ME Open Forum
November 16, 2021
3:00-4:00 PM

Attending:

Jackie Baumgardt
Eckhard Groll
Amanda Palmer
Alex Chortos
Amanda Eldridge
Amy Marconnet
Andres Arrieta
Anil Bajaj
Arezoo Ardekani
Brian Barrett
Benxin Wu
Bert Gramelspacher
Betsy Baxter
Bin Yao
Brian Kelley
Greg Jensen
Carl Wassgren
Cathy Elwell
Chuck Krousgrill
Darrin Wilcoxin
Dave Montgomery
Dave Cappelleri
David Warsinger
Davide Ziviani
Davin Piercey
Emma Cox
Euiwon Bae
Farshid Sadeghi
George Chiu
Guillermo Paniagua
Holly Englert
Jim Jones
Jay Gore
Jessica Valley
Jitesh Panchal
John Pearson
Jong Hyun Choi
Julia King
Jun Chen
Kay Shepherd
Kristin Deckard Dawson
Kejie Zhao
Klod Kokini
Laura Blumenstein
Lauren Adu
Lou Anna Eichrodt
Maralee Hayworth
Luciano Castillo
Marcial Gonzalez
Martha Lucht
Mike Logan
Monique McClain
Pam Graff
Peter Meckl
Rebecca Ciez
Rob McGuire
Bob Lucht
Robert Ferguson
Ryan Wagner
Salil Bapat
Sarah Williams
Sherri Tague
Song Zhang
Steve Kessler
Steve Son
Thomas Siegmund
Tina Denson
Todd Lillian
Xiulin Ruan
Amy Greenan
Dan Feng
Fu Zhao
Greg Shaver
Nicole Key
Tami Armstrong
Terry Meyer
Xiaomin Qian

Minutes

1. Announcements – Eckhard
    - Share a value, make a point
        - Our faculty stepped up in a time of need this fall (due to several unforeseen instances of faculty being out). Eckhard is grateful and this shows the community that we have and the support that we have for one another.

    - Important Dates
        - Nov. 17 – ME Forum / 5:30 – 7:30 pm / ME 1130
        - Nov. 23 – MELT Meeting / 8:30-10:30 am / ME 2180 & WebEx
        - Nov. 23 – MEPC Meeting / 3:00-5:00 pm / HAMP 1252

- Nov. 25-26 – Thanksgiving Holiday
- Nov. 30 – ME Open Forum re Online Instruction / 3:00-4:00 pm / WebEx
- Dec. 1 – PEDLS / Daniela Rust / 2:00-5:00 pm / TBD

- Updates on Searches
  - Robotics search: phone interviews complete. In person interviews for 3 candidates scheduled for after Thanksgiving.
    - Eckhard encouraged everyone to attend the seminars of the candidates.
  - Thermal Systems-High Performance Buildings search: phone interviews have been completed. Still in the phase of down selecting from the phone interviews to finalists.
  - Professor of Engineering Practice search in manufacturing: phone interviews with four candidates are currently being conducted.
  - Business Office searches: Have interviewed two finalists for the ME Business Office Manager position. Recommendation have been made to Brittany Vestal and Jason Dietz and an offer should be extended soon. Hope to have in place soon. In addition, one person has been hired for the three open account specialist positions. This person started on Monday, November 15th. Still interviewing for the other two positions. Goal is to be back up to one business manager and 5 staff members by the end of the year.

Comments:
Kejie: Semiconductor and Electronics packaging search will conduct phone interview after Thanksgiving.

2. Update from the University Senate – Thomas Siegmund, Klod Kokini, & Terry Meyer
   - Shared Governance Restructuring
     - Still looking for volunteers for the task force. Task force is led by the Past President of the Senate, Professor Deborah Nichols.
     - Initiated work regarding a new structure of stakeholders on campus. They are working on a plan to change how faculty, graduate, and undergraduate students and professional staff are represented within the university. Instead of having a faculty senate, there would be a university council that would appoint standing committees and other committees.
     - Senators are concerned that faculty would lose significant control over educational issues. The Faculty Senate would cease to exist.
     - At this point, there is not a final or debatable proposal. The proposal is forthcoming and would require a vote.
     - For more information, link to: https://www.purdue.edu/provost/faculty/initiatives/senate.php
   - Winter Flex Term
     - Proposal for a new, 4-week Winter Flex term over the winter break.
     - This is a revision of the original idea to offer 4-week January term.
     - Intended to incorporate the positive elements of the original J-term proposal, while addressing the stated concerns of faculty, staff, and students.

    - No plan to do any in-person instruction except through a Study Abroad educational component.
    - Looking to start in Winter 2022-23.
    - If the semester stays at 16 weeks, this would mean that the AY calendar would be pushed back by one week at the end of the spring semester and there would be no break between the end of the summer and the beginning of the fall semester.
    - There is still a proposal in the document that would also advocate for going from 16-week semesters to 15-week semesters.
    - Survey will be coming in the next few days from the Provost Office. Thomas and the ME Senates encourage everyone to participate in the survey.
    - For more information, link to: https://www.purdue.edu/provost/about/provostInitiatives/winter/
- Shared a screenshot from the University Senate website of relevant items being discussed.
    - One item relates to the assignment of classrooms and teaching times and how it has worked out.
    - Discussions on graduate student compensation. There is a University effort going on right now.
    - Information regarding hiring to accommodate the increased enrollment this year.
- Full presentation from Thomas is included (*see attachment #1*).

Comments:

Bob: Asked whose idea it was to form a Task Force on University governance.

Thomas: Professor Nichols, the past chair of the Senate. Presented to the Board of Trustees in April. There was a significant debate at the Nov. 15th Senate meeting with a motion to completely abandon the effort. That did not carry through and it was delayed until January 2022. It would have needed a two thirds majority vote at the Nov. 15th meeting, whereas it will only need a 50% majority vote in January.

Jay: What is the difference between "faculty senate" and "faculty council"? Is it just a name change?

Thomas: At this time there is no real proposal. What he understands is that there will be no faculty council anymore and there will only be a University Council. The argument is that this would provide more equitable governance to all stakeholders at the University, but would also mean that the current structure in place would be abandoned.

Bob: The University Council would only have 20% faculty members on it. Is that correct?

Thomas: That is the understanding right now. The number is not set in stone. There will be a difference in how faculty are represented.

Terry: The organizational chart that was proposed has some kind of faculty representative body, but, that faculty body is one of five representative bodies that will populate the University Council. All decisions that get made by the Council, the faculty will have an equal vote as the Graduate Student Council, and an equal vote as the Undergraduate Council and so on. They still do not know who is going to be on the University Council, or whether the faculty representative body will be elected or appointed by the University Council. There is a presentation that will be made to the Board of Trustees in January. What exactly will be in the presentation is still unknown.

3. Report from the Undergraduate Workload Committee Task – Carl Wassgren
    - Students report being overloaded and burned out.
    - Workload expectations by ME faculty are approximately 30% higher than the University standard.
    - The ME Student Forum data and advising office feedback indicate that workload often depends on the lead instructor.
    - Student reported workload has increased in upper-level courses since 2011. Primarily in lab-based courses.
    - Two components: objective and perceived workload.
    - Recommendations:
        - Faculty should review objective workload expectations for their course(s)
        - Can we re-order some courses in the Plan of Study to balance workload?
        - Initiate methods for reducing perceived workload
            - Improve student motivation.
            - Have a well-defined course structure.
            - Encourage student formed study groups/teams.
            - Minimize loss of confidence incidents.
            - Minimize tedious and little value added work.
            - Provide a clear path to success.
        - Recommendations on methods for reducing stress
            - Provide periodic breaks in workload.
            - Coordinate exams between courses, avoid back to back.
            - Fewer high stakes assessments and more low-stakes assessments.
            - Encourage students to seek help early.
            - Provide a support network.
    - Full presentation from Carl included (*see attachment #2*).

Action item: Eckhard to ask the Area Chairs to take a look in their areas and go through the core courses to see what can be done towards the recommendations of the Task Force Committee.

Comments:
Tami (via chatroom): How many students participated in the surveys?
Carl (to Tami): Typically, half the students participated.
Andres: Expectations are very important, if we reduce expectations something has to give. There is a correlation between fundamental knowledge and ability to provide innovative solutions to difficult challenges. In fundamentals, we should be very careful when considering reductions.
Carl (to Andres): Don't have to reduce the quality of our program, but should rethink about ways we can make it more efficient. Can still have a high quality program and have high expectations but just reduce a lot of the small stuff that's really not useful. We want our students to understand what they are doing and to be able to do it at the undergraduate level and be able to apply what they are doing. The mechanics of some things may not be necessary anymore.
Jim: Thinks students need to know what the limits are and they need to understand what is going on so that they can spot when their solution is way off.
Carl: Would like to see more focus on understanding rather than the mechanics.
Jim: For lab courses that are outside of ME control, we should try to see if could influence it.

