WORCESTER POLYTECHNIC INSTITUTE
December 16, 2016

To: The WPI Faculty

From: Mark Richman
Secretary of the Faculty

The fourth Faculty meeting of the 2016-2017 academic year will be held on **Friday**, **December 16, 2016** at 10:00 am in **Olin Hall 107**, with refreshments at 9:45**.**

1. Call to Order — M. Richman
   - Approval of the Agenda
   - Consideration of the Consent Agenda (including Minutes from 11-17-16)
2. Opening Announcements — M. Richman
3. President's Remarks — L. Leshin
4. Provost's Remarks — B. Bursten
5. Committee Report (for Open Discussion)

   Committee on Governance (COG) — T. Dominko
   - Motion to revise the Faculty Handbook Description of the Committee on Appointments and Promotions
6. Special Report (for Open Discussion)

   Vice Provost for Research — B. Vernescu
   - Faculty Input on Revisions to WPI's Conflict of Interest Policy
7. Old Business
8. New Business
9. Closing Announcements
10. Adjourn

TABLE OF CONTENTS
Faculty Meeting Materials, December 16, 2016

WORCESTER POLYTECHNIC INSTITUTE
Faculty Meeting Minutes
November 17, 2016

Summary:

1. Call to Order
2. Opening Announcements
3. President's Remarks
4. Provost's Remarks
5. Committee Business: CAP
6. Adjournment

Detail:

1. Call to Order

The third meeting of the 2016-2017 academic year was called to order at 3:20pm in OH 107 by **Prof. Richman** (ME). Prof. Richman briefly described the factors that need to be considered when setting the agendas for Faculty meetings and hoped that faculty members would respect the difficult choices that sometimes have to be made when doing so. The agenda for the meeting, the consent agenda (including the minutes from October 14, 2016 - with one minor change) were approved as distributed.

2. Opening Announcements

Prof. Richman explained that WPI would participate again in the COACHE (Collaborative on Academic Careers in Higher Education) survey. Either he or Dean Heinricher (or both) will send emails beginning in January 2017 urging faculty members to respond to the survey in a time period from February 2017 through April 2017. He emphasized that the survey has already been helpful in teaching us important lessons about our own Instutution.

Mr. Peter Thomas (Exec. Dir., Lifetime Engagement, Univ. Adv.) thanked the WPI Faculty for their support of WPI's advancement efforts. Mr. Thomas announced the Fall 2017 inception of the WPI Hall of Fame to recognize individuals (not limited to alumni) who are at the pinnacle of their careers and/or have done exemplary service to the WPI community. Individuals can be posthumously granted induction. Mr. Thomas encouraged nominations for this honor (the link is here: Link to Nominating Form) from all members of the WPI Community.

3. President's Remarks

President Leshin expressed her concern and appreciation for faculty members who she realizes are on the front line in dealing with students' stress after an intense period following the Presidential election. She thanked the faculty for its leadership during this period of high emotion. She encouraged faculty members to reach out to Department Heads, Deans, or anyone in the Administration to access campus resources that might help in navigating through this period. Finally, the President emphasized WPI's solid footing and wished all a happy and peaceful Thanksgiving.

4. Provost's Remarks

Provost Bursten recognized **Prof. Wills** (CS), who introduced new faculty member Prof. Carlo Pinciroli (CS).

Provost Bursten reported on the Trustees' November Academic Planning Committee (APC) meeting, which was highlighted by an enlightening panel discussion on WPI's promotion process. The panelists were Profs. DiBiasio (ChE), Weekes (MA), Wobbe (CBC), and Zeng (BUS); it was moderated by Prof. Dougherty (CS). The Provost also reported to the APC on work being done by Profs. Gaudette and Abel to incorporate innovation and entrepreneurship throughout the curriculum.

Provost Bursten announced the Dean of Arts & Sciences Search Committee members: Profs. Boudreau (HUA), Scarlata (CBC) and Weekes (MA) were elected by the Faculty; Dean Soboyejo and VP Tichenor were appointed by the President; Prof. Korkin (CS) was appointed by the Provost; and Prof. Tuzel (PH) was appointed by COG. The selection of a search firm is underway and the search will commence soon.

Provost Bursten encouraged the faculty to stay positive, to not lose sight of the importance of WPI's mission, and to enjoy the Thanksgiving break.

5. Committee Business

CAP

Prof. Doyle (SSPS), for the Committee on Academic Policy, moved that the following (general) statement be added to the undergraduate catalog:

> ***UNDERGRADUATE INDEPENDENT STUDY (ISU)***
> *Independent Study normally provides the opportunity for an individual student, with the approval and under the direction of a faculty member, to study and to explore in greater depth an area of particular interest to the student and faculty member. An independent study may be used as a substitute for an existing WPI course, as an opportunity to study a topic not currently offered as a course at WPI, or to conduct directed undergraduate research.*

Prof. Doyle explained that there is currently no policy in the undergraduate catalog defining an independent study or designating who can advise independent studies and what credit may be earned from them. He characterized our current practice as extremely lenient when compared to policies at other institutions. Typically a written proposal for the independent study must be submitted to and approved by the Department Head.

Prof. Hakim (ECE) pointed out that the original WPI Plan left room for innovation through the MQP, the IQP and the ISP. All were ~~projects~~ academic activities (designated by the "P") in which faculty advisors and students were trusted to be creative. He pointed out that independent studies need not involve just one student and just one faculty member. Furthermore, he objected to defining "normal" independent studies in the motion. Prof. Doyle responded that currently 90 percent of ISPs are not project activities.

Prof. Addison (HUA) thought that the one-on-one or small group nature of the independent study activity described in the motion would invariably be more of a project experience than a course. So the project nature of the independent study should be retained. Prof. Doyle did not think that the motion precluded offering project-based independent studies.

Prof. Ciaraldi (CS) thought the wording of the motion should be expanded beyond activities "for an individual student**"**. **Prof. Doyle** accepted a friendly amendment from **Prof. Rich** (CS) to delete the word "normally" and to expand "an individual student" to "an individual student or group of students".

Prof. Rich (CS) wanted to know who certifies the course equivalency of the independent study, and where that information is recorded. **Prof. Doyle** indicated that it is currently judged and signed only by the faculty advisor of the ISP and the information is recorded in the Registrar's Office.

Prof. Pins' (BME) motion to call the question did not pass.

Prof. Iannacchione (PH) explained that in his view the issue is whether or not the ISP counts toward disciplinary credit, and that determination would be made by department's undergraduate curriculum committee rather than the registrar.

Prof. Roberts (CHE) asked if a statement should be inserted to clarify when an independent study would fulfill a degree requirement. **Prof. Doyle** thought that further clarification was not needed.

Prof. Hakim (ECE) wanted the motion to be expanded to include the possibility that an independent study could be advised by more than just one faculty member, and he did not believe it was necessary to change the "ISP" designation to "ISU."

Prof. Martin (MA) agreed with Prof. Roberts and suggested that a sentence be added indicating that the independent study could satisfy a degree requirement with the approval of the advisor or the advisor and Department Head.

Prof. Addison (HUA) repeated his point that by its nature the independent study will be a project activity crafted by the faculty member(s) and student(s) involved, and its uniqueness is something we should want to celebrate. It is different than a class – in which there are lectures and exams. **Prof. Doyle** stated his view that a project is devoted to solving a problem whereas as course is a setting in which to learn a subject.

Prof. Demetry (ME) thought that the current wording of the motion leaves open a wide variety of models for an independent study ranging from coursework to project activities.

Prof. Skorinko (SSPS) didn't think that any flexibility would be lost by referring to the activities simply as independent studies because "studies" themselves may refer to projects.

Prof. Iannacchione (PH) thought that the scale of the problem was not large enough to warrant changing the 40-year old IS/P designation. **Prof. Doyle** explained that with this motion, CAP is trying to place a description in the catalog that matches what is actually happening in our independent study offerings.

Prof. Hakim (ECE) stated that the ~~"/" in IS/P gave faculty members the opportunity to innovate~~ "/P" implied that faculty members are given wide latitude to offer innovative academic experiences for students. **Prof. Doyle** indicated that the "/" in IS/P meant "and" so that independent study was different than a project.

Prof. Rich (CS) made a friendly amendment to change "under the direction of a faculty member" to "under the direction of one or more faculty advisors". The friendly amendment was accepted by Prof. Doyle.

Prof. Gericke (CBC) asked if it was clear that requests from students for independent studies can be denied by faculty members. **Prof. Doyle** pointed out that the proposed wording requires the approval the faculty advisor(s).

The **amended** motion **passed.** The amended wording was as follows (with words ~~struckthrough~~ deleted and words underlined in **bold** added):

> ***UNDERGRADUATE INDEPENDENT STUDY (ISU)***
> *Independent Study ~~normally~~ provides the opportunity for an individual student **or group of students**, with the approval and under the direction of ~~a faculty member~~ **one or more faculty advisors**, to study and to explore in greater depth an area of particular interest to the student and faculty member. An independent study may be used as a substitute for an existing WPI course, as an opportunity to study a topic not currently offered as a course at WPI, or to conduct directed undergraduate research.*

CAP

Prof. Doyle (SSPS), for the Committee on Academic Policy, moved that the following statement be added to the Undergraduate Catalog:

> *An independent study may be used to assign credit in a particular discipline when the faculty advisor has an appointment in the department or program associated with the discipline. If disciplinary credit is not assigned to the independent study, the academic credit will be identified as* Interdisciplinary (ID) *and the credit will be assigned as free elective on the student's transcript.*

Prof. Doyle explained that the motion was inspired by NEASC Standard 6.3 that requires that the qualifications of each faculty member must be appropriate to his or her assignment, and by our own MQP policy that requires that

the project advisor must be a member of the faculty in the discipline that corresponds to the major area of study of the student. He emphasized that the motion would allow any faculty member to advise any independent study for free elective credit.

Prof. Rich (CS) made two friendly amendments that (taken together) changed, "An independent study may be used to assign credit in a particular discipline when the faculty advisor has an appointment in the department or program associated with the discipline." to "An independent study may be used to assign credit in a particular discipline **only** when **at least one of** the faculty **advisors** has an appointment in the department or program associated with the discipline." Both friendly amendments were accepted.

Prof. Ciaraldi (CS) asked if it is permissible for a faculty member in one discipline to advise an independent study that counted as credit in another. **Prof. Doyle** explained that under the proposed motion, the faculty member would need an appointment in or a co-advisor from the other department, or the Department Head would need to obtain approval from the Dean of Undergraduate Studies.

Prof. Demetriou (ME) asked about the mechanism that would determine whether independent study credit could count as 4000- or 5000-level credit toward the BS/MS program. **Prof. Doyle** indicated that the faculty advisor judges the level of credit to be given, and a department's program review committee could decide not to accept the credit for a particular distribution requirement.

Prof. Gennert (CS) made a friendly amendment to add "…or with the approval of the appropriate Department Head or Program Director." to the end of the first sentence of the proposed statement. The friendly amendment was accepted.

The **amended** motion **passed.** The amended wording was as follows (with words ~~struckthrough~~ deleted and words underlined in **bold** added):

> *An independent study may be used to assign credit in a particular discipline **only** when **at least one of** the faculty ~~advisor~~ **advisors** has an appointment in the department or program associated with the discipline **or with the approval of the appropriate Department Head or Program Director**. If disciplinary credit is not assigned to the independent study, the academic credit will be identified as* Interdisciplinary (ID) *and the credit will be assigned as free elective on the student's transcript.*

CAP

Prof. Doyle (SSPS), for the Committee on Academic Policy, moved that the following statement be added to the Undergraduate Catalog:

> *Independent studies that are not substitutes for an existing WPI course and are offered more than twice by the same instructor require the approval of the Department Head or Program Director and associated Dean when disciplinary credit is granted and the Dean of Undergraduate Studies when interdisciplinary credit is granted.*

Prof. Doyle explained that the motion was inspired by CAO's restriction that experimental courses may only be offered twice. He emphasized that the motion would apply neither to independent studies that are used as substitutes for existing courses nor to research activities that would be different each time the independent study were offered.

Prof. Martin (MA) asked how this motion would be enforced if a faculty member were to use the same name for more than two independent studies offered intermittently over a period of several years. **Prof. Doyle** agreed that it would be difficult to enforce in that case. But if the rule were adopted then most faculty members would comply with it in good faith and a Dean would have the basis to take action if it were clear that the rule had been or was being violated.

Prof. Iannacchione (PH) expressed concern that the motion would put the Registrar's Office in the position of "gatekeepers" while they are not equipped to do so. He also pointed out that most independent studies have

fewer students than would be required for a course, so it is inconsistent to use the same limit on independent studies as we use to limit courses. **Prof. Doyle** expected that in the vast majority of cases, the Department Head or Program Director would give approval for further offerings of the independent study.

Prof. Addison (HUA) asked if the Dean of IGSD rather than the Dean of Undergraduate Studies should be given the authority to sign off on interdisciplinary independent studies. **Prof. Doyle** explained that the Dean of Undergraduate Studies is more closely connected with CAP and CAO, and is therefore more appropriate. The Dean of Undergraduate Studies has agreed to work with the Registrar's Office to review advisors of independent studies from each department and to make this information available to Department Heads and Program Directors.

Prof. Rich (CS) thought that the proposed statement addressed internal administration within individual departments and therefore that did not belong in Undergraduate Catalog. **Prof Doyle** explained that the Undergraduate Catalog was the one common place where such policies could be documented and easily accessed.

Prof. Skorinko (SSPS) did not foresee any problems that would be created by adopting the proposed rule.

Prof. Fehribach (MA) did not think it was necessary to have the approval of the Dean for these matters and **moved** that the motion be amended to delete "….and associated Dean…." from those whose approval would be required. The motion was seconded. **Prof. Doyle** explained that if a Dean is going to provide oversight to an academic department, then he or she needs to be adequately informed. Prof. Doyle thought that the extra oversight of a Dean beforehand would avoid lengthier disputes afterward. Prof. Fehribach expressed the view that policy should not be formulated based on one bad experience. **Prof. Humi** (MA) explained that oversight by the Dean was included because oftentimes independent studies overlap several disciplines.

The amendment **passed**.

Prof. Hakim (ECE) warned that it was counter to WPI's tradition to give a single individual (in this case a Department Head or a Program Director) the authority to prohibit an academic activity by a faculty member. **Prof. Doyle** responded that, as important counterexamples, tenure and promotion decisions are ultimately made by one person – the Provost.

Prof. Heineman (CS) asked if there were any recourse for a faculty member who was not allowed to advise an independent study under this proposed rule. **Prof. Doyle** stated that there would be no recourse.

Prof. Dominko (BBT) asked how independent studies are different from IQPs offered repeatedly at the same sites on the same projects and on topics that are beyond the faculty advisors' disciplinary competence. **Prof. Doyle** responded there is currently some oversight and review of IQPs by IGSD, but that there is no similar oversight of independent studies.

The motion **passed.** The amended wording was as follows (with words ~~struckthrough~~ deleted):

> *Independent studies that are not substitutes for an existing WPI course and are offered more than twice by the same instructor require the approval of the Department Head or Program Director ~~and associated Dean~~ when disciplinary credit is granted and the Dean of Undergraduate Studies when interdisciplinary credit is granted.*

6. Adjournment

The meeting adjourned at 4:45pm.

Respectfully submitted,

Mark Richman
Secretary of the Faculty

Addendum on file with these minutes:

1. **Addendum #1 CAP ISP Motions – Nov 17 2016**

(Note: This will be presented for discussion only.)

Date: December 16, 2016
To: WPI Faculty
From: Committee on Governance (Prof. Dominko, Chair)
Re: Motion to revise COAP's Faculty Handbook description

Motion: The Committee on Governance (COG) recommends and I move that the current language describing COAP's membership, responsibilities, nomination and election process, and recusal process be revised (in Part One, Bylaw One, Section VI of the Faculty Handbook) as delineated below.

Details of the motion:

Current COAP Description: (with *italicized* words eventually changed according to color-coding, underlined words eventually deleted, and each change identified by numbered footnote for reference in the "Rationale.")

VI. The Committee on Appointments and Promotions (COAP) consists of *six*[#1] elected Faculty Members holding the rank of Professor, with no more than one representative from any one academic department or program.
COAP is concerned with criteria for academic appointments and promotions. It *advises the*[#2] Provost on *individual*[#3] appointments *above the rank of Assistant Professor*[#4], on academic promotions from Assistant to Associate Professor that occur prior to the scheduled tenure review year, and on academic promotions from Associate Professor to Professor, after consultation with the appropriate Department Heads and others concerned[#5]. It makes recommendations to the Provost regarding recipients of sabbatical leaves. It makes recommendations to the Faculty for changes in recognized titles of academic rank[#6] and *criteria of eligibility thereto*[#6]. The Committee represents the Faculty to the President and Provost in consultation on appointment and performance evaluation of academic administrative officers.

Proposed COAP Description: (with *italicized* words changed according to color coding, underlined words added, and each change identified by numbered footnote for reference in the "Rationale.")

VI. The Committee on Appointments and Promotions (COAP)
Roles and responsibilities

COAP is concerned with criteria for academic appointments and promotions. In collaboration with COG[#6], COAP makes recommendations to the Faculty *for changes in criteria for promotion from associate professor to full professor and for changes in criteria for appointment and promotion of continuing non-tenure track faculty members.*[#6]

COAP *makes recommendations to*[#2] the Provost on *initial*[#3] appointments of Associate Professors without tenure and all full Professors[#4], on academic promotions from Assistant to Associate Professor that occur prior to the scheduled tenure review year,

on academic promotions from Associate Professor to Professor, on initial appointments of Associate and (full) teaching and research Professors, on initial appointments of Professors of Practice, on academic promotions of continuing non-tenure track Faculty members to the Associate and (full) teaching and research Professor levels, and on reappointments of Professors of Practice.[#7]

COAP makes recommendations to the Provost regarding recipients of sabbatical leaves, and represents the Faculty to the President and Provost on appointment, reappointment, and performance evaluation of academic Department Heads.[#8]

Membership and Election Procedure

COAP consists of *seven*[#1] elected Faculty members holding the rank of Professor, with no more than one representative from any one academic department. Department Heads, Deans, and the Provost are not eligible to serve on COAP. The term of office for this committee is three years, and no member may serve successive terms.[#9]

Nominations and elections for COAP are conducted by the Secretary of the Faculty. The election procedure is as follows: The Secretary prepares a nominating ballot listing eligible Faculty members by department and distributes it to all members of the Faculty, with instructions to nominate up to one person from each department. The member of each academic department who receives the largest number of nominations and is willing to serve if elected is then placed on an election ballot to be distributed to all members of the Faculty. The number to be elected annually will rotate from three to two to two in successive years. Vacancies to unexpired terms will be filled by the same nominating and election procedure as for full terms.[#10]

Recusal

For the purpose of considering each promotion case, a Joint Promotion Committee is formed, consisting of six members of COAP, and a Nominator and an Advocate. If the candidate and one of the COAP members are from the same department, then that COAP member is recused from the Joint Promotion Committee automatically. The Joint Promotion Committee also will consider whether any of its members should be recused due to direct conflict of interest. In the event of no departmental overlap or conflict of interest, the selection of the six COAP members to sit on the Joint Promotion Committee will be governed by COAP procedures developed to lead to an overall pattern of recusals distributed over the COAP membership so as to ensure appropriate participation for each COAP member. If recusal of two COAP members is necessary, then the most recent qualified past Chair of COAP will serve for that particular case. The Joint Promotion Committee is chaired by the Chair of COAP. If the Chair is recused, then the Joint Promotion Committee is chaired by the senior-most elected member of COAP participants.[#11]

Rationale:

The changes suggested in the motion are identified by numbered footnotes (#1 to #11) throughout both the "Current COAP Description" and the "Proposed COAP Description" provided above. Each change is identified and explained below:

Change #1: Six COAP members increased to seven.

This change was recommended by the Task Force on Promotions. The addition of one COAP member makes it possible to recuse one COAP member from each promotion case. The flexibility to recuse one member from each case will parallel the recusal mechanism used by CTAF, and will allow COAP to recuse one of its members due to any conflict of interest.

Change #2: The language "…advises the Provost…" changed to …"makes recommendations to the Provost…"

This is purely an editorial change that reflects the common description of the relationship between COAP and the Provost in dealing with promotion cases.

