Self-Study for Engineering Physics BS

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Primary Contact: Wendy Crone, Professor, Department of Engineering Physics, wcrone@wisc.edu, 608-262-8384

Department(s)/Academic Unit(s): Department of Engineering Physics

School(s)/College(s): College of Engineering

A. Response to previous program review recommendations

The previous program review was quite favorable, and no action items were taken away from that review. Ongoing program assessments and continuous improvement actions are summarized in section C below.

Excerpts from the Joint Review Committee for the BS-Engineering Physics (4/19/2010):

"The committee believes this program is unique among engineering and physics oriented B.S. degree programs on campus, primarily in its focus on research training through specific, structured coursework, and through its culmination in an undergraduate thesis. The Engineering Physics Degree program focuses on a particular set of emerging technology areas, including nano-technology and scientific computational methods (the program is designed to allow these focus areas to evolve over time)."

"In particular, the committee observed that while students in other degree programs in the College of Engineering might assemble course sequences close to that of a typical EP student, one could not duplicate the EP curriculum in other degree programs without considerably exceeding normal degree credit levels, and would lack the capstone research thesis."

"In regard to assessment of quality achieved in the EP degree program, the committee was quite favorably impressed. The committee examined samples of undergraduate theses written by recent program graduates, and found these capstone efforts to be of very high quality. The nature of topics and instructional methods in the research-oriented EP course sequences was also discussed, and the committee was similarly impressed with the design and implementation of these unique courses."

"Given the high quality of the program, its strong system of advising and adequate assessment, its documentation of sufficient faculty resources, and added documentation that dispelled concerns regarding lack of accreditation, the Joint review Committee was very impressed with the value of this degree program to our students, and its contribution to the standing of this university. In summary, the Joint Review Committee for BS Engineering Physics strongly recommends continuation of this degree program among the offerings of the University of Wisconsin-Madison."

B. Overview of the Program

The broad objective of the BS-EP degree program is to educate students in emerging engineering technology areas, emphasizing analytical and creative thinking through participation in research. The specific purposes of offering this degree are to: provide a challenging honors-oriented degree program that provides full access for students to the diverse emerging technology research programs of the Department of Engineering Physics, and provide an engineering-based B.S. degree that prepares students for pursuing advanced graduate degrees and for employment in high-tech startup companies and traditional engineering firms, as well as positions in academia, government, and national laboratories.

The B.S. degree program in Engineering Physics is offered and administered by the Department of Engineering Physics in the College of Engineering (CoE) at UW-Madison. The BS-EP program has the following features: a strong emphasis on engineering, math, and physics; choice of a technical focus area by the junior year; specialized education in an emerging technology; and emphasis on a research project culminating in a senior thesis. Focus areas include nanoengineering, plasma science and engineering, and scientific computing. These focus areas were developed based on the research strengths of faculty in the department and can be modified, added or discontinued, as emerging technologies change and mature.

Appendix 1 provides the Engineering Physics B.S. degree requirements as posted in Guide (also available at https://guide.wisc.edu/undergraduate/engineering/engineering-physics/engineering-physics-bs/).

The core faculty for this degree program are EP faculty, with affiliated faculty from other departments in engineering and physical sciences. Because students need to be academically strong and highly motivated to work effectively within a research groups and warrant significant faculty attention, the B.S. in Engineering Physics degree program is a selective one with a high GPA requirement – 3.5 to meet progression requirements and an overall GPA of 3.3 must be maintained to graduate with the “Honors in Research” designation.

The B.S. degree in Engineering Physics contributes to the university, college and department missions by providing a challenging degree program that encourages students to take advantage of and participate significantly in the active, diverse and substantial emerging technology research programs. Participation of the undergraduate EP student in research-based activities with a faculty research mentor emphasizes application of knowledge acquired during the formal coursework. The emphasis on emerging technologies connotes a forward-looking philosophy by focusing on areas where the EP Department is creating new knowledge and disciplines. This is also evidenced in the department’s graduate programs, which have well-established reputations in engineering physics areas such as nuclear systems, plasma physics and fusion energy science, and experimental and theoretical mechanics.

Learning Outcomes

The approved learning outcomes for the Engineering Physics B.S. programs are:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering research practices to produce results that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to apply experimental, theoretical, and computational methods to address scientific and engineering objectives
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Program Structure

The B.S. in Engineering Physics degree program is very selective and challenging, and graduates individuals who are ready for research-oriented career trajectories. Distinguishing features of the Engineering Physics degree include a strong emphasis on math, physics, and engineering fundamentals; choice of a technical focus area; and emphasis on research culminating in a senior thesis.

Focus areas are offered in:

Nanoengineering
Plasma Science and Engineering
Scientific Computing

Each Focus Area provides the ability for students to gain a depth of knowledge in their chosen area of study beyond the fundamental breadth of engineering studies. Example course topics within the focus areas include:

Plasma Science and Engineering	**NanoEngineering**	**Scientific Computing**
Intro to Plasmas	Solid State Physics	Intro to Scientific Computing for Engineering Physics

Plasma Confinement and Heating	Continuum Mechanics	Monte Carlo Radiation Trans
Plasma Processing and Technology	Heterogeneous and Multiphase Materials	Comp. Fluid Dynamics
Laboratory Course in Plasmas	Applied Optics	Intro to Finite Elements
Ionizing Radiation	Crystallography and X-Ray Diffraction	Comp. Methods in Electromagnetics
Thermal Physics	Atomistic Modeling	Numerical Analysis
Electronic Aids to Measurement	Processing of Electronic Materials	Linear Programming Methods

Students complete an in-depth research experience with the guidance of a research mentor that culminates in a senior research thesis. Students complete 8 credits of research over two years and produce a written thesis to meet graduation requirements. Research progress and thesis writing are facilitated by a four-course research sequence: EP 468, EP 469, EP 568, EP 569.

Engineering Physics Research Sequence
EP 468 *Introduction to Engineering Research*
EP 469 *Research Proposal in Engineering Physics*
EP 568 *Research Practicum in Engineering Physics I*
EP 568 *Research Practicum in Engineering Physics II*

Sample EP Thesis Titles include:

Nanoengineering

- A Measurement of the Flexoelectric Coefficient of ZnO Wires
- Effects of Electric Fields on the Properties of Thin Films Grown with Atomic Layer Deposition
- Hydrothermal Synthesis of Hierarchically Structured Tungsten Trioxide Nanomaterials for Energy Storage Applications

Plasma science and engineering

- Electron Temperature Fluctuations During Magnetic Reconnection in the Reversed-Field Pinch
- Optical Emission Spectroscopy in Laboratory Astrophysical Plasmas
- Analysis of Simple Charged Particle Systems That Exhibit Chaos
- The Influence of Field Structure Over Potential Origins of Observable High-Energy Astroparticle Anisotropies

Scientific Computing

- Accelerating Electron Microscopy Simulation Using Polynomial Regression
- AHAB — OR — The Hunt for Automated Shock Timing
- Attribute Management in ACIS Based Geometry Files

Although not required, EP students often graduate with certificates and double majors, most frequently in Mathematics, Physics, and Computer Science.

Relationship to other B.S. Programs in the Department

There is a strong relationship between the Engineering Physics major and the other two majors offered by the department, Nuclear Engineering and Engineering Mechanics. These three majors share a highly common curriculum of 63 credits for the first two years: 10 credits of general education and liberal studies requirements, 5 credits of chemistry, 11 credits of physics, 22 credits of math and statistics, and 15 credits of engineering. This foundation prepares students for the 65 required credits of in-depth upper-level work. Courses after the first two years emphasize the student's chosen technical focus area and research-focused activities.

Current faculty levels in the Department of Engineering Physics are sufficient to maintain the program of study. The Plasma Science and Engineering focus area relies heavily on Nuclear Engineering (NE) courses which are also needed by undergraduate and graduate students in the Nuclear Engineering B.S. and the Nuclear Engineering and Engineering Physics graduate degree programs. The Scientific Computation focus area relies heavily on courses offered by the Departments of Computer Science and Mathematics, which are populated primarily by students from majors other than Engineering Physics. In the case of the Nanoengineering focus area, courses have been identified which are regularly offered by other departments such as the Department of Mechanical Engineering and the Department of Materials Science and Engineering and populated primarily by students from majors other than Engineering Physics.

The only courses specific to the B.S. EP major are those in the four-course research sequence: EP 468, EP 469, EP 568, EP 569. Recently these have been taught and coordinated by Prof. Wendy Crone and Prof. Carl Sovinec. Given the documentation and teaching resources already developed for these courses, they can be handled by any faculty member in the department.

Program Governance

The program is governed by the faculty of the Department of Engineering Physics in the College of Engineering. Undergraduate Curriculum Committee, a subcommittee of the faculty, handles regular actions with the degree program and take major items to the faculty as a whole for a vote when necessary. Although only a few members of the faculty are engaged with the day-to-day activities and advising within this program, there is ample backup and past leaves/sabbaticals have been easily covered.

C. Program Assessment and Evaluation

Since the original implementation of the degree program, refinements have been made to the BS EP degree curriculum but no significant changes have occurred other than further formalization of the EP 468, EP 469, EP 568, EP 569 research sequence. Since 2007 a one hour discussion has been held every semester with students enrolled in the research sequence courses to solicit feedback from students on the major in general, specific course requirements, and content of the EP 468 *Introduction to Engineering Research*, and the structure of the research sequence. As a result of these discussions, adjustments concerning alternative options for certain required courses to better align them with prerequisites for later classes (e.g. accepting Phys 531 *Introduction to Quantum Mechanics* in place of NE 305 *Fundamentals of Nuclear Engineering*) and expansion of the courses listed in the Focus Area requirements as additional courses have been added to the catalog have occurred. Students have also identified topic areas for which they would like additional instruction/exposure, some of which have been added to the research sequence; examples include writing workshops, research summary talks, attending research conferences, citation management systems, and preparing to manage personal finances as a graduate student.

After working with the first few students in the degree program, it was found that even the elite cohort of students in the Engineering Physics program require additional structure to complete the research project and thesis requirements within the constraints of a four-year degree program. The EP 468 *Introduction to Engineering Research* was further structured to add milestones for acquiring a research mentor and topic by the end of the first semester of the research sequence. Additional writing assistance and deadlines associated with potions of the research proposal and research thesis were incorporated into the EP 469 *Research Proposal in Engineering Physics* and EP 569 *Research Practicum in Engineering Physics II* courses (the second and fourth courses in the research sequence). Additional experiences were also structured into the research sequence to provide practice in oral communication to prepare for the oral presentation of the proposal in EP 469 and oral defense of the thesis in EP 569.

The case for this is made succinctly in a paper coauthored by Prof. Crone concerning the EP 468 *Introduction to Engineering Research* course[1]:

> "[Nationally there is] a growing realization that undergraduate researchers benefit from training in ancillary research skills such as searching the scientific literature or presenting research findings,[2] many institutions have developed undergraduate research programs that incorporate additional training on research skills as part of their mission. In addition to providing undergraduate students with opportunities to pursue research projects with faculty members, these programs also offer workshops,[3,4,5] courses,[6,7] and even "boot-camp"-style summer research experiences[8] that focus on topics such as performing scientific literature searches, the role of the engineer in society, research and engineering ethics, communicating research findings, careers in research and even applying to graduate school.
>
> The topics covered by these programs and that of … [EP 468] are among the issues that the Council on Undergraduate Research points to as critical for a successful undergraduate research experience associated with "socializ[ing] students in the research laboratory culture."[9] This ranges from topics as diverse as the values and ethics of research, safety,

group dynamics, intellectual property, and graduate school applications. Lessons on many of these topics have been presented for young scientists in the National Academies' "On Being a Scientist."[10] In particular, this resource highlights case studies and advocates the active learning technique of "collective deliberation" on the topics in a group discussion format. In addition to the National Academies' booklet, there are a number of resources available that provide cases on the responsible conduct of research and guidance for instructors (or discussion facilitators) and on how to guide this process of learning and discovery.[11,12,13] "

Direct Assessment

As discussed in Appendix 2a, regarding the Assessment Activities and Action Outcomes for 2017-18 Academic Year, feedback from research mentors is sought on a regular basis during their enrollment in EP 568 and EP 569 to gauge student performance and progress. Several of the direct measures we have identified align with our EP student learning outcomes as indicated below. The "Evaluation of Research Progress and Researcher Development" is a five-page document which asks the research mentor to assess skills and development in the areas of:

Milestones and Timeline: The ability to set realistic goals and use time and resources effectively; to obtain the maximum benefit from a minimum investment of time and resources. (Aligns with student learning outcome 5)

Research Documentation: The ability to effectively document research approach, progress, hypotheses, and outcomes. (Aligns with student learning outcome 6)

Scientific Literacy: The ability to use processes and skills of science to conduct investigations; to recognize and define problems, analyze data, develop and implement solutions, and evaluate outcomes. (Aligns with student learning outcome 2)

Critical Thinking: The ability to question logically; to identify, generate, and evaluate elements of logical argument; to recognize and differentiate facts, illusions, assumptions and hidden assumptions; and to distinguish the relevant from the irrelevant. (Aligns with student learning outcome 1)

Commitment to Learning: The ability to self-assess, self-correct, and self-direct; to identify needs and sources of learning; and to continually seek new knowledge and understanding. (Aligns with student learning outcome 7)

Communication Skills: The ability to communicate effectively (i.e., speaking, body language, reading, writing, listening) for varied audiences and purposes. (Aligns with student learning outcome 3)

Interpersonal Skills: The ability to interact effectively with faculty research mentor, scientific staff, graduate students, team members, and other department personnel, and to deal effectively with cultural and ethnic diversity issues. (Aligns with student learning outcome 5)

Use of Constructive Feedback: The ability to identify sources of feedback, to seek out feedback, and to effectively use and provide feedback for improving personal interaction. (Aligns with student learning outcome 5)

Professionalism: The ability to exhibit appropriate professional conduct and to represent the profession effectively. (Aligns with student learning outcome 4)

Responsibility: The ability to fulfill commitments and to be accountable for actions and outcomes

Stress Management: The ability to identify sources of stress and to develop effective coping behaviors.

