WORCESTER POLYTECHNIC INSTITUTE
March 17, 2016

To: The WPI Faculty

From: M. W. Richman
              Secretary of the Faculty

The seventh Faculty meeting of the 2015-2016 academic year will be held on **Thursday, March 17, 2016 at 3:15 pm in Olin Hall 107,** with refreshments at 3:00.

1.   Call to Order   M. Richman

      - Consideration of the Minutes and the Consent Agenda

2.   Opening Announcements   M. Richman

3.   President's Remarks   L. Leshin

4.   Committee Business

      - Committee on Governance (COG)   G. Gaudette
        Committee on Administrative and Financial Policy (FAP)   H. Hakim
         - Motion to revise the membership, charge, and name of FAP
           (for discussion, only)

5.   Committee Reports

      - Committee on Administrative and Financial Policy (FAP)   H. Hakim
         - FAP's Recommendation on Compensation for Summer Teaching
      - Committee on Information Technology Policy (CITP)   C. Shue
         - Planned Updates to the myWPI System

6.   Special Report

      - "Preparing for the Future of the Ph.D."   T. Camesano

7.   New Business

8.   Old Business

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WORCESTER POLYTECHNIC INSTITUTE
Faculty Meeting Minutes
February 16, 2016

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Detail:

1. <u>Call to Order</u>
The sixth meeting of the 2015-2016 academic year was called to order at 3:20pm in OH 107 by **Prof. Richman** (ME). The minutes from Jan. 21, 2016 were approved with two minor typos corrected. The consent agenda was approved as distributed.

2. <u>Opening Announcements</u>
Prof. Richman announced that Prof. Albano and Prof. Ryder had been elected for three-year terms to COG, and Prof. Taylor had been elected for a four-year term to CTAF. All terms begin on July 1, 2016. Prof. Richman also thanked all those who agreed to have their names appear on the ballots.

Prof. Gaudette (BME) reminded tenured and tenure-track faculty members to fill out the evaluations of administrators (Pres. Leshin, CFO Solomon, Dean of Undergraduate Studies Heinricher, Dean of Graduate Studies Camesano, and Dean of IGSD Vaz).

Dean Snoddy (Assoc. Dean of Students) reminded faculty members that they could rent their regalia for May commencement through the campus bookstore.

Prof. Richman explained that Pres. Leshin was absent due to illness.

3. <u>Provost's Remarks</u>
Provost Bursten encouraged WPI faculty members to submit interdisciplinary/multi-institutional symposia proposals for presentation at next year's (Feb. 2017, Boston) meeting of the American Association for the Advancement of Science (AAAS); the overarching theme of the meeting will be science policy. **Provost Bursten** thanked Dean Wobbe for moving Jack Sim's invited talk in order to avoid a conflict with today's Faculty meeting.

Provost Bursten recognized **VPR Vernescu** (MA), who explained that WPI's Intellectual Property (IP) Policy is being revised with input from the Faculty (through CAP, CGSR, and COG). The goal is to have an IP policy that is concise, flexible, and easy for both faculty members and students to understand. VPR Vernescu explained that an open session to explain the policy will be announced very soon.

4. <u>Memorial Resolution</u>
Prof. Christopher (MA) read a memorial resolution honoring Prof. Gordon Branche. (See **Addendum #1** attached to these minutes.) The resolution **passed** and a moment of silence was observed.

5. <u>Committee Business</u>
<u>Committee on Academic Operations</u>:
Prof. Sturm (MA), for CAO, moved that the students identified by the Office of the Registrar as having completed the requirements for their undergraduate degrees be approved for February 26, 2016 graduation. The motion **passed**.

<u>Committee on Graduate Studies and Research</u>:

Prof. Demetriou (ME), for CGSR, moved that the students identified by the Office of the Registrar as having completed the requirements for their graduate degrees be approved for February 26, 2016 graduation. The motion **passed**.