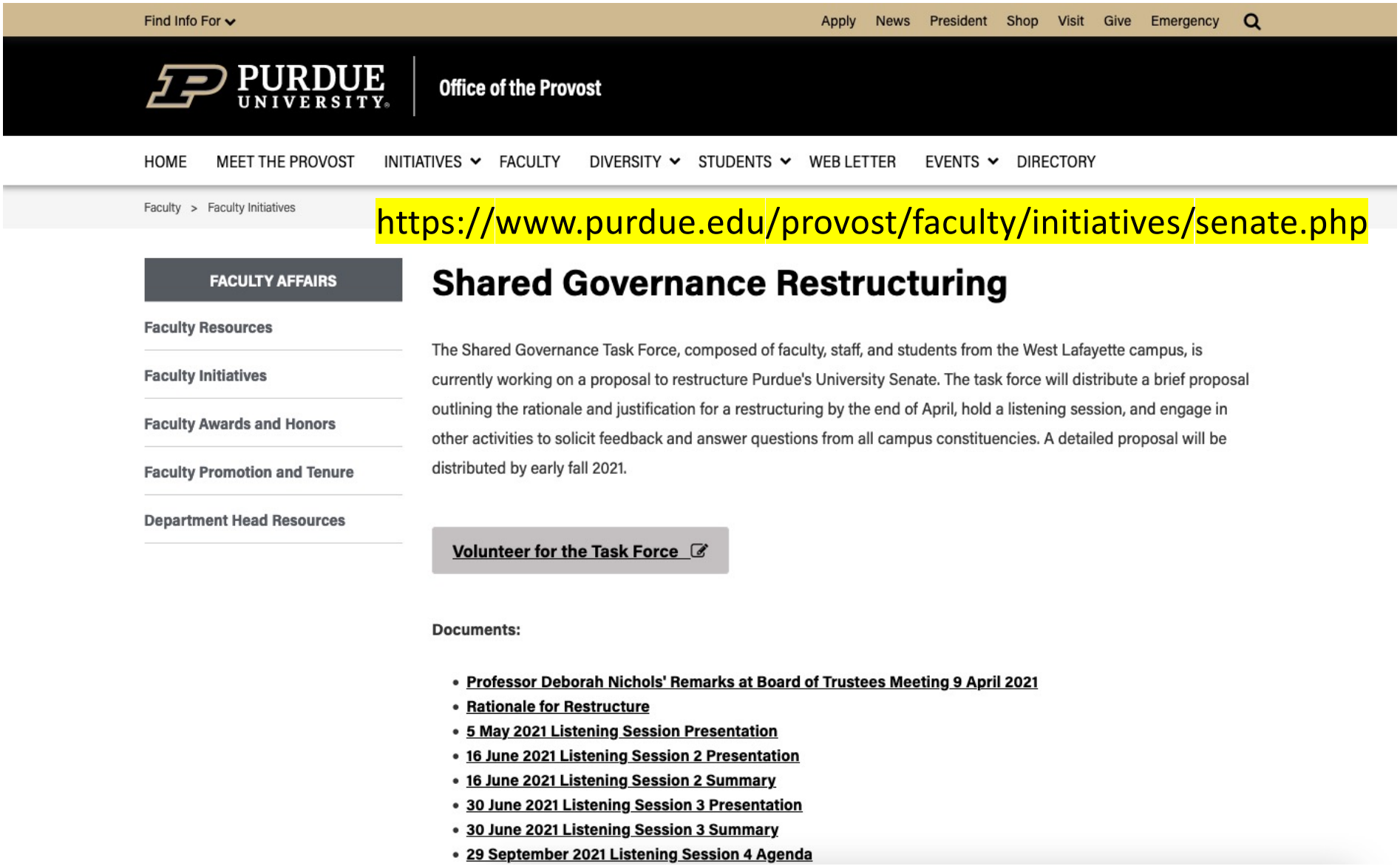
Jay: Has concerns with the thermodynamics courses changed with the efforts made by the School on TA support, and team teaching and common exams/homeworks?
Carl: Thermo and ME 200 are not considered problems. Workload expectations seem to be right where it should be.
Thomas: It would be helpful if we had access to an instructional designer in ME. This would help with Brightspace, etc.
Eckhard: Likes Thomas' idea. He would like to give it more thought and see if something can be done. He will discuss this with the MELT Team.
Carl: This type of help may already be available at the University level through Teaching Academy, or ITAP.
Laura: Is there any research or information on the perception of the workload based off of how stressed out students are going to be on assignments affecting the grades? If you only give three mid-term exams and that's their entire grade, does that have a higher perceived workload even though the students are doing less work overall?
Carl (to Laura): Doesn't have any published information.
Dave C.: Coordinating exams among different classes is a good idea but challenging since we don't control the evening exam schedules. We can get control of scheduling ME exams in ME classrooms?
Amy (via chatroom): Agrees that students need to understand the fundamentals to use computational and interpret results effectively. Hears of a lot of concerns that students don't connect what they learn in math and programming to our engineering courses. Potentially we can reduce the perceived workload by strategically leveraging continuity between courses. This would take communication between instructors - we actually all rely on similar foundations to solve engineering problems in our own disciplines. But students don't connect the dots.
Kejie (via chatroom): ME323 had experimental lab section for 10-20% students to participate, that's probably why it is an outlier in the 2019-2011 survey. We will have a standalone lab section for all students. Do we see other courses have higher load in general? This would help us to understand overall curriculum.

Attachment #1
Presentation from Thomas Siegmund

Senate Update

ME Open Forum Nov 16, 2021

Klod Kokini, Terry Meyer, Thomas Siegmund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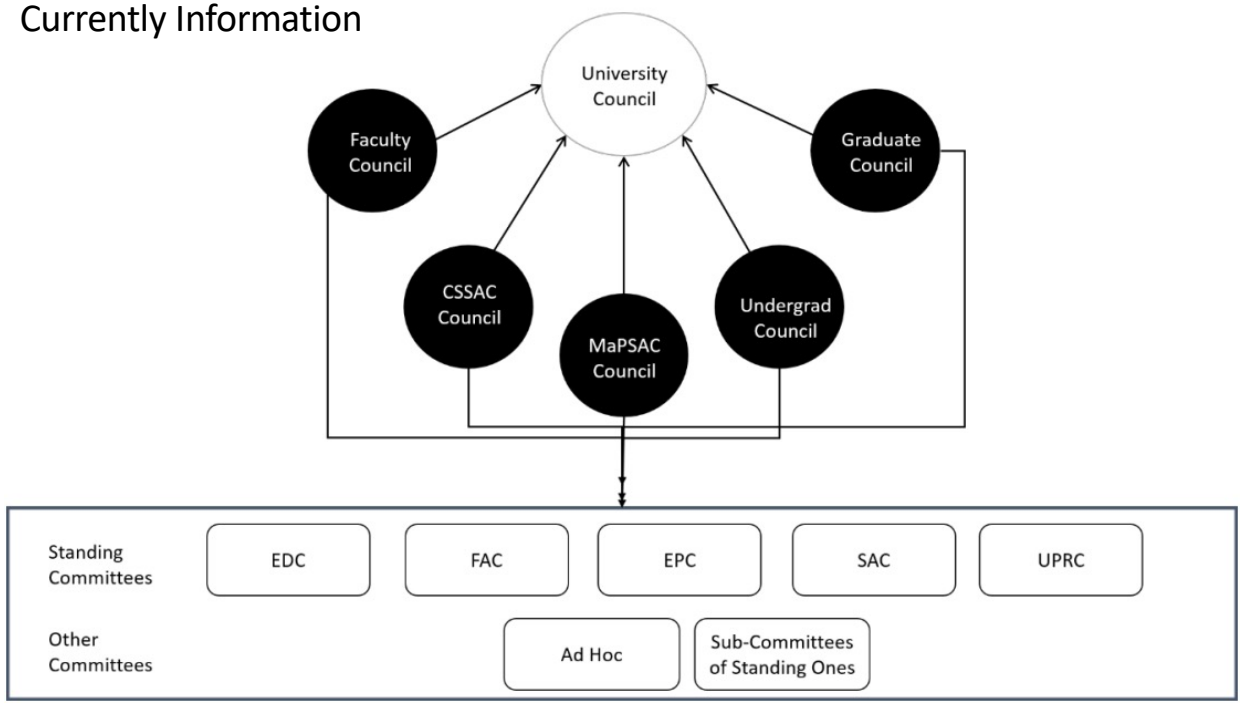
https://www.purdue.edu/provost/faculty/initiatives/senate.php
FACULTY AFFAIRS
Faculty Resources
Faculty Initiatives
Faculty Awards and Honors
Faculty Promotion and Tenure
Department Head Resources
Shared Governance Restructuring
The Shared Governance Task Force, composed of faculty, staff, and students from the West Lafayette campus, is currently working on a proposal to restructure Purdue's University Senate. The task force will distribute a brief proposal outlining the rationale and justification for a restructuring by the end of April, hold a listening session, and engage in other activities to solicit feedback and answer questions from all campus constituencies. A detailed proposal will be distributed by early fall 2021.
Volunteer for the Task Force
Documents:
Professor Deborah Nichols' Remarks at Board of Trustees Meeting 9 April 2021
Rationale for Restructure
5 May 2021 Listening Session Presentation
16 June 2021 Listening Session 2 Presentation
16 June 2021 Listening Session 2 Summary
30 June 2021 Listening Session 3 Presentation
30 June 2021 Listening Session 3 Summary
29 September 2021 Listening Session 4 Agenda