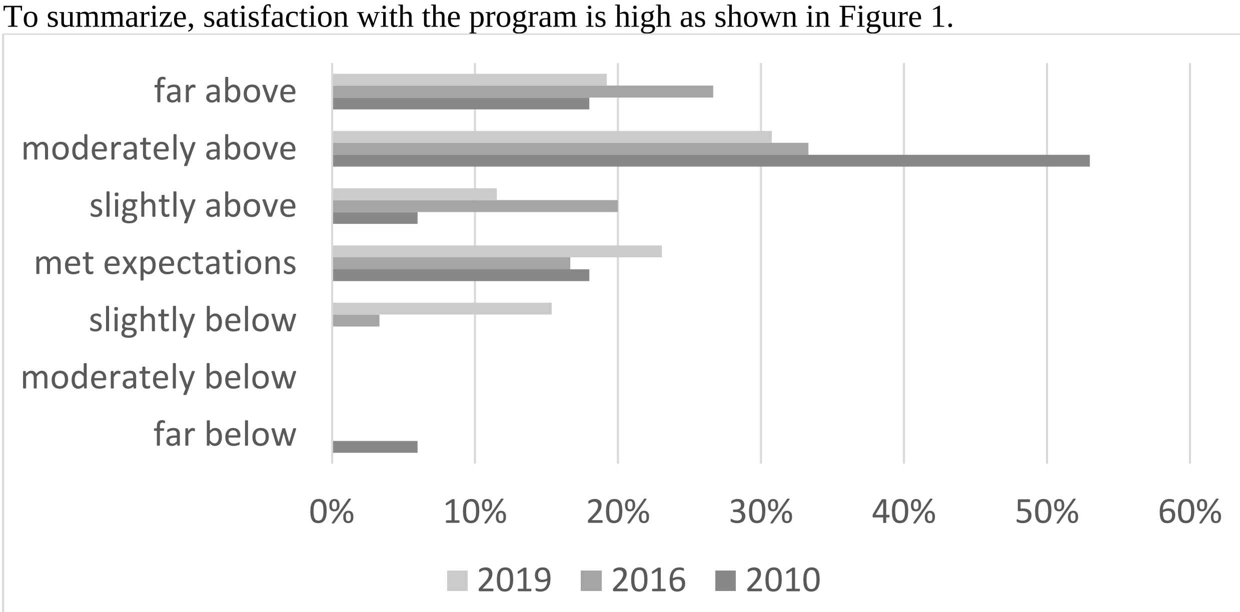
Project-Specific Research Skill: (determined by the research mentor and student) In addition to specific feedback, research mentors rate the student in each category using the scale: Unacceptable, Beginning, Developing, and Mastery. (Aligns with student learning outcome 6)

Most students are rated as Beginning and Developing in the categories described above (Mastery level is not expected and would usually only be achieved by an advanced graduate student given the subcriteria delineated). Improvements from Beginning to Developing were also seen for a number of students in a number of the categories. No students were rated as Unacceptable on any scale.

Student Survey

To support ongoing work to continuously improve the degree program, approximately every five years anonymous feedback is sought from all current and former EP majors who can be tracked. A survey tool was developed, submitted to the Institutional Review Board (which determined that it did "not meet the definition of human subject research", SE-2009-0715) and administered in 2010, 2016 and 2019. Questions included in the survey were adapted from the EBI Engineering Exit Assessment, the EP department exit survey, and the undergraduate research survey developed by the WI Program for Scientific Teaching. The survey is conducted via Qualtrics. Appendices 3 and 4 provide survey data from 2019 and 2016 respectively.

To summarize, satisfaction with the program is high as shown in Figure 1.



	2010	2016	2019
MEAN	5.47	5.63	5.15
n	17	30	26

Figure 1. Responses from the 2019, 2016 and 2010 survey on Q32 - The Bottom Line – Overall Satisfaction: "To what extent did the Engineering Physics program experience fulfill your expectations?"

Advice from External Board

In addition to student feedback, the Department engages with its Industrial Liaison Committee (ILC) regarding its degree programs on a regular basis. The ILC is composed of key individuals from industry, national laboratories, and academia representing the breadth of activity within the Department. The ILC meets 1-2 times per year. During their time on campus, the Committee meets with students from all of the department majors independent of the faculty. Most recently, in the Spring 2019 ILC visit, in addition to the student meeting, a presentation and devoted discussion time with the faculty and staff were focused on the Engineering Physics B.S. degree program. A key aspect of this discussion was the recruitment of students into the EP major as well as the Department's other two undergraduate majors.

> "The ILC notes a non-trivial decline in undergraduate enrollment in each degree area in Spring 2019, as well as challenges in attracting sufficient qualified candidates to the EP degree …….A successful marketing campaign should highlight the vision of what Department graduates an accomplish after the curriculum is completed and what is unique about the program (e.g. EP undergraduate thesis, taking a reactor critical, Project Karman, etc) rather than on the curriculum itself. Recognizing that parents are typically part of students' enrollment decisions, the Department should consider comparing employment/graduate school admission statistics across College Departments, salary figures, average time needed to achieve degrees, intern statistics – anything that shows an advantage for the Department's degree programs."

In response, the Department is developing a marketing plan for each of the Department's majors. The marketing to prospective majors is more difficult now that direct admission to programs as freshman has gone into place within the College. New strategies for Engineering Physics B.S. program are needed to attract majors who have research career goals and who are academically suited to the rigors of the coursework required of the BS EP major. We will be working with the College to increase access to prospective majors through Admitted Student Preview Days, SOAR, and Academic Advising Office, etc. This will require additional investment of time from the Department faculty and staff in an ongoing fashion.

D. <u>Recruiting, Admissions, and Enrollment</u>

The College of Engineering (COE) has transitioned to a direct admissions process, meaning that most first year students begin in one of the COE majors. Due to this change, initial inclusion in the major is predicated only on student interest and high school performance. In later semesters student performance is evaluated against progression criteria to determine if the individual's college course performance is sufficiently high to maintain enrollment in that major.

As discussed in Appendix 2a, regarding the Assessment Activities and Action Outcomes for 2016-17 Academic Year, the College of Engineering's move to a direct admission practice produced some disruption with enrollment in the major. In response, faculty advisors Profs. Carl Sovinec and Wendy Crone worked with Student Services Coordinator Tyree Bolden to assess GPA summaries and transcripts of enrolled individuals and identify those who would likely have difficulty in successfully completing the degree program given their college course performance to date. Having students with low GPAs counseled in a timely manner is important to avoid any delays in graduation with a change to another CoE major. Further refinements in advising around the direct admissions system were also implemented.

Although the Engineering Physics major was designed to be smaller in comparison to the Engineering Mechanics and Nuclear Engineering degree programs within the department, we seek to maintain a consistent enrollment and a viable community of students (see Figure 2). To attract majors who have research career goals and who are academically suited to the rigors of the coursework required of the BS EP major, the Department will be working with the College to increase access to prospective majors through Admitted Student Preview Days, SOAR, and Academic Advising Office, etc. These efforts will also seek to enhance the diversity of students in the program (Figure 3).

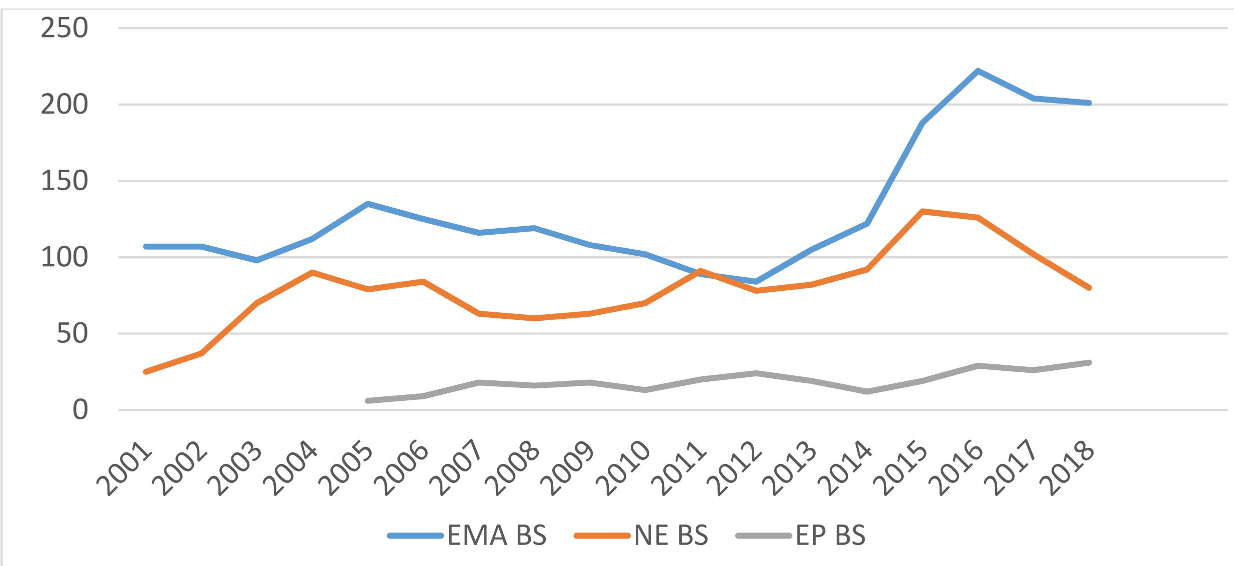


Figure 2. Enrollment in Department B.S. degree programs.

Undergraduate Student Demographics in Engineering Physics Comparison of Enrolled Undergraduates to Degree Recipients (Removed several enrolled students as directed by Engineering administration)		
	Enrolled Students	**Degree Recipients**
Number of Students	281	52
% Targeted Minority	6.8%	1.9%
% Female	10.3%	5.8%
% First Generation	19.2%	9.6%
% Low Income	18.5%	15.4%

Notes:
1. Enrolled students: includes all undergraduates ever enrolled in plan codes EGR 403,
EGRT403, or EP 403 (terms 1084-1194) except for several that were removed at the direction
of Engineering administration.
2. Degree recipients: includes all students awarded a bachelors degree in EP 403 (terms 1084-1194). Includes degrees posted by 6/15/2019.
3. Targeted minority includes all students who self-identified as Hispanic/Latino(a), African
American, American Indian/Alaska Native, or Southeast Asian (Hmong, Vietnamese, Laotian,
Cambodian).
4. First Generation includes all students who indicated at the time of application for admission that neither of their parents had earned a four-year bachelors degree.
5. Low income includes all students who ever received a federal Pell Grant while they were
enrolled as an undergraduate.

Figure 3. Undergraduate Student Demographics in the Engineering Physics Major

E. Advising and Student Support

In their first year, EP students are assigned an academic advisor with the CoE Office of Academic Advising. The CoE student/academic advisor ratios are approximately 285:1. The primary responsibility of the academic advisors is advising students, and they also have duties surrounding course enrollment & management and other various student service-related duties. First-year students are required to attend group advising sessions in both the fall and spring semester and to have their course-taking plans reviewed and approved by their academic advisor before they can enroll. Individual appointments are available and optional. The advisors use the Advising Gateway and Advisor Notes System. CoE advisors are expected to have education and experience in STEM education, STEM academic affairs or working as practicing STEM professionals. All new advisors attend the Office of Undergraduate Advising (OUA) New Advisor Academy where they learn about the Guiding Principles and Advising Core Competencies. Their performance is reviewed annually by the director of the advising office. The current EP academic advisor is Catherine Turng. When personnel changes necessitate change in advisee assignments, the advising office works diligently to ensure students are informed and that there are no gaps in meeting student needs.

Once a student meets the CoE Progression Requirements (typically at the end of their first year), they are also assigned a faculty advisor within EP who works with them throughout their degree program. Students are required to meet with their faculty advisor each semester before they can enroll. Faculty advising is split by focus are:

Nanoengineering: Wendy Crone, Professor
Plasma Science and Engineering: Carl Sovinec, Professor
Scientific Computing: Carl Sovinec, Professor

After their first year, students are primarily advised by their faculty advisor, while the academic advisor is available as needed to assist students in all aspects of their student experience.

A recent concern that has arisen with direct admission of freshmen into majors within the College of Engineering is that the Progression Requirement is applied before the students experience the rigor and research orientation of the degree. We are, therefore, working with the College of Engineering Dean's Office to develop a holistic milestone that considers progress toward identifying a research area and GPA in more advanced courses. In our current planning, we except that this milestone would be evaluated one year after the student meets the Progression Requirement.We anticipate moving the EP 468 course into the sophomore-year curriculum, which is not barred by requisites and is already encouraged. Students who do not achieve the milestone would be guaranteed admission into one of the two other undergraduate majors (Nuclear Engineering or Engineering Mechanics and Astronautics) offered by the department, or they may choose to switch to another major.

Overall, satisfaction with academic advising is high as illustrated by Figure 4. One area that is not rated as highly as others is guidance on career options. The research course sequence EP 468, EP 469, EP 568, EP 569 includes a general discussion of research careers and detailed discussion to prepare students for graduate school applications and activities. This is appropriate, given that the vast majority of EP graduates pursue advanced degrees (see Section H). However, more information on other career opportunities may benefit those few individuals who do not continue on to graduate school immediately, and give those who do a greater sense of flexibility. We believe that this can be effectively addressed by the EP faculty advisors.