<u>Committee on Academic Policy</u>:

Prof. Doyle (SSPS), for CAP, moved that the policy prohibiting students from being paid by sponsors for credit-bearing work on MQPs and IQPs be suspended for a trial period of three years, beginning academic year 2016-2017. He explained that based on input received at the January 21 Faculty meeting, the evaluation of the three-year experiment has been modified to include a description of the efforts made to prepare students (as well as faculty members) for pay-for-credit projects. (See **Addendum #2** attached to these minutes.)

Prof. Weathers (BBT) made a friendly amendment (accepted by Prof. Doyle) to move the start of the trial period to E-term 2016. So the new motion was modified to read: "CAP recommends and I move that the current policy prohibiting students from being paid by sponsors for credit-bearing-work on MQPs and IQPs be suspended for a trial period beginning E-term 2016 and ending D-term 2019, according to the rules described below." The trial period will end in D-term 2019, but CAP will be expected to study the issue beginning in January 2019 so that it can be brought for discussion at a Faculty meeting before the end of D-term 2019.

The motion **passed**.

6. <u>Committee Report</u>
<u>Committee on Advising and Student Life</u>:

Prof. Elgert (SSPS), in anticipation of Advising Appointment Day on February 18, presented the latest version of the "Faculty Academic Advising Resource Guide" that is available to all faculty members through the homepage of the Office of Student Advising. It contains the following links: Faculty Advising Handbook; Tracking Sheets; HUA Requirement; HUA Inquiry Seminars and Practica; Social Science Requirement; Career Outlooks; Project Opportunities; I'm Concerned About a Student; International Student Support; GPS Courses; and WPI Scheduler. Prof. Elgert pointed out that the Guide had been emailed to all faculty members. The new Scheduler permits students to register directly from within the software. In response to a question from **Prof. Weathers** (BBT), Prof. Elgert pointed out that some students may be inadvertently accessing an older version of the Scheduler. In response to a question from **Prof. Billiar** (BME), Prof. Elgert noted that the Scheduler is not yet accessible to faculty members.

7. <u>Special Report</u>
<u>CFO Solomon and the Gensler Architects</u>:

CFO Solomon explained that he was filling in for Pres. Leshin, who was sick. He indicated that representatives from Gensler had been meeting with faculty members, students, and staff to understand the programmatic elements of the Foisie building. He explained that the goal was to construct a world class facility that is the embodiment of our undergraduate education, but that the ideas to be presented by Gensler did not represent a finished work. The idea today is to share the latest iteration and get faculty input. **Prof. Richman** emphasized the importance of keeping the presentation short so that there would be time for questions and comments.

Mr. Ken Fisher (Gensler Architects) expressed his appreciation to the community for the opportunity to work on the Foisie project. He introduced **Mr. Alexander Fernandez** (Gensler Architects) who presented the current design of the building. (See **Addendum #3** attached to these minutes.) Mr. Fernandez pointed out that the building will sit at the heart of the campus, so that it should enhance campus connections (through what is referred to as a "link"), and it should be designed for high usage and high efficiency. The building should be easily adaptable for a long lifespan. Simultaneously, in designing the four exterior facades of and the paths around the building, we are also paying respect to WPI's 2014 campus master plan. The current design includes two lower stories of academic space with an el-shaped residence hall above. With the cutout of the residence hall, there will be an (inaccessible) terrace/roof

over part of the academic space that will allow daylight into the atrium/hive of the space below. The building will have two entries at either end of a diagonal "link" that passes through the heart of the building on the first floor, as well as an entrance to the residence hall in a third corner of the building.

Mr. Fisher explained that there will be three main elements to the academic space: four active classrooms with flexible arrangements totaling about 7000 square feet (including one of about 1500 square feet designated for robotics); makerspace; and a global impact lab. The goal is to create a collaborative learning space. **Mr. Fernandez** described an amphitheater that would sit at the center of the building for quick presentations, project displays, and other cross-pollinating purposes. **Mr. Fisher** explained that the design will ensure that noise from one part of the space does not propagate to others by using appropriate acoustical separations.

Prof. Claypool (CS) asked if the terrace could be designed as usable space. **Mr. Fisher** didn't believe that the setting of the residence hall would permit it.