Currently Information



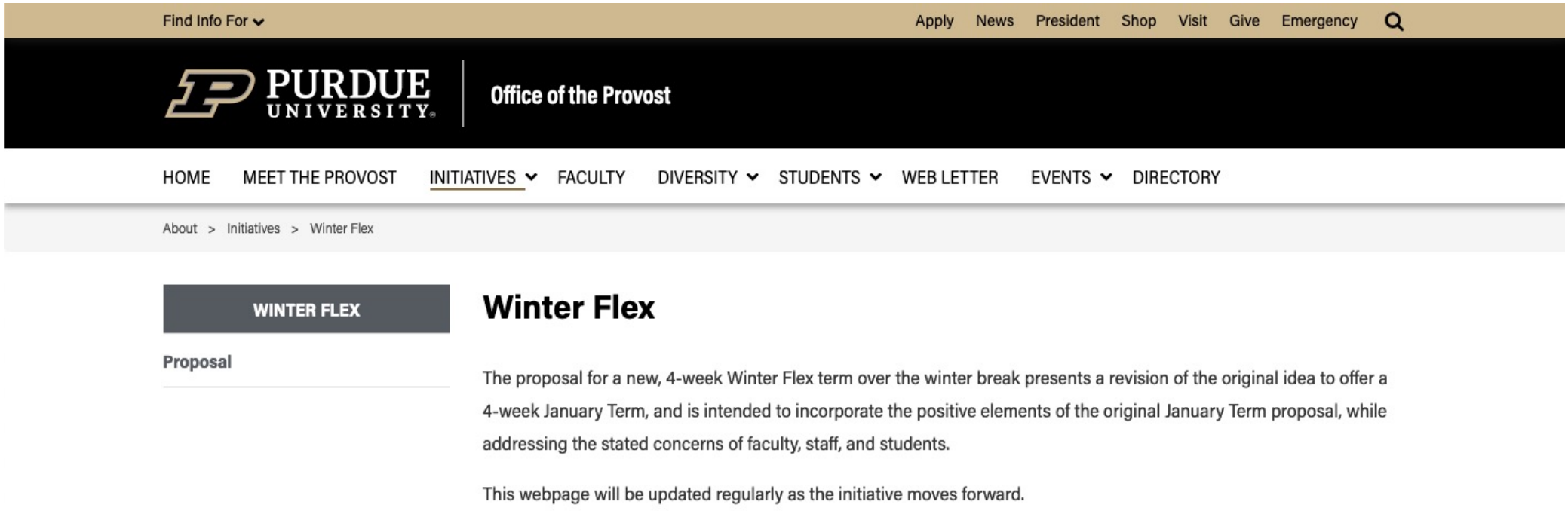
EQUITABLE REPRESENTATION AS A PRIMARY GOAL

Who would be included in the campus-wide vote this fall?

Tenured, tenure-track, clinical and professional faculty; and full-time staff. The Board of Trustees would also need to ratify the proposal.

- while faculty currently have primacy on issues related to education, in the proposed model faculty appears only have 20% of the representation in this new council.
- Comparable university councils (Brown, U Penn, and New York University) are all private institutions.
- no public universities are listed that have these models, nor any peer institutions.
- No final and debatable proposal has yet been provided by the task force

https://www.purdue.edu/provost/about/provostInitiatives/winter/



Actual Proposal for WinterFlex, including changes to the academic calendar

PURDUE UNIVERSITY

WINTER FLEX PROPOSAL – November 12, 2021

Contacts: Kris Wong Davis, Vice-Provost Enrollment Management
Marion Underwood, Dean of Health and Human Sciences and Distinguished Professor of Psychological Sciences
Kristi Mickle, Senior Director of Finance and Business Operations

This proposal for a new, 4-week Winter Flex term over the winter break presents a revision of the original idea to offer a 4- week January Term, and is intended to incorporate the positive elements of the original January Term proposal, while addressing the stated concerns of faculty, staff, and students. As a result of continued discussions with key constituents, this proposal incorporates many ideas of the original group that developed the January Term proposal. Members of the 2020-2021 January Term Working group and key collaborators are listed below.

Watch for a Survey from the Provost Office
Please make sure you submit!

November 15, 2021

2:30 PM, Virtual (Zoom)

- **Agenda**
- Newsletter
- **Documents**
  - **Chair's Remarks**
  - **President's Remarks - Purdue Online Update from Senior Vice President Gary Bertoline**
  - **Questions and Administrative Responses**

Teaching Policies

Faculty have commented that a different approach seems to have been used to set the Spring 2022 course schedule, and faculty are surprised by how the dates/times of their courses for the Spring 2022 semester have been disrupted. They felt they did not have input regarding the day/time when their courses would be taught. Could this be clarified, perhaps by the Provost?

In general, our approach to time and room assignments did not change for Spring 2022—the Registrar attempts to accommodate instructor time and room preferences where possible. We did make one change for Fall 2021 to our time and room scheduling process that likely impacted some instructors: because of the need to accommodate increased enrollment when setting class time and location, some Departmental classrooms were moved into the central schedule build to provide more space options. This included any room larger than 50 seats. The Registrar then assigned these rooms instead of allowing the Departments to assign the room, as they would have in the past. This change added about 100 additional sections to the central schedule build that the Registrar managed versus the Departments controlling the space.

We will closely monitor the need to continue (or not) this practice going forward. In general, with increased enrollment and need to support additional student demand, some instructor preferences have not been able to be accommodated because of the need to account for student conflicts and room optimization. That said, we will continue to accommodate instructor time and room preferences wherever possible.

What is the university's plan to pay graduate students a living wage and give systematic additional yearly raises to match inflation, which is currently at a 30-year high and affects BIPOC, international, and other minoritized students disproportionately?

Graduate Students holding assistantships are included in our annual merit compensation pool and units work to provide stipends competitive with those in their discipline. That said, the Office of the Treasurer, the Office of the Provost, and the Graduate School launched a project in October to conduct an analysis of current graduate student compensation and develop a set of recommendations based on that analysis. The recommendations will be delivered early in the Spring 2022 semester to the Provost and the Chief Financial Officer, in order that any appropriate action could be implemented in fiscal year 2022-23.

Of the faculty/instructor hires made to handle the enrollment bump this summer, how many were of tenure-track faculty? How many were contingent faculty (visiting assistant professors, clinical faculty, lecturers, graduate students in instructor-of-record positions)? How many hires of each category are anticipated for 2022-23?

We have been making investments in instructional capacity, student support, learnings spaces, etc. as we have grown our undergraduate enrollment. Specifically, for Fall 2022, we authorized the hiring of more than 200 graduate teaching assistants, limited-term lecturers, lecturers, advisors, and student support personnel. Of this total, 97 were graduate teaching assistants. For academic year 21-22, we authorized 38 new faculty lines (above and beyond normal hiring): 31 Tenure/Tenure-Track and 7 Clinical/Professional. For academic year 22-23, we have authorized another 84 new faculty lines (again, above and beyond normal hiring): 51 Tenure/Tenure-Track and 33 Clinical/Professional. Over the past 4 years, we have authorized a total of 151 new faculty lines to support enrollment growth.

Attachment #2
Presentation from Carl Wassgren

UG Student Workload Task Force

Beth Hess, Jitesh Panchal, Carl Wassgren

Spring 2021 (Updated Fall 2021)

PURDUE MECHANICAL ENGINEERING

Summary

- Many students report being overloaded and burned out.
- ME faculty workload expectations are up to 30% higher than the University standard.
  - ME expectation: 15 credit hour load = 45 – 60 hr/wk
  - Student feedback indicates workloads generally consistent or higher than the ME faculty expectations.
- ME Forum data and Advising Office feedback indicate that workload often depends on the lead instructor.
- Student-reported workload has increased in upper-level courses since 2011. Seems to be primarily in lab-based courses.
- Two components: objective and perceived workload

Why this Task Force?

- Reports of high student stress and overload.
- Increased awareness of mental health and well-being (Pedrelli et al., 2014)
  - 12% of college students suffer from an anxiety disorder
  - 7-9% of college students suffer from depression
- Student burnout correlates with significant professional problems (Robins et al., 2018)
  - poor performance
  - less ethical decisions
  - increased turnover
  - less organizational commitment (Neumann et al., 1990)
- Expectation of burnout may affect recruitment (Neumann et al., 1990)

A To-Do List from a High Achieving ME354 Student

- *ME 315*
  - *Monday lecture and quiz*
  - *Wednesday lecture and quiz*
  - *Friday lecture and quiz*
  - *Homework due Wednesday*
  - *Prelab due every other Sunday*
  - *Lab report due every other Monday*
  - *Lab homework due every other Monday*
  - *Lab project*
  - *2 hour lab every week*
- *ME 375*
  - *Tuesday pre-lecture video and quiz*
  - *Thursday pre-lecture video and quiz*
  - *Friday pre-lecture video and quiz every other week*
  - *Tuesday lecture*
  - *Thursday lecture*
  - *Friday lecture every other week*
  - *Homework due Thursday*
  - *Prelab due every other Monday*
  - *3 hour lab every other week*
  - *Robot project*
- *ME 354*
  - *Monday lecture*
  - *Wednesday lecture*
  - *Friday lecture*
  - *Homework due Thursday*
  - *Discussion group every other week*
  - *Quiz every other Friday*
  - *Project deliverables due once a week*
- *ME 35401*
  - *3 hour lab every week*
  - *Deliverables and memo due every week*

Purdue Semester Credit Hour Guidelines

https://www.purdue.edu/registrar/documents/forms/Credit_Hr_Guidelines.pdf

Lecture, Recitation -

Normally, one credit hour is associated with a class meeting for 50 minutes per week for an entire semester (or the equivalent 750 semester-minutes, excluding final exams). Another widely repeated standard states that each in-class hour of college work should require two hours of preparation or other outside work.