Change #3: The language "..individual…" changed to "…initial…" in reference to COAP's involvement with appointments made above the rank of Assistant Professor.

This is an editorial change that better explains that COAP's involvement in such appointments occurs when Faculty members are *initially* hired.

Change #4: "…initial appointments above the rank of Assistant Professor…" to ."…initial appointments of Associate Professors without tenure and all full Professors…"

This change avoids duplication of effort between COAP and CTAF by leaving initial appointments at the Associate Professor level *with tenure* to CTAF, and is parallel to the change made in 2000 to give CTAF the simultaneous responsibility to recommend both for or against tenure and for or against promotion to Associate Professor.

Change #5: Delete "…after consultation with the appropriate Department Heads and others concerned."

COAP does not always consult with the candidate's Department Head, and "others concerned" is vague and ill-defined. The extent to which Promotion Committees consult with others is a procedural matter that should be provided in a separate description of promotion procedures.

Changes #6:

- Add "In collaboration with COG…" for recommendations of changes in criteria.

Explicitly stating the collaboration between COAP and COG will formalize cooperation by both committees whenever such recommendations are contemplated. This change will improve the diversity of those within the Faculty governance structure formally involved in making such recommendations.

- Focus specifically on "….changes in criteria for promotion from Associate professor to Full professor and for changes in criteria for appointment and promotion of continuing non-tenure track Faculty members."

This change focuses COAP's involvement specifically in criteria for promotion from Associate professor to Full professor. This is because the criteria for promotion from Assistant professor to Associate professor are primarily concerns for CTAF. Modifications in CTAF rules have historically been handled in collaboration between COG and CTAF.

Also, in order to provide a mechanism for changing and adding to the criteria described in the Faculty Handbook (Part Two, Section 7) for non-tenure track Faculty members, this change also explicitly states COG's and COAP's collaborative involvement in recommending changes to the criteria for appointment and promotion of continuing non-tenure track Faculty members.

- Delete "…in recognized titles of academic rank…" from the recommendations for change made by COAP.

The recognized titles of faculty members serve as a University-wide definition of the Faculty at WPI. Changes and additions to these titles have in the past been coordinated by COG in appropriate collaboration with CTAF, COAP, Department Heads, and the Provost. Recent examples of COG coordination of this type include the elimination of the Instructor title (in April 2014), and – over a three-year period – the introduction of titles for non-tenure track Faculty members, including appointment, evaluations, and promotion procedures for continuing non-tenure track Faculty members (concluding in March 2012).

Change #7: Add …"….on initial appointments of Associate and (full) teaching and research Professors, on initial appointments of Professors of Practice, on promotions of continuing non-tenure track Faculty members to the Associate and (full) teaching and research Professor levels , and on reappointments of Professors of Practice."

This change reflects the new responsibilities of COAP that were assigned when the non-tenure track Faculty structure was put in place in 2012. These added responsibilities are outlined in the Faculty Handbook (Part Two, Section 7, Subsection E) but were never incorporated into the Faculty Handbook charge for COAP.

Change #8: Replace evaluation of "academic administrative officers" with evaluation of "…Department Heads."

This change reflects current and past practice, in which COG has been responsible for the Faculty evaluations of administrative officers and COAP has been involved with Department Head evaluations.

Change #9: Add "…Department Heads, Deans, and the Provost are not eligible to serve on COAP. The term of office for this committee is three years, and no member may serve successive terms."

These additions are purely to clarify the current and intended practice, and they are parallel to the CTAF membership rules.

Change #10: Add "Nominations and elections for COAP are conducted by the Secretary of the Faculty. The election procedure is as follows: The Secretary prepares a nominating ballot listing eligible Faculty members by department and distributes it to all members of the Faculty, with instructions to nominate up to one person from each department. The member of each academic department who receives the largest number of nominations and is willing to serve if elected is then placed on an election ballot to be distributed to all members of the Faculty. The number to be elected annually will rotate from three to two to two in successive years. Vacancies to unexpired terms will be filled by the same nominating and election procedure as for full terms."

This recommendation was made by the task Force on Promotions to elevate the importance, status, and primacy of service on COAP. The proposed election procedure is exactly parallel to the CTAF election procedures.

Change #11: Add: "For the purpose of considering each promotion case, a Joint Promotion Committee is formed, consisting of six members of COAP, and a Nominator and an Advocate. If the candidate and one of the COAP members are from the same department, then that COAP member is recused from the Joint Promotion Committee automatically. The Joint Promotion Committee also will consider whether any of its members should be recused due to direct conflict of interest. In the event of no departmental overlap or conflict of interest, the selection of the six COAP members to sit on the Joint Promotion Committee will be governed by COAP procedures developed to lead to an overall pattern of recusals distributed over the COAP membership so as to ensure appropriate participation for each COAP member. If recusal of two COAP members is necessary, then the most recent qualified past Chair of COAP will serve for that particular case. The Joint Promotion Committee is chaired by the Chair of COAP. If the Chair is recused, then the Joint Promotion Committee is chaired by the senior-most elected member of COAP participants.

The recusal mechanism proposed here is consistent with the recommendation of the Task Force on Promotions, and exactly parallels the recusal process used by CTAF. The need for a recusal mechanism due to conflicts of interest is clear. In addition, (like the CTAF procedures) the proposal includes an automatic recusal of any COAP member in the same department as the promotion candidate. This is to eliminate the current non-uniformity in which certain candidates may have more departmental representation on the promotion committee than others.

The (proposed) formation of a Joint Promotion Committee that formally includes the Nominator and the Advocate will ensure that in each case the Nominator and Advocate play a more significant role in the promotion-deliberations. However, the exact role and privileges, if any, of the Nominator and the Advocate are to be determined. This will improve the level of communication between COAP members and those who know the promotion candidate's qualifications best.

(DRAFT: For Faculty Input**)**

REVISED WPI ANNUAL CONFLICT OF INTEREST POLICY

Revised for discussion: December 16, 2016

Intention:

Worcester Polytechnic Institute is committed to ensuring that its research and other activities are conducted in a manner that upholds the integrity and credibility of its faculty, staff, students, and associates. This policy establishes a shared ethical standard of ensuring that relationships with business entities are transparent, grounded in objectivity, and do not improperly influence professional judgment, exercise of WPI responsibilities, or performance of WPI-related activities. This policy and its procedures promote compliance with all applicable federal and state laws, regulations, and sponsor policies regarding financial conflict of interest, including among others the policies of the National Science Foundation, the National Institutes of Health, Public Health Service, and private foundations.

WPI recognizes the value of entrepreneurship, as well as engagement in external organizations and activities. It encourages faculty, staff, and students to engage in appropriate outside relationships and activities, including consulting and starting their own companies. However, the financial interests that accompany such relationships may lead to real or apparent financial conflicts of interest. These financial interests need to be disclosed, reviewed, and managed in accordance with this policy and the associated procedures.

Who is covered? This policy applies to all faculty and exempt staff employed by WPI. It also applies to all other individuals with responsibility for the design, conduct, or reporting of sponsored research at WPI, including students, consultants, and affiliate faculty.

Annual Disclosure. Annually, covered individuals, including those who are temporarily away from campus (e.g., leave, sabbatical), must complete a Conflict of Interest (COI) Disclosure listing all significant financial interests and relationships/commitments outside of WPI which are related to their institutional responsibilities at WPI. “Institutional responsibilities” may include, but are not limited to teaching, research, departmental administration, committee membership, purchasing of goods and services etc. Covered individuals must disclose their own financial interests as well as those held by members of their families.

Updated Disclosure. In addition to the annual disclosure requirements, all covered individuals must complete a new disclosure within 30 days of a substantial change in a business or financial interest that relates to their WPI institutional responsibilities. A "substantial change" includes, but is not limited to, the acquisition of a new financial interest or an increase in the value of an existing financial interest to a value that qualifies it as a significant financial interest.

What must be disclosed? Covered individuals must disclose all significant financial interests (“SFIs”) that reasonably appear to be related to the individual’s institutional responsibilities. An SFI must be disclosed even if the individual does not believe that it creates a conflict of interest.

Significant Financial Interests include any of the following when reasonably related to the covered individual’s institutional responsibilities:

1. Remuneration. Any remuneration (income) received from an outside entity in the calendar year preceding the COI disclosure, or anticipated during the calendar year following the disclosure. Disclosure is required when the annual amount received from an entity is $5,000 or greater.
2. Equity Interests. Any equity (ownership) interests in a business entity. This includes stock, stock options, warrants, futures, purchase rights, or convertible securities. Disclosure is required when the market value of the equity exceeds $5,000 for a given entity, or when a covered individual owns 5% or more of an entity's total equity. Equity in non-publicly-traded entities, or any other equity where the value cannot be readily determined through reference to market prices, must be disclosed regardless of the amount or value.
3. Royalties Paid in Connection with Intellectual Property Rights. The value of any royalties paid in connection with intellectual property rights, e.g., patents and copyrights, and any agreements to share in royalties related to such rights.
4. Travel Expenses. Covered individuals must disclose travel that is estimated to exceed $5000 and is paid for or reimbursed by an outside entity (except as described in the following section). New sponsored travel expenses should be reported within 30 days of the trip by way of an updated disclosure.

Disclosure Not Required. Covered individuals are not required to disclose the following:

1. Salaries, royalties, or other remuneration paid by WPI to the covered individual. This includes remuneration paid from grant funds awarded to WPI.
2. Income (including honoraria) from seminars, lectures, or teaching engagements sponsored by a federal, state, or local government agency, an institution of higher education, an academic teaching hospital, a medical center, or a research institute affiliated with an institution of higher education.
3. Income from service on advisory or review panels for a federal, state, or local government agency, an institution of higher education, an academic teaching hospital, a medical center, or a research institute affiliated with an institution of higher education.
4. Income and equity related to certain investments, such as mutual funds or blind trusts, where the covered individual does not directly control the investment decisions being made.
5. Travel expenses paid for or reimbursed by a governmental agency, an institution of higher education, an academic teaching hospital, a medical center, or a research institute that is affiliated with an institution of higher education.

Review. WPI's Chief Compliance Officer or designee will review each annual or updated disclosure. The Chief Compliance Officer, in consultation with the individual's Department Head, will determine if any of the disclosed SFIs constitute a real or apparent conflict of interest.

If the individual disclosing the SFI has any active research projects or proposals, the Office of Sponsored Programs (OSP) will conduct a further review. OSP will determine (1) whether or not

the SFI is related to the individual's research, and (2) whether the SFI could constitute a real or apparent conflict of interest.

If the Chief Compliance Officer and/or OSP believe that a disclosed SFI could constitute a real or apparent conflict of interest, they will refer the matter to the Conflict Management Committee (CMC).

Conflict Management Committee. The Conflict Management Committee is charged with determining (1) whether or not it is possible to manage an identified conflict of interest, and (2) if so, what conditions and restrictions are needed in order to do so. The committee may issue a written Conflict Management Plan describing these conditions in detail. Conflict Management Committee membership shall consist of a faculty member selected annually by the Committee on Governance (COG) to chair the committee, the Chair of the Committee on Graduate Studies and Research (CGSR), an additional member selected by CGSR, the Vice Provost for Research, Chief Compliance Officer, the Director of Sponsored Programs (non-voting), Associate Director, Post-Award & Compliance (non-voting), and HR Compliance Manager (non-voting). COG shall also annually appoint an alternate to the Committee to serve in the event of the recusal or absence of one of the other appointed faculty members. In the event that more than one alternate is needed, the Vice Provost for Research shall appoint additional alternates as necessary. Recusal shall be required when it appears that a member of the Conflict Management Committee will be unable to fairly judge a potential conflict raised by a disclosure statement.

Appeals Process. Should the individual not agree with the Conflict Management Committee's conditions or restrictions, he/she can appeal in writing to the Provost within ten (10) days after receipt of notification from the Vice Provost for Research, detailing why such conditions and restrictions are inappropriate. The Provost will then consult with the Conflict Management Committee and make a decision, which will be final.

Human Subject Protocols. Disclosures associated with the submissions of protocols for Institutional Review Board (IRB) review will be reviewed following the same process as for sponsored research proposals. Protocols will not be approved until all conflicts are resolved or addressed in a management plan.

Reporting to funding agencies. The designated institutional official will report financial conflicts of interest or non-compliance to PHS in accordance with PHS regulations. If the funding for the research is made available from a prime PHS-awardee, such reports shall be made to the prime awardee prior to the expenditure of any funds and within 60 days of any subsequently identified financial conflict of interest such that the prime awardee may fulfill their reporting obligations to the PHS.

Sanctions. In the event of an individual's failure to comply with this Policy, the Conflict Management Committee may suspend all relevant activities or take other disciplinary action until the matter is resolved to the committee's satisfaction. The institution will promptly notify sponsors, if applicable, of the action taken.

Retrospective Review. In addition, if a Financial Conflict of Interest was not identified or managed in a timely manner, WPI will complete a retrospective review of the covered individual's activities and the research project to determine whether the research conducted

during the period of non-compliance was biased in its design, conduct or reporting. If bias is found, WPI will promptly notify the sponsor and submit a mitigation report in accordance with applicable regulations.

Training. Individuals will comply with training requirements mandated by sponsors. OSP will notify individuals of such requirements when applicable. Sponsors may require the completion of training prior to the expenditure of grant funds.

Record Retention. WPI will retain all disclosure forms, conflict management plans, and related documents for a period of three years from the date the final expenditure report is submitted to the sponsor, unless any litigation, claim, financial management review, or audit is started before the expiration of the three-year period. In that case, the records shall be retained until all litigation, claims or audit findings involving the records have been resolved.

Public Accessibility. With regard to any PHS-funded research, WPI will make accessible to the public, within five business days of written request, information concerning any Significant Financial Interest disclosed to the institution that meets all of the following criteria:

1. The Significant Financial Interest is related to the PHS-funded research;
2. WPI has determined that a conflict of interest exists; and
3. The Significant Financial Interest is still held by the individual.

Subrecipients. Subrecipients on federal grants and contracts must have an active and enforced conflict of interest policy that meets the requirements of the funding agency. If a subrecipient does not have such a policy, they will be required to comply with WPI's policy.

Definitions

Family means the covered individual's spouse/partner, dependent children, and any other dependents living in the covered individual's household.

Institutional Review Board (IRB) Any boards established or contracted to review protocols for human subjects research whether federally funded or not.

Public Health Service or PHS means the Public Health Service of the U.S. Department of Health and Human Services, and any components of the PHS to which the authority of the PHS may be delegated (including the National Institutes of Health).

Sponsored Research means any research-related activity, including training, which is funded by a grant, contract, cooperative agreement, or fellowship awarded to WPI.

CURRENT WPI CONFLICT OF INTEREST POLICY

Faculty Handbook, Part Two, Section 4.A

(Endorsed by the Faculty, March 20, 2003. Adopted by the Board of Trustees, May 2003)

Preamble

Worcester Polytechnic Institute promulgates this Conflict of Interest policy to assure its constituents of its continued commitment to the integrity of its students, faculty, staff, and associates in the conduct of research and other activities.

Universities have long recognized the importance of maintaining policies on conflict of interest. In 1964, the American Association of University Professors and the American Council on Education issued a joint statement On Preventing Conflicts of Interest in Government-Sponsored Research at Universities. This was followed in 1978 when the Association of American Universities, the ACE, and the National Association of State Universities and Land-Grant Colleges published Principles to Govern College and University Compensation: Policies for Faculty Engaged in Sponsored Research. In 1985, the AAU issued a report entitled University Policies on Conflict of Interest and Delay of Publication. Additional statements and reports have been published by the Association of American Medical Colleges, Guidelines for Dealing with Faculty Conflicts of Commitment and Conflicts of Interest in Research (1990), the AAU, Framework Document for Managing Financial Conflicts of Interest (1993), and the Association of Academic Health Centers.

Both the National Science Foundation (NSF) and the Public Health Service (PHS) require principal investigators and co-principal investigators "to certify that they have read and understood the institution's conflict of interest policy," that they have made all required financial disclosures, and that "they will comply with any conditions or restrictions imposed by the institution to manage, reduce, or eliminate actual or potential conflicts of interest." Moreover, the University's representative must certify that the University "has implemented and is enforcing a written policy on conflicts of interest," that all financial disclosures required by the conflict of interest policy were made, and that actual or potential conflicts of interests, if any, were, or prior to expenditure of funds under the award, will be satisfactorily managed, reduced or eliminated in accordance with the institution's conflict of interest policy, or disclosed to PHS or NSF.

In its Notice No. 117 dated June 30, 1994 and updated in its Notice No. 118 dated July 13, 1995 on the subject of Investigator Financial Disclosure Policy, the National Science Foundation requires that all grantee institutions employing more than fifty persons have in effect on October 1, 1995 a written and enforced conflict of interest policy. In addition, the Department of Health and Human Services published its final rule on "Objectivity in Research" on July 11, 1995 in the Federal Register (60 Fed. Reg. 35820) to coincide in effective date and requirements with NSF's Financial Disclosure Policy. As the NSF Notice states:

The National Science Foundation encourages the increased involvement of academic researchers and educators with industry and private entrepreneurial ventures. But NSF recognizes that such interactions carry with them an increased risk of conflict of interests.

The Public Health Service (PHS) wishes to assure the public that its support to researchers will follow standards and procedures to ensure that the design, conduct, or reporting of research funded under ...[its] grants, cooperative agreements or contracts will not be biased by any conflicting financial interest of those investigators responsible for the research.

Policy Rationale

Funding sources and personal gain represent two aspects about which investigators must be ever mindful, because without clear guidelines there is a possibility for conflict of interest issues to arise. Donors, for example, providing grants to conduct research may sometimes possess a vested or proprietary interest in the research results. Professors themselves may hold equity positions or policy making authority in an enterprise from which they would benefit personally by research sponsored by the enterprise, a government, or other private agency, and that is conducted using university facilities, equipment, or personnel.

In addition, there are large numbers of other types of funded and unfunded interactions between WPI faculty members and government, industry and other non-University organizations through research, projects and consulting.

With the increased national emphasis on technology transfer and economic competitiveness, it is particularly timely for Worcester Polytechnic Institute to articulate a new conflict of interest policy to protect the integrity of the University, its faculty, and the research process, to encourage the free flow of knowledge and ideas, and to ensure that public and institutional resources are used appropriately.

WPI's conflict of interest policy now requires annual disclosure by all faculty and other personnel associated with the university (listed in Appendix D).

Disclosure Rationale and Procedure

For all University personnel to maintain public trust, disclosure of all conflicts and potential conflicts of interest is appropriate practice. Based upon the traditions of university life there are two pillars on which to construct a conflict of interest policy.

One pillar of the academy is peer review. Some matters of peer review are handled confidentially; for example, senior faculty routinely review junior colleagues for appointment, re-appointment, promotion, and tenure. Other peer reviews are more open. Faculty committees review courses to be included in the university curriculum, and pass on degree requirements and other issues of academic policy. Peer review is essential, then, for a conflict of interest policy. Another pillar of the academy is disclosure of discoveries and other scholarly accomplishments. Indeed, peer review cannot occur without prior disclosure. When faculty publish their research, they are disclosing their findings to peers not only within the University, but to all scholars throughout the world. Disclosure is also essential for a conflict of interest policy. Indeed, NSF's Investigator Financial Disclosure Policy requires "a) limited and targeted financial disclosure, b) designation of a person(s) to review the disclosures and resolve actual or potential problems revealed, c) enforcement mechanisms, and d) arrangements for informing NSF of conflict issues that are not resolved to the satisfaction of the institution."

In addition, NSF and PHS require that an institution's policy provide for disclosure prior to submitting a proposal, and that all actual or potential conflicts be satisfactorily managed, reduced, or eliminated prior to the time funds from an award are expended, or disclosed to NSF or PHS. In addition, both NSF and PHS require that, during the period of any award, the University obtain updated financial disclosures from investigators either on an annual basis or as investigators obtain new reportable financial interests.

Disclosure Process

How and to whom should the significant financial interest(s) of a faculty member and/or investigator be disclosed?

On or before October 1 annually or within sixty (60) days of appointment, each faculty member and other individuals identified in Appendix D shall complete and submit a Conflict of Interest Disclosure Form to his/her Department Head.