Prof. Putnam (CS) pointed out that the planned 1500 square foot robotics classroom space is considerable smaller than is currently available on campus.

Prof. Samson (HUA) suggested that more architectural emphasis should be place on the entrances to the diagonal in order to telegraph the start of an important campus pathway. He also wanted to know about how tightly the programmatic elements in the building were going to be tied to the MQP, the IQP, and the HUA requirement. **Mr. Fisher** explained that the space was going to be highly flexible and adaptable so that it could have many different uses over time. This is necessary because programs will change over the life of the building. **CFO Solomon** indicated that the intention is that every undergraduate student should get good use of the building from their first year to their senior year.

Prof. Hakim (ECE) asked about the estimate of the annual cost to maintain the building. **CFO Solomon** indicated that the cost of the building is currently estimated at $45M, and after accounting for revenue generated by the residence hall, it is estimated that $1.7M from the operating budget would be required for annual costs. This annual expense has been included in longer-term budget planning.

Prof. Shockey (IGSD) asked if the IGSD area of the building could be described in more detail. **Mr. Fisher** indicated that it is a piece of the program that is still under review and in some flux.

Prof. Gaudette (BME) wanted to know how faculty input had been received so far, and how additional feedback was being sought. He also asked if classroom space was going to be open to all faculty members and all programs or if there were spaces designated for specific uses, such as Robotics and GPS, and if needs concerning additional large or small classrooms were accounted for in the design. **Mr. Fisher** explained that the classroom space had been designed for active learning without fixed tiered seating, but they could be set up in lecture style, if needed. Right now the Robotics space would be specifically dedicated for that purpose, but the GPS space could be shifted to other purposes as permitted by the scheduling of classes through the registrar. As for faculty input, Gensler has been meeting with WPI advisory groups that had been established for that purpose, including meeting with subgroups and in one-on-one settings. Now Gensler will meet again with those groups to iterate again on the design.

Prof. Hansen (HUA) asked what a makerspace is. He worried that it might duplicate space that we already have elsewhere and that it might serve primarily as a showcase rather than as a complement to other programmatic spaces in the building. **Mr. Fisher** described it as a low-tech, interdisciplinary, highly visible, project-based space that facilitates creative thought. It supports prototyping and making/breaking and rethinking ideas quickly. **CFO Solomon** explained that there are currently several high-tech makerspaces on campus, and that the goal of the new space is to augment what we already have established by providing space for students to do preliminary work that they could take to other more narrowly focused spaces at the appropriate stage of development. The makerspace in the Foisie building is designed to spill out into the open amphitheater to facilitate the flow and exchange of ideas. **Mr. Fisher** also pointed out the importance of having the makerspace in the Foisie building placed near a space dedicated to innovation and entrepreneurship.

Prof. Fehribach (MA) thought the building as described would function quite well, and he contrasted it favorably to other existing buildings on campus that create barriers.

Prof. Golding (IGSD) pointed out the importance of smaller private spaces that are sometimes required for small groups or for internet communications with global partners. **Mr. Fisher** indicated that there will be so called "tech-suites" for those purposes and that a balance had to be struck between dedicating those spaces for specific programs (such as IGSD) and leaving them to be shared more broadly with the help of effective scheduling. **CFO Solomon** thought that the current design adequately addresses the needs for both open and private spaces.

Prof. El-Korchi (CEE) wanted to know about the shops within the building that would support the makerspace. **Mr. Fisher** so far anticipated an enclosed area with a light touch woodshop, a rapid prototyping capability (with a laser cutter, 3-D printers, etc.), and a small electronics lab. Other needs would be determined over time as need demonstrates.

Prof. Christopher (MA) asked about the lower level of the building. **Mr. Fisher** explained that there would be a partial basement devoted to mechanical systems and storage.

Mr. Fisher, In response to a question about the availability of incubator-space for entrepreneurial students interested in generating companies from their ideas, explained that the ingredients for such spaces were being considered for the building in a way that would allow us to experiment with such configurations if we wished to do so.