3 credit hour class: 9 hr/wk
=> 15 credit hour load: 45 hr/wk

Conversations with various faculty: 2 – 3 out-of-class hr/wk/cr

3 credit hour class: 9 – 12 hr/wk
=> 15 credit hour load: 45 – 60 hr/wk

PlanOfStudy2020.xlsx

https://engineering.purdue.edu/ME/Undergraduate

soph

Fall 20 (3)	Hr/Wk	Crs
ME 200	13	3
ME 270	13	3
ME 290	3	1
MA 261	13	4
PHYS 241	13	3
CGT 163	9	2
Total	64	16

Spr. 20 (4)	Hr/Wk	Crs
ME 263 (L)	18	3
ME 274	13	3
MA 262	13	4
ECE 20001	13	3
ECE 20007 (L)	5	1
Total	62	14

Sum. 20 (5)	MM* Hr/Wk	Sum** Hr/Wk	Crs
Internship			
Econ El. (Econ)		6	3
Gen. Ed. (GE-2)		6	3
Total	0	24	6

junior

Fall 20 (5)	Hr/Wk	Crs
ME 309 (L)	18	4
ME 365 ((L) Even Wks)	15	3
ME 323	13	3
MA 303	13	3
Total	59	13

Spr. 20 (6)	Hr/Wk	Crs
ME 354	15	3
ME 35401 (L)	3	1
ME 375 ((L) Odd Wks)	15	3
ME El. (ME-1)	15	3
Tech. El. (TE-1)	13	3
Total	61	13

Sum. 20 (6)	MM* Hr/Wk	Sum* Hr/Wk	Crs
Internship			
Gen. Ed. (GE-3)		6	3
Total	0	12	3

senior

Fall 20 (7)	Hr/Wk	Crs
ME 315 (L)	18	4
MSE 230	13	3
ME El. (ME-2)	15	3
Tech. El. (TE-2)	13	3
Wrld/Cult El (WAC)	6	3
Total	65	16

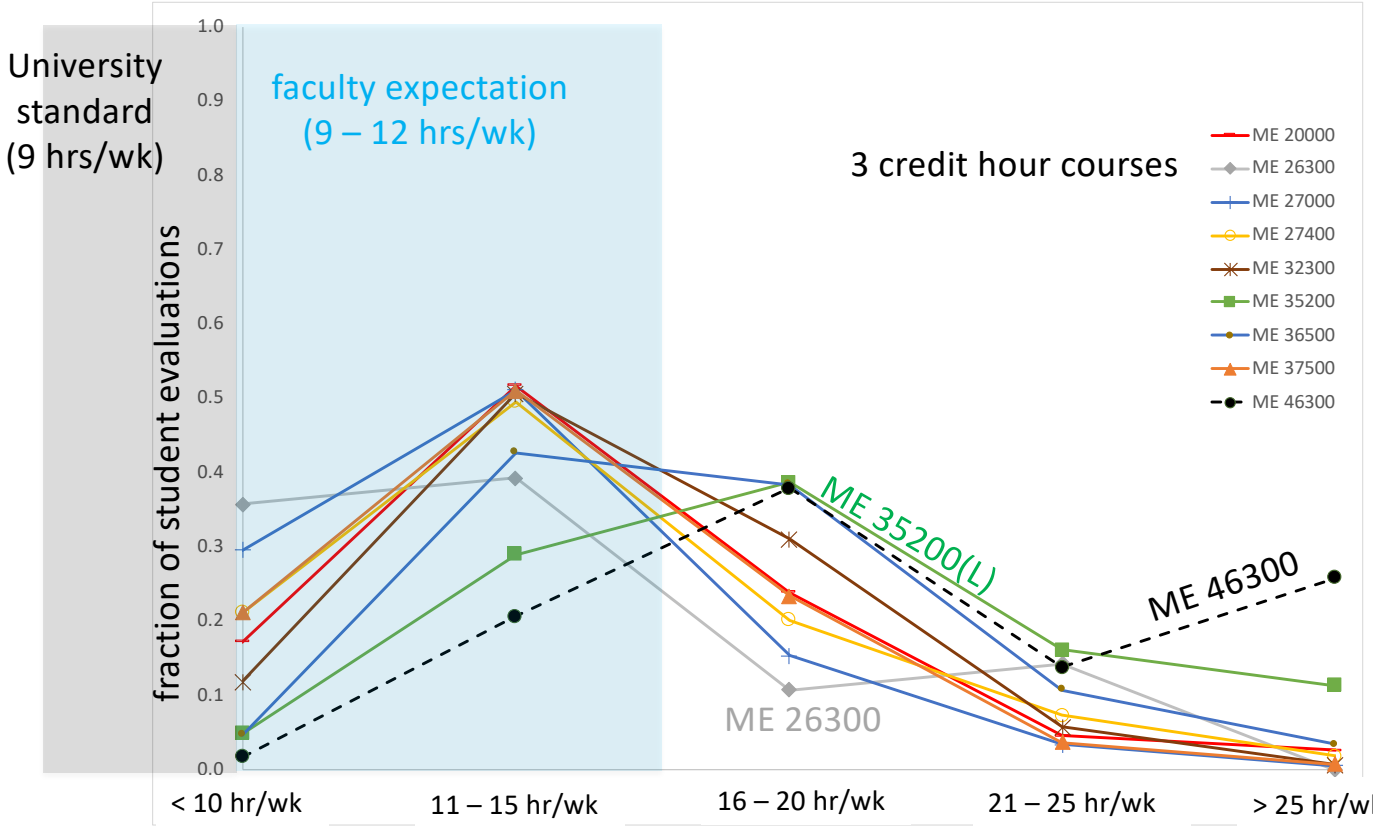
Spr. 20 (8)	Hr/Wk	Crs
ME 463 (L)	18	3
Tech. El. (TE-3)	13	3
ME El. (ME-3)	15	3
Free El. (free)	6	3
Gen Ed. (GE - 4)	6	3
Total	58	15

Sum. 20 (9)	MM* Hr/Wk	Sum** Hr/Wk	Crs
Total	0	0	0

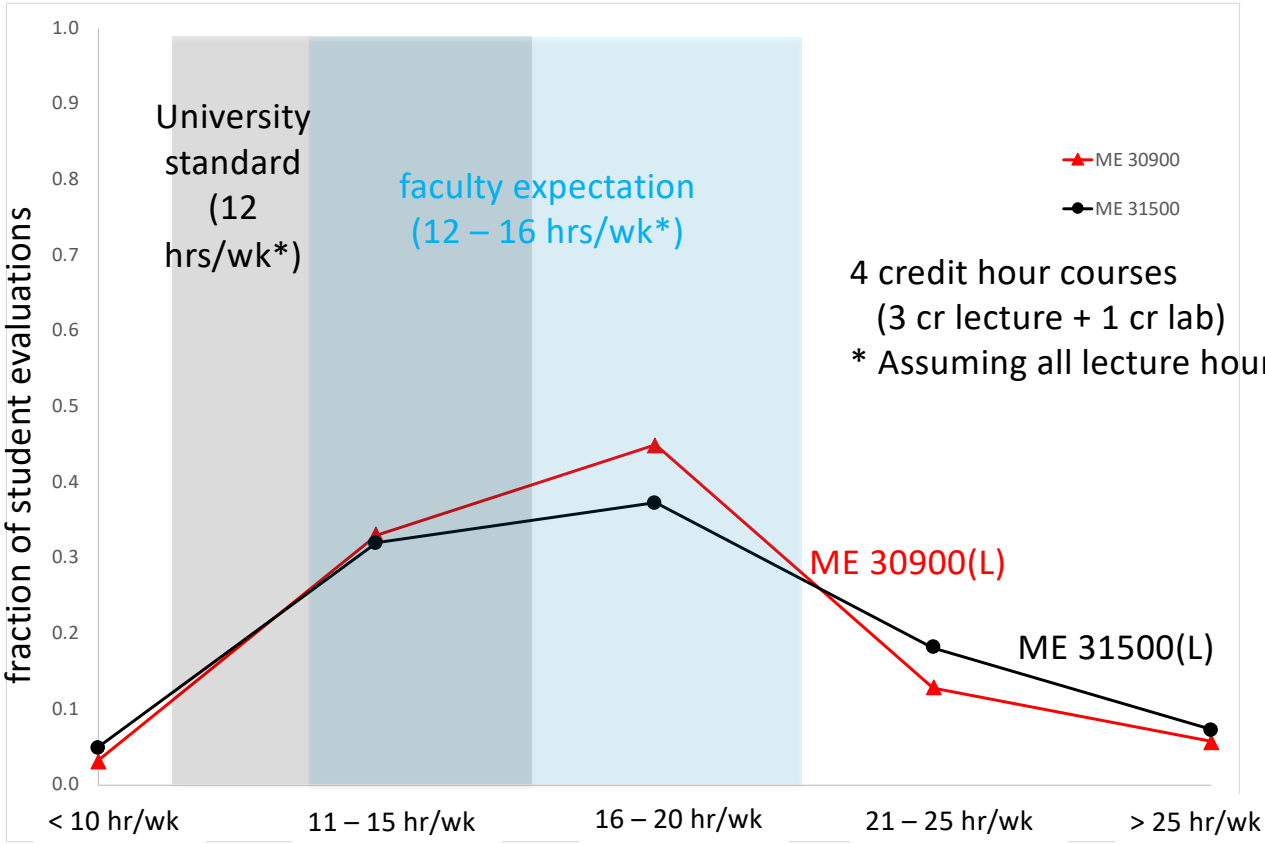
Feedback from the UG Advising Office

- In general, the highest workloads are in lab courses.
  - ME308001, ME31500(L), ME36500(L), ME 37500(L), ME354001, ME32301(?)
- Toughest semesters are:
  1. 1st semester junior year then 1st semester sophomore year
  2. Likely to change due to lecture-lab transitions (ME309, ME352, ME323)
- Significant workload variability for the same course depending on who's the lead.
- Having so many exams in the same week is a significant source of stress.
- The 90+% on-time graduation rate is due, in part, to having core courses available during the summer.
  - If a student has no AP credit, then they would need to take summer courses to graduate on time.
  - Only have 3 free elective credit hours, 1 hour of which is likely going to be used for Data Science.
- It's difficult to have experiential learning when the course loads are so high, e.g., study abroad, teams, etc.
- Even for high GPA students, break days are needed to avoid burnout.
- We have a broader distribution of academic skills as more students are admitted to the program. Are these students at the low GPA end of the distribution?
- The possibility of the J-term schedule is a concern. We need to avoid delivering the same information in a semester with one less week.
- Most faculty only have familiarity with one or two courses and don't see the whole of the curriculum. Unaware of the work expectations of other courses.