WPI policy requires Principal Investigators to complete a Proposal Coordination Form (see Appendix A) at the time the Principal Investigator submits the proposal for review and authorization by the Office of Research Administration. This form includes check boxes in which the respondent shall indicate whether or not a conflict of interest exists or is likely to exist in connection with the proposal being submitted. Co-investigators and any other individuals who are expected to participate in the design, conduct, and/or reporting of the research also must complete a Conflict of Interest Disclosure Form (see Conflict of Interest Disclosure for NSF and PHS Submissions, Appendices B and/or C) concurrent with submission of the Proposal Coordination Form by the Principal Investigator, unless they have done so as a required annual disclosure. Principal Investigators will have filed the Annual Conflict of Interest Disclosure Statement, as required.

Investigators submitting a human subjects protocol for Institutional Review Board (IRB) review must file or have on file a Conflict of Interest Disclosure Form, Appendix C, at that time.

Any Disclosure Statements, whether submitted in satisfaction of the NSF or PHS proposal submission requirement or in fulfillment of the WPI annual disclosure requirement or IRB disclosure requirement, must be updated when a new reportable Significant Financial Interest or potential conflict of interest exists.

Annual Review Process

All faculty members and other individuals, identified in Appendix D, who have not, within the last year, completed the Conflict of Interest Disclosure Form for funded research associated with an NSF or PHS submission (Appendix B or C) must file the Annual Conflict of Interest Disclosure Statement with his/her Department Head annually by October 1 and as any significant changes occur. Department Heads will file their Annual Disclosure Statements with the Vice President for Research. The individual shall, to the best of his/her knowledge, include in his/her Disclosure Statement the same information for his/her family, as defined by this Policy. Department Heads and members of the Cabinet will file with the Vice President of Research. The Vice President of Research will file his/her Annual Conflict of Interest Disclosure Form with the Provost.

Upon receipt of each annual or updated Disclosure Statement, the Department Head or his/her designee will make a review for adequacy, requesting additional information, as necessary. If the answers to the four questions on Part I of the Disclosure Statement are "no," then no further review is required. The Disclosure Statement should be transmitted to the Office of Research Administration, the central repository for all Disclosure Statements. No additional action will be required of the faculty member or other submitter unless a significant change occurs prior to the next annual due date. If the answer to any of the four questions on Part I of the Annual Conflict of Interest Disclosure Form is "yes", the Department Head will determine if a real or apparent conflict appears to be significant. If so, the Department Head will forward the disclosure to the Vice President for Research with a copy to the Office of Research Administration. The Vice President for Research will gather further information and supporting documentation from the individual and will bring the Disclosure Statement to the attention of the Conflict Management Committee for resolution. All such documentation and subsequent discussions will be confidential. The individual will have an opportunity to meet with the Conflict Management Committee to explain the financial documentation and to discuss options for management of the conflict. Should the findings indicate significant potential conflict of interest, the Conflict Management Committee will consult with the faculty

member or other submitter to devise a plan to effectively eliminate, reduce, or otherwise manage the conflict. If the Committee cannot come to an agreement with the individual and concludes that a significant conflict of interest to WPI's interests appears to remain, the Committee will refer the matter to the Office of the Provost and so inform the individual.

Review Process for NSF and PHS Proposal

Should a disclosure associated with any NSF or PHS submission indicate a potential or actual conflict of interest, the Director of Research Administration will advise the Vice President for Research. The Vice President for Research will gather further information and supporting documentation from the investigator and take the matter to the Conflict Management Committee for resolution. All such documentation and subsequent discussions will be confidential. The investigator will have an opportunity to meet with the Conflict Management Committee to explain the financial documentation and to discuss possible conditions or restrictions. Should the findings indicate significant financial interest, the Conflict Management Committee will impose conditions or restrictions to effectively manage, reduce, or eliminate the conflicts. The Conflict Management Committee will use as guidelines this policy statement including the definitions of significant financial interest and conditions or restrictions found in the section of Definitions.

If the Conflict Management Committee determines that imposing conditions or restrictions would be either ineffective or inequitable, and that the potential negative impacts that may arise from a significant financial interest are outweighed by interests of scientific progress, technology transfer, or the public health and welfare, then the Conflict Management Committee may recommend to the Vice President for Research that the research be permitted to go forward without imposing such conditions or restrictions. In such cases, the conflict of interest of the investigator(s) will be disclosed to the government agency as required.

Appeal Process for NSF and PHS Proposals

Should the faculty member or other individual (as defined in Appendix D) not agree with the Conflict Management Committee's conditions or restrictions, he/she can appeal in writing to the Provost within ten (10) days after receipt of notification from the Vice President for Research, spelling out why such conditions and restrictions are inappropriate. The Provost will then consult with the Conflict Management Committee; it is possible that a modification of the conditions and restrictions will be agreeable to all parties. However, the decision of the Provost is final.

Human Subject Protocols

Disclosures associated with the submissions of protocols for IRB review will be reviewed following the same process as for NSF and PHS proposals. Protocols will not be approved until all conflicts are resolved.

Definitions

Conflict of Interest - A conflict of interest may take various forms but arises when an individual is or may be in a position to influence University business, research, or other decisions in ways that could lead to any form of personal gain for the individual or his/her family, or give improper advantage to others. A real or perceived conflict of interest may also arise when someone engages in an action or decision that compromises the integrity of teaching, research, advising, or scholarship.

Family - The family of a faculty member means spouse, minor children, and other persons financially dependent upon the faculty member.

Investigator - The term investigator means the principal investigator, co-principal investigators, and any other person at the institution who is responsible for the design, conduct, or reporting of research or educational activities.

Relationships which can give rise to conflicts of interest - Relationships as used in this policy include relationships with others which can give rise to real or perceived conflicts of interest. These include, among others, personal relationships created by kinship, friendship, or professional contacts, and financial relationships created by contracts, shared property rights, or state or Federal law. Though a domestic partnership may create a real or perceived conflict of interest, this policy is not meant to force disclosure of one's sexual orientation. By policy, WPI does not discriminate on the basis of sexual orientation.

Significant Financial Interest - The term significant financial interest means anything of monetary value, including, but not limited to, salary or other payments for services (e.g., consulting fees or honoraria); equity interests (e.g., stocks, stock options or other ownership interests); and intellectual property rights (e.g., patents, copyrights and royalties from such rights) when related to the subject matter of the individual's research and/or scholarly activities, including teaching and advising. The term does not include:

- salary, royalties or other remuneration from the University;
- income from service on advisory committees or review panels for public or nonprofit entities;
- financial interests in business enterprises or entities if the value of such interests does not exceed $10,000 or does not represent more than a 5% ownership interest for any one enterprise or entity when aggregated for the investigator and the investigator's family;
- royalties or other payments that, when aggregated for the investigator, and the investigator's family, are not expected to exceed $10,000 during the next twelve-month period;
- income from self-authored textbooks, software, etc. that are used for your teaching purposes; or
- project fees solicited from sponsors of MQP's and IQP's that are returned to Faculty professional development accounts.

A significant financial interest becomes a conflict of interest if it could result in personal gain, advantage to others to the detriment of WPI, or influence the outcomes of research.

Conditions or Restrictions - Examples of conditions or restrictions that might be imposed to manage, reduce or eliminate actual or potential conflicts of interest include:

- public disclosure of significant financial interests;
- monitoring of funded research by independent reviewers;
- modification of the funded research plan;
- disqualification from participation in the portion of the NSF-or PHS-funded research that would be affected by the significant financial interests;
- divestiture of significant financial interests; or
- severance of relationships that create actual or potential conflicts.

Institutional Review Board (IRB) - Any boards established or contracted to review protocols for human subjects research whether federally funded or not.

Conflict Management Committee - Conflict Management Committee membership shall consist of a faculty member selected annually by the Committee on Governance (COG) to chair the committee, the Chair of the Committee on Graduate Studies and Research, an additional member selected by CGSR, the Vice President for Research, and the Director of Research Administration. COG shall also

annually appoint an alternate to the Committee to serve in the event of the recusal or absence of one of the other appointed faculty members. In the event that more than one alternate is needed, COG shall appoint additional alternates as necessary. Recusal shall be required when it appears that a member of the Conflict Management Committee will be unable to fairly judge a potential conflict raised by a disclosure statement. All such potential conflicts of interest of committee members must be disclosed to the committee in advance of the proceedings, and the committee will vote to determine whether recusal is required. To prevent the appearance of bias in judgment, the committee shall follow the practices that the Committee on Tenure and Academic Freedom uses to determine whether tenure committee members are able to fairly judge candidates for tenure.

Instructions

To comply with this policy regarding the submission of an annual Disclosure Statement, each Faculty Member must complete the Disclosure form and any updates on or before October 1 of each year and forward it to his/her department head.

In addition, to comply with this policy regarding authorization for the submission of a proposal for funded research to the NSF and/or PHS, a principal investigator will:

1. in accordance with the Explanation and Instructions, complete and sign the front side of the Proposal Coordination Form and require any co-investigators and/or other key personnel to complete and submit a Conflict of Interest Disclosure Form for funded research, Appendix B, (unless already submitted);
2. ask his/her department head to review and complete the Proposal Coordination Form and any accompanying Conflict of Interest Disclosure Forms and sign them;
3. submit the Proposal Coordination Form and accompanying Conflict of Interest Disclosure Form together with the NSF or PHS proposal to the Office of Research Administration when requesting submission authorization.

Appendices

Conflict of Interest Policy (Endorsed by the Faculty and Recommended for Adoption by the Board of Trustees, March 20, 2003)
Appendix A – Proposal Routing Form (PRF)
Appendix B – Conflict of Interest Disclosure for NSF Submissions
Appendix C – Conflict of Interest Disclosure for PHS Submissions
Disclosure Statement – *WPI's Annual Disclosure Statement*
Appendix D – Individuals Who Must Sign Disclosure
Appendix E – Implementation of the Final Rule on Conflicts of Interest in Public Health Service Funded Research (NEW!)
Appendix F – Travel Disclosure Form (NEW!)

The Appendices and Forms identified above are available at
http://www.wpi.edu/Pubs/Policies/conflict.html

Appendix: Consent Agenda Motions

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to change the title and description for MA 2631 Probability

Motion: On behalf of the Department of Mathematical Sciences, the Committee on Academic Operation recommends and I move, that the title and description for MA 2631 Probability be changed as described below.

Current course title, description and course offering schedule:

MA 2631. PROBABILITY *Cat. I*
The purpose of this course is twofold:
• To introduce the student to probability. Topics to be covered will be chosen from: axiomatic development of probability; independence; Bayes theorem; discrete and continuous random variables; expectation; special distributions including the binomial and normal; moment generating functions; multi-variate distributions; conditional and marginal distributions; independence of random variables; transformations of random variables; limit theorems.
• To introduce fundamental ideas and methods of mathematics using the study of probability as the vehicle. These ideas and methods may include systematic theorem-proof development starting with basic axioms; mathematical induction; set theory; applications of univariate and multivariate calculus.
This course is designed primarily for Mathematical Sciences majors and those interested in the deeper mathematical issues underlying probability theory.
Recommended background: MA 1024.
Undergraduate credit may not be earned both for this course and for MA 2621

Term offered: A

Proposed course title, description, and course offering:

MA 2631. Probability Theory
Cat. I
The purpose of this course is twofold:
• To introduce fundamental ideas and methods of mathematics using the study of probability as the vehicle. These ideas and methods may include systematic theorem-proof development starting with basic axioms; mathematical induction; set theory; applications of univariate and multivariate calculus.
• To introduce the student to probability. Topics to be covered will be chosen from: axiomatic development of probability; independence; Bayes theorem; discrete and continuous random variables; expectation; special distributions including the binomial and normal; moment generating functions; multi-variate distributions; conditional and marginal distributions; independence of random variables; transformations of random variables; limit theorems.

This course is designed primarily for Mathematical Sciences majors and those interested in the deeper mathematical issues underlying probability theory. A more applications-oriented course with similar content is MA 2621 Probability for Applications which is primarily designed for students in departments other than Mathematical Sciences.
Recommended background: ~~MA 1024~~ Multivariable Differential and Integral Calculus (MA 1024, or equivalent).
Undergraduate credit may not be earned both for this course and for MA 2621 Probability for Applications.

Term offered: A

Rationale:
Over the last years this course was restricted to Mathematical Sciences and Actuarial Majors (other Majors could sign up with the instructor's permission). CAO communicated to the Mathematical Sciences Department that it viewed this practice to be not consistent with the spirit of the WPI plan. The faculty of the Mathematical Sciences Department decided to drop the restriction, but change the course description to make the purpose of the course clearer. The motion on hand concertizes this for one of the courses concerned.

The proposed course title and description better convey the purpose of this course to students so that access restrictions are not needed.

Impacts on students: The change of title and course description as proposed will help students in course selection as it highlights the differences between MA 2621 Probability for Applications and this course.

Resource Needs:
No change in resource needs.

Implementation Date: AY 2017/18

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to change the title and description for MA 1971 Bridge to Higher Mathematics

Motion: On behalf of the Department of Mathematical Sciences, the Committee on Academic Operation recommends and I move, that the title and description for MA 1971 Bridge to Higher Mathematics be changed as described below.

Current course title, description and course offering schedule:

MA 1971. BRIDGE TO HIGHER MATHEMATICS *Cat. I*
The principal aim of this course is to introduce and enhance mathematical thinking. The course is intended not only for beginning mathematics, statistics or actuarial students, but also for students seeking to further their mathematical interests and those simply curious about logic and reason. Students in the course will be expected to explain, justify, defend, disprove, conjecture and verify mathematical ideas, both verbally and in writing. One expected by product of this training is that students will develop concrete proof-writing skills which will improve their prospects for success in more advanced mathematics courses. When appropriate, course discussion will touch on current events in the mathematical sciences, including recently solved problems and open challenges facing today's scientists. Recommended background: at least two courses in Mathematical Sciences at WPI, or equivalent.

Term offered: D

Proposed course title, description, and course offering:

MA 1971. BRIDGE TO HIGHER MATHEMATICS *Cat. I*
~~The principal aim of this course is to introduce and enhance mathematical thinking.~~ The principal aim of this course is to practice mathematical problem interpretation, proof techniques, and question formulation. The course is intended not only for beginning students in the mathematical sciences, but also for all students interested in mathematical art and rigor. ~~The course is intended not only for beginning mathematics, statistics and actuarial students, but and also for students seeking to further their mathematical interests and those simply curious about logic and reason .~~ Students in the course will be expected to explain, justify, defend, disprove, conjecture and verify mathematical statements, both ~~verbally~~ orally and in writing, in order to develop proof-writing skills.
~~One expected by product of this training is that students will develop concrete proof-writing skills which will improve their prospects for success in more advanced mathematics courses. When appropriate, course discussion will touch on current events in the mathematical sciences, including recently solved problems and open challenges facing today's scientists.~~
(These skills should prove useful in more advanced mathematics courses). Topics covered include basic logic; basic set theory; definitions and properties of functions; definitions and properties of binary relations; fundamental proof techniques, including proof by induction. Depending on student background and instructor preferences, the course objectives may be

conveyed through a selection of problems from various mathematical sub-disciplines, through discussions of current events in the mathematical sciences, including recently solved problems and open challenges facing today's scientists, or through discussions of applications of mathematics.

Recommended background: at least two courses in Mathematical Sciences at WPI, or equivalent.

Term offered: D

Rationale:
Over the last years this course was restricted to Mathematical Sciences and Actuarial Majors (other Majors could sign up with the instructor's permission). CAO communicated to the Mathematical Sciences Department that it viewed this practice to be not consistent with the spirit of the WPI plan. The faculty of the Mathematical Sciences Department decided to drop the restriction, but change the course description to make the purpose of the course clearer. The motion on hand concertizes this for one of the courses concerned.

The proposed course title and description better convey the purpose of this course to students so that access restrictions are not needed.

Impacts on students: The change of title and course description as proposed will help students in course selection as it clarifies the course description.

Resource Needs:
No change in resource needs.

Implementation Date: AY 2017/18

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to add ENV 300X Field Course in European Urban Development and Sustainability

Motion: On behalf of the Environmental and Sustainability Studies program and the Department of Social Science and Policy Studies, the Committee on Academic Operation recommends and I move, that ENV 300X as described below, be added.

Proposed Course Description:
ENV 300X, Field Course in European Urban Development and Sustainability, (Cat.II). This course examines the European City model for urban and sustainable development policies and practices. The course has both classroom and field-based components. In class we will learn about model strategies for urban development, how they are mobilized, and the causes of differentiated implementation from place to place. During the field-based component, we will travel to Europe for a one-week to 10-day field trip where we will meet policy makers and other stakeholders in several cities in Belgium, The Netherlands, Luxembourg, and Germany. Discussion and reflection time will take place each evening. Field trip expenses, transport and lodging, will be paid for by the University of Luxembourg. Each student is responsible for getting to Europe and paying a few nights accommodation before and after the trip.
Recommended background: an interest in smart or sustainable cities and/or urban policy, planning, and practice.
Students who completed this course as an ISRP cannot receive credit for ENV300X.

Contact: Prof. Robert Krueger
Preferred term: D term
Expected enrollment: 10
Course type: Cat II
Anticipated Instructor: Profs. Robert Krueger

Intended audience: All students interested in a global experience while fulfilling part of their social science requirement. The course would also count for the International and Global Studies program requirements. Students in the CEE would also be interested as the course discusses planning and infrastructure issues.

Rationale:
This course provides another global perspective our students interested in sustainability, civil engineering, urban planning, and energy. It also provides a critical comparative perspective that students will relate to their other coursework.

I have offered this as an ISP over the past three years. Without advertising the course has attracted 1-2 students per year. They have all enjoyed the experience and the

cross-cultural change with the master students at the University of Luxembourg. I did not collect official course evaluations.

Resource Needs:

- This is one of Krueger's areas of expertise and he is available.
- No special class resources are required
- No laboratory space is needed
- Additional library resources, such as books, can come from the ENV budget, maybe $300
- No IT support is required
- Student costs are for air travel and incidentals. The local travel (transport and accomdation) is covered by the University of Luxembourg.

Assessment: The course will be assessed by traditional evaluations as well as student reflection essays that will occur at the beginning of the course, between the course and the field trip, and post field trip.

Impact on Distribution Requirements and Other Courses: Other programs who benefit from this are Global and International Studies, Science Technology Policy, the Planning Track in Civil and Environmental Engineering. The impacts would be beneficial, offering an additional opportunity to learn about thematic content in these broad areas. It would further establish WPI as a Global Polytechnic. Finally, it would create another opportunity for students to have an international experience.

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to drop IMGD/AR 2201: The Art of Animation I

Motion: On behalf of the IMGD program and the Humanities & Arts Department, the Committee on Academic Operation recommends and I move that IMGD/AR 2201: The Art of Animation I be removed from the undergraduate catalog.

Rationale:
This course will be replaced by IMGD/AR 2222: 2D Animation I and IMGD/AR 2333: 3D Animation I (described below).

Until now, IMGD animation courses have been a blend of both 2D and 3D animation assignments. In IMGD/AR 2201: The Art of Animation I, students learned a variety of techniques that applied to both media. By effectively splitting up these courses into specialized animation offerings, students will be able to focus on each respective medium to a higher degree. In addition to allowing for more artistic focus, this will also result in a stronger understanding of each medium and will result in higher quality student work due to the fact they are granted more time within each respective medium.

> **IMGD/AR 2222. 2D Animation I** *Cat I.*
> 2D Animation I teaches students how to draw, pose, breakdown and in-between characters for 2D animation, focusing on weight, balance, timing, and movement to achieve well-structured and fluid animation. Lectures and projects are conducted to train students in the twelve classical animation principles using digital 2D media. Projects and lectures are designed to practice the fundamentals of traditional frame-by-frame and hand-drawn character animation.
> Recommended background: Basic knowledge of figure drawing (AR 2202) and digital art software (AR 1101) is recommended.
>
> **IMGD/AR 2333. 3D Animation I** *Cat I.*
> 3D Animation I teaches students how to use 3D animation software to apply classical animation principles into 3D work. Lectures focus on creating organic and compelling character animation through body mechanics, weight, and dynamic posing in addition to exposing students to learning how to think about character acting and staging within a 3D environment.
> Recommended background: Basic knowledge digital art software (AR 1101) is recommended.
> Suggested background: Basic knowledge of animation (IMGD/AR 2222).