Prof. Yagoobi (ME) asked about the energy efficiency of the building, including the use of solar and geothermal techniques. **Mr. Fisher** explained that the use of passive ventilation was being tested. There will not be much area for photovoltaics, but Gensler is studying possibilities for solar/thermal techniques for the water needs of the residence hall.

Prof. Weekes (MA) asked about the structure of the supervision that would be present in the building. She also asked why the design of the building included a flat roof in the New England climate. **Mr. Fisher** described a possible scenario in which advanced students play a central role in policing other students based on their certification to use certain pieces of equipment. He also pointed out that, while parts of the building would be open 24 hours per day, it would be possible to close off areas when there is not adequate on site supervision. **Mr. Fisher** explained that the engineering associated with flat roofs (i.e. water proofing and internal drainage, etc.) is quite advanced, so they can be used effectively provided that the structure itself is properly reinforced.

Prof. Dominko (BBT) wanted to know if the plan for the building incorporated our graduate students in any way. **Mr. Fisher** thought that the makerspace and the I&E space would invite both undergraduate and graduate student usage. While the classroom space would be devoted to undergraduates, he also thought that the social nature of the building would draw graduate students to it.

Prof. Richman asked for a motion to extend the meeting to make time for the scheduled report from the CDC on the Class of 2015 Career Outcomes. No motion was made. The suggestion was offered to either send out the report by email or perhaps hope for time at a subsequent Faculty meeting.

8. Adjournment
The meeting adjourned at 4:45apm.

Respectfully submitted,

Mark Richman, Secretary of the Faculty

Addenda on file with these minutes:
1. **Memorial Resolution for Prof. Gordon Branche, February 16, 2016**
2. **CAP Modifications on Pay-for-Credit Project Work, February 16, 2016**
3. **Gensler Presentation of the Foisie Innovation Studio, February 16, 2016**

(Note: This item will be brought for <u>discussion only</u> on March 17, and then for a vote at a subsequent meeting.)

Date: March 17, 2016
To: WPI Faculty
From: Committee on Governance (Prof. Gaudette, Chair)
Committee on Administrative and Financial Policy (Prof. Spanagel, Chair)
Re: Motion to revise FAP's membership, charge, and name

<u>Motion</u>: The Committee on Governance (COG) and the Committee on Administrative and Financial Policy (FAP) recommends and I move that the current language of Bylaw One, Section VIII of the Faculty Handbook describing FAP's membership, charge, and name be revised as described below.

Details of the motion: Proposed change to Bylaw One, Section VIII of the Faculty Handbook

Current language of Bylaw One, Section VIII :

The Committee on Administrative and Financial Policy (FAP) consists of three elected Faculty Members and, ex officio, the President, or a representative designated by the President, and the Chief Financial Officer or person serving in that capacity. FAP informs the Faculty on administrative and financial policies affecting the Faculty and the academic affairs of WPI. It ascertains the interests and views of the Faculty concerning such policies, and represents these interests and views to the Administration.

Proposed language of Bylaw One, Section VIII:

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

<u>Rationale:</u>

Expanding FAP's size and composition:
FAP is a small committee. Smallness can be an advantage. Within the intimate confines of its conversations, highly sensitive matters can be discussed and frank exchanges of views can help FAP members to bridge the differences in experience and perspective that they bring from the constituencies that they represent; differences that might otherwise lead to needless conflict, misunderstandings, or miscalculations about the likely consequences of impending decisions. At its best, FAP mobilizes enough diversity and wisdom among its members to identify key issues before they reach a critical point, and helps to frame the analyses of institutional opportunities and challenges so that good decisions and policies result from the light that FAP casts on those issues.

Smallness can also be a vulnerability. With so few members, it is hard to ensure key elements of diversity (such as gender or breadth in years of experience at WPI), as well as a repertoire of relevant skills (e.g. having members who bring experience in finance, policy, and risk management matters, small group discussion leadership and facilitation capabilities, familiarity with consensus-building and other decision-making techniques, sophisticated communications and listening skills, etc.).