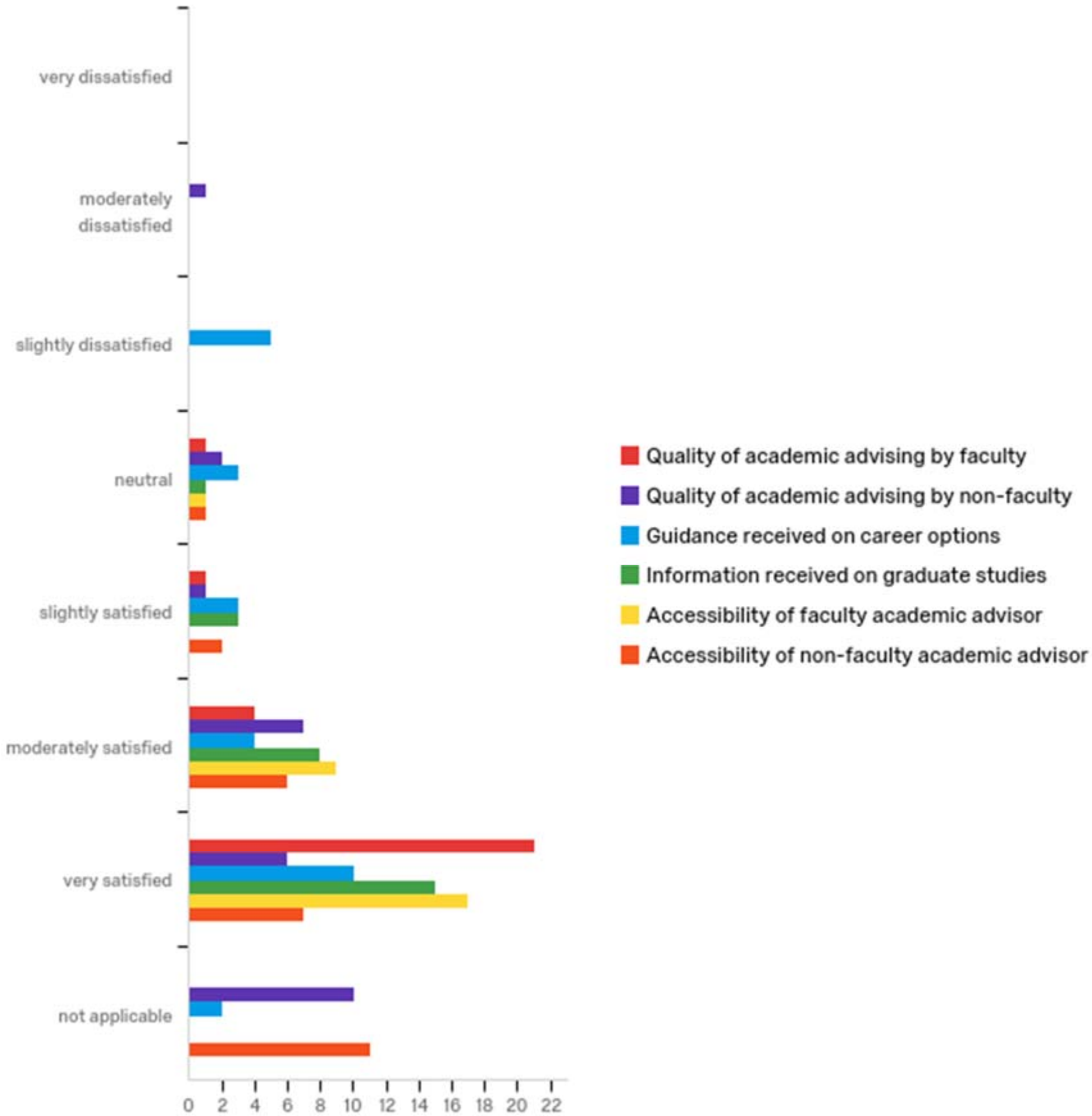


Figure 4. 2019 survey response data from Q22 - Academic Advising: Satisfaction with: ….(see inset for specific categories of advising).

Beyond the academic and faculty advising received, each student has a research mentor to guide their research and undergraduate thesis. The faculty members of the Department of Engineering Physics are possible faculty research mentors for the students in the program; however, students are not limited to choosing a faculty research mentor from within the department. While research groups in the various emerging technology areas are led by EP faculty, these groups are typically quite interdisciplinary and involve collaborations with faculty and scientific staff from other departments, particularly the Materials Science & Engineering, Electrical & Computer Engineering, Mechanical Engineering, and Physics departments. These departments are closely affiliated with EP, and there are numerous Department of Engineering Physics faculty with joint and affiliate appointments in these other departments.

Satisfaction with research mentoring is high as shown in Figure 5. Guidance on career options is again rated slightly lower than other areas. An addition to the program's guidance to research mentors will suggest that they also consider this facet of mentoring and help the students with professional networking.

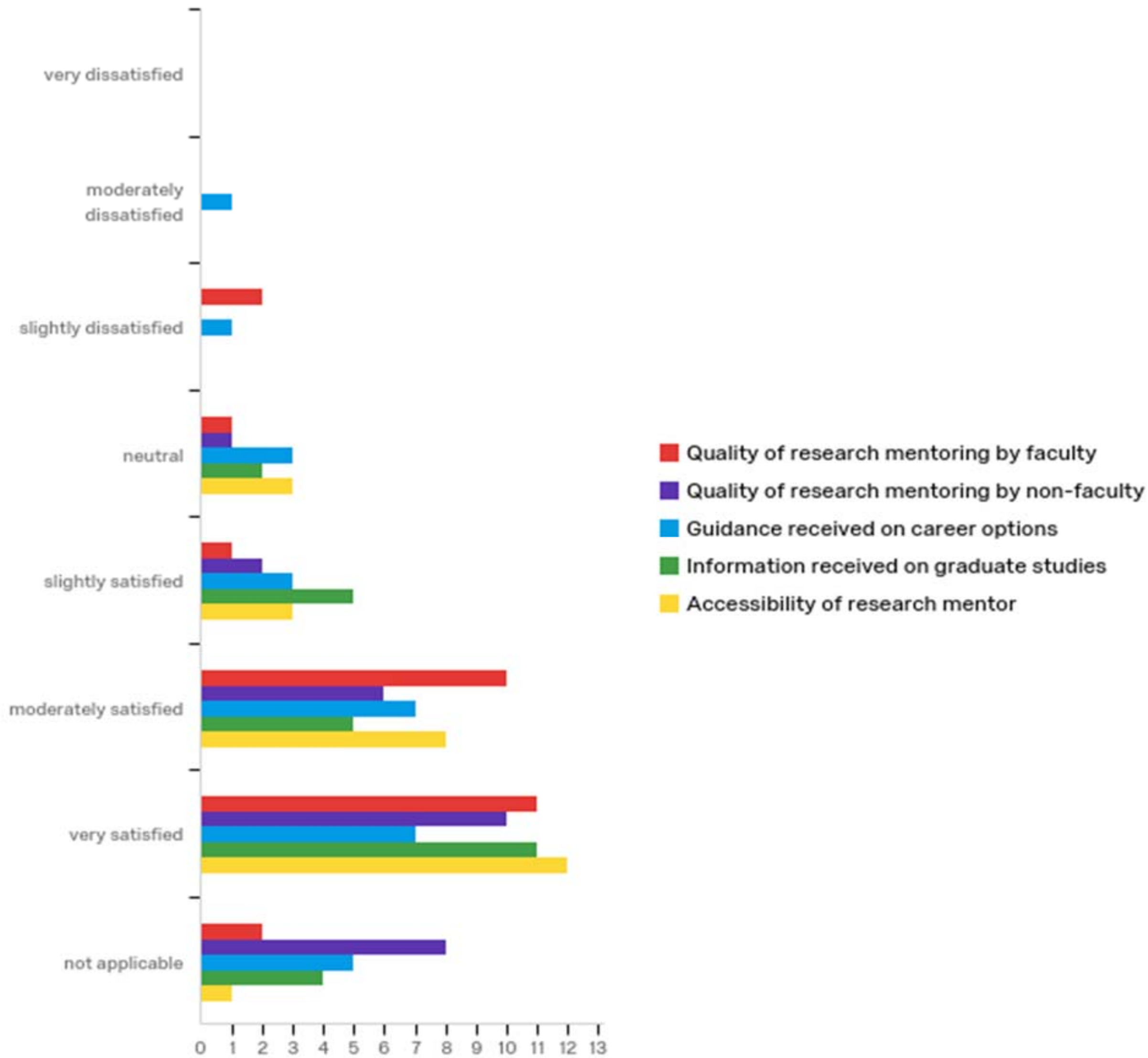


Figure 5. 2019 survey response data from Q23 – Research Mentoring: Satisfaction with: ….(see inset for specific categories of advising).

Curricular material is primarily available online via the Guide resource for UW Madison. We are currently working to ensure other web resources point toward Guide to ensure consistency in the published curricula. The CoE follow campus deadlines and deadlines for updating Guide. https://guide.wisc.edu/undergraduate/engineering/engineering-physics/engineering-physics-bs/ We also have curricular flow charts available in paper form in the advising office.

F. Program Community and Climate

EP majors engage with a community of like-minded scholars within the major and obtain a mentored research experience within one of the engineering and science research groups. The Engineering Physics Research Sequence facilitates community in the program by using a meet-with format across the EP 469, 568, and 569 courses. Students interact once a week over the course of three semesters, where they participate in large and small group discussions and peer evaluation of writing.

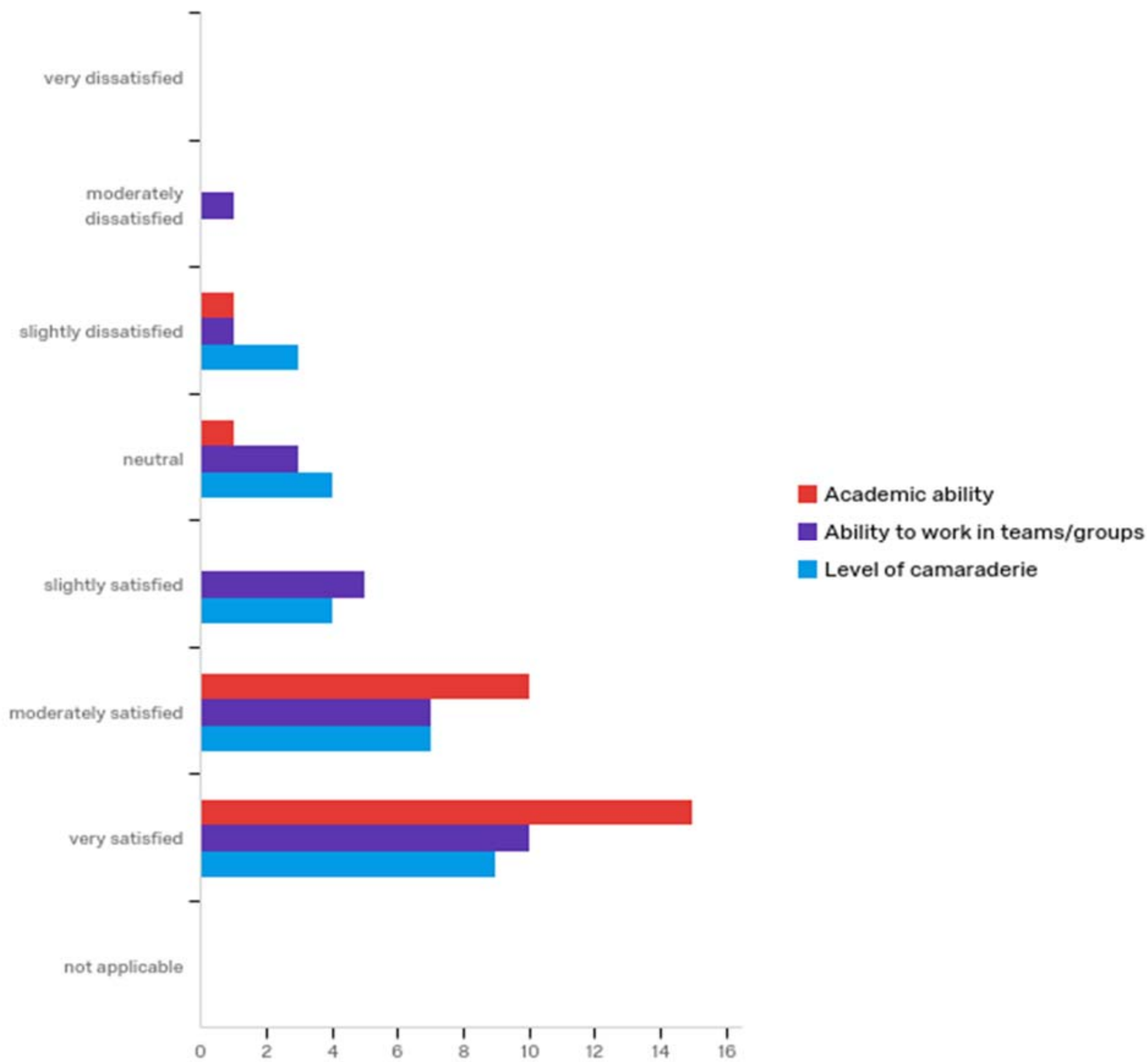


Figure 6. 2019 survey response data from Q24 - Classmates Satisfaction with characteristics of your fellow students:….(see inset for specific categories of advising).

The Department of Engineering Physics has made strides in the area of gender demographics of the faculty in the last several years with the hiring of Profs. Jennifer Franck and Jennifer Choy.

The Department continues to seek opportunities to further diversify the faculty. A list of current faculty members in the Department of Engineering Physics can be found at:
https://directory.engr.wisc.edu/display.php/faculty?page=ep&search=faculty

G. Degree Completion and Time to Degree

Referencing relevant data and campus goals, describe efforts to help students make timely progress to degree. Include the following in your discussion:

Time to degree data with comparison to AAU Peer Institutions is given in Appendix 5 and with comparison to other degrees in the College of Engineering is given in Appendix 6. (It should be noted that the anomalously high data point for 2009-10 is attributed to a student who's recorded time to degree was >10 years although he only spent 4 years in the EP degree program.) Time to degree is favorable and in alignment with both AAU Peers and other College of Engineering majors. This is the case despite the tendency for EP students to seek a double major or certificate while completing their B.S. in EP. Study abroad and summer internship activity is also high in the major.