Impact on Distribution Requirements and Other Courses: This course is on the current list of distribution requirements in Visual Art for IMGD Art Track majors. The 2 proposed replacement courses will count as acceptable substitutes for this requirement with the approval of the IMGD Director. For the concurrently-proposed IMGD BA degree, the new courses will be listed in the distribution requirements, but the dropped

IMGD/AR 2201 will be an acceptable alternative for grandfathered students with the approval of the IMGD Director. For students fulfilling their Humanities and Arts requirement in Art, the replacement courses will provide comparable alternatives. No impact on other courses is expected.

WPI currently offers 4 sections per year of Art of Animation I (Cat I). These will be replaced with 2 sections each of 2D Animation I and 3D Animation I. We believe that combined student demand for the new courses will be approximately the same as for the previous Art of Animation I course. The vast majority of students taking Art of Animation I are non-majors, who typically only take three courses in Art and Art History, and have considerable flexibility in their course choices in these areas. The course offerings would fall within the aforementioned faculty's regular teaching loads, so no additional faculty resources are required.

Implementation Date: Implementation date for this action is the 2017-2018 Academic year.

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to drop IMGD/AR 3201: Animation II

Motion: On behalf of the IMGD program and the Humanities & Arts Department, the Committee on Academic Operation recommends and I move that IMGD/AR 3201:Animation II be dropped from the undergraduate catalog.

Rationale:
This course will be replaced by IMGD/AR 3222: 2D Animation II and IMGD/AR 3333: 3D Animation II (described below).

Until now, IMGD animation courses have been a blend of both 2D and 3D animation assignments. In Animation II (IMGD/AR 3201), students learned a variety of techniques that applied to both media. By effectively splitting up these courses into specialized animation offerings, students will be able to focus on each respective medium to a higher degree. In addition to allowing for more artistic focus, this will also result in a stronger understanding of each medium and will result in higher quality student work due to the fact they are granted more time within each respective medium.

IMGD/AR 3222. 2D Animation II *Cat. I.*

This course will build upon the techniques learned in IMGD/AR 2222. Students will learn to apply the animation principles to character animation. Students are taught how to tell a compelling, character-driven story through a focus on character acting techniques such as body language, lip syncing, facial animation, and micro expressions. Additional topics covered may include sprites for games, biped and quadruped animation, and 2D animation pipelines. Students will create animated sequences that are intended to serve a narrative structure for games and other media.

Recommended background: Knowledge of digital 2D animation techniques and classical animation principles (IMGD/AR 2222).

IMGD/AR 3333 3D Animation II *Cat I.*

This course will build upon the techniques learned in IMGD/AR 2333. Students will learn to apply the animation principles with a focus on character acting and cinematic animation. Students are taught how to tell a compelling, character-driven story through a focus on acting techniques such as body language, lip syncing, facial animation, and micro expressions whilst incorporating digital cinematography techniques. Additional topics covered may include creating 3D simulations for hair and cloth, biped and quadruped animation, and 3D animation pipelines. Students will create animated sequences that are intended to serve a narrative structure for games and other media.

Recommended background: Knowledge of digital 3D animation techniques and classical animation principles (IMGD/AR 2333).

Impact on Distribution Requirements and Other Courses: This course is on the current list of distribution requirements in Visual Art for IMGD Art Track majors. The 2 proposed replacement courses will count as acceptable substitutes for this requirement with the approval of the IMGD Director. For the concurrently-proposed IMGD BA degree, the new courses will be listed in the distribution requirements, but the dropped IMGD/AR 3201 will be an acceptable alternative for grandfathered students with the approval of the IMGD Director. For students fulfilling their Humanities and Arts requirement in Art, the replacement courses will provide comparable alternatives. No impact on other courses is expected.

WPI currently offers 2 sections per year of Animation II (Cat I). These will be replaced with 2 sections each of 2D Animation II and 3D Animation II. We believe that combined student demand for the new courses will be approximately the same as for the previous Animation II course. The vast majority of students taking Animation II are non-majors, who typically only take three courses in Art and Art History, and have considerable flexibility in their course choices in these areas. The course offerings would fall within the aforementioned faculty's regular teaching loads, so no additional faculty resources are required.

Implementation Date: Implementation date for this action is the 2017-2018 Academic year.

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to add IMGD/AR: 2222: 2D Animation I

Motion: On behalf of the IMGD program and the Humanities & Arts Department, the Committee on Academic Operation recommends and I move that IMGD/AR 2222: 2D Animation I as described below, be added.

Proposed Course Description:

IMGD/AR 2222. 2D Animation I *Cat I.*
2D Animation I teaches students how to draw, pose, breakdown and in-between characters for 2D animation, focusing on weight, balance, timing, and movement to achieve well-structured and fluid animation. Lectures and projects are conducted to train students in the twelve classical animation principles using digital 2D media. Projects and lectures are designed to practice the fundamentals of traditional frame-by-frame and hand-drawn character animation.
Recommended background: Basic knowledge of figure drawing (AR 2202) and digital art software (AR 1101) is recommended.

Anticipated Instructors: Ralph Sutter, Farley Chery, Edward Gutierrez

Expected enrollment: 48 per year (2 sections of 24)

Intended audience: IMGD Majors; students fulfilling their Humanities & Arts requirement in Art.

Rationale:
Until now IMGD animation courses have been a blend of both 2D and 3D animation assignments. In both Animation I (IMGD/AR 2201) and Animation II (IMGD/AR 3201), students learned a variety of techniques that applied to both media. By effectively splitting up these courses into specialized animation offerings, students will be able to focus on each respective medium to a higher degree. In addition to allowing for more artistic focus, this will also result in a stronger understanding of each medium and will result in higher quality student work due to the fact they are granted more time within each respective medium.

This course, like most digital art courses at WPI, is cross listed as both AR and IMGD, reflecting its relevance to both Humanities & Arts students and IMGD majors.

Implementation Date: Implementation date for this action is the 2017-2018 Academic year.

Resource Needs:
Instructor: This course will be taught by Instructor Ralph Sutter, Assistant Teaching Professor Farley Chery, and Assistant Teaching Professor Edward Gutierrez. WPI currently offers 4 sections per year of Art of Animation I. These will be replaced with 2

sections each of 2D Animation I and 3D Animation I. We believe that combined student demand for the new courses will be approximately the same as for the previous Art of Animation I course. The vast majority of students taking Art of Animation I are non-majors, who typically only take three courses in Art and Art History, and have considerable flexibility in their course choices in these areas. The course offerings would fall within the aforementioned faculty's regular teaching loads, so no additional faculty resources are required.

Classroom: This course will be taught in the IMGD Lab (Fuller 222), which already contains all of the computers and software required.

Library: No additional library resources will be required.

Information Technology: This course will use Adobe Flash/Animate, Adobe Photoshop, and Adobe After Effects. All of this software is part of the Adobe Creative Cloud suite, which is already licensed and installed in the IMGD Lab (FL 222) and the Zoo Lab (FL A21). Both labs are available for IMGD majors and other students taking this course.

Impact on Distribution Requirements and Other Courses: This course will be added to the list of Visual Art courses applicable to the Visual Art concentration of the IMGD BA degree (see concurrent proposal from IMGD). For students fulfilling the current degree requirements, this course will be countable as part of the IMGD Art track Visual Art distribution requirement. For students fulfilling their Humanities and Arts requirement in Art, this course will provide an additional option in the area of Art. No impact on other courses is expected.

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to add IMGD/AR 2333: 3D Animation I

Motion: On behalf of the IMGD program and the Humanities & Arts Department, the Committee on Academic Operation recommends and I move that IMGD/AR 2333: 3D Animation I as described below, be added.

Proposed Course Description:

IMGD/AR 2333. 3D Animation I *Cat I.*
This course teaches students how to use 3D animation software to apply classical animation principles into 3D work. Lectures focus on creating organic and compelling character animation through body mechanics, weight, and dynamic posing in addition to exposing students to learning how to think about character acting and staging within a 3D environment.
Recommended background: Basic knowledge of digital art software (AR 1101) is recommended.
Suggested background: Basic knowledge of animation (IMGD/AR 2222).

Anticipated Instructors: Ralph Sutter, Farley Chery, Edward Gutierrez

Expected enrollment: 48 per year (2 sections of 24)

Intended audience: IMGD Majors; students fulfilling their Humanities & Arts requirement in Art.

Rationale:
Until now, IMGD animation courses have been a blend of both 2D and 3D animation assignments. In both Animation I (IMGD/AR 2201) and Animation II (IMGD/AR 3201), students learned a variety of techniques that applied to both media. By effectively splitting up these courses into specialized animation offerings, students will be able to focus on each respective medium to a higher degree. In addition to allowing for more artistic focus, this will also result in a stronger understanding of each medium and will result in higher quality student work due to the fact they are granted more time within each respective medium.

This course, like most digital art courses at WPI, is cross listed as both AR and IMGD, reflecting its relevance to both Humanities & Arts students and IMGD majors.

Implementation Date: Implementation date for this action is the 2017-2018 Academic year.

Resource Needs:
Instructor: This course will be taught by Instructor Ralph Sutter, Assistant Teaching Professor Farley Chery, and Assistant Teaching Professor Edward Gutierrez. WPI

currently offers 4 sections per year of Art of Animation I. These will be replaced with 2 sections each of 2D Animation I and 3D Animation I. We believe that combined student demand for the new courses will be approximately the same as for the previous Art of Animation I course. The vast majority of students taking Art of Animation I are non-majors, who typically only take three courses in Art and Art History, and have considerable flexibility in their course choices in these areas. The course offerings would fall within the aforementioned faculty's regular teaching loads, so no additional faculty resources are required.

Classroom: This course will be taught in the IMGD Lab (Fuller 222), which already contains all of the computers and software required.

Library: No additional library resources will be required.

Information Technology: This course will use Autodesk Maya, Autodesk 3ds MAX, and Adobe After Effects. All of this software is already licensed and installed in the IMGD Lab (FL 222) and the Zoo Lab (FL A21). Both labs are available for IMGD majors and other students taking this course.

Impact on Distribution Requirements and Other Courses: This course will be added to the list of Visual Art courses applicable to the Visual Art concentration of the IMGD BA degree (see concurrent proposal from IMGD). For students fulfilling the current degree requirements, this course will be countable as part of the IMGD Art track Visual Art distribution requirement. For students fulfilling their Humanities and Arts requirement in Art, this course will provide an additional option in the area of Art. No impact on other courses is expected.

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to add IMGD/AR 3222: 2D Animation II

Motion: On behalf of the IMGD program and the Humanities & Arts Department, the Committee on Academic Operation recommends and I move, that IMGD/AR 3222: 2D Animation II as described below, be added.

Proposed Course Description:

IMGD/AR 3222. 2D Animation II *Cat. I.*
This course will build upon the techniques learned in IMGD/AR 2222. Students will learn to apply the animation principles to character animation. Students are taught how to tell a compelling, character-driven story through a focus on character acting techniques such as body language, lip syncing, facial animation, and micro expressions. Additional topics covered may include sprites for games, biped and quadruped animation, and 2D animation pipelines. Students will create animated sequences that are intended to serve a narrative structure for games and other media.
Recommended background: Knowledge of digital 2D animation techniques and classical animation principles (IMGD/AR 2222).

Anticipated Instructors: Ralph Sutter, Farley Chery, Edward Gutierrez

Expected enrollment: 24 per year

Intended audience: IMGD Majors; students fulfilling their Humanities & Arts requirement in Art.

Rationale:
Until now, IMGD animation courses have been a blend of both 2D and 3D animation assignments. In both Animation I (IMGD/AR 2201) and Animation II (IMGD/AR 3201), students learned a variety of techniques that applied to both media. By effectively splitting up these courses into specialized animation offerings, students will be able to focus on each respective medium to a higher degree. In addition to allowing for more artistic focus, this will also result in a stronger understanding of each medium and will result in higher quality student work due to the fact they are granted more time within each respective medium.

This course, like most digital art courses at WPI, is cross listed as both AR and IMGD, reflecting its relevance to both Humanities & Arts students and IMGD majors.

Implementation Date: Implementation date for this action is the 2017-2018 Academic year.

Resource Needs:
Instructor: This course will be taught by Instructor Ralph Sutter, Assistant Teaching Professor Farley Chery, and Assistant Teaching Professor Edward Gutierrez. WPI

currently offers 2 sections per year of Animation II. These will be replaced with 1 section each of 2D Animation II and 3D Animation II. We believe that combined student demand for the new courses will be approximately the same as for the previous Animation II course. The vast majority of students taking Animation II are non-majors, who typically only take three courses in Art and Art History, and have considerable flexibility in their course choices in these areas. The course offerings would fall within the aforementioned faculty's regular teaching loads, so no additional faculty resources are required.

Classroom: This course will be taught in the IMGD Lab (Fuller 222), which already contains all of the computers and software required.

Library: No additional library resources will be required.

Information Technology: This course will use Adobe Flash/Animate, Adobe Photoshop, and Adobe After Effects. All of this software is part of the Adobe Creative Cloud suite, which is already licensed and installed in the IMGD Lab (FL 222) and the Zoo Lab (FL A21). Both labs are available for IMGD majors and other students taking this course.

Impact on Distribution Requirements and Other Courses: This course will be added to the list of Visual Art courses applicable to the Visual Art concentration of the IMGD BA degree (see concurrent proposal from IMGD). For students fulfilling the current degree requirements, this course will be countable as part of the IMGD Art track Visual Art distribution requirement. For students fulfilling their Humanities and Arts requirement in Art, this course will provide an additional option in the area of Art. No impact on other courses is expected.

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to add IMGD/AR 3333: 3D Animation II

Motion: On behalf of the IMGD program and the Humanities & Arts program, the Committee on Academic Operation recommends and I move that IMGD/AR 3333: 3D Animation II as described below, be added.

Proposed Course Description

IMGD/AR 3333. 3D Animation II *Cat I.*
This course will build upon the techniques learned in IMGD/AR 2333. Students will learn to apply the animation principles with a focus on character acting and cinematic animation. Students are taught how to tell a compelling, character-driven story through a focus on acting techniques such as body language, lip syncing, facial animation, and micro expressions whilst incorporating digital cinematography techniques. Additional topics covered may include creating 3D simulations for hair and cloth, biped and quadruped animation, and 3D animation pipelines. Students will create animated sequences that are intended to serve a narrative structure for games and other media. Recommended background: Knowledge of digital 3D animation techniques and classical animation principles (IMGD/AR 2333).

Anticipated Instructors: Ralph Sutter, Farley Chery, Edward Gutierrez

Expected enrollment: 24 per year

Intended audience: IMGD Majors; students fulfilling their Humanities & Arts requirement in Art.

Rationale: Until now, IMGD animation courses have been a blend of both 2D and 3D animation assignments. In both Animation I (IMGD/AR 2201) and Animation II (IMGD/AR 3201), students learned a variety of techniques that applied to both media. By effectively splitting up these courses into specialized animation offerings, students will be able to focus on each respective medium to a higher degree. In addition to allowing for more artistic focus, this will also result in a stronger understanding of each medium and will result in higher quality student work due to the fact they are granted more time within each respective medium.

This course, like most digital art courses at WPI, is cross listed as both AR and IMGD, reflecting its relevance to both Humanities & Arts students and IMGD majors.

Implementation Date: Implementation date for this action is the 2017-2018 Academic year.

Resource Needs:
Instructor: This course will be taught by Instructor Ralph Sutter, Assistant Teaching Professor Farley Chery, and Assistant Teaching Professor Edward Gutierrez. WPI

currently offers 2 sections per year of Animation II. These will be replaced with 1 section each of 2D Animation II and 3D Animation II. We believe that combined student demand for the new courses will be approximately the same as for the previous Animation II course. The vast majority of students taking Animation II are non-majors, who typically only take three courses in Art and Art History, and have considerable flexibility in their course choices in these areas. The course offerings would fall within the aforementioned faculty's regular teaching loads, so no additional faculty resources are required.

Classroom: This course will be taught in the IMGD Lab (Fuller 222), which already contains all of the computers and software required.

Library: No additional library resources will be required.

Information Technology: This course will use Autodesk Maya, Autodesk 3ds MAX, and Adobe After Effects. All of this software is already licensed and installed in the IMGD Lab (FL 222) and the Zoo Lab (FL A21). Both labs are available for IMGD majors and other students taking this course.

Impact on Distribution Requirements and Other Courses: This course will be added to the list of Visual Art courses applicable to the Visual Art concentration of the IMGD BA degree (see concurrent proposal from IMGD). For students fulfilling the current degree requirements, this course will be countable as part of the IMGD Art track Visual Art distribution requirement. For students fulfilling their Humanities and Arts requirement in Art, this course will provide an additional option in the area of Art. No impact on other courses is expected.

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to Revise the IMGD Major

Motion: On behalf of the Interactive Media and Game Development Program, the Committee on Academic Operation recommends and I move that the current IMGD major be revised as described below.

Proposed Distribution Requirements (BA)

The distribution requirements for the revised IMGD major are summarized in Table 1. Descriptions and rationales for each distribution area are provided below.

Ref	IMGD Major Distribution Requirements	Units
1	IMGD Core*	2/3
2	IMGD Design*	1/3
3	IMGD Audio*	1/3
4	IMGD Social & Philosophical Issues*	1/3
5	Cultural Narratives*	1/3
6	Visual Arts*	1/3
7	Natural & Engineering Sciences*	2/3
8	General Sciences	1/3
9	Mathematics & Data Analysis	1/3
10	Computer Science	2/3
11	IMGD	8/3
12	IMGD Focus Pair	2/3
13	IMGD Electives	4/3
	Major Qualifying Project	3/3
	Total	30/3

Table 1. Proposed IMGD major distribution requirements.

Distribution areas marked with an asterisk (*) in the above table are identical to their counterparts in the proposed IMGD Technology major (described in an accompanying motion). This overlap is intended to afford efficient use of faculty and physical resources, and to maximize opportunities for collaboration between students working in various IMGD disciplines.

Description (and brief rationale) for the distribution requirements of the revised IMGD major.

1. IMGD Core (2/3 Units)
Students choose 2/3 units from:

- Critical Studies of Interactive Media & Games (IMGD 1000)
- The Game Development Process (IMGD 1001)
- Storytelling in Interactive Media & Games (IMGD 1002)

Introduces students to basic concepts and processes related to the development and analysis of games and interactive media.

2. IMGD Design (1/3 Unit)
Students choose 1/3 unit from:

- Design of Tabletop Strategy Games (IMGD 2500)
- Digital Game Design I (IMGD 2900)
- Digital Game Design II (IMGD 3900)
- History & Future of Immersive & Interactive Media (IMGD 4200 or 5200, but not both)
- Serious Games (IMGD 4600)
- Advanced Storytelling: Quest Logic & Level Design (IMGD 4700)
- Digital Game Design Studio (IMGD 4900)
- Game Design Studio (IMGD 5000)
- Design of Interactive Experiences (IMGD 5300)
- User Experience & Design (MIS 4741)
- User Experience Applications (MIS 583)

Knowledge of design principles is critical to any creative discipline. This requirement insures that all IMGD majors will be exposed to the fundamental theories and practice of design.

3. IMGD Audio (1/3 Unit)
Students choose 1/3 unit from:

- Game Audio I (IMGD 2030)
- Game Audio II (IMGD 3030)

Offers hands-on experience with the tools and techniques of digital audio production, a significant component of games and interactive media.

4. IMGD Social & Philosophical Issues (1/3 Unit)
Students choose 1/3 from:

- Social Issues in Interactive Media Games (IMGD 2000)
- Philosophy & Ethics of Computer Games (IMGD 2001)

Provides opportunities for critical thinking about the increasingly profound social and philosophical impact of games and interactive media.

5. Cultural Narratives (1/3 Unit)
Students choose 1/3 unit from any course with an EN, PY or RE prefix.

Studies the formation and transmission of culture through narrative, a critical skill in creative disciplines related to IMGD.

6. Visual Arts (1/3 Unit)
Students choose 1/3 unit from:

- Essentials of Art (AR 1100)
- Digital Imaging & Computer Art (AR 1101)
- Graphic Design (AR 2301)

Acquaints all IMGD majors with the fundamentals of visual art and design, which are significant components of games and interactive media.

7. Natural & Engineering Sciences (2/3 Units)
Choose two (2) courses with an AE, BB, BME, CHE, CE, CH, ECE, ES, GE, ME, PH or RBE prefix.