This particular small committee contends with another source of vulnerability. FAP's members tend to occupy other key roles in faculty governance and institutional leadership. According to current practice, multiple responsibilities cluster around any Faculty member who is elected to serve on FAP: one FAP member serves as the Committee Chair; one serves as the Secretary of FAP; one serves as Chair of the ad hoc Fringe Benefits Committee (FBC); one serves as the FAP representative to the Retirement Plan Committee (RPC).

To further exacerbate the situation, the assignment of any FAP member to serve as an off-campus project advisor (it has occurred three years in a row that whoever has served as FAP Chair has been off campus for one term!) means that these roles must be shared among just two Faculty members for that term. In recent years, one or more FAP members have played other key roles in institutional budget and planning discussions; and it has proven to be a valuable overlap of roles when a FAP member also serves as a Faculty representative to the Budget & Finance Trustee Committee. Altogether, these add up to a heavy load of responsibilities to divvy up among just three elected Faculty committee members.

The proposed expansion of the committee from 5 to 6 members is intended to provide FAP with more bodies to share in the important work that it undertakes, a way of expanding diversity among its members in ways that can help to recalibrate the committee's composition and skill profile every year, and the opportunity to work closely with another divisional representative from the Administration.

Revising the language of FAP's charge:
Given the recent positive changes in the relationships among the Faculty, the Administration, and the Trustees at WPI, members who serve on FAP see the existing language as being outdated. The new language is intended to provide clearer authorization of appropriate committee access to relevant data, to support effective expression of the principles of shared governance and transparency, and to enhance the possibilities of collaborative problem solving and (problem prevention!) with respect to administrative and financial matters that affect the Institute.

<u>Appendix:</u>

Consent Agenda Items

(Continued on next page)

Date: March 17, 2016
To: WPI Faculty
From: Committee on Academic Operations (Prof. Sturm, Chair)
Re: Motion to add course designations for summer internships and term co-ops

Motion: The Committee on Academic Operation recommends and I move that CP1000 (for Summer Internships) and CP1001, CP1002, CP1003, CP1004, and CP 1005 (for co-ops in A- through E-terms), as described below, be added as zero-credit course titles.

Proposed Course Descriptions:

CP1000 Summer Internship
Undergraduate students who are on WPI-approved summer internships will have this placed on their transcript along with the name of the company for which they will be working. This maintains the student's status as active. There is no credit associated with this course number.

CP1001 A term Co-op
Undergraduate students who are on WPI-approved co-op during A term will have this placed on their transcript along with the name of the company for which they will be working. This maintains the student's status as active. There is no credit associated with this course number.

CP1002 B term Co-op
Undergraduate students who are on WPI-approved co-op during B term will have this placed on their transcript along with the name of the company for which they will be working. This maintains the student's status as active. There is no credit associated with this course number.

CP1003 C term Co-op
Undergraduate students who are on WPI-approved co-op during C term will have this placed on their transcript along with the name of the company for which they will be working. This maintains the student's status as active. There is no credit associated with this course number.

CP1004 D term Co-op
Undergraduate students who are on WPI-approved co-op during d term will have this placed on their transcript along with the name of the company for which they will be working. This maintains the student's status as active. There is no credit associated with this course number.

CP1005 E term Co-op
Undergraduate students who are on WPI-approved co-op during E term will have this placed on their transcript along with the name of the company for which they will be working. This maintains the student's status as active. There is no credit associated with this course number.

Anticipated Instructor: None

Rationale:

We need a mechanism to indicate in Banner which students are away on WPI-approved co-ops and internships. Having a different course number for each term greatly facilitates a number of administrative tasks. As well, this allows the experience to appear on the student transcript and becomes the official record indicating that the student is away on an educational opportunity which is important for maintaining the student's active status.

Implementation Date: 2016-2017 Academic year.

Resource Needs: None

Impact on Distribution Requirements and Other Courses: None

Date: March 17, 2017
To: WPI Faculty
From: Committee on Academic Operations and the Computer Science Department
Re: Motion to add CS 4801 as a cross listed course with ECE 4802

Motion: On behalf of the Computer Science Department, the Committee on Academic Operation recommends and I move that CS 4801 Introduction to Cryptography and Communication Security be added as a crosslisted course with existing course ECE 4802, as described below.