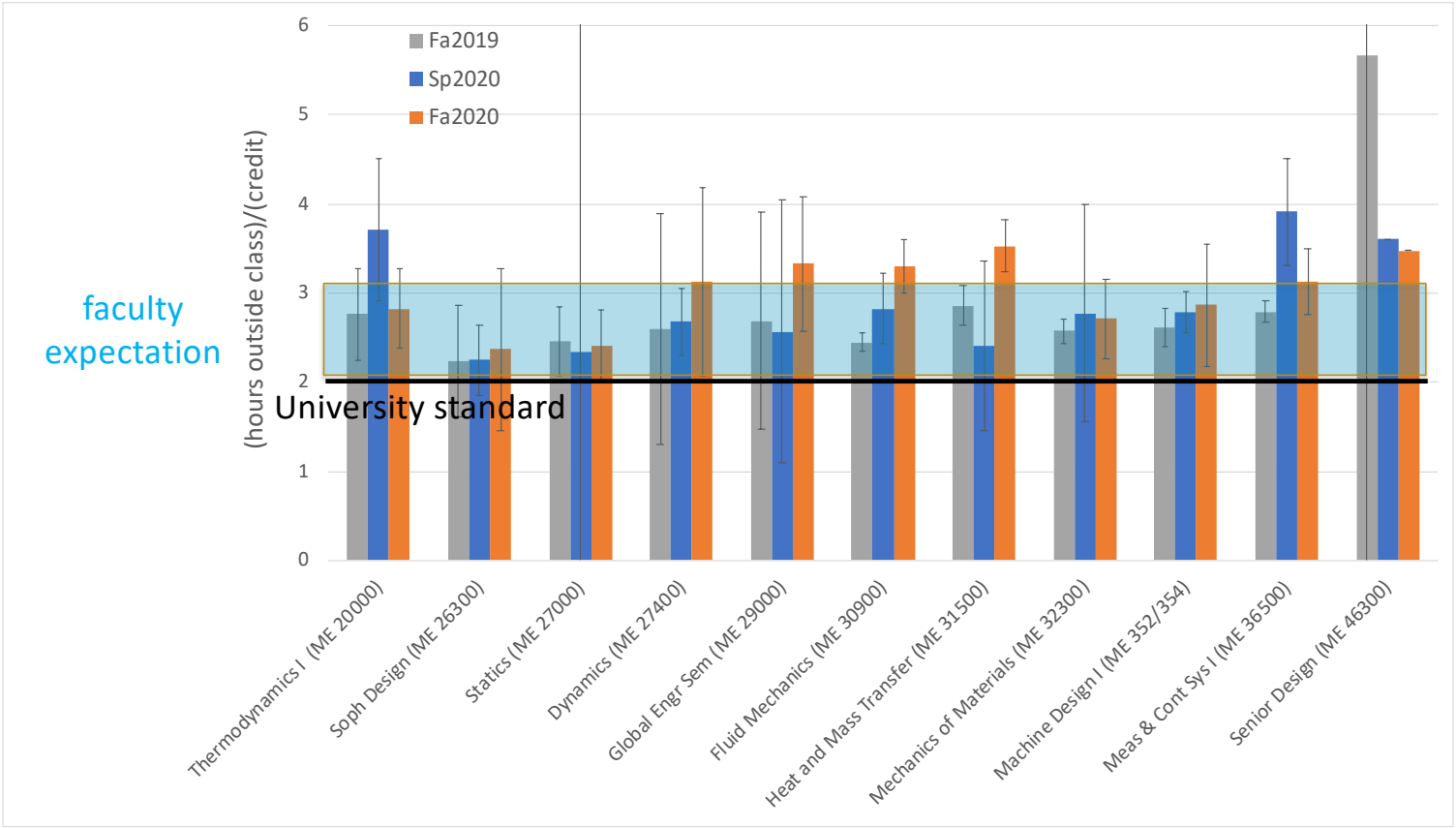
Fall 2019 Student Evaluation Data



Fall 2019 Student Evaluation Data



ME Forum Feedback



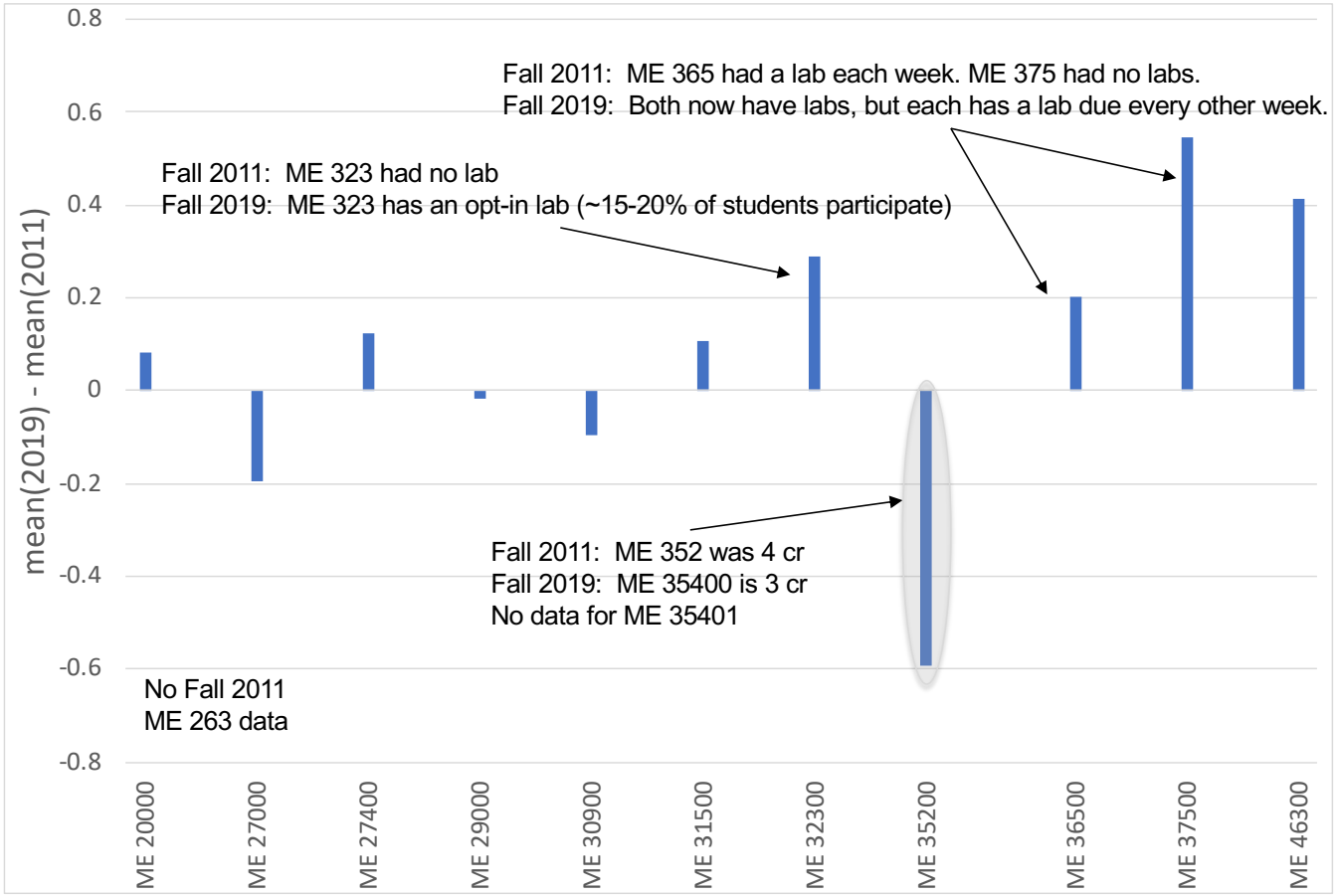
Comparison of Fa 2011 and Fa 2019 Workload Data

Methodology for finding the "mean"

Category	Score
< 10 h/wk	1
11 – 15 h/wk	2
16 – 20 h/wk	3
21 – 25 h/wk	4
> 25 h/wk	5

$$\bar{S} = \sum_{i=1}^{i=5} f_i S_i$$

f_i is the number fraction of students reporting score S_i



Brief Review of Workload Literature

- Workload affects learning quality
- Perceived vs. objective workload
- Good student-student relationships help students cope with workload => Allow students to choose the groups.
- Intrinsic motivation helps reduce perceived workload.
- Projects have lower perceived workload. Busy work and debugging have high perceived workload.
- Well-defined course structure helps reduce perceived workload.
- Answering questions helps reduce workload since students don't need to spend time looking for answers.
- More in the literature on this topic!