Satisfies WPI's institutional requirement for 2/3 units in the Natural/Engineering Sciences.

8. General Sciences (1/3 Unit)
Students choose 1/3 unit from any course with a CS, MA, AE, BB, BME, CHE, CE, CH, ECE, ES, GE, ME, PH or RBE prefix (except CS 2022, Discrete Mathematics or CS 3043, Social Implications of Information Processing).

9. Mathematics and Data Analysis (1/3 Unit)
Students choose 1/3 unit from:

- Data Analysis for Game Development (IMGD 2905)
- Any course with an MA prefix

This, together with the General Sciences requirement above, provides IMGD majors with broad options for exploring mathematics and the sciences, and satisfies WPI's institutional requirement for 6/3 total units in the Quantitative and Natural/Engineering Sciences.

10. Computer Science (2/3 Units)
Students choose 2/3 units from any course with a CS prefix (except CS 2022, Discrete Mathematics or CS 3043, Social Implications of Information Processing).

Introduces concepts and practices of software engineering (the technological backbone of all interactive media), and satisfies WPI's institutional requirement for 2/3 units in the Quantitative Sciences.

11. General IMGD (8/3 Units)
Students choose 8/3 units from any courses with an IMGD prefix, which must include:

- 1/3 unit of any 1000+ level IMGD course
- 3/3 unit of any 2000+ level IMGD course
- 2/3 units of any 3000+ level IMGD courses
- 2/3 units of any 4000+ level IMGD courses

An opportunity to master concepts and methods across a wide range of IMGD topics, some in significant depth.

12. IMGD Focus Pair (2/3 Units)
Students choose 2/3 units from one of the following IMGD course pairs:

- **Technical Art**
  - Technical Game Development I & II (IMGD 3000 + 4000)
- **Visual Art**
  - Artistic Game Development I & II (IMGD 3500 + 4500)
- **Design**
  - Digital Game Design II & Digital Game Design Studio (IMGD 3900 + 4900)

Develops specialized skill in one of three key areas of interactive media and game development: technical art, visual art or design. Also provides opportunities to collaborate on projects with students working in various IMGD disciplines.

13. IMGD Electives (4/3 Units)
Students choose 4/3 units from any courses with an IMGD, AR, EN, WR, MU or CS prefix (except CS 2022, Discrete Mathematics or CS 3043, Social Implications of Information Processing), at least 2/3 of which must be 3000+ level.

Allows students the flexibility to explore a range of disciplines closely related to the development of interactive media and games.

IMGD Concentrations

Students pursuing the proposed IMGD major may, at their option, choose to focus in one of three topics of concentration:

- Visual Art
- Design
- Technical Art

Concentrations are a formal degree designation (noted on a student's transcript), earned by completing a topic-specific selection of 6/3 units drawn from the IMGD Focus Pair and IMGD Electives (see 3.12 and 3.13 above).

In accordance with WPI policy, a student's contribution to their Major Qualifying Project (MQP) must incorporate substantial content/effort in their area of concentration.

1. Visual Art Concentration
Students taking the IMGD Visual Arts Concentration must:

1. Satisfy the 2/3 units IMGD Focus Pair requirement by choosing Artistic Game Development I & II (IMGD 3500 + 4500).
2. Satisfy the 4/3 units IMGD Electives requirement by choosing:
   - 1/3 unit from:
     - Essentials of Art (AR 1100)
     - Digital Imaging & Computer Art (AR 1101)
     - Graphic Design (AR 2301)
   - 1/3 unit from any of:
     - Introduction to Art History (AR 1111)
     - Modern Art (AR 2111)
     - Modern Architecture in the American Era (AR 2114)
     - Modernism, Mass Culture & the Avant-Garde (AR 3112)
     - Light, Vision & Understanding (AR 3150)
   - 2/3 units from any of:
     - 3D Modeling II (IMGD/AR 3101)
     - Interactive Electronic Arts (IMGD/AR 3200)
     - 2D Animation II (IMGD/AR 3222)
     - 3D Animation II (IMGD/AR 3333)
     - Concept Art & Creative Illustration (IMGD/AR 3700)
3. Contribute substantially to the visual art aspects of their Major Qualifying Project.

2. Design Concentration
Students taking the IMGD Design Concentration must:

1. Satisfy the 2/3 units IMGD Focus Pair requirement by choosing Digital Game Design II and Digital Game Design Studio (IMGD 3900 + 4900).
2. Satisfy the 4/3 units IMGD Electives requirement by choosing:
   - 2/3 units from any 2000+ WR courses, or any IMGD writing-oriented courses subject to program approval.
   - 2/3 units from:
     - History & Future of Immersive & Interactive Media (IMGD 4200 or 5200, but not both)
     - Serious Games (IMGD 4600)
     - Advanced Storytelling: Quest Logic & Level Design (IMGD 4700)
     - Digital Game Design Studio (IMGD 4900)
     - Game Design Studio (IMGD 5000)
     - Design of Interactive Experiences (IMGD 5300)
     - User Experience & Design (MIS 4741)
     - User Experience Applications (MIS 583)
3. Contribute substantially to the design aspects of their Major Qualifying Project.

3. Technical Art Concentration

Students taking the IMGD Technical Art Concentration must:

1. Satisfy the 2/3 units IMGD Focus Pair requirement by choosing Artistic Game Development I & II (IMGD 3500 + 4500).
2. Satisfy the 4/3 units IMGD Electives requirement by choosing:
   - 1/3 unit from any course with a CS prefix (except CS 2022, Discrete Mathematics or CS 3043, Social Implications of Information Processing)
   - 3/3 units from:
     - Technical Art and Character Rigging (IMGD 2048)
     - 3D Modeling II (IMGD/AR 3101)
     - Interactive Electronic Arts (IMGD/AR 3200)
     - 3D Animation II (IMGD/AR 3333)
3. Contribute substantially to the technical art aspects of their Major Qualifying Project.

Proposed Catalog Description

It is proposed that the structure and distribution requirements of the revised IMGD major be formally documented by the following language in WPI's undergraduate catalog, prefaced by the revised IMGD Program header proposed in an accompanying motion.

Interactive Media and Game Development (Bachelor of Arts)

Distribution requirements for the IMGD Major

REQUIREMENTS	MINIMUM UNITS

IMGD Core **2/3**

Choose 2/3 units from:

- Critical Studies of Interactive Media and Games (IMGD 1000)
- The Game Development Process (IMGD 1001)
- Storytelling in Interactive Media and Games (IMGD 1002)

IMGD Design **1/3**

Choose 1/3 unit from:

- Design of Tabletop Strategy Games (IMGD 2500)
- Digital Game Design I (IMGD 2900)
- Digital Game Design II (IMGD 3900)
- History & Future of Immersive & Interactive Media (IMGD 4200 or 5200, but not both)
- Serious Games (IMGD 4600)
- Advanced Storytelling: Quest Logic & Level Design (IMGD 4700)
- Digital Game Design Studio (IMGD 4900)
- Game Design Studio (IMGD 5000)
- Design of Interactive Experiences (IMGD 5300)
- User Experience & Design (MIS 4741)
- User Experience Applications (MIS 583)

IMGD Audio **1/3**

Choose 1/3 unit from one of:

- Game Audio I (IMGD 2030)
- Game Audio II (IMGD 3030)

IMGD Social & Philosophical Issues **1/3**

Choose 1/3 unit from:

- Social Issues in Interactive Media Games (IMGD 2000)
- Philosophy & Ethics of Computer Games (IMGD 2001)

Cultural Narratives **1/3**
Choose 1/3 unit from any course with an EN, PY or RE prefix.

Visual Arts **1/3**
Choose 1/3 unit from one of:

- Essentials of Art (AR 1100)
- Digital Imaging & Computer Art (AR 1101)
- Graphic Design (AR 2301)

Natural & Engineering Sciences **2/3**
Choose 1/3 unit from any course with an AE, BB, BME, CHE, CE, CH, ECE, ES, GE, ME, PH or RBE prefix.

General Sciences **1/3**
Choose 1/3 unit from any course with a CS, MA, AE, BB, BME, CHE, CE, CH, ECE, ES, GE, ME, PH or RBE prefix (except CS 2022 or CS 3043).

Mathematics and Data Analysis **1/3**
Choose 1/3 unit from:

- Data Analysis for Game Development (IMGD 2905)
- Any course with an MA prefix

Computer Science **2/3**
Choose 2/3 units from any course with a CS prefix (except CS 2022 or CS 3043).

General IMGD **8/3**
Choose 8/3 units from any course with an IMGD prefix, which must include:

- 1/3 unit of any 1000+ level IMGD course
- 3/3 unit of any 2000+ level IMGD course
- 2/3 units of any 3000+ level IMGD courses
- 2/3 units of any 4000+ level IMGD courses

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

- **Technical Art**
  - Technical Game Development I & II (IMGD 3000 + 4000)
- **Visual Art**
  - Artistic Game Development I & II (IMGD 3500 + 4500)
- **Design**

- Digital Game Design II & Digital Game Design Studio (IMGD 3900 + 4900)

IMGD Electives **4/3**
Choose 4/3 units from any courses with an IMGD, AR, EN, WR, MU or CS prefix (except CS 2022 or CS 3043), at least 2/3 of which must be 3000+ level.

Major Qualifying Project **3/3**

TOTAL DEGREE UNITS **30/3**

NOTE: IMGD majors may not earn a double major in IMGD Technology.

IMGD Concentrations

Students pursuing the proposed IMGD major may, at their option, choose to focus in one of three topics of concentration:

- Visual Art
- Design
- Technical Art

Concentrations are a formal degree designation (noted on a student's transcript), earned by completing a topic-specific selection of 6/3 units drawn from the IMGD Focus Pair and IMGD Electives (see 3.12 and 3.13 above).

In accordance with WPI policy, a student's contribution to their Major Qualifying Project (MQP) must incorporate substantial content/effort in their area of concentration.

1. Visual Art Concentration

Students taking the IMGD Visual Arts Concentration must:

4. Satisfy the 2/3 units IMGD Focus Pair requirement by choosing Artistic Game Development I & II (IMGD 3500 + 4500).
5. Satisfy the 4/3 units IMGD Electives requirement by choosing:
   - 1/3 unit from:
     - Essentials of Art (AR 1100)
     - Digital Imaging & Computer Art (AR 1101)
     - Graphic Design (AR 2301)
   - 1/3 unit from any of:
     - Introduction to Art History (AR 1111)
     - Modern Art (AR 2111)
     - Modern Architecture in the American Era (AR 2114)
     - Modernism, Mass Culture & the Avant-Garde (AR 3112)
     - Light, Vision & Understanding (AR 3150)
   - 2/3 units from any of:

    - 3D Modeling II (IMGD/AR 3101)
    - Interactive Electronic Arts (IMGD/AR 3200)
    - 2D Animation II (IMGD/AR 3222)
    - 3D Animation II (IMGD/AR 3333)
    - Concept Art & Creative Illustration (IMGD/AR 3700)
6. Contribute substantially to the visual art aspects of their Major Qualifying Project.

2. Design Concentration
Students taking the IMGD Design Concentration must:

4. Satisfy the 2/3 units IMGD Focus Pair requirement by choosing Digital Game Design II and Digital Game Design Studio (IMGD 3900 + 4900).
5. Satisfy the 4/3 units IMGD Electives requirement by choosing:
    - 2/3 units from any 2000+ WR courses, or any IMGD writing-oriented courses subject to program approval.
    - 2/3 units from:
        - History & Future of Immersive & Interactive Media (IMGD 4200 or 5200, but not both)
        - Serious Games (IMGD 4600)
        - Advanced Storytelling: Quest Logic & Level Design (IMGD 4700)
        - Digital Game Design Studio (IMGD 4900)
        - Game Design Studio (IMGD 5000)
        - Design of Interactive Experiences (IMGD 5300)
        - User Experience & Design (MIS 4741)
        - User Experience Applications (MIS 583)
6. Contribute substantially to the design aspects of their Major Qualifying Project.

3. Technical Art Concentration
Students taking the IMGD Technical Art Concentration must:

4. Satisfy the 2/3 units IMGD Focus Pair requirement by choosing Artistic Game Development I & II (IMGD 3500 + 4500).
5. Satisfy the 4/3 units IMGD Electives requirement by choosing:
    - 1/3 unit from any course with a CS prefix (except CS 2022, Discrete Mathematics or CS 3043, Social Implications of Information Processing)
    - 3/3 units from:
        - Technical Art and Character Rigging (IMGD 2048)
        - 3D Modeling II (IMGD/AR 3101)
        - Interactive Electronic Arts (IMGD/AR 3200)
        - 3D Animation II (IMGD/AR 3333)
6. Contribute substantially to the technical art aspects of their Major Qualifying Project.

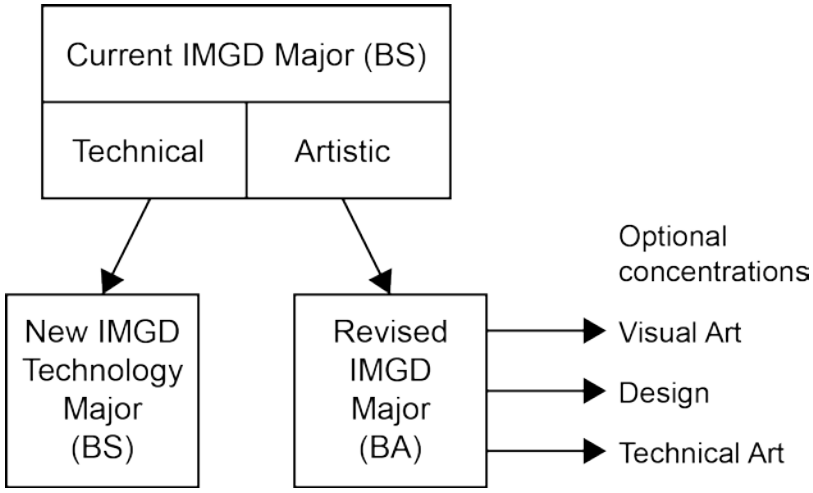
Rationale:

Why a revised major with a BA?

The current IMGD major offers a Bachelor of Science degree. It is divided into two interest areas or "tracks," Technical (focused on software engineering) and Artistic (concentrating on the production of visual art assets).

However, the field of IMGD encompasses many other skill sets (including design and asset/pipeline management) of critical importance to both prospective students and their future employers. Faculty hires over the past decade have substantially expanded IMGD's course offerings in these key competency areas. Despite this expansion, students wishing to specialize in anything except software engineering or visual art are underserved by the program's current structure.

The revised major described in this proposal is intended to broaden the scope and appeal of the IMGD program, expanding it to address the evolving needs and expectations of both students and industry.



For students interested in the software engineering aspects of IMGD, a new IMGD Technical major offering a Bachelor of Science degree replaces the Technical area in the current IMGD major. Details of this proposed major are provided in an accompanying motion.

The Artistic area of the current IMGD major is replaced by a revised IMGD major offering a Bachelor of Arts degree, with optional concentrations in Visual Art, Design and Technical Art. It is intended to attract students seeking a flexible, multidisciplinary course of study focused on the creative aspects of IMGD.

NOTE: IMGD majors will not be allowed to double-major in IMGD Technology.

Learning Outcomes

We have compared the intended outcomes for the revised IMGD major with the intended outcomes for all WPI undergraduates as endorsed by the WPI Faculty on May 20, 2004. This comparison is provided in Table 3.

WPI Undergraduate Outcomes	IMGD Outcomes	Implementation
Have a base of knowledge in mathematics, science, and humanistic studies.	2, 3, 4	The distribution requirements include required coursework in Mathematics, Computer Science, Natural and Engineering Sciences, Language and Visual Arts.
Have mastered fundamental concepts and methods in their principal areas of study.	1, 3	Fundamental IMGD concepts and methods are presented and practiced in required IMGD core and advanced courses.
Understand and employ current technological tools.	1, 3	Skills with IMGD-related technology and tools are acquired through required IMGD core and advanced courses, and the Major Qualifying Project.
Be effective in oral, written and visual communication.	6	Oral, written and visual communication skills are acquired through presentation assignments and class discussions in IMGD core and advanced courses, including a required oral MQP presentation.
Function effectively both individually and on teams.	7, 8, 9, 10	IMGD core and advanced courses often incorporate group project assignments, with frequent opportunities for collaboration between students working in different IMGD disciplines.
Be able to identify, analyze, and solve problems creatively through sustained critical investigation.	3, 4, 5	Critical thinking and creative problem-solving are addressed by the increasing demands placed on students to achieve these goals throughout the program, culminating in the MQP.
Be able to make connections between disciplines and to integrate information from multiple sources.	2, 3, 4, 5	The distribution requirements integrate knowledge obtained from both the humanities (language and visual arts, design and audio/music) and quantitative sciences (mathematics and data analysis, computer science).
Be aware of how their decisions affect and are affected by other individuals separated by time, space, and culture.	3, 4	The Social and Philosophical Issues requirement and the IQP provide students with an understanding of how IMGD technologies and practices intersect with and impact society and culture.
Be aware of personal, societal, and professional ethical standards.	4, 7, 8, 9, 10	The Social and Philosophical Issues requirement, IQP and MQP provide knowledge of personal, societal, and professional ethical standards related to IMGD.
Have the skills, diligence, and commitment to excellence needed to engage in lifelong learning.	5, 6, 7, 9, 10	Lifelong learning is achieved by the totality of the IMGD program experience, particularly by expecting students to take personal responsibility for course selection and the successful completion of their academic responsibilities.

Table 3. WPI and revised IMGD major learning outcomes.

Resource Impact
The proposed revision to the IMGD major requires no change in current IMGD, CS or HU&A faculty count or physical/administrative resources. It continues to serve the same number of students at WPI per term.

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

Implementation Date
The proposed Implementation date for this action is the 2017-18 Academic Year.

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to add an IMGD Technology Major

Motion: On behalf of the Interactive Media and Game Development Program, the Committee on Academic Operation recommends and I move, the addition of an IMGD Technology major to the IMGD program, as described below

Current Distribution Requirements (BS)

The distribution requirements for the current IMGD major are summarized in Table 1.

Current Requirements	Units
IMGD Core	2/3
Game Audio	1/3
IMGD Social & Philosophical Issues	1/3
English	1/3
Studio Art	1/3
Sciences	1/3
Mathematics & Data Analysis	1/3
Computer Science	1/3
IMGD	5/3
Technical or Visual Arts Area	10/3
IMGD Electives	3/3
Major Qualifying Project	3/3
Total	30/3

Table 1. Current IMGD major requirements.

Proposed Distribution Requirements (BS)

The proposed distribution requirements of the IMGD Technology major are summarized in Table 2.

Differences from the requirements of the existing IMGD major are noted inline, with detailed explanations for each revision provided in Section 3 (Rationale) below.

Revised Requirements	Units	Notes [explained in Rationale below]
IMGD Core	2/3	
IMGD Design	1/3	Added [Rationale #1]
IMGD Audio	1/3	
IMGD Social & Philosophical Issues	1/3	
~~English~~ Cultural Narratives	1/3	Renamed; qualifying prefixes modified [Rationale #2]
~~Studio Art~~ Visual Arts	1/3	Renamed; course specifiers modified [Rationale #3]
Natural & Engineering Sciences	2/3	Renamed; 1/3 unit added [Rationale #4]
Mathematics & Data Analysis	2/3	1/3 unit added [Rationale #5]
~~Computer Science~~	~~1/3~~	Consolidated into Computer Science section below
IMGD	5/3	Course specifiers modified [rationale #6]
~~Technical or Visual Arts Area~~ Computer Science	11/3	Renamed; 1/3 unit added; Visual Arts Area removed; course specifiers modified [Rationale #7]
~~IMGD Electives~~	~~3/3~~	Removed (associated units replaced by above revisions)
Major Qualifying Project	3/3	
Total	30/3	

Table 2. Proposed IMGD Technology major distribution requirements.

Proposed Catalog Description

It is proposed that the structure and distribution requirements of the new IMGD Technology Major be formally documented by the following language in WPI's undergraduate catalog, prefaced by the revised IMGD Program header proposed in an accompanying motion.

The language to be replaced is included for reference as Appendix 1 of this motion.