Although the number of graduates fluctuates from year to year given the size of the major, the average number of graduates per academic year has been 4.2 (using 2006-2019 data) and more recently 5.1 (using 2010-2019 data). Over the life of the degree program there have been 59 graduates (through May 2019).

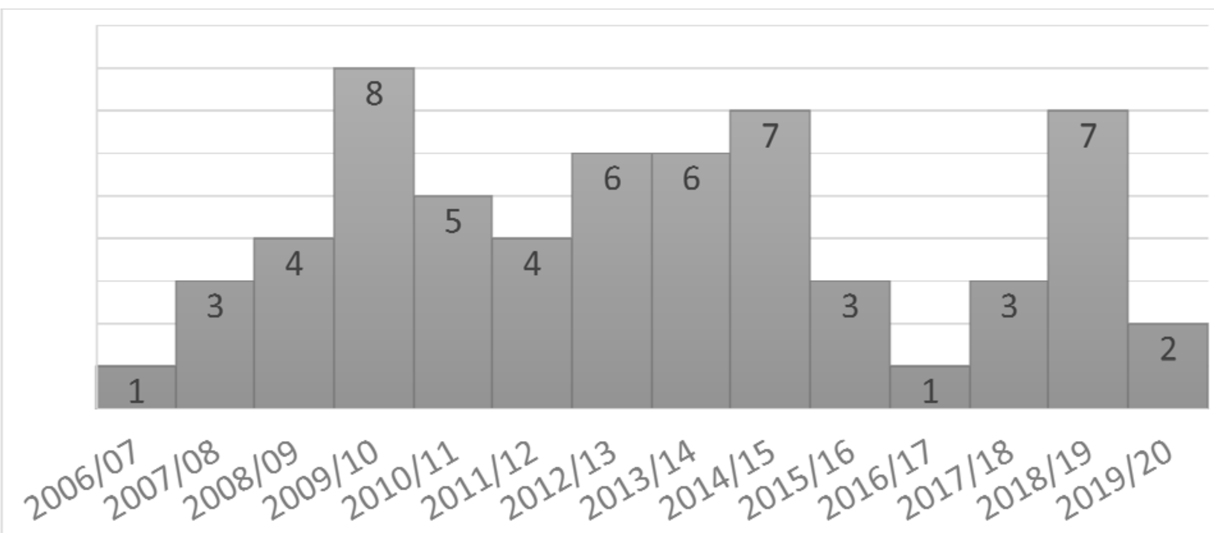


Figure 7. Number of graduates per academic year.

Since the initiation of the degree program, the engagement in the three Focus Areas has fluctuated with Nanoengineering being the most popular choice initially, Plasma Science and Engineering growing in popularity in more recent years, and steady although lesser level of interest in Scientific Computing. The percentage of student completing degrees in each of the focus areas is shown in Table 1.

Table 1. Focus areas of BS EP majors.

Nanoengineering	27	45%
Plasma Science and Engineering	23	38%
Scientific Computing	10	17%

H. Career Services and Post-Graduation Outcomes

The B.S. in Engineering Physics degree program is very selective and challenging, and graduates individuals who are ready for research in frontier fields. BS-EP students have both a very strong and broad background in engineering, math, and physics fundamentals, and in-depth experience in a frontier emerging technology area. Thus, they are sought after because they are ideally prepared for graduate studies at other first rank research universities. To date, **94%** of BS EP graduates have gone on to attend graduate school in graduate programs in science and engineering.

Graduate school trajectories have included:

- UW-Madison (Physics; Electrical Engineering; Materials Science; Nuclear Engineering and Engineering Physics)
- MIT (Plasma Physics; Mechanical Engineering; Materials Science)
- Cornell (Theoretical and Applied Mechanics; Materials Science)
- Columbia University (Applied Physics)
- Stanford University (Materials Science and Engineering)
- University of Michigan (Materials Science)
- University of Illinois-Urbana/Champaign (Materials Science)
- University of California Los Angeles (Physics)
- University of California San Diego (Nanoengineering)
- University of Colorado – Boulder (Physics)
- University of Maryland (Physics)
- University of Minnesota (Materials Science)
- University of Washington
- Universidad Politécnica de Valencia (Advanced Materials and Processes)

Those that choose not to pursue advanced degrees have access to Engineering Career Services and are provided with guidance from their faculty advisor. The students who do not go on to graduate school are directly employable as highly qualified technicians in the emerging technology companies and national laboratories. For example, there are various size companies involved in cryogenics, nanoengineering/nanotechnology, x-ray imaging technology and plasma processing in the Madison area, as well as throughout the upper Midwest and the U.S. The EP faculty take an active role in helping connect B.S. EP candidates with appropriate employers in their emerging technology focus area.

The Department tracks EP graduates after their degree completion to identify their graduate school accomplishments and ultimate employment. Employers include:

- 3M Corporate Research Processing Laboratory
- EPIC
- Fermi Laboratory
- General Atomics Corporation
- IBA Proton Therapy
- Los Alamos National Laboratory
- MIT Lincoln Laboratory
- National Renewable Energy Laboratory
- Naval Research Laboratory
- Rohde & Schwarz, Inc.
- Sandia National Laboratory
- University of Michigan (scientist)

I. Overall Analysis of the Self-Study and the State of the Program

Students are achieving the desired learning outcomes for the program, going on to graduate studies at a rate of 94% after completion of their B.S., and achieve research-related careers in industry, national laboratories, and academia. Marketing the program to prospective students for the purpose of recruiting is the main point of action required as the program moves forward.

J. Appendices

1. Engineering Physics, B.S Degree Requirements (Guide)
2. Annual Assessment Reports
3. Survey Summary 2019
4. Survey Summary 2016
5. Time to Degree with AAU Comparisons
6. Time to Degree with COE Comparisons

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[6] The University of Virginia Department of Science, Technology, and Society Undergraduate Thesis Project, http://www.sts.virginia.edu/stshome/tiki-index.php?page=Undergraduate+Thesis, Accessed January 2008.

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[12] National Center for Case Study Teaching in Science, University at Buffalo, The State University of New York, http://ublib.buffalo.edu/libraries/projects/cases/case.html, Accessed January 2008.

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ENGINEERING PHYSICS, B.S.

The Department of Engineering Physics offers the B.S. degree in engineering physics. The degree is designed to provide graduates with skills in emerging technological areas. They are well prepared for pursuing advanced graduate degrees and for employment in high-tech startup companies and traditional engineering firms, as well as positions in academia, government, and national laboratories.

Students specialize in one of three technological focus areas: nanoengineering, plasma science and engineering, and scientific computing.

Distinguishing features of the engineering physics degree include a strong emphasis on math, physics, and engineering fundamentals; choice of a technical focus area; and emphasis on research as part of a campus research group or through individually mentored research with a faculty member, culminating in a senior thesis.

THE OBJECTIVES OF THE ENGINEERING PHYSICS PROGRAM ARE TO:

- Educate students to think and participate deeply, creatively, and analytically in emerging areas of engineering technology.
- Educate students in the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis.
- Educate students in the methodology of research.
- Provide and facilitate teamwork and multidisciplinary experiences throughout the curriculum.
- Foster the development of effective oral and written communication skills.
- Expose students to environmental, ethical and contemporary issues.

Admission to the College as a Freshman

Students applying to UW–Madison need to indicate an engineering major as their first choice in order to be considered for direct admission to the College of Engineering. Direct admission to a major means students will start in the program of their choice in the College of Engineering and will need to meet progression requirements at the end of the first year to guarantee advancement in that program.

Cross-Campus Transfer to Engineering

UW–Madison students in other schools and colleges on campus must meet the course and credit requirements for admission to engineering degree granting classifications specified in the general college requirements. The requirements are the minimum for admission consideration. Cross-campus admission is competitive and selective, and the grade point average expectations may increase as demand trends change. The student's overall academic record at UW–Madison is also considered. Students apply to their intended engineering program by submitting the online application by stated deadlines for spring and fall. The College of Engineering offers an online information tutorial and drop-in advising for students to learn about the cross-campus transfer process.

Off-Campus Transfer to Engineering

With careful planning, students at other accredited institutions can transfer coursework that will apply toward engineering degree requirements at UW–Madison. Off-campus transfer applicants are considered for direct admission to the College of Engineering by applying to the Office of Admissions with an engineering major listed as their first choice. Those who are admitted to their intended engineering program must meet progression requirements at the point of transfer or within their first two semesters at UW–Madison to guarantee advancement in that program. A minimum of 30 credits in residence in the College of Engineering is required after transferring, and all students must meet all requirements for their major in the college. Transfer admission to the College of Engineering is competitive and selective, and students who have earned more than 80 transferable semester credits at the time of application are not eligible to apply.

The College of Engineering has dual degree programs with select four-year UW System campuses. Eligible dual degree applicants are not subject to the 80 credit limit.

Off-campus transfer students are encouraged to discuss their interests, academic background, and admission options with the Transfer Coordinator in the College of Engineering: ugtransfer@engr.wisc.edu or 608-262-2473.

Second Bachelor's Degree

The College of Engineering does not accept second undergraduate degree applications. Second degree students might explore the Biological Systems Engineering program at UW–Madison, an undergraduate engineering degree elsewhere, or a graduate program in the College of Engineering.

On This Page

University General Education Requirements

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements section of the *Guide*.

General Education	• Breadth—Humanities/Literature/Arts: 6 credits • Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits • Breadth—Social Studies: 3 credits • Communication Part A & Part B * • Ethnic Studies * • Quantitative Reasoning Part A & Part B * * The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

Summary of Requirements

The following curriculum applies to students who entered the program after fall 2018.

Mathematics and Statistics	25
Science	28
Engineering Science	25
Focus Area	22
Technical Electives	6
Communication Skills	8
Liberal Studies	16

Total Credits		130

Mathematics and Statistics

MATH 221	Calculus and Analytic Geometry 1	5
or MATH 217	Calculus with Algebra and Trigonometry II	
or MATH 275	Topics in Calculus I	
MATH 222	Calculus and Analytic Geometry 2	4
or MATH 276	Topics in Calculus II	
MATH 234	Calculus--Functions of Several Variables	4
MATH 319	Techniques in Ordinary Differential Equations	3
MATH 321	Applied Mathematical Analysis	3
MATH 340	Elementary Matrix and Linear Algebra	3
or MATH 341	Linear Algebra	
STAT 324	Introductory Applied Statistics for Engineers	3
or STAT 311	Introduction to Theory and Methods of Mathematical Statistics I	
or STAT/MATH 431	Introduction to the Theory of Probability	
Total Credits		25

Science

Select one of the following:		5-10
CHEM 109	Advanced General Chemistry	
CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II	
PHYSICS 202	General Physics	5
or PHYSICS 208	General Physics	
PHYSICS 241	Introduction to Modern Physics	3

or PHYSICS 205	Modern Physics for Engineers	
PHYSICS 322	Electromagnetic Fields	3
E P 271	Engineering Problem Solving I	3
or COMP SCI 310	Problem Solving Using Computers	
M S & E 351	Materials Science-Structure and Property Relations in Solids	3
or CBE 440	Chemical Engineering Materials	
N E 305	Fundamentals of Nuclear Engineering	3
or PHYSICS 531	Introduction to Quantum Mechanics	
Computing Elective (select one)		3
COMP SCI 300	Programming II	
COMP SCI 412	Introduction to Numerical Methods (required for students in Scientific Computing Focus Area)	
E P/E M A 471	Intermediate Problem Solving for Engineers	
E P/E M A 476	Introduction to Scientific Computing for Engineering Physics	
Total Credits		28-33

Engineering Science

E M A 201	Statics	3
or PHYSICS 201	General Physics	
or PHYSICS 207	General Physics	
PHYSICS 311	Mechanics	3
or E M A 202	Dynamics	
or M E 240	Dynamics	
E M A 303	Mechanics of Materials	3
or M E 306	Mechanics of Materials	
E M A/M E 307	Mechanics of Materials Lab	1
M E 361	Thermodynamics	3

or M S & E 330	Thermodynamics of Materials	
E C E 376	Electrical and Electronic Circuits	3
or PHYSICS 321	Electric Circuits and Electronics	
M E 363	Fluid Dynamics	3
M E 364	Elementary Heat Transfer	3
or M S & E 331	Transport Phenomena in Materials	
INTEREGR 170	Design Practicum	3
Total Credits		25

Focus Area

Research and Development/Senior Thesis

Expectations for Research Projects

Completion of the engineering physics degree program requires satisfactory completion of the E P 468 Introduction to Engineering Research, E P 469 Research Proposal in Engineering Physics, E P 568 Research Practicum in Engineering Physics I, and E P 569 Research Practicum in Engineering Physics II coursework sequence, which culminates in a senior research thesis. The research topic chosen by the student and agreed upon by the advisor should be on a topic connected to the chosen Focus Area. The research conducted should be such that the student participates in the creation of new knowledge, experiences the excitement of the research process, and makes a contribution so that it would be appropriate to include the student's name on a scholarly publication if one results from the research.

Senior Thesis

A senior thesis, completed during enrollment in E P 569 Research Practicum in Engineering Physics II is required. The senior thesis is a written document reporting on a substantial piece of work. It should be written in the style of a graduate thesis. The faculty advisor, in consultation with a research mentor, determines the grade which the student receives for the thesis. A bound copy of the thesis must be submitted to the engineering physics department office.

On or before the Friday of finals week of the semester in which E P 569 Research Practicum in Engineering Physics II is taken, the senior thesis must be presented orally by the student to a committee of three professors in a publicly announced seminar. Interested faculty and students will be invited to attend.