Summary

- Many students report being overloaded and burned out.
- ME faculty workload expectations are up to 30% higher than the University standard.
  - ME expectation: 15 credit hour load = 45 – 60 hr/wk
  - Student feedback indicates workloads generally consistent or higher than the ME faculty expectations.
- ME Forum data and Advising Office feedback indicate that workload often depends on the lead instructor.
- Student-reported workload has increased in upper-level courses since 2011.
- Workload trends for some classes are expected to change as courses re-structure, e.g., ME 352/354, ME 309/308, ME323.
- Two components: objective and perceived workload

Recommendations

- Review objective workload expectations for your course
  - lecture time + reading (2-5 min/pg) + external lecture video time + external example video time + time-per-homework-problem + study time + office hours time + … [Create weekly task lists and spreadsheets to estimate.]
  - How can we reduce busy work?
  - Re-evaluate what topics are important (Sputnik-era assumptions?)
  - Most potential impact: Lab course workload (1 credit hr labs)
  - Workload consistency between lead instructors
- Can we re-order some courses in the Plan of Study to balance workload?
  - (refer to back-up slide for example)

Recommendations…

- Methods for reducing perceived workload
  - Improve student intrinsic motivation, e.g., ARCS model for motivation
  - Have a well-defined course structure
    - e.g., weekly task lists (refer to back-up slide for example)
    - well-designed Brightspace page
    - consolidate information
    - minimize information overload
  - Encourage student-formed study groups and teams
    - e.g., group homework assignments
    - in-class groups
  - Minimize loss-of-confidence incidents
    - Unclear or inconsistent policies and grading
    - Mistakes in lecture, problem statements, solutions
    - Delayed and uninformative responses to questions, emails, grading feedback

Recommendations…

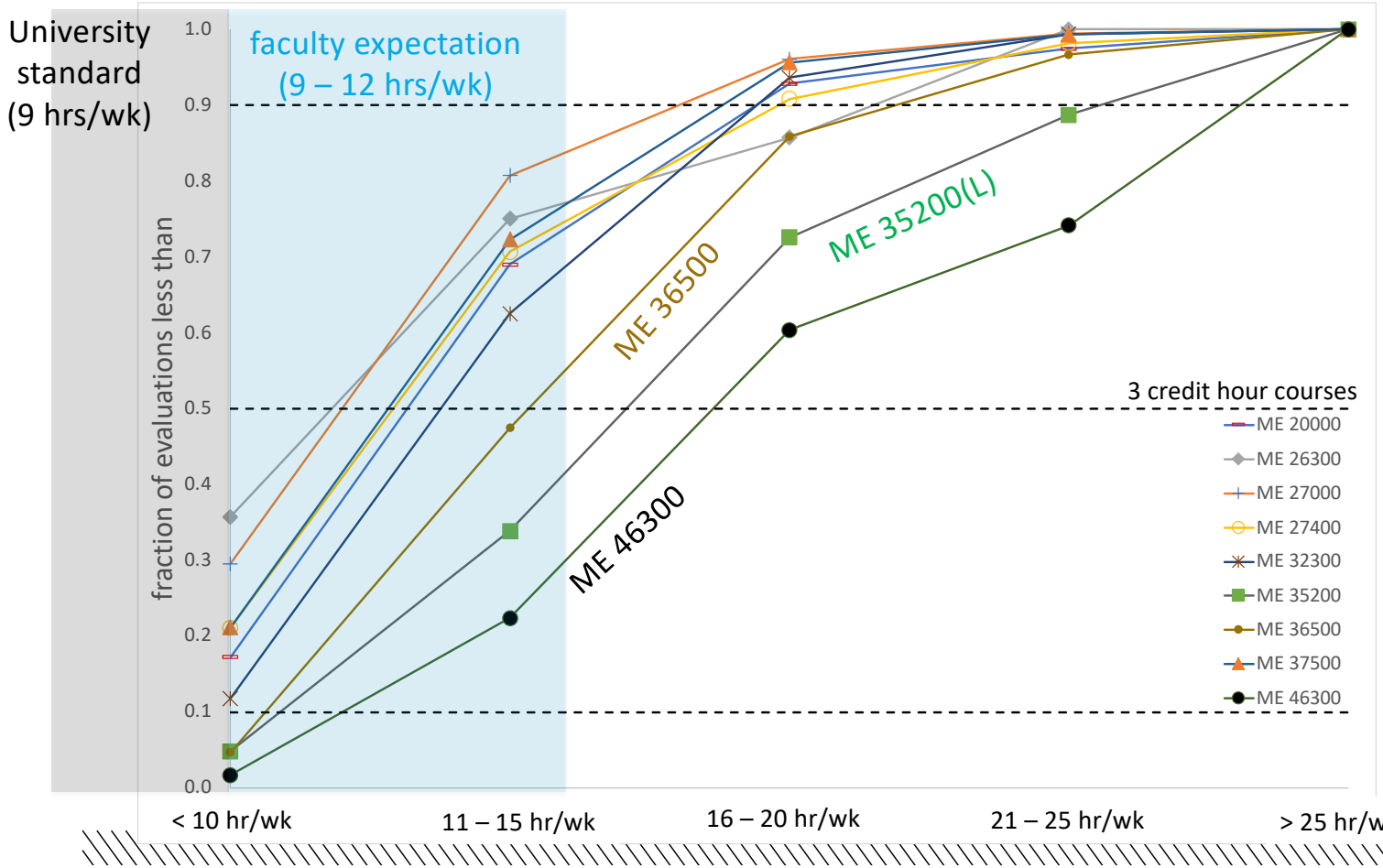
- More methods for reducing perceived workload
  - Minimize tedious and little-value-added work
    - e.g., provide partially-completed notes
    - e.g., allow the use of symbolic computation and numerical calculation software, Python libraries, etc.
  - Provide a clear path to success
    - Grading rubrics
    - Practice exams
    - Examples of good lab reports, project reports, etc.

Recommendations…

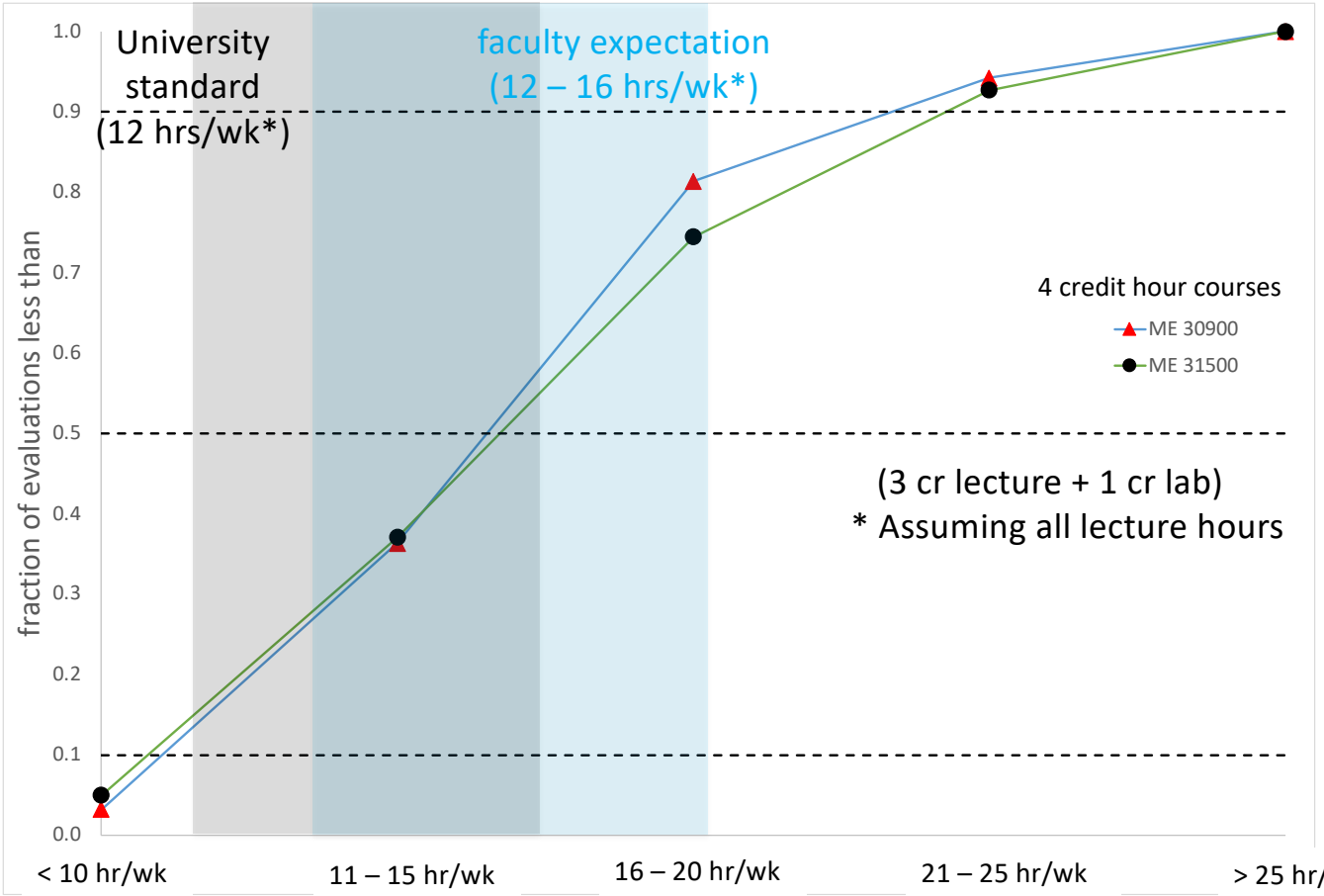
- Additional methods for reducing stress
  - Provide periodic breaks in workload, e.g., review sessions before exams
  - Coordinate exams between courses so they're not back-to-back
    - e.g., Course coordinators for ME 308, ME 323 , and ME365 can try to schedule exams for different weeks
  - Fewer high-stakes assessments and more low-stakes assessments
    - More time consuming, but improved confidence in statistics
  - Encourage students to seek help early
    - Words and attitudes matter – be kind and supportive (faculty + TAs)
    - Meet in "neutral" territory
  - Provide a support network, e.g., peer network, access to timely help (Piazza, tutorial room, office hours, SI, tutors)