Interactive Media and Game Development Technology (Bachelor of Science)

Distribution requirements for the IMGD Technology Major

REQUIREMENTS	MINIMUM UNITS
IMGD Core	**2/3**

Choose 2/3 units from:

- Critical Studies of Interactive Media & Games (IMGD 1000)
- The Game Development Process (IMGD 1001)
- Storytelling in Interactive Media & Games (IMGD 1002)

IMGD Design **1/3**

Choose 1/3 unit from:

- Design of Tabletop Strategy Games (IMGD 2500)
- Digital Game Design I (IMGD 2900)
- Digital Game Design II (IMGD 3900)
- History & Future of Immersive & Interactive Media (IMGD 4200 or 5200, but not both)
- Serious Games (IMGD 4600)
- Advanced Storytelling: Quest Logic & Level Design (IMGD 4700)
- Digital Game Design Studio (IMGD 4900)
- Game Design Studio (IMGD 5000)
- Design of Interactive Experiences (IMGD 5300)
- User Experience & Design (MIS 4741)
- User Experience Applications (MIS 583)

IMGD Audio **1/3**

Choose 1/3 unit from:

- Game Audio I (IMGD 2030)
- Game Audio II (IMGD 3030)

IMGD Social & Philosophical Issues 1/3
Choose 1/3 unit from:

- Social Issues in Interactive Media Games (IMGD 2000)
- Philosophy & Ethics of Computer Games (IMGD 2001)

Cultural Narratives 1/3
Choose 1/3 unit from any course with an EN, PY or RE prefix.

Visual Arts 1/3
Choose 1/3 unit from:

- Essentials of Art (AR 1100)
- Digital Imaging and Computer Art (AR 1101)
- Graphic Design (AR 2301)

Natural & Engineering Sciences 2/3
Choose 2/3 units from any courses with an AE, BB, BME, CHE, CE, CH, ECE, ES, GE, ME, PH or RBE prefix.

Mathematics and Data Analysis 2/3
Choose 2/3 units from:

- Data Analysis for Game Development (IMGD 2905)
- Any courses with an MA prefix

General IMGD 5/3
Choose 5/3 units from any courses with an IMGD prefix, which must include:

- 1/3 unit of any 1000+ IMGD course
- 1/3 unit from one of:
    - Novel Interfaces for Interactive Environments (IMGD 3100)
    - Artificial Intelligence for Interactive Media & Games (IMGD/CS 4100)
- Technical Game Development I (IMGD 3000)
- Technical Game Development II (IMGD 4000)
- 1/3 unit of any 4000+ IMGD course

Computer Science 11/3
Choose 11/3 units from any courses with a CS prefix, which must include:

- 5/3 units of any CS courses
- Any 3/3 units from:
    - Operating Systems (CS 3013)
    - Human-Computer Interaction (CS 3041)
    - Database Systems I (CS 3431)
    - Computer Networks (CS 3516)
    - Software Engineering (CS 3733)

- Any 3/3 units from:
    - Object-Oriented Analysis & Design (CS 4233)
    - Webware: Computational Technology for Network Information Systems (CS 4241)
    - Introduction to Artificial Intelligence (CS 4341)
    - Data Mining & Knowledge Discovery in Databases (CS 4445)
    - Mobile & Ubiquitous Computing (CS 4518)
    - Computer Graphics (CS 4731)
    - Computer Animation (CS 4732)

Computer Science Notes

1. Only CS 1101, CS 1102 and CS courses at the 2000-level or higher can be counted towards the Computer Science requirements.

2. Only one of CS 1101 and CS 1102 may count towards the Computer Science requirement.

3. Only one of CS 2301 and CS 2303 may count towards the Computer Science requirements.

4. CS 2119 or CS 3043 cannot be chosen to satisfy the Computer Science course requirements.

5. Any AP credits earned in Computer Science cannot be applied to the 30/3 unit distribution requirements of the IMGD BS degree. CS AP credit can be applied to the 3/3 Unrestricted Electives units available outside the degree-specific distribution.

Major Qualifying Project	**3/3**
TOTAL DEGREE UNITS	**30/3**

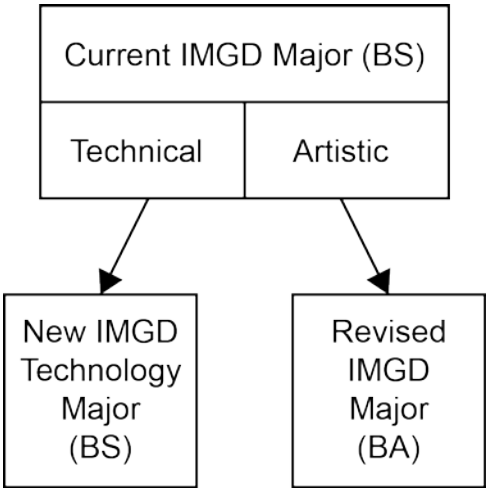
NOTE: IMGD Technology majors may not earn a double major in IMGD.

Rationale

WPI's IMGD major is currently divided into two interest areas: Technical (focused on software engineering) and Artistic (concentrating on the production of visual art assets).

However, the field of IMGD encompasses many other critical skill sets (such as design, asset/pipeline management, writing, audio/music) of interest to both prospective students and their future employers. Faculty hires over the past decade have substantially expanded IMGD's course offerings in these key competency areas. Despite this expansion, students wishing to specialize in anything except software engineering and visual art are underserved by the program's current structure.

This proposal separates the Artistic area into a revised IMGD major (described in an accompanying motion), and replaces the Technical area with a new IMGD Technology major, modified to meet the demands of current industry practice.



NOTE: IMGD Technology majors will not be allowed to double-major in IMGD.

Rationales for the changes to the distribution requirements of the existing IMGD major to accommodate the proposed IMGD Technology major are as follows:

1. IMGD Design

Knowledge of design principles is critical to any creative discipline. Although the IMGD program currently offers six permanent courses in design, none are explicitly required.

Many IMGD students (especially IMGD/CS double majors, about 1/3 of the IMGD population) have difficulty fitting a design course into their schedule. The addition of a 1/3 unit IMGD Design requirement insures that all BS majors will be exposed to the fundamental theories and practice of design.

2. Cultural Narratives

The current IMGD major requires students to take 1/3 unit in any course with an EN or WR prefix. However, many of the WR courses offered by HU&A are focused on the technical/professional aspects of writing. The proposed IMGD Technology major

specifies 1/3 unit in any course with an EN, PY or RE prefix to focus students on the study of cultural transmission through narrative, knowledge of which is critical in creative disciplines.

3. Visual Arts
The current IMGD major requires students to take 1/3 unit of either Essentials of Art (AR 1100) or Digital Imaging and Computer Art (AR 1101). The proposed IMGD Technology major adds the recently-approved permanent course on Graphic Design (AR 2301) to this list to accommodate a wider range of student interest and prior experience.

4. Natural and Engineering Sciences
The current IMGD major requires students to take 1/3 unit of any Natural and Engineering Science (AE, BB, BME, CHE, CE, CH, ECE, ES, GE, ME, PH or RBE). The proposed IMGD Technology major adds an additional 1/3 unit to bring the major in line with institutional degree requirements.

5. Mathematics and Data Analysis
The current IMGD major requires 1/3 unit of either Data Analysis for Game Development (IMGD 2905) or any course with an MA prefix. The proposed IMGD Technology major adds an additional 1/3 unit to increase student engagement with mathematics.

6. IMGD Revisions
The current IMGD major requires 5/3 units of IMGD-prefixed courses, with students in the Technical area required to take Technical Game Development I and II (IMGD 3000 and 4000). The proposed IMGD Technology major increases the software engineering focus by requiring that 1/3 unit be selected from either Novel Interfaces for Interactive Environments (IMGD 3100) or Artificial Intelligence for Interactive Media & Games (IMGD/CS 4100), and improves the rigor of the requirements by specifying that another 1/3 unit must be IMGD 4000 level or higher.

7. Computer Science Revisions
The current IMGD major requires students to select either a Technical or Artistic area of interest, and complete 11/3 units specialized in the chosen area.

The proposed IMGD Technology major completely removes the Artistic area option, instead specifying a revised mix of Computer Science courses.

The existing Technical area requires 11/3 units of Computer Science, including 4/3 units chosen from:

- Human-Computer Interaction (CS 3041)
- Computer Networks (CS 3516)
- Software Engineering (CS 3733)
- Object-Oriented Analysis and Design (CS 4233)
- Introduction to Artificial Intelligence (CS 4341)
- Computer Architecture (CS 4515)
- Advanced Computer Networks (CS 4516)

- Computer Graphics (CS 4731)
- Computer Animation (CS 4732)

The proposed major retains the 11/3 unit requirement. However, it increases the rigor of the selection (ten 2000+ level courses instead of four), and revises the advanced-level course specifiers to (1) improve their alignment with current IMGD industry expectations, and (2) include several new IMGD-relevant courses now being offered by the CS department:

- 5/3 units of any CS courses
- Any 3/3 units from:
  - Operating Systems (CS 3013)
  - Human-Computer Interaction (CS 3041)
  - Database Systems I (CS 3431)
  - Computer Networks (CS 3516)
  - Software Engineering (CS 3733)
- Any 3/3 units from:
  - Object-Oriented Analysis & Design (CS 4233)
  - Webware: Computational Technology for Network Information Systems (CS 4241)
  - Introduction to Artificial Intelligence (CS 4341)
  - Data Mining & Knowledge Discovery in Databases (CS 4445)
  - Mobile & Ubiquitous Computing (CS 4518)
  - Computer Graphics (CS 4731)
  - Computer Animation (CS 4732)

Certain entry-level and non-technical CS courses are explicitly excluded from satisfying the above requirements. In addition, to avoid confusion for IMGD Technology/CS double majors, we revised the handling of AP and redundant 1000- and 2000-level Computer Science credits to be consistent with how these are handled in the requirements for the major in Computer Science. Refer to the Computer Science notes in the Proposed Catalog Description below for details.

Learning Outcomes

We have compared the intended outcomes for the proposed IMGD Technology major with the intended outcomes for all WPI undergraduates as endorsed by the WPI Faculty on May 20, 2004. This comparison is provided in Table 3.

WPI Undergraduate Outcomes	IMGD Tech Outcomes	Implementation
Have a base of knowledge in mathematics, science, and humanistic studies.	2, 3, 4	The distribution requirements include required coursework in Mathematics, Computer Science, Natural and Engineering Sciences, Language and Visual Arts.
Have mastered fundamental concepts and methods in their principal areas of study.	1, 3	Fundamental IMGD concepts and methods are presented and practiced in required IMGD core and advanced courses.
Understand and employ current technological tools.	1, 3	Skills with IMGD-related technology and tools are acquired through required IMGD core and advanced courses, and the Major Qualifying Project.
Be effective in oral, written and visual communication.	6	Oral, written and visual communication skills are acquired through presentation assignments and class discussions in IMGD core and advanced courses, including a required oral MQP presentation.
Function effectively both individually and on teams.	7, 8, 9, 10	IMGD core and advanced courses often incorporate group project assignments, with frequent opportunities for collaboration between students working in different IMGD disciplines.
Be able to identify, analyze, and solve problems creatively through sustained critical investigation.	3, 4, 5	Critical thinking and creative problem-solving are addressed by the increasing demands placed on students to achieve these goals throughout the program, culminating in the MQP.
Be able to make connections between disciplines and to integrate information from multiple sources.	2, 3, 4, 5	The distribution requirements integrate knowledge obtained from both the humanities (language and visual arts, design and audio/music) and quantitative sciences (mathematics and data analysis, computer science).
Be aware of how their decisions affect and are affected by other individuals separated by time, space, and culture.	3, 4	The Social and Philosophical Issues requirement and the IQP provide students with an understanding of how IMGD technologies and practices intersect with and impact society and culture.
Be aware of personal, societal, and professional ethical standards.	4, 7, 8, 9, 10	The Social and Philosophical Issues requirement, IQP and MQP provide knowledge of personal, societal, and professional ethical standards related to IMGD.
Have the skills, diligence, and commitment to excellence needed to engage in lifelong learning.	5, 6, 7, 9, 10	Lifelong learning is achieved by the totality of the IMGD program experience, particularly by expecting students to take personal responsibility for course selection and the successful completion of their academic responsibilities.

Table 3. WPI and proposed IMGD Technology major learning outcomes.

Resource Impact

The proposed IMGD Technology major requires no change in current IMGD, CS or HU&A faculty count or physical/administrative resources. It continues to serve the same number of students at WPI per term.

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

Implementation Date
The proposed Implementation date for this action is the 2017-18 Academic Year.

Appendix: Existing Catalog Description

Program distribution requirements for the Interactive Media & Game Development Major

REQUIREMENTS	MINIMUM UNITS
Core IMGD (Note 1)	2/3
Math or Game Analytics (Note 2)	1/3
Science	1/3
Computer Science (Note 2)	1/3
Social and Philosophical Issues (Note 3)	1/3
Studio Art (Note 4)	1/3
Game Audio (Note 5)	1/3
English (Note 6)	1/3
IMGD (Note 7)	5/3
Major Qualifying Project	3/3

In addition to the requirements listed above, students must satisfy one of the two area requirements, Technical (Computer Science) or Artistic (Humanities and Arts):

AREA	MINIMUM
Computer Science (Note 9)	10/3
Visual Arts (Notes 9, 10, 11, 12, 13, 14)	10/3

Students have electives that can be tailored to meet specific degree requirements and interests:

ELECTIVES	MINIMUM
Total Electives (Note 15)	3/3

NOTES
1. Choose from: Critical Studies of Interactive Media and Games (IMGD 1000), The Game Development Process (IMGD 1001), Storytelling in Interactive Media and Games (IMGD 1002).

2. Any Mathematics course or IMGD 2905.

3. CS 2022 and CS 3043 may not be used to satisfy this requirement.

4. Choose from Social Issues in Interactive Media Games (IMGD 2000) or Philosophy and Ethics of Computer Games (IMGD 2001).

5. Choose from: Essentials of Art (AR 1100) or Digital Imaging and Computer Art (AR 1101).

6. Choose from any audio course with an IMGD prefix.

7. Courses with the prefix EN, WR or RH.

8. Must include (IMGD 3000 and IMGD 4000) or (IMGD 3500 and IMGD 4500).

9. At least 4/3 from: Human-Computer Interaction (CS 3041), Software Engineering (CS 3733, CS 4233), Computer Architecture (CS 4515), Computer Networks (CS 3516, CS 4516), Graphics (CS 4731), Animation (CS 4732), or Artificial Intelligence (CS 4341).

10. 3/3 from Humanities and Arts or IMGD.

11. 1/3 from Art History

12. 6/3 from Visual Arts, chosen from the following list:
- Essentials of Art (AR 1100) or Digital Imaging and Computer Art (AR
- 1101) (whichever was not taken for the Studio Art requirement – Note 4)
- Figure Drawing (AR 2202)
- Digital Painting (IMGD 2700/AR 2700)
- 3D Modeling (IMGD 2101/AR 2101)
- 3D Modeling II (IMGD 3101/AR 3101)
- The Art of Animation (IMGD 2201/AR 2201)
- Animation II (IMGD 3201/AR 3201)
- Concept Art and Creative Illustration (IMGD 3700/AR 3700)

13. At least 5/3 units at the 2000-level or higher.

14. Students completing the Artistic (Humanities and Arts) Area Requirement must complete a Technical Requirement, described below.

15. Electives must be chosen from the following areas: Computer Science, Humanities and Arts, Interactive Media & Game Development, Mathematics, Science, Social Science, Business.

TECHNICAL REQUIREMENT

Each student choosing the Artistic IMGD area will fulfill a Technical Requirement consisting of six courses as follows:

A. Courses required for all IMGD majors:
1. One Mathematics course
2. One CS course, not including CS 2022 or 3043

3. One Science (BB, CH, GE, PH) course

B. Additional requirements:

4. A second course in Computer Science, not including CS 2022 or 3043.
5. Two additional courses from among Mathematical Sciences, Computer Science, Science (BB, CH, GE, PH) and Engineering (BME, CE, CHE, ECE, ES, FPE, ME, RBE), not including CS 3043.

The courses for the Technical Requirement, part A, are satisfied by the IMGD distribution requirements. The courses in part B may not double-count towards other IMGD requirements, including IMGD elective courses.

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to Revise Catalog Description for IMGD Minor

Motion: On behalf of the Interactive Media and Game Development Program, the Committee on Academic Operation recommends and I move that the undergraduate catalog description of the IMGD Minor be revised to reflect proposed program revisions described in accompanying motions, and to correct references to obsolete course designations, as described below.

Proposed Changes (indicated by **[Add]** and ~~deletions~~):

MINOR IN INTERACTIVE MEDIA AND GAME DEVELOPMENT
The Interactive Media & Game Development Minor is for students who, for personal or career purposes, wish to earn official recognition of their achievements in IMGD, but do not have academic time to fulfill the requirements for the major.

A total of six IMGD courses are required for the Minor degree requirement. This consists of:

Two core IMGD courses from this list:
• IMGD 1000. Critical Studies of Interactive Media and Games
• IMGD 1001. The Game Development Process
• IMGD 1002. Storytelling in Interactive Media and Games

Three additional IMGD courses. If necessary for the academic goals of a student's minor program, and with prior approval of the IMGD Minor Coordinator, may include one course in art history, visual art, creative writing and rhetoric, theatre, or music.

One 3000 or higher level IMGD course as a final capstone.

General WPI rules that apply to the Minor are that at most three courses can be double-counted for any other degree requirement, and the capstone course cannot be a double-counted course.

Students interested in pursuing the Minor should speak with an IMGD advisor about the rules of pursuing the Minor, as well as finding a capstone course and any related background courses.

[Add] NOTE: IMGD Technical majors may not earn a minor in IMGD.

Sample Programs of Study:

Visual Art
IMGD 1001. The Game Development Process
IMGD 1002. Storytelling in Interactive Media and Games
IMGD 2101/AR 2101. 3D Modeling I

IMGD 2700/AR 2700. Digital Painting
IMGD 3101/AR 3101. 3D Modeling II
IMGD 3700 Concept Art and Creative Illustration

Creative Writing/Game Design
IMGD 1000. Critical Studies of Interactive Media and Games
IMGD 1002. Storytelling in Interactive Media and Games
IMGD 2500. Design of Tabletop Strategy Games
IMGD 2900. Digital Game Design I
IMGD 4700. Advanced Storytelling: Quest Logic and Level Design
~~**RH 3211. Rhetoric of Visual Design**~~
WR 3310. Digital Rhetoric

Animation
IMGD 1001. The Game Development Process
IMGD 1002. Storytelling in Interactive Media and Games
IMGD 2101/AR 2101. 3D Modeling I
~~**IMGD 2201/AR 2201. The Art of Animation I**~~
~~**IMGD 3201. Animation II**~~
[Add] IMGD 2222/AR 2222. 2D Animation I
[Add] IMGD 3222/AR 3222. 2D Animation II

Audio Arts
IMGD 1000. Critical Studies of Interactive Media and Games
IMGD 1001. The Game Development Process
IMGD 2030. Game Audio I
IMGD 3200/AR 3200. Interactive Electronic Arts
~~**IMGD 3500 Artistic Game Development I**~~
~~**IMGD 302x. Game Audio II**~~
IMGD 3030. Game Audio 2
MU 3614. Topics in MIDI

Technical Development
IMGD 1000. Critical Studies of Interactive Media Games
IMGD 1001. The Game Development Process
IMGD 3000. Technical Game Development I
IMGD 4000. Technical Game Development II
IMGD 3100. Novel Interfaces For Interactive Environments
IMGD 4100. Artificial Intelligence for Interactive Media and Games

Game Studies
IMGD 1000. Critical Studies of Interactive Media and Games
IMGD 1001. The Game Development Process
IMGD 1002. Storytelling in Interactive Media and Games
IMGD 2000. Social Issues in Interactive Media and Games
IMGD 2001. Philosophy and Ethics of Computer Games
IMGD 4200. History and Future of Immersive and Interactive Media

Rationale:

The proposed modifications in this motion reflect proposed program revisions described in accompanying motions, and correct references to obsolete course designations,

Date: December 16, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Iannacchione, Chair)
Re: Motion to Add and Revise IMGD Catalog Descriptions

Motion: On behalf of the Interactive Media and Game Development Program, the Committee on Academic Operation recommends and I move, that the undergraduate catalog be revised to:

- Update the IMGD Program header to reflect staff changes, add a formal statement of the program's educational objectives, and revise the existing statement of learning objectives.
- Amend the list of disallowed Double Majors to reflect structural changes to the IMGD program proposed in accompanying motions.
- Add/amend a missing IMGD course description.
- Revise the existing descriptions of three IMGD courses to correct various errors.
- Replace the outdated IMGD course flowchart.