Research and Development

Research and Development	8

E P 468	Introduction to Engineering Research
E P 469	Research Proposal in Engineering Physics
E P 568	Research Practicum in Engineering Physics I
E P 569	Research Practicum in Engineering Physics II

Focus Area Electives

Nanoengineering

Focus Area Total Credits:		14
Required:		
PHYSICS 551	Solid State Physics	3
At Least One of:		
E P/E M A 615	Micro- and Nanoscale Mechanics	3
M S & E 553	Nanomaterials & Nanotechnology	3
At Least One of:		
E M A 506	Advanced Mechanics of Materials I	3
E M A 622	Mechanics of Continua	3
E M A 519	Fracture Mechanics	3
At Least One of:		
M S & E 448	Crystallography and X-Ray Diffraction	3
E M A 611	Advanced Mechanical Testing of Materials	3
M E 601	Special Topics in Mechanical Engineering (Micro & Nano Fabrication)	1-3
N E 602	Special Topics in Reactor Engineering (Vacuum Technology Lab)	3
PHYSICS 623	Electronic Aids to Measurement	4
PHYSICS 625	Applied Optics	4
M S & E 748	Structural Analysis of Materials	3
Open Electives:		

M S & E 333	Microprocessing of Materials	3
E C E 335	Microelectronic Devices	3
M S & E 434	Introduction to Thin-Film Deposition Processes	3
M S & E 441	Deformation of Solids	3
E C E 445	Semiconductor Physics and Devices	3
M S & E 451	Introduction to Ceramic Materials	3
E M A/M S & E 541	Heterogeneous and Multiphase Materials	3
M S & E 560	Fundamentals of Atomistic Modeling	3
M S & E 570	Properties of Solid Surfaces	3
CHEM 630	Selected Topics in Analytical Chemistry	1-3
M S & E 756	Structure and Properties of Advanced Electronic Materials	3

Plasma Science and Engineering

Focus Area Total Credits:		14
Required:		
N E/E C E/PHYSICS 525	Introduction to Plasmas	3
At Least One of:		
N E/E C E/PHYSICS 527	Plasma Confinement and Heating	3
N E/E C E 528	Plasma Processing and Technology	3
At Least One of:		
N E 526	Laboratory Course in Plasmas	3
Open Electives:		
N E 408	Ionizing Radiation	3
N E 536	Feasibility St of Power from Controlled Thermonuclear Fusion	3
Any plasma-related special topics course in NE		
PHYSICS 415	Thermal Physics	3

PHYSICS 623	Electronic Aids to Measurement	4
PHYSICS 625	Applied Optics	4
N E/E C E/PHYSICS 724	Waves and Instabilities in Plasmas	3
N E/E C E/PHYSICS 725	Plasma Kinetic Theory and Radiation Processes	3
N E/E C E/PHYSICS 726	Plasma Magnetohydrodynamics	3

Scientific Computing

Focus Area Total Credits:		14
At Least One of:		
N E/MED PHYS 506	Monte Carlo Radiation Transport	3
M E 573	Computational Fluid Dynamics	3
E M A 605	Introduction to Finite Elements	3
E C E 742	Computational Methods in Electromagnetics	3
At Least One of:		
Students must take at least two credits of laboratory experience in the Physical or Biological Sciences beyond the required chemistry and mechanics of materials courses		
Open Electives:		
E P/E M A 476	Introduction to Scientific Computing for Engineering Physics	3
COMP SCI 300	🎓 Programming II	3
COMP SCI/MATH 513	Numerical Linear Algebra	3
COMP SCI/MATH 514	Numerical Analysis	3
COMP SCI/I SY E/MATH/STAT 525	Linear Optimization	3
COMP SCI 577	Introduction to Algorithms	4
COMP SCI/MATH 714	Methods of Computational Mathematics I	3
COMP SCI/MATH 715	Methods of Computational Mathematics II	3
M S & E 560	Fundamentals of Atomistic Modeling	3

M E/COMP SCI/E C E/E M A/E P 759	High Performance Computing for Applications in Engineering	3
Any scientific-computing-related special topics course in NE		

Technical Elective

Select 6 credits at a level that requires two semesters of calculus or two semesters of physics as a prerequisite.

Communication Skills

ENGL 100	Introduction to College Composition	3
or COM ARTS 100	Introduction to Speech Composition	
or LSC 100	Science and Storytelling	
or ESL 118	Academic Writing II	
E P D 275	Technical Presentations	2
E P D 397	Technical Communication	3
Total Credits		8

Liberal Studies

Complete Requirements 1

1 Students must take 16 credits that carry H, S, L, or Z breadth designators. These credits must fulfill the following subrequirements:

1. A minimum of two courses from the same department or program. At least one of these two courses must be designated as above the elementary level (I, A, or D) in the course listing.
2. A minimum of 6 credits designated as humanities (H, L, or Z in the course listing), and an additional minimum of 3 credits designated as social science (S or Z in the course listing). Foreign language courses count as H credits. Retroactive credits for language courses may not be used to meet the Liberal Studies credit requirement (they can be used for subrequirement 1 above).
3. At least 3 credits in courses designated as ethnic studies (lower case "e" in the course listing). These courses may help satisfy subrequirements 1 and 2 above, but theyonly count once toward the total required. Note: Some courses may have "e" designation but not have H, S, L, or Z designation; these courses do not count toward the Liberal Studies requirement.

Total Credits: 130–132

For information on credit load, adding or dropping courses, course substitutions, pass/fail, auditing courses, dean's honor list, repeating courses, probation, and graduation, see the College of Engineering Official Regulations.

University Degree Requirements

Total Degree	To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.
Residency	Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. "In residence" credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.
Quality of Work	Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering research practices to produce results that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to apply experimental, theoretical, and computational methods to address scientific and engineering objectives
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

SAMPLE FOUR-YEAR PLAN

First Year			
Fall	**Credits**	**Spring**	**Credits**
CHEM 109	5	E M A 201	3

MATH 221	5	MATH 222	4
Communications A	3	PHYSICS 202	5
INTEREGR 170	3	Liberal Studies Elective	3
	16		15
Second Year			
Fall	**Credits**	**Spring**	**Credits**
MATH 319	3	MATH 234	4
PHYSICS 241 or 205	3	PHYSICS 322[1]	3
PHYSICS 311	3	M S & E 351 or CBE 440	3
E P 271 or COMP SCI 310	3	E M A 303	3
E P D 275 or COM ARTS 105	2	E M A/M E 307	1
STAT 324	3	Liberal Studies Elective	3
	17		17
Third Year			
Fall	**Credits**	**Spring**	**Credits**
E P 468[2]	1	E P 469	1
N E 305 or PHYSICS 531[3]	3	Technical Elective	3
E P Focus Area Course	3	E P D 397	3
MATH 321	3	E C E 376 or PHYSICS 321	3-4
M E 361 or M S E 330	3	MATH 340 or 341	3
Computing Elective	3	Liberal Studies Elective	3
	16		16-17
Fourth Year			
Fall	**Credits**	**Spring**	**Credits**
E P 568	3	E P 569	3

M E 363	3	E P Focus Area Course	2
E P Focus Area Course	3	M E 364 or M S E 331	3
E P Focus Area Course	3	Technical Elective	3
Liberal Studies Elective	4	E P Focus Area Course	3
		Liberal Studies Elective	3
	16		17
Total Credits 130-131			

1 Topics from MATH 321 Applied Mathematical Analysis are applied in PHYSICS 322 Electromagnetic Fields, and some students may find it helpful to take PHYSICS 322 Electromagnetic Fields after MATH 321 Applied Mathematical Analysis if PHYSICS 322 Electromagnetic Fields is not required for focus area courses.

2 Students are encouraged to take E P 468 Introduction to Engineering Research during their second year to allow for more flexibility in the research sequence.

3 Students in the nanoengineering focus area should take PHYSICS 531 Introduction to Quantum Mechanics.

Advising

Each College of Engineering program has academic advisors dedicated to serving its students. Program advisors can help current College of Engineering students with questions about accessing courses, navigating degree requirements, resolving academic issues and more. Students can find their assigned advisor on the homepage of their student center.

Continuing students who have fulfilled the progression requirements will also be assigned an Engineering Physics faculty advisor. Before enrolling in courses each semester, students must meet with their faculty advisor for assistance in planning courses and reviewing degree requirements. Faculty advisors are a valuable resource, as they can provide students with in-depth guidance on course content, internship and job opportunities, research, and more.

Engineering Career Services

Engineering Career Services (ECS) assists students in identifying pre-professional work-based learning experiences such as co-ops and summer internships, considering and applying to graduate or professional school, and finding full-time professional employment during their graduation year.

ECS offers two major career fairs per year, assists with resume writing and interviewing skills, hosts workshops on the job search, and meets one-on-one with students to discuss offer negotiations.

Students are encouraged to utilize the ECS office early in their academic careers. For comprehensive information on ECS programs and workshops, see the ECS website or call 608-262-3471.

PROFESSORS

Henderson (chair)
Blanchard
Bonazza
Bronkhorst
Crone
Fonck
Hegna
Lakes
Schmitz
Smith (also Mathematics)
Sovinec
Waleffe (also Mathematics)
Wilson

ASSOCIATE PROFESSORS

M. Allen
Witt

ASSISTANT PROFESSORS

Choy
Couet
Franck
Geiger
Notbohm
Thevamaran

See department website for list.

Facilities

Facilities available for instruction and research include:

Fluid Mechanics and Heat Transfer Laboratories
Instructional Computing Labs (in Computer Aided Engineering)
Nanomechanics Laboratory
Nuclear Instrumentation Laboratory
Plasma Physics Laboratories
Superconductivity and Cryogenics Laboratories

Contact Information

Engineering Physics
College of Engineering
Engineering Physics, B.S.
http://www.engr.wisc.edu/
Engineering Physics
608-263-1646
151 Engineering Research Building
1500 Engineering Drive
Madison, WI 53706
http://www.engr.wisc.edu/ep/
Collapse Headers

Assessment Activities and Action Outcomes for 2016-17 Academic Year
Summary for the Bachelor of Science in Engineering Physics
November 1, 2017

Background

Upon creation of the Engineering Physics (EP) major, the Department of Engineering Physics faculty decided not to seek ABET accreditation due to the research-oriented nature of the program. ABET traditionally stresses the engineering design process. EP students are exposed to the basic principles of engineering design through the common coursework they take in the first two years. However, the degree program is primarily focused on cross-disciplinary research in areas of emerging technology where new types of engineering develop from applied science. In place of the design capstone sequence that usually occurs in the senior year for other engineering majors, the EP students complete a four semester research sequence culminating in a written thesis which is defended in a final oral presentation.

The two other degrees offered by the department are ABET accredited (B.S. in Nuclear Engineering and a B.S. in Engineering Mechanics), so the BS-EP students are exposed to ABET-approved engineering methods, and our faculty applies the same level of scrutiny in assessment of degree requirements. As with our other majors, we seek feedback from students on a regular basis, including their annual interaction with our Industrial Advisory Board, and ask them to complete the departmental exit interview and EBI survey upon graduation, as do the graduates from our other majors. Beyond these standard evaluation measures, student feedback is sought regularly during the research sequence classes.

In March 2016 a "Status Report and Assessment Summary for the Bachelor of Science in Engineering Physics" was submitted. This five-year review undertook a thorough evaluation of the degree program, its curriculum, and its graduates.

AY 2016-2017 Assessment Activities and Outcomes

In the initial implementation of the B.S. in EP degree it was anticipated that most of the students will be "high-performance" undergraduates, many of whom will have already started thinking about graduate school and demonstrated an aptitude to get there. Faculty advisor Wendy Crone remains in contact with recent graduates of the EP major to record their career progression. They continue to have an excellent track record of continuing on in graduate studies at highly selective institutions.

Each semester every student in the EP major meets with their faculty advisor. To ensure that this takes place, an advising hold is put in place for the subsequent term's registration and released after an advising consultation has taken place (confirmed by a faculty advisor's signature). In the Fall 2016 semester, these advising consultations identified a new issue with Degree Audit Report System (DARS) coding for the EP major. As a result, in November 2016 the DARS coding was reviewed and checked against approved and published degree requirements by faculty advisors Profs. Carl Sovinec and Wendy Crone, by Assistant Dean for Undergraduate Affairs Jennifer Binzley, and by Student Services Coordinator Tyree Bolden. After this review, the discrepancy in the focus area credit requirement was corrected in the DARS coding.

The College of Engineering (COE) has transitioned to a direct admissions process, meaning that most first year students begin in one of the COE majors. Due to this change, initial inclusion in the major is predicated only on student interest and high school performance. In later semesters student performance is evaluated against progression criteria to determine if the individual's college course performance is sufficiently high to maintain enrollment in that major. Given this new direct admission process and the challenging coursework required prior to graduation in the EP major, faculty advisors Profs. Carl Sovinec and Wendy Crone requested a list of all enrolled EP majors in December 2016. At this time, Student Services Coordinator Tyree Bolden identified 27 EP undergraduate majors enrolled at all levels in the degree program (roughly the target size intended for this major due to its research intensive expectations). GPA summaries and transcripts of these 27 individuals were reviewed, and four students with notably low GPAs were identified who would likely have difficulty in successfully completing the degree program given their college course performance to date. Having students with low GPAs counseled in a timely manner is important to avoid any delays in graduation as those who need to change to another CoE major may need additional relevant curriculum for their ultimate choice of major. Student Services Coordinator Barry Crook confirmed that he had undertaken academic advising with the four students to develop individual action plans to pursue another major in COE or transfer out of COE to another school/college on campus.

In follow up conversations about how best to advise new EP majors in the direct admissions system, Student Services Coordinator Tyree Bolden was also informed that the faculty advisors encourage students to take the first course in the research sequence, EP468 *Introduction to Engineering Research*, early if possible (ideally in their 2nd year on campus or first semester if they are a transfer student). The EP468 course gives students an opportunity to understand the major better and determine if engineering research at the undergraduate level is the right choice for them. Taking EP468 in the second year is something stressed by the faculty advisors when they begin advising once the student has passed their progression requirements, but should also be stressed earlier by the academic advisors in their earlier advising interactions.