Proposed Crosslisting:

CS 4801/ECE 4802 Introduction to Cryptography and Communication Security
Cat I
This course provides an introduction to modern cryptography and communication security. It focuses on *how* cryptographic algorithms and protocols work and how to use them. The course covers the concepts of block ciphers and message authentication codes, public key encryption, digital signatures, and key establishment, as well as common examples and uses of such schemes, including the AES, RSA-OAEP, and the Digital Signature Algorithm. Basic cryptanalytic techniques and examples of practical security solutions are explored to understand how to design and evaluate modern security solutions. The course is suited for students interested in cryptography or other security related fields such as trusted computing, network and OS security, or general IT security.
Recommended background: Experience in expressing algorithms in a modern programming language (e.g., ECE 2049 or CS 2301).
Suggested background: Discrete mathematics (CS 2022/MA2201 or equivalent)

Rationale:
Cryptography is a key element of computer security and is closely tied to computer science. Security professionals need to know the basics of cryptography to effectively use the primitives in building secure software and systems. The course develops students analytical thinking, from proof construction to understanding general techniques for ensuring data is protected. Accordingly, computer science students would benefit from having the course listed in our department. As currently taught in ECE, the course is approachable to computer science majors at the 4000-level and has the appropriate rigor of a 4000-level CS course. Cross listing is needed to allow CS students to take the course as one of the CS courses and even one of the required 4000-level CS courses.

Implementation Date: Effective immediately. ECE is planning on next teaching the course in D-term, 2016.

Resource Needs: ECE is committed to offering the course. Thus, no resources beyond those they have already allocated are required.

Impact on Distribution Requirements and Other Courses:
CS 4801 will count towards the 15 units (excluding the MQP) required of CS majors (notes 1 and 2 in the undergraduate catalog). CS 4801 can also count towards the 5/3 unit requirement for 4000-level CS courses (note 1c in the undergraduate catalog).

Date: March 17, 2016
To: WPI Faculty
From: Committee on Graduate Studies and Research (Prof. Demetriou, Chair)
Re: Motion to eliminate the Computer and Communications Networks specialization
        and drop CS/ECE 595.

Motion: On behalf of the Computer Science Department, the Committee on Graduate Studies and Research recommends and I move that the "Computer and Communications Networks" (CCN) specialization be eliminated, the course CS/ECE 595 Computer and Communications Networks Internship (6 credits) be dropped from the Graduate Catalog, and pages 5, 70-71 and 80 of the 2015-16 Graduate Catalog be modified as described below.

Description of Proposed Changes to the Graduate Catalog:

The CCN specialization should be removed from the listing on p. 5 of the catalog, and pages 70-71 of the catalog can be eliminated. The description of CS/ECE 595 on page 80 should be removed.

~~**CS/ECE 595. Computer and Communications Networks Internship (6 credits)**~~

~~This project will provide an opportunity to put into practice the principles which have been studied in previous courses. It will generally be conducted off campus and will involve a real-world networking situation. Overall conduct of the internship will be supervised by a WPI faculty member and an on-site liaison will direct day-today activity. The project must include substantial analysis and/or design related to computer or communications networking and will conclude with a substantial written report. A public oral presentation must also be made, to both the host organization and a committee consisting of the supervising faculty member, the on-site liaison and one additional WPI faculty member. Successful completion of the internship will be verified by this committee. For a student from industry, an internship may be sponsored by his or her employer. (Prerequisite: completion of 12 credits of the CCN program; CS 598 Directed Research, CS 599 Master's Thesis, or CS 699 Ph.D. Dissertation.~~

Rationale:
The CCN specialization was a joint program initiated and managed by the Computer Science and Electrical and Computer Engineering Departments. The last ECE student to register for ECE 595 was in 1998, while the last CS student to register for CS 595 was in the summer of 2008. The ECE department ceased supporting this program in April 2010 and there appears to be little support for CCN within the CS department.