These additions and revisions are described below.

Description of Proposed Revisions (indicated by **[Add]** and ~~deletions~~):

1. Update IMGD Program Header

The following update to the IMGD Program header is intended to reflect staff changes, add a formal statement of the program's educational objectives, and align the learning objectives with structural program changes proposed in accompanying motions.

INTERACTIVE MEDIA & GAME DEVELOPMENT

~~**DIRECTOR: R. LINDEMAN (CS)**~~
~~**CO-DIRECTOR: J. ROSENSTOCK (HUA)**~~

~~ASSOCIATED FACULTY: A. Agloro (HUA), E. Agu (CS), I. Arroyo (SSPS), F. Bianchi (HUA), K. Boudreau (HUA), M. Claypool (CS), D. Cyganski (ECE), J. deWinter (HUA), J. Farbrook (HUA), D. Finkel (CS), J. Forgeng (HUA), L. Harrison (CS), N. Heffernan (CS), R. Lindeman (CS), V.J. Manzo (HUA), B. Moriarty (IMGD), D. O'Donnell (IMGD), E. Ottmar (SSPS), G. Phillies (PH), C. Rich (CS), J. Rosenstock (HUA), J. Sanbonmatsu (HUA), L. Sheldon (IMGD), B. Snyder (IMGD), R. Sutter (IMGD), C. Wills (CS).~~

~~PROGRAM OUTCOMES~~

~~The specific outcomes for the WPI IMGD major are that all graduates will:~~

1. ~~Understand Artistic and Technical areas related to IMGD.~~
2. ~~Demonstrate an in-depth understanding of either the Artistic or Technical area related to IMGD.~~
3. ~~Have a base of technical knowledge in Computer Science, Mathematics and Science.~~
4. ~~Have a base of artistic knowledge in Art, Music and English.~~
5. ~~Successfully complete a team-based, multi-term IMGD project.~~
6. ~~Successfully complete a group project with both Technical and Artistic IMGD majors.~~
7. ~~Be able to creatively express and analyze artistic forms relative to IMGD.~~
8. ~~Communicate effectively orally, in writing, and in visual media.~~
9. ~~Be aware of social and philosophical issues pertaining to games and related media.~~
10. ~~Successfully complete team-based, full-term IMGD projects.~~

DIRECTOR: J. DEWINTER (HUA)

ASSOCIATE DIRECTOR: B. MORIARTY (IMGD)

ASSOCIATED FACULTY: A. Agloro (HUA), E. Agu (CS), I. Arroyo (SSPS), F. Bianchi (HUA), M. Claypool (CS), J. deWinter (HUA), J. Forgeng (HUA), L. Harrison (CS), N. Heffernan (CS), M. Keller (HUA), V.J. Manzo (HUA), B. Moriarty (IMGD), D. O'Donnell (IMGD), E. Ottmar (SSPS), C. Rich (CS), J. Rosenstock (HUA), J. Sanbonmatsu (HUA), L. Sheldon (IMGD), R. Sutter (IMGD), C. Wills (CS).

Program Educational Objectives

The educational objectives of the IMGD program are:

- To prepare students for technical and/or creative roles in the interactive media and game industries.

- To provide a solid base of IMGD-related technical and/or creative expertise, strong written and oral communication skills, and substantial experience in collaborating effectively in multidisciplinary teams.
- To cultivate an understanding of the social and ethical issues relevant to interactive media and games, together with a sense of personal responsibility and professionalism.
- To develop personal traits necessary for continuous career growth, including
    - The ability to integrate theory and practice.
    - The ability to think analytically and critically in order to define, analyze and solve technical and/or creative challenges.
    - The ability to learn new skills in response to evolving technology and a dynamic professional environment.

Program Outcomes
The specific outcomes for the IMGD program are that all graduates will:

1. Demonstrate practical skill and in-depth understanding of IMGD-related technologies, concepts, tools and aesthetics.
2. Have a base of knowledge in computer science, mathematics and the natural/engineering sciences.
3. Have a base of knowledge in IMGD-related design, audio, cultural narratives and visual arts.
4. Be aware of social and philosophical issues pertaining to interactive media and games.
5. Be able to creatively express and analyze artistic forms relative to IMGD.
6. Communicate effectively orally, in writing, and in visual media.
7. Successfully complete individual projects.
8. Successfully complete a group project with students from other IMGD disciplines.
9. Successfully complete team-based, full-term IMGD projects.
10. Successfully complete a team-based, multi-term IMGD project.

2. Amend List of Disallowed Double Majors

To reflect changes to the IMGD program proposed in accompanying motions, the undergraduate catalog's list of disallowed Double Majors should be amended as follows:

- Actuarial Mathematics and Mathematics
- Aerospace Engineering and Mechanical Engineering

- Biochemistry and Chemistry
- Civil Engineering and Architectural Engineering
- Civil Engineering and Environmental Engineering
- Computer Science and Computers with Applications
- Humanities and Arts and International and Global Studies
- Industrial Engineering and Management Engineering with Concentration in Operations Management
- **[Add] Interactive Media and Game Development Technology and Interactive Media and Game Development**
- Physics and Applied Physics

3. Add and amend missing course description

IMGD 3900 (Digital Game Design II, a permanent Cat II course) was approved in 2013, but has somehow evaded inclusion in subsequent undergraduate catalogs.

The missing course description is provided below, with a recently-approved permanent course (IMGD 2905: Data Analysis for Game Development) amended to the recommended background.

IMGD 3900. DIGITAL GAME DESIGN II *Cat II.*
This team-oriented, project-based course will provide opportunities for students to deepen their experience and understanding of digital game design concepts through a combination of thorough design, practical implementation, playtesting and in-class game critique.

Students will prepare and present design treatments, develop hands-on expertise with game scripting, and study methods of collecting and analyzing gameplay data. A final project and presentation will test their creativity and demonstrate their practical mastery of game design concepts.

Recommended background: IMGD 2900: Digital Game Design I, and basic knowledge of statistical data analysis such as that provided by IMGD 2905: Data Analysis for Game Development.

4. Add missing course category

The undergraduate catalog description for IMGD 2030 (Game Audio I) does not indicate its approved category designation, which is Cat I.

IMGD 2030. GAME AUDIO I [Add] ***Cat I.***
This course serves as an introduction to game audio, where the basics of audio theory and production are discussed along with practical applications for use in game development. Topics may include music, sound effects, dialogue, soundscape design, digital signal processing, basic audio engine principles, and the aesthetic vs. technical considerations in game audio production. Lab exercises may include an introduction to audio editing and mixing, dynamics and effects processing, creating and timing sound

effects to character animations, mixing for cinematics, and audio integration using a 3D engine.

Recommended background: IMGD 1000 and IMGD 1001.

This course assumes no prior knowledge of audio production.

5. Remove obsolete course references

The undergraduate catalog description for IMGD 4200 (History and Future of Immersive and Interactive Media, Cat II) states that "Students may not receive credit for both IMGD 4200 and IMGD 420X."

IMGD 402X (the experimental version of 4200) was last offered in 2011. Also, a recommended background course, EN 2211: Elements of Writing, has been dropped. These obsolete references should be removed.

IMGD 4200. History and Future of Immersive and Interactive Media *Cat II*
This course will familiarize students with the history of the development, deployment, commercialization, and evolution of immersive and active media. The lesson plan will cover a broad range of enabling technologies, such as geometric perspective drawing, pre-20th-century panoramic displays, photography and the stereoscope, sound recording and reproduction, motion pictures, radio and television, the planetarium, immersive and 3-dimensional cinema, and special attraction venues, with a particular focus on digital games. Current trends and future directions will also be considered. Students will attend seminars and lectures, read and discuss texts on media history and aesthetics, and write an original research paper. Midterm and final exams test students' knowledge and understanding of important events and developments.

A student may not receive credit for both IMGD 4200 and IMGD 5200.

Recommended background: IMGD 1000~~**, EN 2211**~~ and either IMGD 2000 or IMGD 2001.

~~**Students may not receive credit for both IMGD 4200 and IMGD 402X.**~~

This course will be offered in 2017-18, and in alternating years thereafter.

6: Correct recommended background course and offering dates

The undergraduate catalog description for IMGD 4900 (Digital Game Design Studio) incorrectly designates IMGD 2900 as the recommended background course. The correct course is IMGD 3900.

The suggested background courses (IMGD 3000 or 3500) have been removed to reflect structural program changes proposed in accompanying motions.

Also, the catalog incorrectly states that IMGD 4900 will be offered in 2016-17. The correct dates are 2017-18.

IMGD 4900. DIGITAL GAME DESIGN STUDIO *Cat. II*
This studio course will provide students an opportunity to collaborate on the creation of an original game project, with an emphasis on the importance of scoping and a thorough, well-documented design. Students will form project teams, create a team Web site, and design, implement and test their project using industry-standard tools and methods.

~~**Recommended background: IMGD 2900 (Digital Game Design I)**~~
Recommended background: IMGD 3900 (Digital Game Design II)

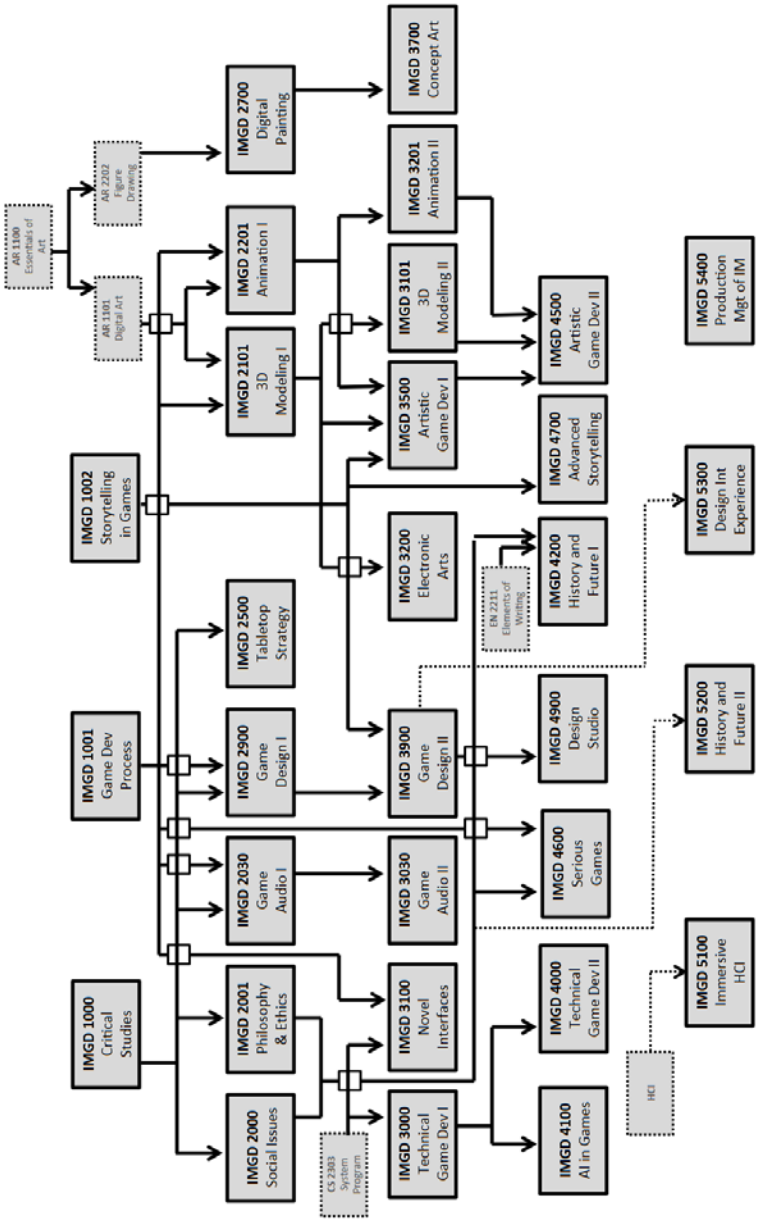
~~**Suggested background: IMGD 3000 (Technical Game Development I) or IMGD 3500 (Artistic Game Development I).**~~

This course ~~**is**~~ will be offered in ~~**2016-17**~~ 2017-18, and in alternating years thereafter.

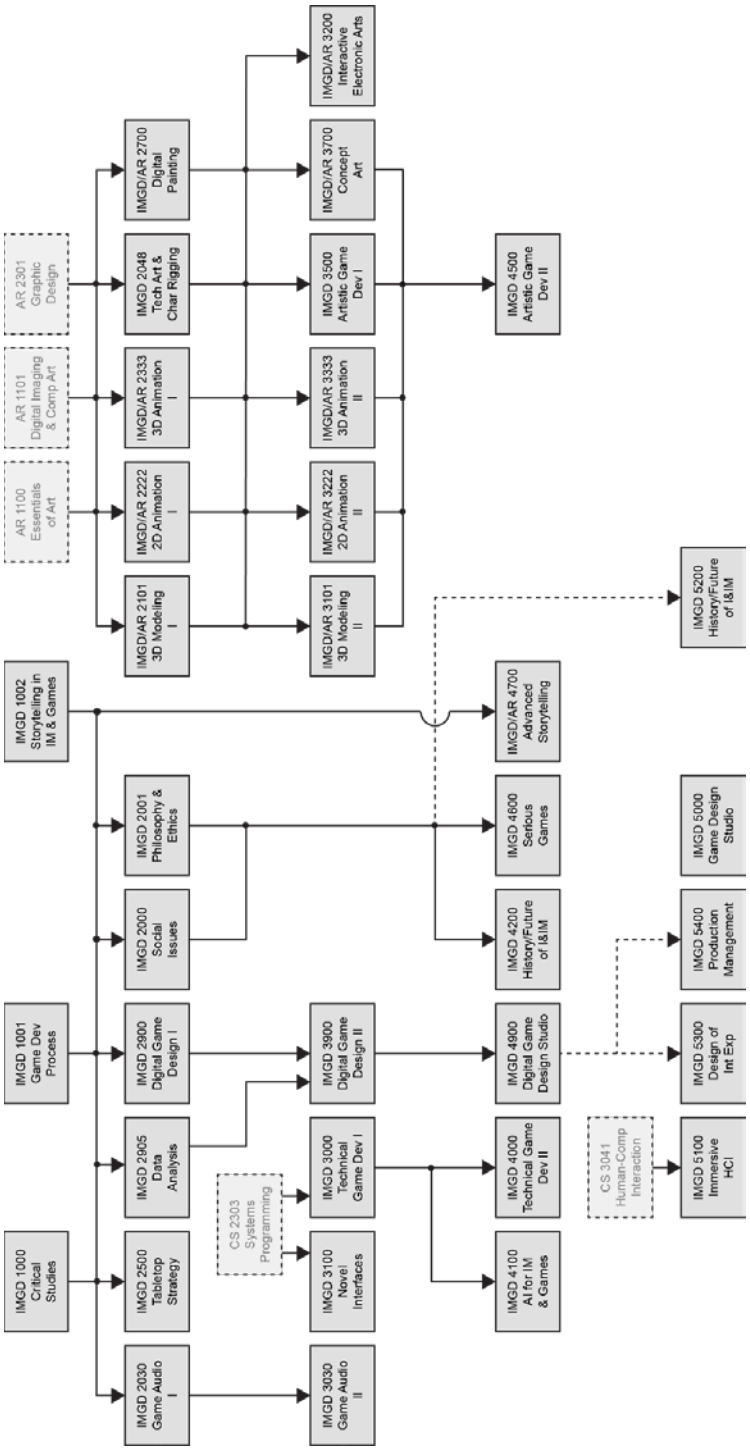
7. Replace outdated flowchart

The IMGD flowchart in the current catalog is outdated, and does not incorporate any of the revisions proposed in preceding motions. The existing and updated charts are provided below.

Current flowchart (to be replaced):



Replacement flowchart:



Date December 16, 2016
To: WPI Faculty
From: Committee on Graduate Studies and Research (Prof. Demetriou, Chair)
Re: Motion to add AE 5108/ME 5108 Introduction to Computational Fluid Dynamics

Motion:
On behalf of the Aerospace Engineering Program and the Mechanical Engineering Department, the Committee on Graduate Studies and Research recommends, and I move that AE 5108/ME 5108 Introduction to Computational Fluid Dynamics, as described below, be added.

Proposed Course Description

AE 5108/ME 5108. Introduction to Computational Fluid Dynamics (2 credits)
The course provides the theory and practice of computational fluid dynamics at an entry graduate level. Topics covered include: classification of partial differential equations (PDEs) in fluid dynamics and characteristics; finite difference schemes on structured grids; temporal discretization schemes; consistency, stability and error analysis of finite difference schemes; explicit and implicit finite differencing schemes for 2D and 3D linear hyperbolic, parabolic, elliptic, and non-linear PDEs in fluid dynamics; direct and iterative solution methods for algebraic systems. The course requires completion of several projects using MATLAB.

Anticipated Instructors
Professor Gatsonis (others from ME and AE).

Rationale:
This course provides the necessary introduction to CFD and complements the renumbered and revised version of AE5103/ME5103 (AE 6108/ME 6108) Computational Fluid Dynamics described in a separate motion. This course is also suitable for seniors. The course will alternate each year with AE/ME 6108 Computational Fluid Dynamics.

Enrollment Data
Based on data from past AE 5103/ME 5103 offerings, this course is expected to enroll close to 30 students.

Resource Needs
Instructors have already been identified. There will be no need for new resources as this will alternate with AE6108/ME 6108 course which has been offered yearly as AE5103/ME5103.

Impact on Distribution Requirements
The course adds flexibility to graduate and undergraduate students by increasing the number of courses available and enriching our offerings.

Assessment
The course will be reviewed by the ME Graduate Committee and AE Program Committee as part of our regular course assessment process.

Implementation Date
Implementation date for this action is the 2017-2018 academic year.

Date December 16, 2016
To: WPI Faculty
From: Committee on Graduate Studies and Research (Prof. Demetriou, Chair)
Re: Motion to renumber and revise AE 5103/ME 5103 Computational Fluid Dynamics

Motion:
On behalf of the Aerospace Engineering Program and the Mechanical Engineering Department, the Committee on Graduate Studies and Research recommends, and I move that AE 5103/ME 5103 Computational Fluid Dynamics be renumbered and revised, as described below.

Proposed Course Description (with additions underlined and deletions ~~crossed out~~.)

AE ~~5103~~6108/ME ~~5103~~6108. Intermediate Computational Fluid Dynamics (2 credits)
The course presents computational methods for incompressible and compressible viscous flows at an intermediate level. Topics are chosen from: ~~Navier Stokes equations in general coordinates and~~ grid generation techniques; finite volume ~~techniques~~ schemes; ~~including discretization;~~ stability analysis; artificial viscosity; explicit and implicit schemes; ~~methods~~, flux-vector splitting; monotonic advection schemes; ~~and~~ multigrid methods; particle-based simulation methods. ~~Parallel computing.~~ (Prerequisite: fluid dynamics; ~~and~~ an introductory course in numerical methods for partial differential equations; programming language experience) ~~Students cannot receive credit for this course if they have taken the Special Topics (ME 593P) version of the same course or ME 612.~~
Students who have received credit for AE/ME 5103 will not receive credit for AE/ME6108.

Anticipated Instructors
Professor Gatsonis (others from ME and AE).

Rationale
The original AE5103/ME5103 course description was introduced when it was offered as a 3-credit course. The renumbering and revisions are necessary to reflect the current coverage and anticipated content for a 2-credit intermediate course. The renumbering and revisions also align it with the AE 5108/ME 5108 Introduction to CFD introduced under a separate motion. The renumbered and revised AE6108/ME6108 course will alternate each year with AE5108/ME 5108 Introduction to Computational Fluid Dynamics.

Resource Needs
Instructors have already been identified. There will be no need for new resources as this will alternate with AE5108/ME 5108.

Impact on Distribution Requirements
The course adds flexibility to graduate students by enriching our offerings with an upper level course in CFD.

Implementation Date:
Implementation date for this action is the 2017-2018 academic year.