Questions and Discussion

Fall 2019 Student Evaluation Data

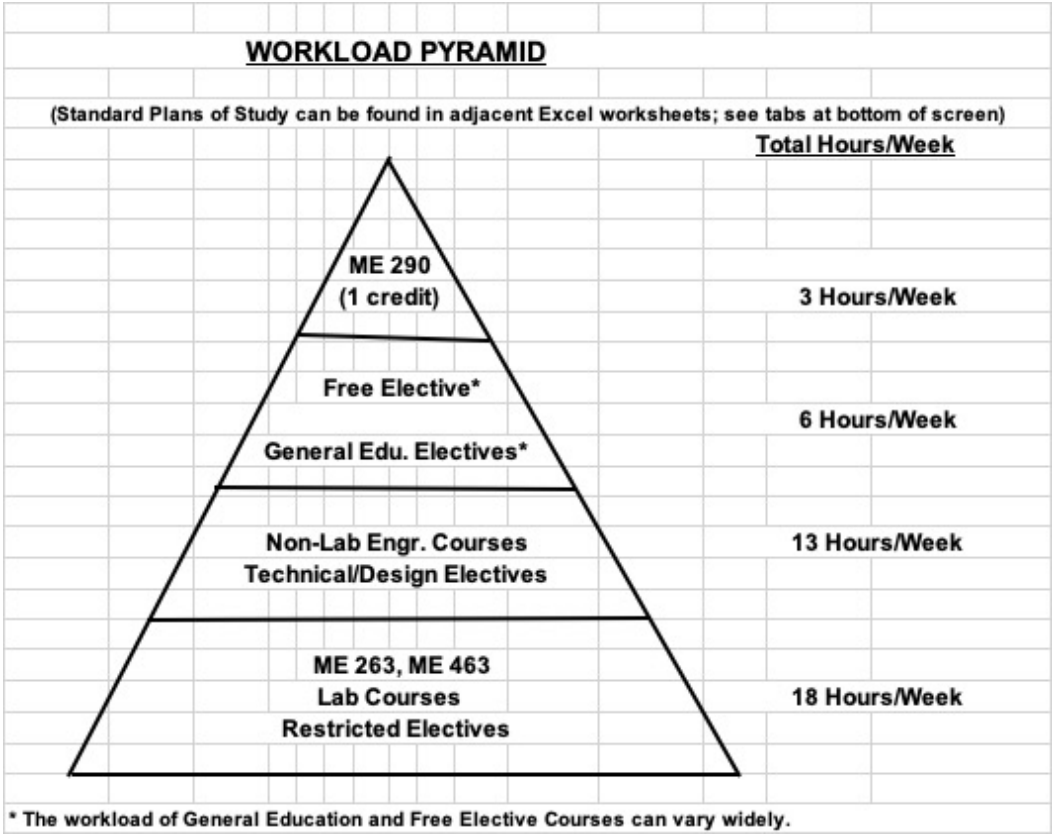


Fall 2019 Student Evaluation Data



PlanOfStudy2020.xlsx

https://engineering.purdue.edu/ME/Undergraduate



Recommendations…

- Is there a better way to measure student workload?
  - End-of-semester evaluation: hard to remember
  - Ask students to report back on time spent on homework, project, and lab assignments?
- If the J-term passes…
  - Need to remove content
  - Good opportunity to redesign courses
  - Offer labs during J-term?

Example Time Budget Spreadsheet

3	number credit hours for the course
Minutes per Task	
2	time to read one page from a textbook
80	time to complete one homework problem*
45	time seeking outside help per week, e.g., office hours, tutorial room, SI help
60	time studying per week, e.g., reviewing notes, watching lecture videos, watching example videos, re-reading, working examples
Tasks per Week	
24	pages of reading
5	homework problems
Minutes per week	
48	reading
400	working homework problems
45	time seeking outside help per week, e.g., office hours, tutorial room, SI help
60	time studying per week, e.g., reviewing notes, watching lecture videos, watching example videos, re-reading, working examples
553	total minutes
9.2	**hrs/wk outside of class**
3.1	**(hrs/wk outside of class)/(credit hr)**
***Estimated Time to Complete One Homework Problem**	
3	problems per two hour (120 min) exam
40	minutes per exam problem
2	ratio of time spent on a problem when first seeing it (homework) to time spent after having studied (exam)
80	minutes per homework problem

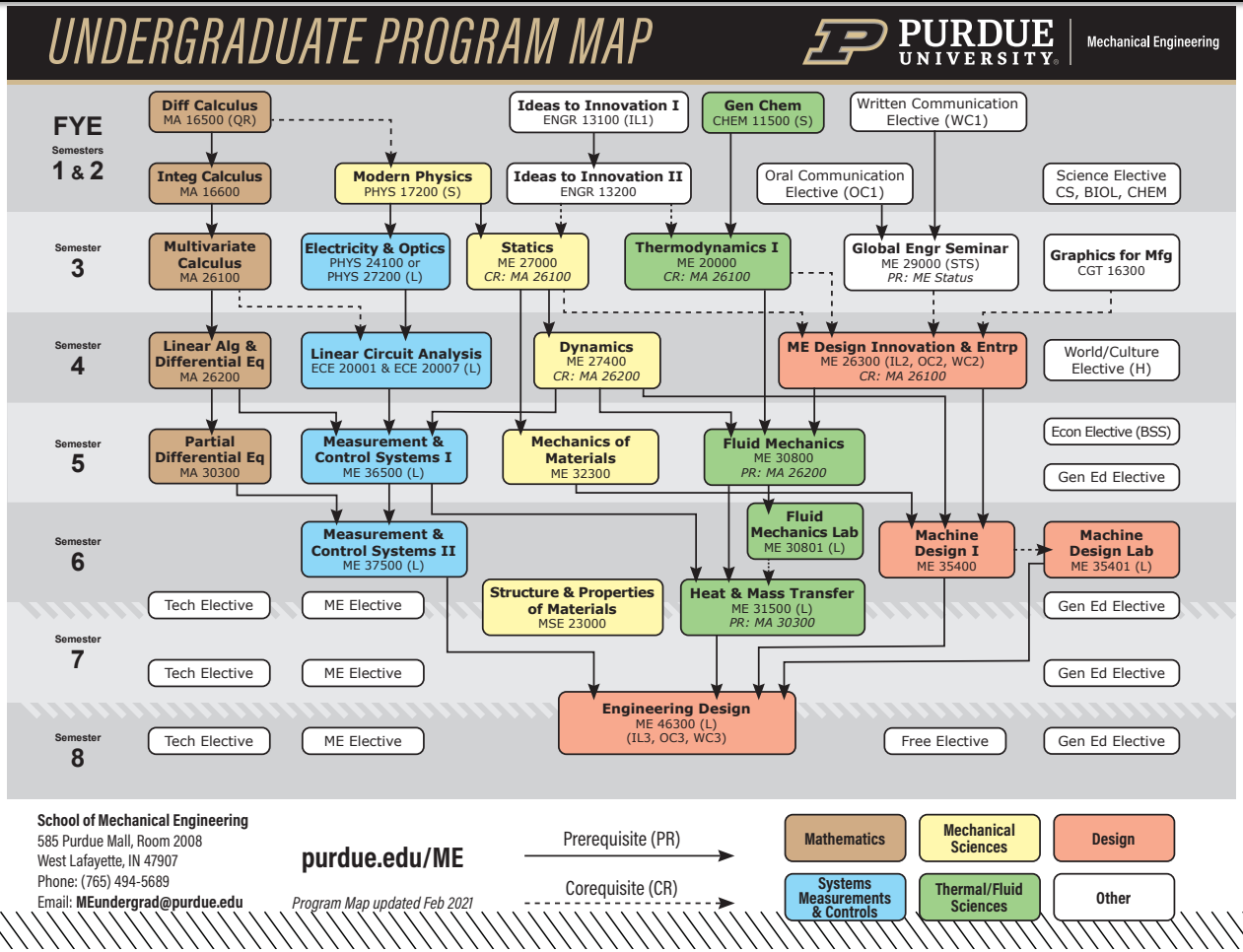
Information Overload Examples

- More locations for administrative content, e.g., lectures, multiple handouts, Brightspace, Gradescope, Piazza, emails, etc.
  - Brightspace pages are often poorly organized
- From Transformative Education 2.0 Update (2021 Oct 07): Student Engagement Team found that ~250 emails go out to a student from when they've been admitted to Purdue through the fall (students are overwhelmed and confused)
- The ME UG Office now posts information on the UG Blog (one location). Previously they were sending out a large number of emails which were often ignored.

Additional Thoughts

- The backgrounds of students in our program have changed over time.
  - e.g., students with less hands-on experience, e.g., working on farms, cars, etc.
- Faculty are good at adding content, but poor at removing it.
  - e.g., video lectures + reading + in-class meeting
  - e.g., extra lab, extra data sciences course, fewer free electives
- We have a broad distribution of student skills. Should we target our workload expectations for the top 10% of students, top 50%, etc.?

ME UG Program Map



Example ME309 Weekly Checklist

ME30900 (Sp21) – Checklist
Week 07: We, Mar 03 – Tu, Mar 09

We're now at the half way point in the semester. Now is a good time to review your study habits and performance in the course and make mid-course corrections, if needed.