Assessment Activities and Action Outcomes for 2017-18 Academic Year
Summary for the Bachelor of Science in Engineering Physics
October 24, 2018

<u>Background</u>

Upon creation of the Engineering Physics (EP) major, the Department of Engineering Physics faculty decided not to seek ABET accreditation due to the research-oriented nature of the program. ABET traditionally stresses the engineering design process. EP students are exposed to the basic principles of engineering design through the common coursework they take in the first two years. However, the degree program is primarily focused on cross-disciplinary research in areas of emerging technology where new types of engineering develop from applied science. In place of the design capstone sequence that usually occurs in the senior year for other engineering majors, the EP students complete a four semester research sequence culminating in a written thesis which is defended in a final oral presentation.

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In March 2016 a "Status Report and Assessment Summary for the Bachelor of Science in Engineering Physics" was submitted. This five-year review undertook a thorough evaluation of the degree program, its curriculum, and its graduates.

<u>AY 2017-2018 Assessment Activities and Outcomes</u>

Every major in the EP degree program has a research mentor to guide them in their thesis research though the EP 469, 568 and 569 course sequence. It is the student's responsibility to seek out a willing research mentor. These individuals sign Research Mentor agreement with the student that identifies the project, the weekly research schedule the student will commit to, and regular meetings between the student and research mentor. Through these interactions over the course of three semesters, the research mentors are able to develop a clear sense of the student's progress and development as a researcher.

In order to provide the student with regular feedback on their progress we have developed a rubric for evaluations that are conducted at regular intervals (mid-semester and end of semester in EP568 and mid-semester in EP569) in order to gauge performance and progress. The <u>Evaluation of Research Progress and Researcher Development</u> is a 5 page document which asks the research mentor to assess skills and development in the areas of:

> **Milestones and Timeline:** The ability to set realistic goals and use time and resources effectively; to obtain the maximum benefit from a minimum investment of time and resources. (Aligns with student learning outcome 10)

Research Documentation: The ability to effectively document research approach, progress, hypotheses, and outcomes. (Aligns with student learning outcome 8)

Scientific Literacy: The ability to use processes and skills of science to conduct investigations; to recognize and define problems, analyze data, develop and implement solutions, and evaluate outcomes.

Critical Thinking: The ability to question logically; to identify, generate, and evaluate elements of logical argument; to recognize and differentiate facts, illusions, assumptions and hidden assumptions; and to distinguish the relevant from the irrelevant.

Commitment to Learning: The ability to self-assess, self-correct, and self-direct; to identify needs and sources of learning; and to continually seek new knowledge and understanding. (Aligns with student learning outcome 10)

Communication Skills: The ability to communicate effectively (i.e., speaking, body language, reading, writing, listening) for varied audiences and purposes. (Aligns with student learning outcome 8)

Interpersonal Skills: The ability to interact effectively with faculty research mentor, scientific staff, graduate students, team members, and other department personnel, and to deal effectively with cultural and ethnic diversity issues. (Aligns with student learning outcome 6)

Use of Constructive Feedback: The ability to identify sources of feedback, to seek out feedback, and to effectively use and provide feedback for improving personal interaction. (Aligns with student learning outcome 10)

Professionalism: The ability to exhibit appropriate professional conduct and to represent the profession effectively. (Aligns with student learning outcome 7)

Responsibility: The ability to fulfill commitments and to be accountable for actions and outcomes (Aligns with student learning outcome 7)

Stress Management: The ability to identify sources of stress and to develop effective coping behaviors. (Aligns with student learning outcome 10)

Project-Specific Research Skill: (determined by the research mentor and student)

In addition to specific feedback, research mentors rate the student in each category using the scale: Unacceptable, Beginning, Developing, and Mastery.

During AY 2017-2018 all EP majors enrolled in EP 568 and EP 569 were evaluated at least once each semester. No students were rated as Unacceptable on any scale. Most students were rated as Beginning and Developing in the categories described above (Mastery level is not expected and would usually only be achieved by an advanced graduate student given the subcriteria delineated). Improvements from Beginning to Developing were also seen for a number of students in a number of the categories.

As noted in parenthesis with the performance indicators detailed above, several of the direct measures we have identified for EP 568 and EP 569 align with our EP student learning outcomes (found here: http://guide.wisc.edu/undergraduate/engineering/engineering-physics/engineering-physics-bs/index.html#learningoutcomestext). This assessment rubric for EP 568 and 569 (Research Practicum courses) focuses on how well students are developing as researchers, and thus it is not intended to assess all of our student outcomes.

Continuous Improvement: Action Item

During the end-of-semester feedback discussion in Spring 2018, students in EP 568 and 569 expressed a gap in knowledge around research abstract preparation (**Communication Skills**) and fundamental processes related to professional organization conference attendance (**Professionalism**), a new course module was created on this topic for implementation in Fall 2018.

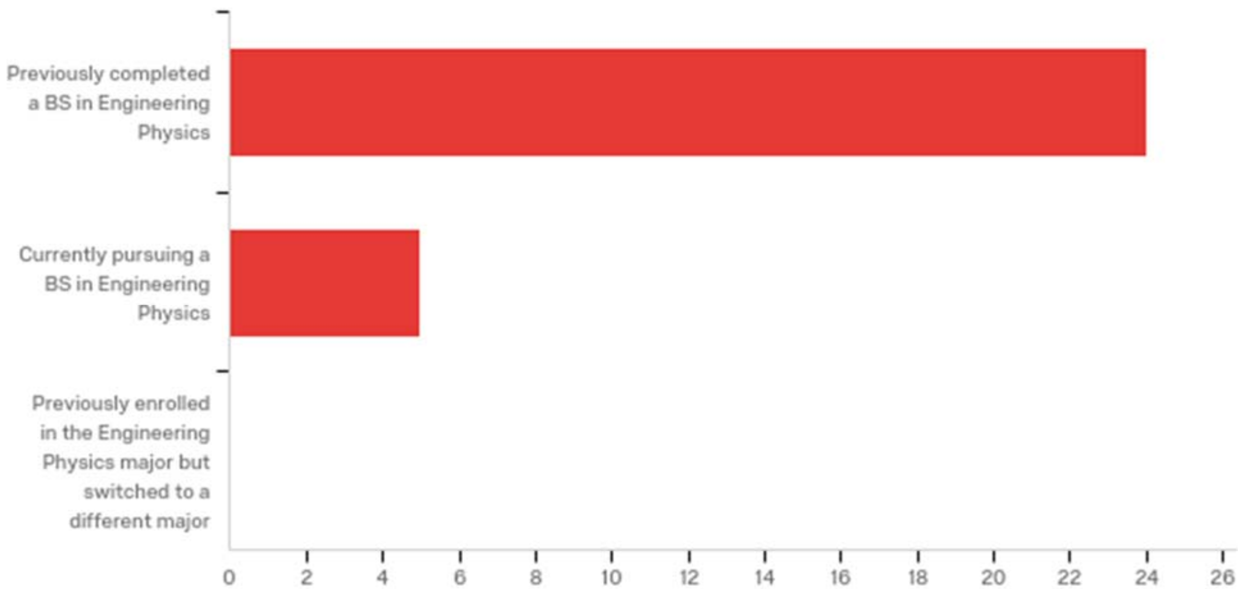
Report

EP Self Study Survey - 2019

March 19th 2019, 8:16 am CDT

Response rate: 44% (68 individuals surveyed, 30 respondents)

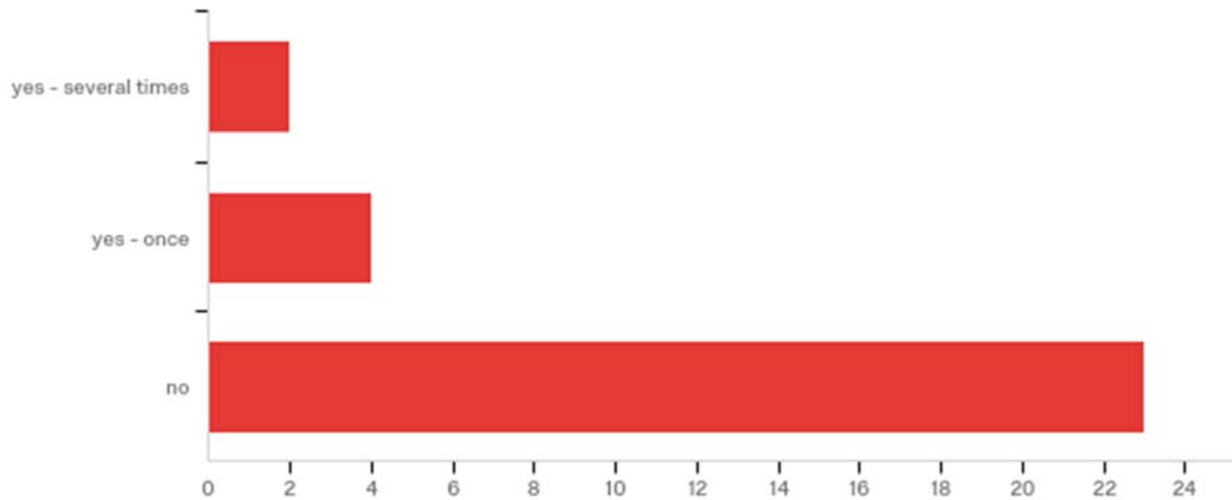
Q1 - What is your current relationship to the Engineering Physics undergraduate degree program?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is your current relationship to the Engineering Physics undergraduate degree program?	1.00	2.00	1.17	0.38	0.14	29

#	Answer	%	Count
1	Previously completed a BS in Engineering Physics	82.76%	24
2	Currently pursuing a BS in Engineering Physics	17.24%	5
3	Previously enrolled in the Engineering Physics major but switched to a different major	0.00%	0
	Total	100%	29

Q2 - After entering the Engineering Physics program, did you or are you currently considering switching to a different major?



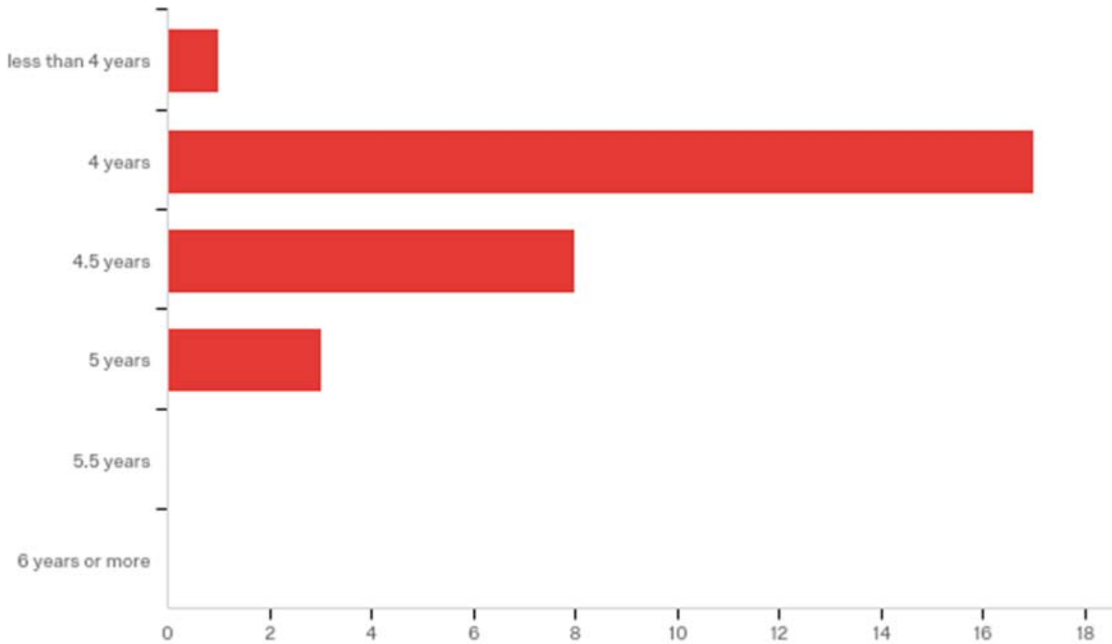
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	After entering the Engineering Physics program, did you or are you currently considering switching to a different major?	1.00	3.00	2.72	0.58	0.34	29

#	Answer	%	Count
1	yes - several times	6.90%	2
2	yes - once	13.79%	4
3	no	79.31%	23
	Total	100%	29

Q3 - If so, why?

If so, why?
The senior thesis seemed like such a daunting challenge. I felt completely unprepared for what I had to do.
Not sure if this is what I want to do as a career
Became more interested in Comp Sci and less interested in grad school, but switching from CoE to L&S required too many additional classes to graduate on time.
Some of the course work is not as relevant to my particular field of interest.
I briefly considered switching to a different college but ended up staying in the EP major.

