 Introduction to Materials Science
AE 2410 Introduction to Aerospace Structures
AE 3420 Fundamentals of Aerospace Structures
AE 4410 Fundamentals of Structural Dynamics

FLIGHT DYNAMICS AND CONTROLS (2/3 units)

ES 2503 Introduction to Dynamic Systems
AE 2310 Introduction to Control of Aerospace Systems

GENERAL ENGINEERING (1/3 units)

ME 3901 or ME 3902

Aeronautics Track (9/3 units)

FLUID DYNAMICS (1/3 unit)

AE 3120 Fundamentals of Aerodynamics

PROPULSION AND ENERGY (1/3 unit)

AE 4210 Fundamentals of Air-breathing Propulsion

MATERIALS AND STRUCTURES (1/3 unit)

AE 3420 Fundamentals of Composite Materials

FLIGHT DYNAMICS AND CONTROLS (1/3 units)

AE 4310 Fundamentals of Aircraft Dynamics and Control

AEROSPACE DESIGN (4/3 units)

AE 4510 Aircraft Design
MQP

ASTRONAUTICS ELECTIVE (1/3 units)

AE 4220 Fundamentals of Rocket Propulsion; or
AE 2320 Introduction to Orbital Mechanics; or
AE 3310 Fundamentals of Navigation and Communication; or
AE 4320 Fundamentals of Spacecraft Dynamics and Control

Astronautics Track (9/3 units)

PROPULSION AND ENERGY (1/3 unit)
AE 4220 Fundamentals of Rocket Propulsion

FLIGHT DYNAMICS and CONTROLS (3/3 units)
AE 2320 Introduction to Orbital Mechanics
AE 3310 Fundamentals of Navigation and Communication
AE 4320 Fundamentals of Spacecraft Dynamics and Control

AEROSPACE DESIGN (4/3 units)
AE 4520 Spacecraft and Mission Design
MQP

AERONAUTICS ELECTIVE (1/3 unit)
AE 3120 Fundamentals of Aerodynamics or AE 4210 Fundamentals of Air-breathing Propulsion or AE 3420 Fundamentals of Composite Materials or AE 4310 Fundamentals of Aircraft Dynamics and Control

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Rationale:

The revised distribution requirements are consistent with the new course numbers and titles approved in Motion 1. They also organize courses into six thematic curricular areas. This organization makes the program easier to navigate by identifying core courses required by both tracks as well as courses specific to one of the two tracks. These requirements improve flexibility by allowing students to choose an elective from a list of three courses from the track not pursued. This organization is based on curricular areas used by the graduate program, easing the transition for students pursuing the BS/MS program. Each track requires three 4000-level courses and several 4000-level courses as electives, making the BS/MS program easily accessible. Finally, the new requirements more clearly address the ABET criteria.

Resource Needs: No additional resources are needed because there is no net increase in the number of courses taught by AE faculty.

Impact on Degree Requirements: There is no increase on credits required. Proposed revised distribution requirements are described in the changes described above.

Implementation Date: Academic Year 2022-2023

Contact: Prof. Nikolaos Gatsonis