This week we start by spending an additional lecture on the Linear Momentum Equation for accelerating coordinate systems. It's an important topic and, thus, deserves extra emphasis. The rest of the week focuses on dimensional analysis. Dimensional analysis is a powerful tool and, fortunately, easy to apply once the parameters that are significant to the system are identified. The hard part is identifying the significant parameters. Dimensional analysis is used to efficiently present data, simplify experimental studies, and perform scale-model testing. It's worthwhile to mention that dimensional analysis can be applied to fields other than fluid mechanics.

✓	Task
	We, Mar 03: Review homework solutions and examine where mistakes may have been made
	We, Mar 03: Attend TA help hours/contact instructors to resolve homework difficulties
	We, Mar 03: Study in preparation for Quiz 06
	Read textbook: pp. 111 – 117
	Watch online video lecture: Linear Momentum for Non-Inertial FORs (lecture notes)
	If needed, read Wassgren notes: Linear Momentum for Non-Inertial FORs
	We, Mar 03: Participate in lecture
	Review/practice online Linear Momentum for Non-Inertial FORs
	Th, Mar 04: Take Quiz 06
	Fr, Mar 05: Review quiz solutions and examine where mistakes may have been made
	Read textbook: pp. 246 – 254
	Watch online video lecture: Dimensional Analysis - Introduction (lecture notes); Buckingham-Pi Theorem; Method of Repeating Variables (lecture notes)
	If needed, read Wassgren notes: Introduction; Buckingham-Pi Thm and Method of Repeating Variables
	Fr, Mar 05: Participate in lecture
	Review/practice online Dimensional Analysis
	Read textbook: pp. 256 - 267
	Watch online video lecture: Dimensional Analysis (Similarity and Scaling) (lecture notes)
	If needed, read Wassgren notes: Dimensional Analysis (Similarity and Scaling)
	Mo, Mar 08: Participate in lecture
	Review/practice online Dimensional Analysis (Modeling and Similarity)
	Throughout the week: Work on Hmk 07
	Throughout the week, if needed: Attend TA help desk sessions, review Piazza posts, meet with instructor
	Tu, Mar 09, before 11:59 P.M.: Submit Hmk 07

Example Modified Plan of Study

ME 200	13	3
ME 270	13	3
ME 290	3	1
MA 261	13	4
PHYS 241	13	3
CGT 163	9	2
Total	**64**	**16**

ME 263 (L)	18	3
ME 274	13	3
MA 262	13	4
ECE 20001	13	3
ECE 20007 (L)	5	1
Total	**62**	**14**

	Hr/Wk	Hr/Wk	
Internship			
Econ El. (Econ)		6	3
Total	**0**	**12**	**3**

Fall 20 (5)	**Hr/Wk**	**Crs**
ME 30800	13	3
ME 365 ((L) Even Wks)	15	3
ME 323	13	3
MA 303	13	3
Gen. Ed. (GE-2)	6	3
Total	**60**	**15**

Spr. 20 (6)	**Hr/Wk**	**Crs**
ME 354	15	3
ME 35401 (L)	3	1
ME 375 ((L) Odd Wks)	15	3
ME El. (ME-1)	15	3
Tech. El. (TE-1)	13	3
ME 30801 (L)	5	1
Total	**66**	**14**

Sum. 20 (6)	**MM***	**Sum***	**Crs**
	Hr/Wk	**Hr/Wk**	
Internship			
Gen. Ed. (GE-3)		6	3
Total	**0**	**12**	**3**

Fall 20 (7)	**Hr/Wk**	**Crs**
ME 315 (L)	18	4
MSE 230	13	3
ME El. (ME-2)	15	3
Tech. El. (TE-2)	13	3
Wrld/Cult El (WAC)	6	3
Total	**65**	**16**

Spr. 20 (8)	**Hr/Wk**	**Crs**
ME 463 (L)	18	3
Tech. El. (TE-3)	13	3
ME El. (ME-3)	15	3
Free El. (free)	6	3
Gen Ed. (GE - 4)	6	3
Total	**58**	**15**

Sum. 20 (9)	**MM***	**Sum****	**Crs**
	Hr/Wk	**Hr/Wk**	
Total	**0**	**0**	**0**

ARCS Model for Motivation

Attention • Interesting or counter-intuitive facts • Humor • Demonstrations • Active participation	**Relevance** • Real world applications • Link to previous experience • Student control of their learning
Confidence • Clear path to success (guidelines, consistency, reasonable expectations) • Quality and timely feedback • Staged difficulty – opportunity for growth • Resources for help • Student control of their learning	**Satisfaction** • Applying knowledge outside of class • Positive experiences • External rewards: praise, grades • Immediate application of knowledge

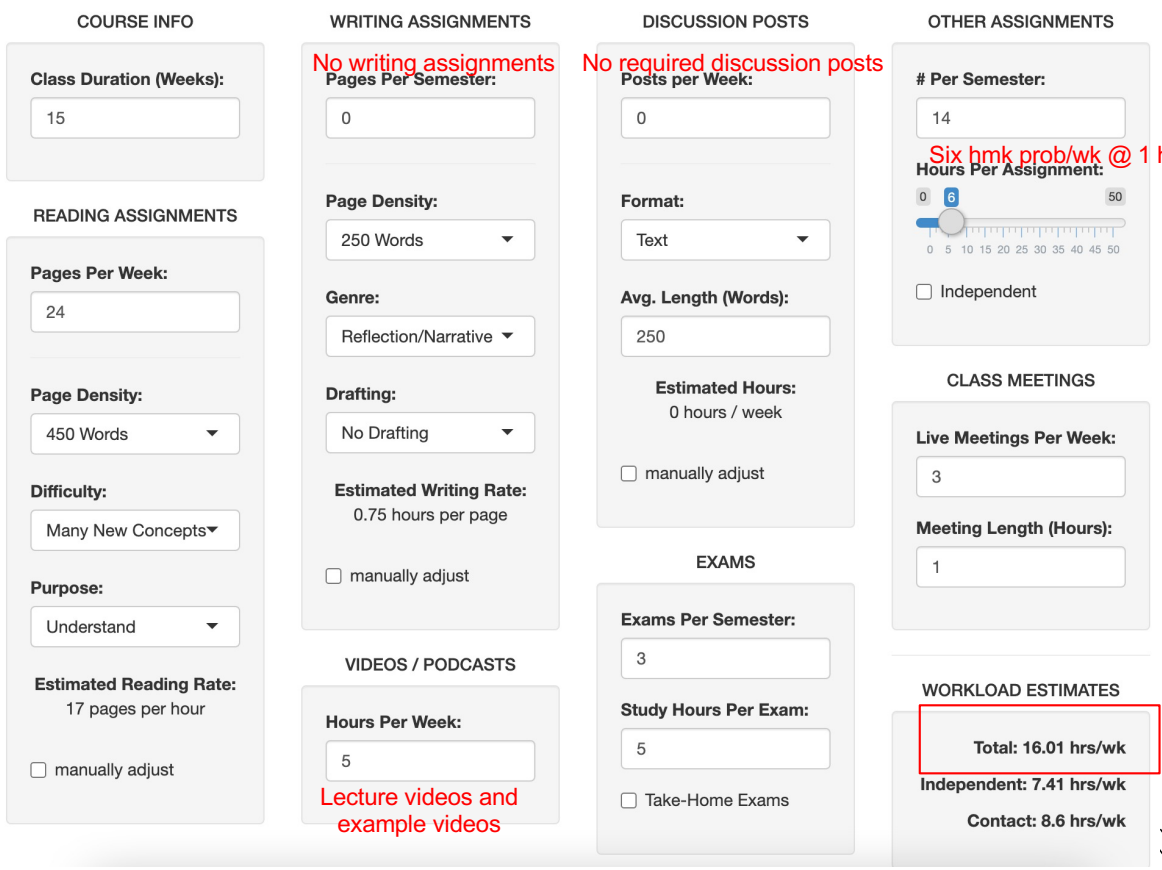
(Keller, 1984)

References

- Keller, J.M., 1984, ”Development and use of the ARCS model of instructional design”, *Journal of Instructional Development*, Vol. 10, Article 2.
- Neumann, Y., Finaly-Neumann, E., and Reichel, A., 1990, “Determinants and consequences of students’ burnout in universities”, *The Journal of Higher Education*, Vol. 61, No. 1, pp. 20 – 31.
- Pedrelli, P., Nyer, M., Yeung, A., Zulauf, C., and Wilens, T., 2015, “College Students: Mental Health Problems and Treatment Considerations”, *Acad Psychiatry*, Vol. 39, No. 5, pp. 503 – 511.
- Robins, T.G., Roberts, R.M., and Sarris, A., 2018, “The role of student burnout in predicting future burnout: exploring the transition from university to the workplace”, *Higher Education Research & Development*, Vol. 37, No. 1, pp. 115 – 130.

Online Workload Estimator

https://cat.wfu.edu/resources/tools/estimator2/



Example for ME30800 (no lab)

ME 352 vs. ME 35400 + ME 35401

From Beth Hess:

- The transition from 352/452 to 354/452 began in Spring 2019.
- Until Summer 2020 the course numbers were still 352 and 452. The 4th credit hour of 352 was used mostly as a recitation (time to work on homework and projects and quizzes were also given in the lab), but the content of 352 was shifting.
- Beginning Fall 2020, ME 354 was entirely the “old 452” material and a 3-hour lecture. ME 35401 began Fall 2020 as a 1-hour lab.
- So the data from Spring 2019 - Summer 2020 are a little muddled. Fall 2018 and prior was “old 352 and 452” and Fall 2020 and since are “new 354 and 452.”