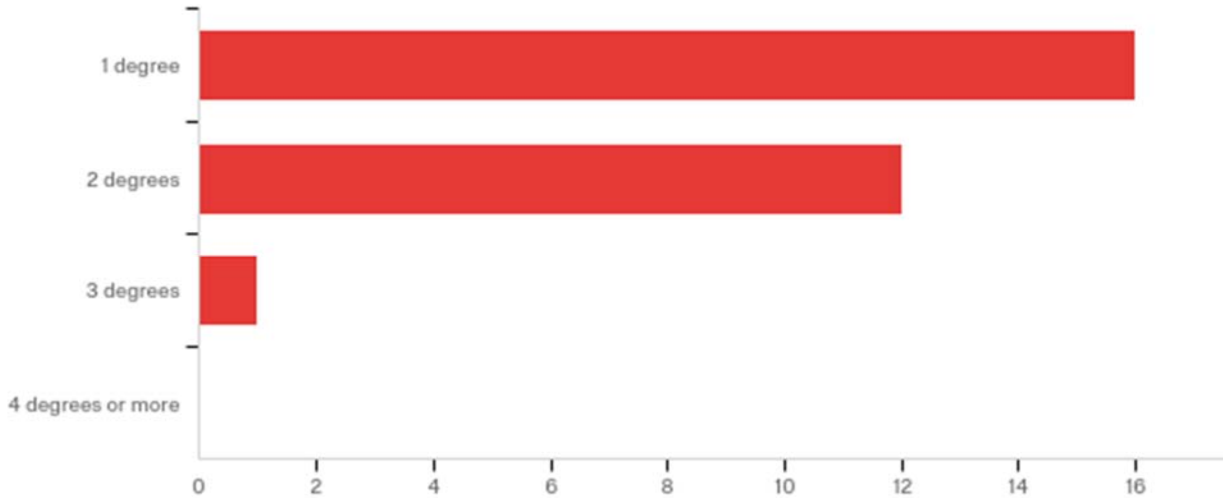
Q4 - Time to Degree   How long did you take or do you anticipate it will take for you to complete the requirements for the BS degree in Engineering Physics, including time spent at other schools if you transferred here, and excluding time spent as a coop, intern, or off campus research experience program:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	*Time to Degree How long did you take or do you anticipate it will take for you to complete the requirements for the BS degree in Engineering Physics, including time spent at other schools if you transferred here, and excluding time spent as a coop, intern, or off campus research experience program:*	1.00	4.00	2.45	0.72	0.52	29

#	Answer	%	Count
1	less than 4 years	3.45%	1
2	4 years	58.62%	17
3	4.5 years	27.59%	8
4	5 years	10.34%	3
5	5.5 years	0.00%	0
6	6 years or more	0.00%	0
	Total	100%	29

Q5 - Including the Engineering Physics major, how many BS degrees did you or do you plan to receive upon graduation?



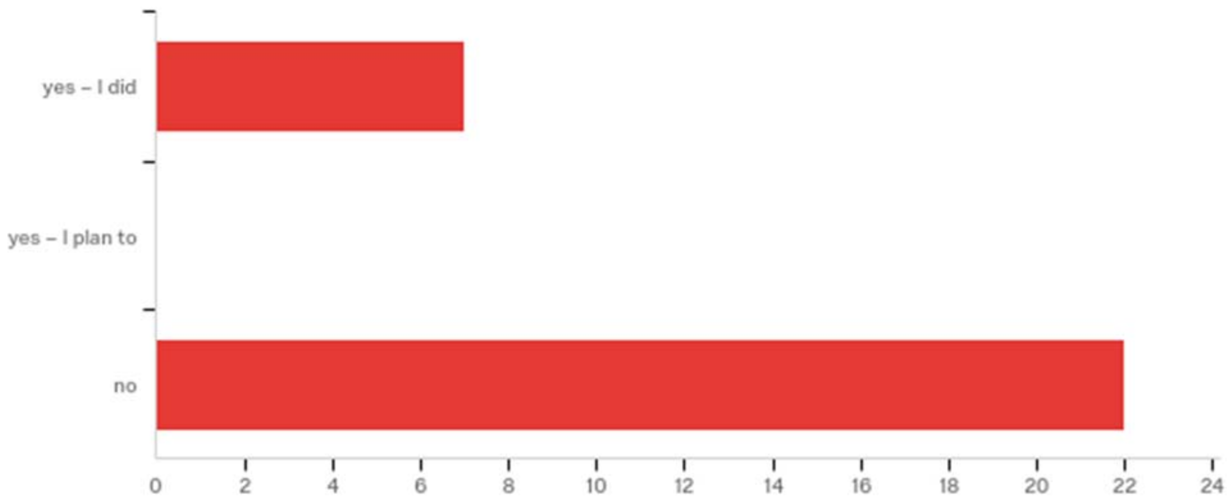
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Including the Engineering Physics major, how many BS degrees did you or do you plan to receive upon graduation?	1.00	3.00	1.48	0.56	0.32	29

#	Answer	%	Count
1	1 degree	55.17%	16
2	2 degrees	41.38%	12
3	3 degrees	3.45%	1
4	4 degrees or more	0.00%	0
	Total	100%	29

Q6 - Which Certificate Programs did you or do you plan to complete?

Which Certificate Programs did you or do you plan to complete?
Physics, Computer Science
Mathematics
Environmental Studies
Computer Science, Math
Computer science, engineering honors in liberal arts
Physics & Comp Sci
Biology in Engineering and Physics
None
Physics
2nd Major in Physics
None
Computer Sciences and Physics
None

Q7 - Did you or do you plan to participate in a study or work abroad program?



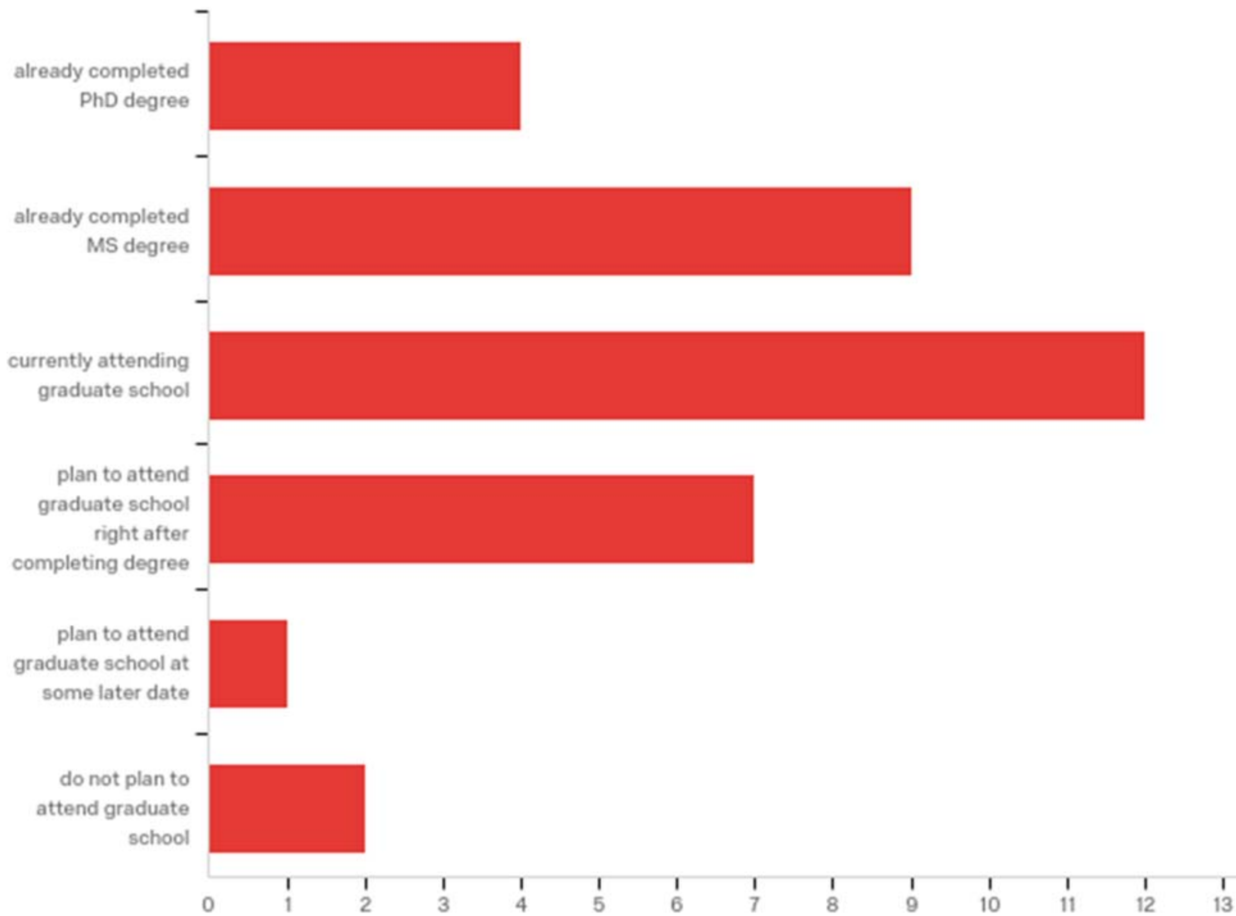
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Did you or do you plan to participate in a study or work abroad program?	1.00	3.00	2.52	0.86	0.73	29

#	Answer	%	Count
1	yes – I did	24.14%	7
2	yes – I plan to	0.00%	0
3	no	75.86%	22
	Total	100%	29

Q8 - What other are factors affected or are affecting your time to complete your undergraduate studies?

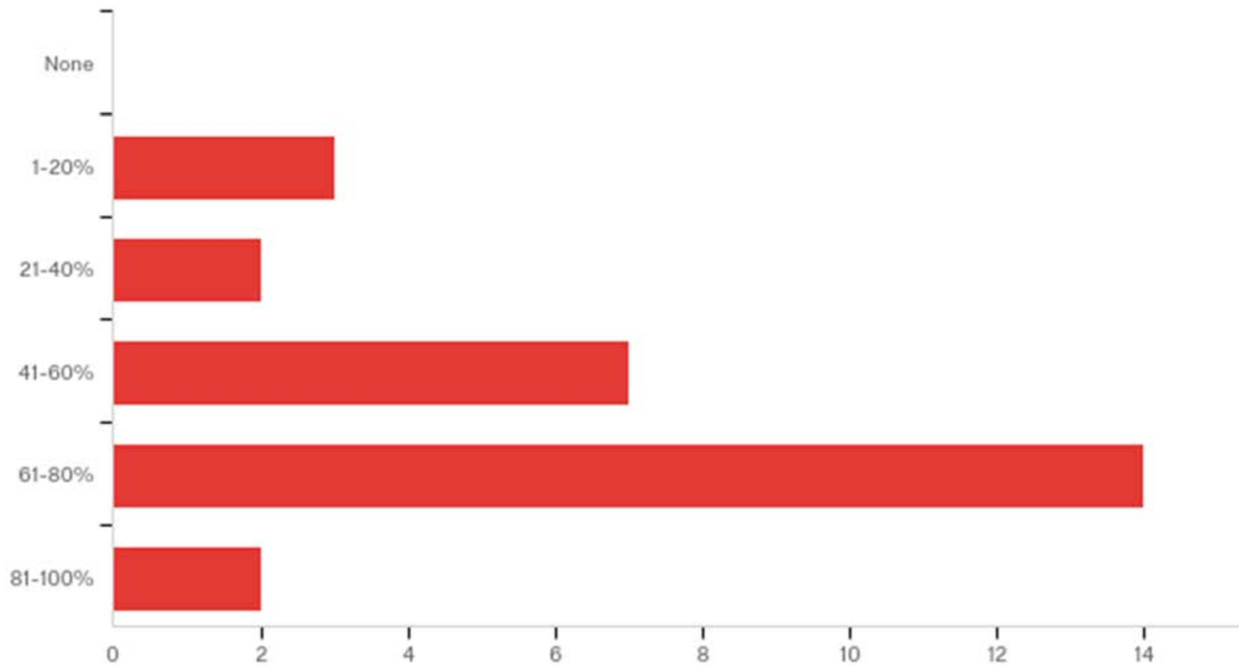
What other are factors affected or are affecting your time to complete your undergraduate studies?
I want to continue on to graduate school after completing study in undergraduate, and although I could stretch the degree to 4.5 or 5 years total, I know I can handle a larger courseload and finish in 4 years.
Timing, Switching Majors, Wanting to take more classes.
I was on an athletic team. The time commitment meant that it was not possible to fit all EP requirements (on top of my other degrees) into 4 years.
I earned my BS in Engineering Physics as a returning adult student. Because of that, I had many of the prerequisites already completed. That said, the rigor of courses required by the program meant it took me about 2.5 years to complete it.
Had a lot of AP and math credit coming into freshman year that made graduating in 4y easier.
Applied math major
Sequence and availablity of courses. Decision to study abroad or not.
One summer class, 16 credits for Advanced Placement testing in HS.

Q10 - Graduate Studies   Did you or do you plan to attend graduate school?



#	Answer	%	Count
1	already completed PhD degree	11.43%	4
2	already completed MS degree	25.71%	9
3	currently attending graduate school	34.29%	12
4	plan to attend graduate school right after completing degree	20.00%	7
5	plan to attend graduate school at some later date	2.86%	1
6	do not plan to attend graduate school	5.71%	2
	Total	100%	35

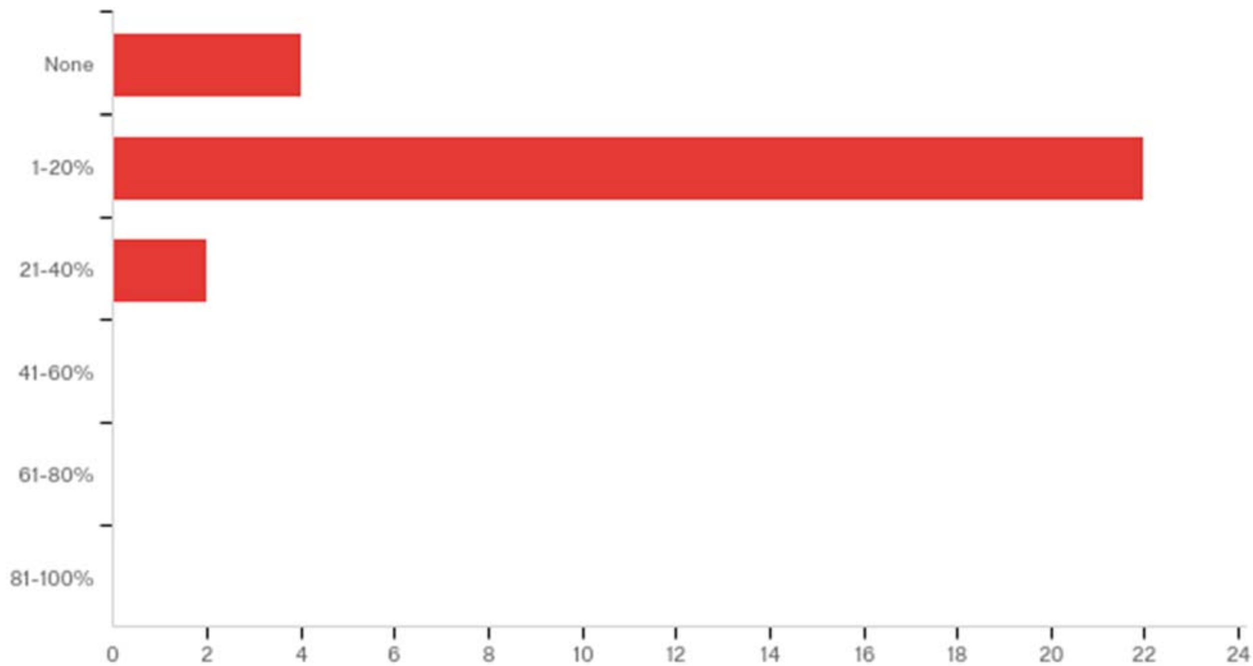
Q11 - Instruction and Faculty in Required Courses   Percentage of instructors in your required courses you rate as excellent:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Instruction and Faculty in Required Courses Percentage of instructors in your required courses you rate as excellent:	2.00	6.00	4.36	1.08	1.16	28