Implementation Date: Implementation date for this action is the 2016-2017 Academic year.

Resource Needs: No additional resources are needed.

Date: March 17, 2016
To: WPI Faculty
From: Committee on Graduate Studies and Research (Prof. Demetriou, Chair)
Re: Four motions to remove cross-listing of several ME/AE and AE/ME graduate courses

<u>Motion 1</u>:   On behalf of the Mechanical Engineering Department and the Aerospace Engineering Program, the Committee on Graduate Studies and Research recommends and I move that the following seven courses (listed below), currently cross-listed with the prefix "AE/ME" in the Graduate Catalog (pp. 31-33 of the 2015-16 Graduate Catalog), have the cross-listing removed and instead be designated with the prefix "AE" under the "Aerospace Engineering" section of the Graduate Catalog (pp. 31-33 of the 2015-16 Graduate Catalog).

AEROSPACE ENGINEERING
AE/~~ME~~ 5102 Advanced Gas Dynamics
AE/~~ME~~ 5110 Introduction to Plasma Dynamics
AE/~~ME~~ 5111 Spacecraft Propulsion
AE/~~ME~~ 5222 Optimal Control of Dynamical Systems
AE/~~ME~~ 5223 Space Vehicle Dynamics and Control
AE/~~ME~~ 5224 Air Vehicle Dynamics and Control
AE/~~ME~~ 5382 Aeroelasticity

<u>Motion 2</u>:
On behalf of the Mechanical Engineering Department, the Committee on Graduate Studies and Research recommends and I move that the following seven courses (listed below) be removed from the "Mechanical Engineering" section in the Graduate Catalog (pp. 145-150 of the 2015-16 Graduate Catalog). These courses are retained as AE courses.

MECHANICAL ENGINEERING
~~ME/AE 5102 Advanced Gas Dynamics~~
~~ME/AE 5110 Introduction to Plasma Dynamics~~
~~ME/AE 5111 Spacecraft Propulsion~~
~~ME/AE 5222 Optimal Control of Dynamical Systems~~
~~ME/AE 5223 Space Vehicle Dynamics and Control~~
~~ME/AE 5224 Air Vehicle Dynamics and Control~~
~~ME/AE 5382 Aeroelasticity~~

<u>Motion 3</u>:
On behalf of the Mechanical Engineering Department and the Aerospace Engineering Program, the Committee on Graduate Studies and Research recommends and I move that the following two courses (listed below), currently cross-listed with the prefix "ME/AE" in the Graduate Catalog (pp. 145-150 of the 2015-16 Graduate Catalog) have the cross-listing removed and instead be designated with the prefix "ME" in the "Mechanical Engineering" section of the Graduate Catalog.

MECHANICAL ENGINEERING
ME/~~AE~~ 5200 Mechanical Vibrations
ME/~~AE~~ 5202 Advanced Dynamics

Motion 4:
On behalf of the Aerospace Engineering Program, the Committee on Graduate Research and Studies recommends and I move that the following courses be removed from the "Aerospace Engineering" section of the Graduate Catalog (pp. 31-33 of the 2015-16 Graduate Catalog). These courses are retained as ME courses.

AEROSPACE ENGINEERING
~~**AE/ME 5200 Mechanical Vibrations**~~
~~**AE/ME 5202 Advanced Dynamics**~~

Rationale (for all four motions):
The cross-listing of these courses was established before the formal establishment of the AE graduate program. Now that the BS/MS, MS and PhD degrees in Aerospace Engineering have been established, the need for the cross-listed courses no longer exists. The motion will also help students to easily identify those courses which are distinctly within the AE and ME disciplines.

This motion does not eliminate all graduate ME/AE cross-listed courses. The joint designation will continue to exist for nine foundation courses where the content is interdisciplinary between ME and AE, specifically for:

AE/ME 5101 Fluid Dynamics
AE/ME 5104 Turbomachinery
AE/ME 5107 Applied Fluid Dynamics
AE/ME 5103 Computational Fluid Dynamics
AE/ME 5105 Renewable Energy
AE/ME 5220 Control of Linear Dynamical Systems
AE/ME 5221 Control of Nonlinear Dynamical Systems
AE/ME 5380 Foundations of Elasticity
AE/ME 5381 Applied Elasticity

Implementation Date: Implementation date for this action is the 2016-2017 Academic year.