Date: December 16, 2016
To: WPI Faculty
From: Committee on Graduate Studies and Research (Prof. Demetriou, Chair)
Re: Motion to add a skills-based Master of Science (MS) degree in Biotechnology

Motion: On behalf of the Department of Biology and Biotechnology, the Committee on Graduate Studies and Research recommends and I move that a skills-based (non-thesis) M.S. degree in Biotechnology be approved.

Description of Additions to be included in Graduate Catalog: Additions in *italics*, deletions ~~struck through~~. The description of the skills-based M.S. degree in Biotechnology to be included in the Graduate Catalog (pp. 39 of the 2016-17 Graduate Catalog) is listed below.

Degree Requirements: *Master of Science in Biotechnology (skills-based): Students pursuing skills-based M.S. degree in Biotechnology must complete a minimum of 30 credit hours beyond the bachelor's degree. Students enrolled in the M.S. in Biotechnology program must successfully complete 15 credit hours of BB courses, 9 credit hours of skills-based courses, chosen from an approved list provided below and 6 credit hours of elective courses. All courses must be at the 500 or 4000 level and no more than 9 credits may be at the 4000 level. An approved list is provided below. Additional courses will require approval of graduate co-ordinator.*

Credit requirement:

BB courses	*(at the 500 or 4000 level)*	*15 CR*
Electives	*(approved by advisory committee)*	*6 CR*
Skills-based courses (**)		*9 CR*

Approved list of courses for Skills-based MS degree in Biotechnology

Courses

BB 501 Seminar
BB 570 Special Topics
BB 551 Research Integrity in the Sciences
BB 552 Scientific Writing and Proposal Development
** *BB 553 Experimental Design and Statistics in the Life Sciences*
BB 554 Journal Club
BB 556 Mentored Teaching Experience
BB 515 Environmental Change: Problems and Approaches
** *BB 505 Fermentation Biology*
** *BB 5xx Animal Cell Culture*
** *BB 509 Scale Up of Bioprocessing*
** *BB 560 Methods of Protein Purification and Downstream Processing*
BB 565 Virology
BB 561 Model Systems: Experimental Approaches and Applications
BB 562 Cell Cycle Regulation
BB 575 Advanced Genetics and Cellular Biology
** *BB 581 Bioinformatics*
** *BB 598 Directed Research*
** *BB 4xxx Capstone courses*

Related Courses

** *BCB 502 Biovisualization*
CH 540 Regulation of Gene Expression
CH 555 Advanced Topics
CH 560 Current Topics in Biochemistry
** *CH 561 Functional Genomics*
CH 4110 Biochemistry I
CH 4120 Biochemistry II
CH 4130 Biochemistry III
** *CH 516 Chemical Spectroscopy*
** *CH 536 NMR Spectroscopy*
CH 538 Medicinal Chemistry
CH 541 Membrane Biophysics
** *CH 554 Molecular Modeling*
CHE 521 Biochemical Engineering
** *BME 562 Small animal surgery*
** *BME 550 Tissue Engineering*
MIS 576 Project Management
FIN 500 Financial information in Management

Rationale: Currently, the M.S. program is strictly a thesis-based M.S. degree in Biology and Biotechnology. The proposed skills-based, non-thesis program builds upon the current graduate programs. This skills-based program differs from the existing M.S. program in that it is especially suited for those students with general practice career goals and those not planning subsequent pursuit of the Ph.D. degree. It is particularly suited to students wishing to pursue post baccalaureate training in Biotechnology. The skills-based M.S. program is designed for students who wish to be well prepared to enter the workforce as a professional scientist, providing a broad base in advanced coursework and laboratory training in techniques that are applicable to the Biotechnology Industry.

Market research indicates a growing trend in the job market for scientists with M.S. qualifications in Biotechnology, Biochemistry and Biomedical fields. Individuals with strong hands-on lab and bio-production skills are in demand locally. Job growth in these areas is projected by the Bureau of Labor Statistics to be stronger than average for the next 10 years. Further, Massachusetts industry is very strong in the Biotech and Biomed arena; one of the top areas in the country. Voice of the customer research conducted with WPI alumni show a significant interest in graduate education in Biotechnology, Biochemistry and Biomedical fields. The first year enrollment target for the MS Biotechnology is 10 students.

Impact on Degree Requirements: The skill-based degree program elevates the "Research and Graduate education" piece of WPI's Strategic Plan by increasing the visibility of WPI's Biotechnology program, along with increased program enrollment and revenue without a significant burden on resources both capital and human.

Resources and Anticipated Instructors: No new resources required.

Implementation Date: Implementation date for this action is the 2017-2018 academic year.

Date December 16, 2016
To: WPI Faculty
From: Committee on Graduate Studies and Research (Prof. Demetriou, Chair)
Re: Motion to modify credit hours requirements in four Mathematical Sciences MS programs

Motion: On behalf of the Department of Mathematical Sciences, the Committee on Graduate Studies and Research recommends, and I move that modifications be made to the graduate catalog descriptions of the the MS programs in Applied Mathematics, Applied Statistics, Financial Mathematics, and Industrial mathematics, as described below

Proposed Catalog Changes (pg. 127 of AY 2016-16 graduate catalog)

- For the M.S. in Applied Mathematics:
  - **Present Wording:** The master's program in applied mathematics is a 30-credit-hour program.
  - **Proposed Wording:** The master's program in Applied Mathematics requires a minimum of 30 credit-hours of coursework. Additional credit from coursework may be required by the department depending on the student's background.
- For the M.S. in Applied Statistics:
  - **Present Wording:** The master's program in Applied Statistics is a 30-credit-hour program.
  - **Proposed Wording:** The master's program in Applied Statistics requires a minimum of 30 credit-hours of coursework. Additional credit from coursework may be required by the department depending on the student's background.
- For the M.S. in Financial Mathematics:
  - **Present Wording:** The professional M.S. Degree Program in Financial Mathematics is a 30 credit-hour program.
  - **Proposed Wording:** The master's program in Financial Mathematics requires a minimum of 30 credit-hours of coursework. Additional credit from coursework may be required by the department depending on the student's background.
- For the M.S. in Industrial Mathematics:
  - **Present Wording:** The professional master's degree program in Industrial Mathematics is a 30-credit-hour program.
  - **Proposed Wording:** The master's program in Industrial Mathematics requires a minimum of 30 credit-hours of coursework. Additional credit from coursework may be required by the department depending on the student's background.

Rationale:
Due to US Immigration changes, WPI will no longer allow conditional admission. This affects us because around half our matriculated MS students have been conditional admits. The usual condition is that the applicant have a basic real analysis or real variables course equivalent to at least MA3831. This is necessary to keep our graduate courses at suitable level.

Many of our applicants, to the MAF and MAS programs especially (the overwhelming bulk of our MS applicants and matriculating students), have majors in areas such as statistics or

economics and do not have a real analysis or real variables course, hence the reason for this condition. In fact, MA 500 was created as a way for these students to satisfy this condition.

Impact on Distribution Requirements
The proposed changes are intended to maintain the level of our programs while also accommodating promising students who lack the required mathematical background. In practice, we would require students we would previously have admitted conditionally to add MA 500 to their program in the first semester and, hence, take a minimum total of 33 credits for the degree. Students who have the desired background would not have to take MA 500 and would take a minimum total of 30 credits for the degree.

Resources and Anticipated Instructors: The proposed changes will allow to retain all the flexibility of the previous model, without requiring new resources.

Implementation Date: Implementation date for this action is the 2017-2018 academic year.

Date December16, 2016
To: WPI Faculty
From: Committee on Graduate Studies and Research (Prof. Demetriou, Chair)
Re: Motion to add PH 562 Fundamentals of Biological Physics

Motion: On behalf of the Physics Department, the Committee on Graduate Studies and Research recommends and I move that PH 562 Fundamentals of Biological Physics, as described below, be added.

Proposed Course Description

PH 562. Fundamentals of Biological Physics (3 credits)
The course will cover the fundamental concepts of biological physics. The main objective is to learn how to apply the principles of physics, methods of mathematical analysis and computational modeling to complex biological systems and develop a better understanding. The approach will be truly interdisciplinary, bringing concepts from statistical physics, classical mechanics, cell biology, chemistry and biochemistry. Topics covered include: biology by the numbers: time and length scales, mechanical and chemical equilibrium in the living cell, entropy in biology, two-state systems and cooperative binding, random walks and the structure of macromolecules, architecture of the cytoskeleton, biological membranes, modeling of fluids, statistical view of biological dynamics, life in crowded environments, rate equations and dynamics in the cell, dynamics of molecular motors. Prerequisite: A bachelor's degree in physics, biology, chemistry, or engineering.

Anticipated Instructors
Prof. Erkan Tüzel. Prof. Qi Wen can also teach this course.

Rationale:
The purpose of this course is to introduce various biophysical techniques to graduate students in physics, mechanical engineering, biomedical engineering, biology, and chemistry. This course will serve as an introduction to this wide area, providing students with necessary general concepts, as well as selected topics from current literature. The course has been offered 5 times as PH 597B. The data from the course evaluations are:

Offering	**#**	**Q1 [5.00]**	**Q2 [5.00]**	**Q9 [5.00]**	**Q26 [hrs]**
S12	5	4.60	4.60	4.00	> 10 hrs.
S13	7	4.70	4.90	4.40	6-10 hrs.
S14	3	5.00	5.00	4.70	6-10 hrs.
S15	3	4.70	4.70	5.00	6-10 hrs.
S16	2	5.00	5.00	5.00	6-10 hrs.

Resource Needs: Instructors have already been identified. The class meets in the Physics Department's conference room, which is equipped with an overhead projector.

Impact on Distribution Requirements: None. This course will not impact other courses.

Implementation Date: Implementation date for this action is the 2017-2018 academic year.

Date December 16, 2016
To: WPI Faculty
From: Committee on Graduate Studies and Research (Prof. Demetriou, Chair)
Re: Motion to add PH 572 Nanoscience Journal Club

Motion: On behalf of the Physics Department, the Committee on Graduate Studies and Research recommends, and I move that PH 572 Nanoscience Journal Club, as described below, be added.

Proposed Course Description

PH 572. Nanoscience Journal Club (1 credit)
Students interested in nanoscience read journal articles, write abstracts, give short talks, engage in critical discussion, and provide feedback to fellow students. The objectives of the course are for students to learn about current topics in nanoscience and nanotechnology and to improve their professional skills.
Prerequisite: A bachelor's degree in physics, biology, chemistry, or engineering.

Anticipated Instructors
Prof. Nancy A Burnham. Prof. Lyubov Titova can also teach this course.

Rationale:
Most graduate students need practice with their professional skills. This course gives the students practice and feedback while learning about current interdisciplinary topics in nanoscience. The course has been offered four times as PH 597N. The data from the course evaluations are:

Offering	#	Q1 [5.00]	Q2 [5.00]	Q9 [5.00]	Q26 [hrs]
F12	12	4.50	4.67	4.27	10
S13	12	4.67	4.92	3.82	8
F13	6	5.00	5.00	4.83	7
F14	12	4.70	4.50	4.70	4

Resource Needs : Instructors have already been identified. The class meets in the Physics Department's conference room, which is equipped with an overhead projector.

Impact on Distribution Requirements: None; this course emphasizes professional skills and current topics.

Implementation Date: Implementation date for this action is the 2017-2018 academic year.

Date December 16, 2016
To: WPI Faculty
From: Committee on Graduate Studies and Research (Prof. Demetriou, Chair)
Re: Motion to add PH 580 Graduate Seminar

Motion:
On behalf of the Physics Department, the Committee on Graduate Studies and Research recommends, and I move that PH 580 Graduate Seminar, as described below, be added.

Proposed Course Description

PH 580. Graduate Seminar (0 credits)
Students attend Physics Colloquia by WPI faculty and invited scientists on current research topics in different areas of physics. They discuss results and ideas presented in those talks. In addition, students give presentations on their research or on problems of current interest to physics community. The course therefore will provide opportunities for students to develop their presentation skills, broaden their perspectives and provide networking opportunities. All full-time physics graduate students are required to register and attend.

Anticipated Instructors
Prof. Lyubov Titova, Prof. Erkan Tüzel, Prof. Qi Wen.

Rationale:
Presentation skills are essential to professional development of graduate students. This course will expose graduate students to presentations by experts in physics, as well as provide opportunities for students to improve their presentation skills.

Resource Need: Instructors have already been identified. The class meets in the Physics Department's conference room, which is equipped with an overhead projector.

Impact on Distribution Requirements: Since it is a required course, it does effect distribution requirements but does not impose an additional load. The graduate students are already required to attend the colloquia as department policy. The course emphasizes professional and writing skills, and current topics.

Implementation Date: Implementation date for this action is the 2016-2017 academic year, starting with the Spring 2017 semester.

Date: December 16, 2016
To: WPI Faculty
From: Committee on Graduate Studies and Research (Prof. Demetriou, Chair)
Re: Motion to add a Graduate Certificate Program in Construction Project Management

Motion: On behalf of the Department of Civil and Environmental Engineering, the Committee on Graduate Studies and Research recommends and I move that the distribution requirements for a Graduate Certificate Program in Construction Project Management, as described below, be approved.

Description of motion to be included in Graduate Catalog:
This certificate program is proposed to meet the needs of a variety of corporations and individuals who are interested in deepening their understanding along a particular theme of Construction Project Management. The framework presents the minimum requirements for the program but provides flexibility to allow the plans of study to be tailored to the specialized interests of the industry and to prospective students with consultation with the faculty advisor.

Plan of Study
The Construction Project Management Graduate Certificate requires students to complete 12 credit hours of coursework, consisting of:

- CE 580 Advanced Project Management
- At least one of the following:
  - CE 584 Advanced Cost Estimating Procedure
  - CE 587 Building Information Modeling
- Elective graduate coursework in Math, Science, Engineering, Business and/or Systems Dynamics that is thematically related to Construction Project Management as determined by the faculty advisor.

Admission Requirements
BS in Civil Engineering or equivalent from an ABET accredited program. Students with BS degrees in areas such as architecture, management engineering or civil engineering technology are also eligible for this program. Students with other Bachelor degrees with sufficient professional experience in design and construction activities are eligible for consideration.

Resources and Anticipated Instructors: No new resources required.

Implementation Date: Implementation date for this action is the spring semester of the 2016-2017 academic year.

Date: December 16, 2016
To: WPI Faculty
From: Committee on Graduate Studies and Research (Prof. Demetriou, Chair)
Re: Motion to change the distribution requirements for the Systems Engineering Ph.D. degree

Motion: On behalf of the Systems Engineering Program, the Committee on Graduate Studies and Research recommends and I move that the distribution requirements specified as part of the Ph.D. program of study in Systems Engineering be changed as described below.

Description of the Systems Engineering Ph.D. degree requirements to be modified (pp. 173 of the 2016-17 Graduate Catalog) - with additions **boldfaced** and deletions ~~struck through~~.

Coursework Requirements

Students must complete 60 or more credits of graduate work beyond the credits required for the Master of Science degree. Of the 60 credits, at least 30 credits must be registered under the designation SYS 699.

The doctoral student must ~~establish two minors~~ **must meet two distribution requirements for courses** in areas outside of Systems Engineering. The specific courses used to meet the ~~minor~~ **distribution** requirements are selected in consultation with a student's Research Advisor. ~~One of the minors must be comprised of courses from a Science (including Computer Science), Mathematics, or Engineering program and must total a minimum of 12 credit hours of approved, thematically-related graduate level courses. The second minor is selected in consultation with the Research Advisor(s) and must consist of a minimum of 9 credit hours of approved, thematically-related graduate level courses. Courses which are cross-listed between the Systems Engineering program and the course offerings of another department or program cannot be used to fulfill the requirements of a minor area.~~

For the first course distribution requirement, doctorial students must take a minimum of 12 credits hours of approved, thematically-related graduate level courses from a Science (including Computer Science), Mathematics, or Engineering program, excluding Systems Engineering. For the second course distribution requirement, doctorial students must take a minimum of 9 credits hours of approved, thematically-related graduate level courses from a Science (including Computer Science), Mathematics, or Engineering program, excluding Systems Engineering, and different from the area selected to satisfy the first course distribution requirement. Courses which are cross-listed between the Systems Engineering program and the course offerings of another department or program cannot be used to fulfill either of these distribution requirements.

Students who enter the Systems Engineering program with a Master of Science Degree in a Science (including Computer Science), Mathematics or Engineering program, but excluding a Systems Engineering Master of Science degree, will be considered to have completed the first course distribution requirement for 12 credit hours of approved, thematically-related graduate level courses. Students who meet this exception will still

be required to complete a minimum of 60 credits of graduate work, including the second course distribution requirement noted above, for the Systems Engineering Ph.D. beyond the credits required for the Master of Science degree.

Rationale:

First, there are no specific requirements for minors or distribution requirements in the *general* WPI Ph.D. catalog rules found on page 22 of the 2016-17 WPI Graduate Catalog. As a result, any minor/distribution requirements for a WPI graduate program are a result of a specific Ph.D. granting program or department creating and managing their own Ph.D. program requirements.

Second, with respect to individual department or program required courses, we note the following from reviewing the 2016-17 WPI graduate catalog.

Program or Department	Ph.D. Minor (or equivalent) Requirements
Civil and Environmental	• a single 3 course minor, approved by the advisor
Electrical and Computer	• two minors, each 6 cr minimum
Computer Science	• 27cr course work + 3 cr mathematics • of the 27 cr, at least 15 must be CS grad courses • *courses outside CS* (a minor perhaps?) requires advisor approval
Fire Protection	• no minor or course distribution requirement
Learning Sciences and Technologies	• no minors required, but distribution courses outside LS&T are required as part of the Ph.D. course work (e.g. cognitive psychology, statistics) • *courses taken at the MS level can be used to satisfy the Ph.D. course distribution requirements*
Manufacturing	• no required courses or minors
Mathematical Sciences	• at least 6 cr of graduate courses outside of MA
Mechanical	• no specific course distribution/minor(s) required
Physics	• no specific course distribution/minor(s) required
Robotics	• 3 cr of graduate management or systems engineering • *courses taken at the MS level can be used to satisfy the Ph.D. 3 cr course distribution requirements*

At least two departments (LS&T, RBE) specifically state that **MS level graduate course**(s) can be used to satisfy a Ph.D. minor or distribution course requirement. This sets a precedence for **previous MS level graduate course work** satisfying a program's course requirements.

Third, we have found that the majority of students who have applied for and been accepted to the Ph.D. in Systems Engineering have earned an MS Degree in an acceptable area other than Systems Engineering[1]. We do not believe that it makes sense for these non-SE MS degree students to have to satisfy the two course distribution requirements since they already have a **MS degree** and, as a result, a broad background in an area that is outside of Systems Engineering. As a result, we seek to change the requirement so that the 12 credit hour distribution requirement is automatically satisfied by these students.

While the intent of our requirement for the distribution requirements (e.g. "minor" in the current 2016-17 catalog) was to enhance the background knowledge of our Ph.D. students, we based our original Ph.D. requirements rules on those of the ECE program but failed to account for the different nature of our applicants who generally do not have a previous SE MS program degree compared to ECE applicants who mostly do have an ECE MS degrees or equivalent at the time of the application to the respective Ph.D. programs. As a result, we desire to change our SE Ph.D. degree requirements to compensate for the unique background of our applicants, while still ensuring that the few applicants we accept who do have an SE MS degree are still required to fulfill the distribution course requirements as we originally intended.

Impact on Degree Requirements: There will be no impact on or change to the overall degree requirements for matriculated SE Ph.D. program students who have a Systems Engineering Master's degree.

For matriculated SE Ph.D. program students who have a MS degree in an acceptable area other than Systems Engineering, these students will be able to take at least 12 additional credits of SE courses without unnecessarily extending their program credit hours to enhance their background in the systems engineering domain.

Resources and Anticipated Instructors: No new resources required.

Implementation Date: Implementation date for this action is the 2017-2018 academic year.

[1] The SE faculty have accepted 7 students into the SE Ph.D. program so far. Two of the 7 have an SE MS background (from WPI). The other five we have accepted into the SE Ph.D. program **have MS degrees** in Mechanical Engineering (ME, 3), Industrial and Systems Engineering (ISE, 1) and Biomedical Engineering (BME, 1). Only about 1/3 of the courses taken by the Industrial Systems Engineering (ISE) candidate are related to SE so this student would, in our opinion, also qualify for the 12 credit course distribution rule noted in this motion.