Resource Needs: No additional resources are needed.

Impact on Distribution Requirements:
Because nine foundational courses continue to be cross-listed, there will be no impact on distribution requirements as a result of this motion. The AE (and ME) courses eliminated with this motion will be available to the ME (and AE) students, respectively, as engineering electives. These courses can also be accepted for the ME or AE graduate degrees with separate motions from each graduate program as done routinely by graduate programs.

Date: March 17, 2016
To: WPI Faculty
From: Committee on Graduate Studies and Research (Prof. Demetriou, Chair)
Re: Motion to update the list of CS courses that count towards both the BS and MS degrees

Motion: On behalf of the Computer Science Department, the Committee on Graduate Studies and Research recommends and I move that the "Degree Requirements" section in the Graduate Catalog (pp. 73-74 of the 2015-16 Graduate Catalog) be modified as described below to update the courses that may be counted toward both the BS and MS degrees.

Description of Proposed Revisions to be included in Graduate Catalog: (Additions in ***bold italic underline***, deletions ~~struck through~~.)

Regulations
The CS department allows only selected 4000-level undergraduate course credits to count towards the BS/MS. The 4000-level course credits that may be counted towards both degrees are:

- CS 4120 Analysis of Algorithms
- CS 4123 Theory of Computation
- CS 4233 Object-Oriented Analysis and Design
- CS 4241 Webware: Computational Technology for Network Information Systems
- CS 4341 Introduction to Artificial Intelligence
- CS 4401 Software Security Engineering
- CS 4404 Tools and Techniques: Computer Network Security
- CS 4432 Database Systems II
- CS 4445 Data Mining and Knowledge Discovery in Databases
- CS 4513 Distributed Computing Systems
- CS 4515 Computer Architecture
- CS 4516 Advanced Computer Networks
- ***CS 4518 Mobile & Ubiquitous Computing***
- CS 4533 Techniques of Programming Language Translation
- CS 4536 Programming Languages
- CS 4731 Computer Graphics
- CS 4732 Computer Animation
- Undergraduate Independent Studies, with permission of instructor and either the Graduate Committee or the Department Chair
- CS graduate courses except CS 505

Some undergraduate and graduate courses cover similar material. Students may receive credit for both when the graduate course covers extensive material beyond the undergraduate course. The table below lists courses with significant overlap. A student can receive credit for at most one of the two courses in any row of this table.

Undergraduate Course	Graduate Course
CS 4341 Introduction to Artificial Intelligence	CS 534 Artificial Intelligence
CS 4432 Database Systems II	CS 542 Database Management Systems
CS 4513 Distributed Systems	CS 502 Operating Systems
CS 4516 Advanced Computer Networks	CS 513 Computer Networks
CS 4518 Mobile & Ubiquitous Computing	***CS 528 Mobile & Ubiquitous Computing***
CS 4533 Techniques of Programming Language Translation	CS 544 Compiler Construction
CS 4536 Programming Languages	CS 536 Programming Language Design
CS 4731 Computer Graphics	CS 543 Computer Graphics

A BS/MS student may use 1/3 unit of undergraduate credit or independent study/project work taken for BS/MS credit to satisfy an MS bin requirement, if either of the following conditions is met: (1) The undergraduate course covers material similar to that of a graduate course that satisfies the MS bin. The table above provides pairs of undergraduate and graduate courses that cover similar material. The undergraduate course under consideration must appear in this table, and the corresponding graduate course must satisfy the MS bin requirement. (2) The course or independent study/project work is deemed to satisfy the MS bin by the instructor, Bin Committee, and Graduate Program Chair as indicated on the Graduate Bins Petition Form.

Implementation Date: Implementation date for this action is the 2016-2017 Academic year.

Resource Needs: No additional resources are needed.