#	Answer	%	Count
1	None	0.00%	0
2	1-20%	10.71%	3
3	21-40%	7.14%	2
4	41-60%	25.00%	7
5	61-80%	50.00%	14
6	81-100%	7.14%	2
	Total	100%	28

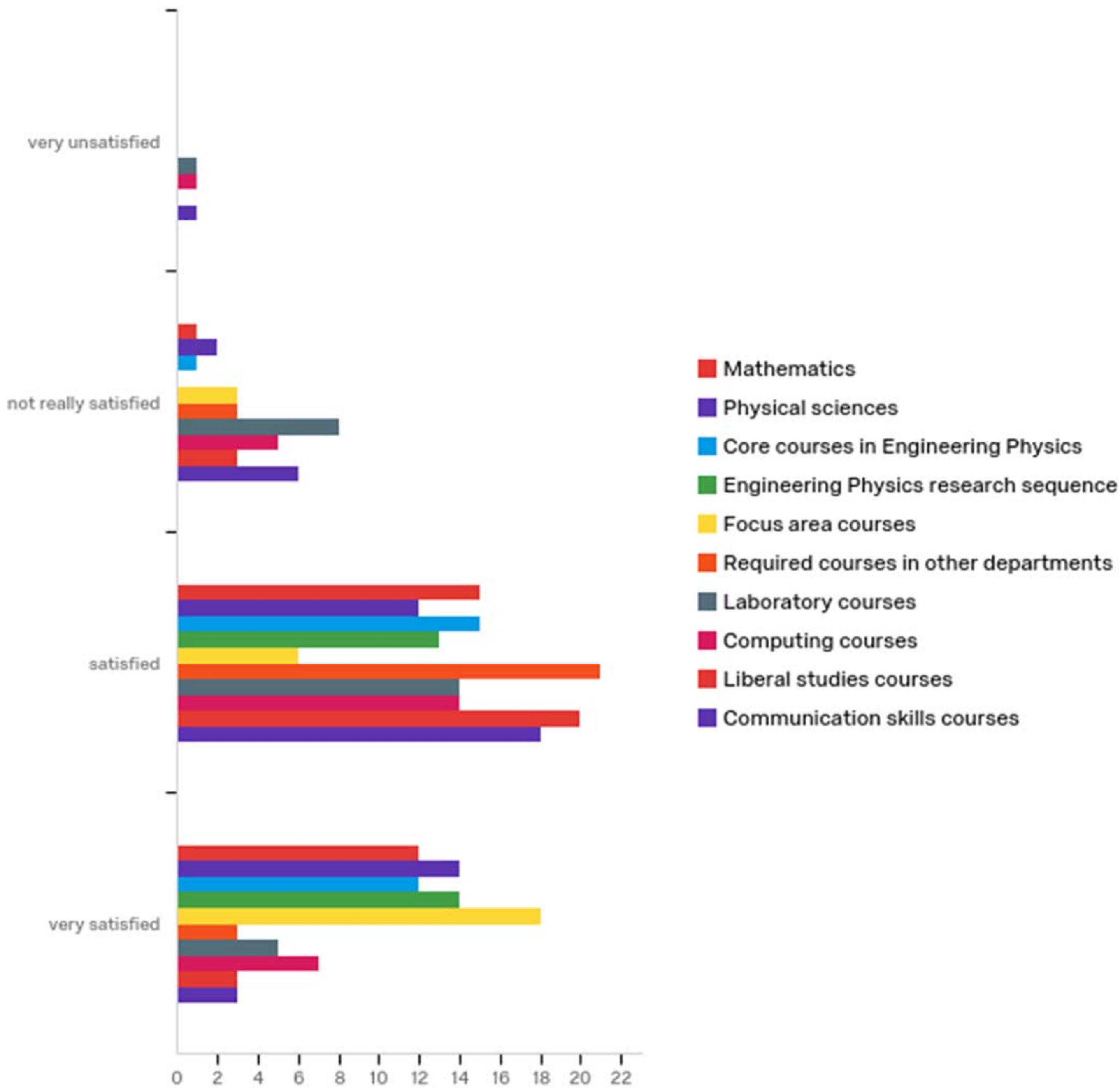
Q12 - Percentage of instructors in your required courses you rate as poor:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Percentage of instructors in your required courses you rate as poor:	1.00	3.00	1.93	0.46	0.21	28

#	Answer	%	Count
1	None	14.29%	4
2	1-20%	78.57%	22
3	21-40%	7.14%	2
4	41-60%	0.00%	0
5	61-80%	0.00%	0
6	81-100%	0.00%	0
	Total	100%	28

Q13 - Satisfaction with the following sections of the curriculum:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Mathematics	2.00	4.00	3.39	0.56	0.31	28
2	Physical sciences	2.00	4.00	3.43	0.62	0.39	28
3	Core courses in Engineering Physics	2.00	4.00	3.39	0.56	0.31	28
4	Engineering Physics research sequence	3.00	4.00	3.52	0.50	0.25	27
5	Focus area courses	2.00	4.00	3.56	0.68	0.47	27
6	Required courses in other departments	2.00	4.00	3.00	0.47	0.22	27
7	Laboratory courses	1.00	4.00	2.82	0.76	0.58	28
8	Computing courses	1.00	4.00	3.00	0.77	0.59	27
9	Liberal studies courses	2.00	4.00	3.00	0.48	0.23	26
10	Communication skills courses	1.00	4.00	2.82	0.66	0.43	28

#	Question	very unsatisfied		not really satisfied		satisfied		very satisfied		Total
1	Mathematics	0.00%	0	3.57%	1	53.57%	15	42.86%	12	28
2	Physical sciences	0.00%	0	7.14%	2	42.86%	12	50.00%	14	28
3	Core courses in Engineering Physics	0.00%	0	3.57%	1	53.57%	15	42.86%	12	28
4	Engineering Physics research sequence	0.00%	0	0.00%	0	48.15%	13	51.85%	14	27
5	Focus area courses	0.00%	0	11.11%	3	22.22%	6	66.67%	18	27
6	Required courses in other departments	0.00%	0	11.11%	3	77.78%	21	11.11%	3	27
7	Laboratory courses	3.57%	1	28.57%	8	50.00%	14	17.86%	5	28
8	Computing courses	3.70%	1	18.52%	5	51.85%	14	25.93%	7	27
9	Liberal studies courses	0.00%	0	11.54%	3	76.92%	20	11.54%	3	26
10	Communication skills courses	3.57%	1	21.43%	6	64.29%	18	10.71%	3	28

Q14 - Which courses were the most satisfying learning experiences?

Which courses were the most satisfying learning experiences?
I've enjoyed almost every course I've taken, but primarily the upper-level Math, Physics and Engineering courses I've taken, i.e. Math 375/376, 321/322, Physics 311/322.
XXX Matlab class. XXX Nuclear engineering class. XXX Analysis class. XXX Programming class.
ME 363 and ME 364 were very well done. Everything was built up one step at a time. The ME department, I've found, is quite good.
Chem 109 H
Grad level courses in specialized topics - micro and nano fluidics, flexible electronics, etc.
The graduate level plasma physics courses were excellent and I don't know of any other school that even offers something like that. The Engineering communications courses were also great, and the Engineering-Physics-specific research course was very helpful.
My focus area courses (plasma) - they were well taught and engaging. I was also very satisfied with my courses in EE and upper level ME (circuits, fluids, heat transfer); they were presented clearly and in an engaging way that allowed me to retain a lot of information. Quantum Mechanics with XXX (& later XXX) was also deeply satisfying due to high quality instruction and strong personal engagement of the professors, though not required
I took a number of humanities and social science courses through the EHLA program that I really enjoyed. I also liked the intro programming sequence in the CS department.
High level physics courses, learning about new areas of research
Advanced mechanics of materials, heat transfer, nano materials, optics (physics dept, the lab was phenomenal)
My plasma focus area courses
Focus area courses
I was most satisfied by my focus area courses.
NE305, NE526, Physics 527, Physics 625
Adv Mech of Mat
NE 726, Physics 311, 322, Math 321, 322
Computer science
Ones in which the professor’s commitment to teaching was evident. Good teachers were the most important part of any class I took.
these required course in engineering department
My focus area courses.
The core physics and materials science classes were quite good. Highly recommend Dane Morgan's thermodynamics class.
Plasma specific courses
Research courses taught me a lot about how to define and carry out experiments. It was a good combination of theory, research and hands on experience.
NE 526, NE 527, and Math 321

Math 375, Philosophy 104, Math/Stat 431, EMA 303, CS 367, Chem 109H

Design-focused and laboratory work

Q15 - Which courses did you find least satisfying? Why?

Which courses did you find least satisfying? Why?
Courses under 'interEGR' were really bad, but have been cut from our curriculum. I found those two to be misleading in what they offered and didn't provide much of anything.
They don't come to me? Guess I probably didn't like labs or writing, but glad they're enforced
Anything taught by the Physics department. They have no idea how to teach. One professor didn't even label his axes when drawing a graph on the board. They do not understand that homework is meant to be instructional, it's not supposed to be a small test itself.
Math 222 due to the professor's teaching and exam policies
Physics department core classes such as quantum physics and others, instruction was poorer generally
The Engineering drafting course was like having my finger nails pulled out. Some of the core required Engineering classes were painfully boring and awful (like having to take Statics after having already done 300-level physics courses).
Communication courses - they didn't really teach me anything and felt like a giant waste of time. I also found the math courses unsatisfying - not because of the content, but because many of the instructors clearly did not care at all about the course and were not at all helpful to my learning.
Circuits, intro to numerical methods (CS 412?), intro to quantum mechanics (the one semester version in the physics department) and intro to materials science stand out as bad experiences, all because I felt the instructors were extremely ineffective. In the case of circuits and quantum, I also felt the material was irrelevant to what I was interested in.
Lab courses were very rare and difficult to schedule
Electromagnetism, Introduction to Plasmas: both were in the physics department and taught straight from non-standard books with little insight added via the classroom.
The required EP 468,469,568, and 569 professional development courses
Communication, mostly because it seemed like content I was already familiar with and might've tested out of.
I found the computing courses least satisfying. They were not very instructive or relevant to my field.
MSE351 (lack of rigor), Physics 321 (inadequate textbook)
ME 361-363, ME 303, 307, MSE 351
Upper level physics. Instructors didn't teach well enough/care enough about teaching
might be the graduate level of quantum mechanics
The required Matlab courses were a waste of time; a proper programming class in something like Java or python would have been much more useful and have better prepared me for graduate school.
General engineering laboratory courses.
Graphics-Not needed. The emphasis on vector math is very useful for the plasma physics students, but not as useful for nanoengineering folks
EPD sequence
Liberal arts were a drag. Seemed like a lot of busy work just to fulfill requirements.
The intro to Matlab course seemed tedious and slow.

ENG 110, ENG 170, Physics 208

Q16 - What are the strong points of the Engineering Physics curriculum?

What are the strong points of the Engineering Physics curriculum?
The ability to cover a broad range of courses and challenge oneself through a very rigorous curriculum that you can personalize, while integrating research experience to create a thorough and interdisciplinary degree that is really interesting and fun.
Computation. Plasma physics. Research faculty. A la carte course selection.
It is a great way to get into grad school, as you'll be doing graduate level work for years before you get there.
The focus on research and preparation for graduate school
Ability to pursue grad level topics in areas of interest - very valuable for determining interesting research avenue for grad school
The flexibility to design one's own plan of study. In addition, the quality of course offerings for each of the EP Research focus areas was world class.
Focus area courses! I had a huge leg up the first year of my PhD because I was already familiar with much of the material in my courses and on my qualifying exams. Required research is also a huge plus.
That it offers more freedom to choose electives than other engineering majors is helpful. I also found the requirement to complete a research project to be good motivation to get involved in research (that is why I chose engineering physics; I was not confident I would have ever gotten involved in undergraduate research otherwise)
Link to research opportunities, grooming for grad school
Great insight and mentor ship in regards to developing rigorous research studies. Assistance with expanding research contacts and network. Focus on excellence, breadth, and depth in first principles analysis.
I was interested in fusion, so I was glad that I was able to take a lot of plasma courses, instead of being required to take a lot of fission courses, which I would have had to as a nuclear engineer.
Research focus.
The research sequence, number of elective course options, and small number of students in the major.
Research sequence
Flexibility to suit the desired technical interest
Doing research
Interdisciplinary engineering learning
Research component was helpful preparing me for grad school
Engineering and physics fundamentals, exposure to research environments, technical communication.
the opportunity to take courses required for Physics major as well as large amount engineering course.
Being able to gain specific academic expertise with focus area courses.
Great variety of classes; a lot of different disciplines covered. The preparation for graduate school is absolutely spot on.
Wide engineering background
Having a guided research project under the supervision of faculty who are actively engaged in their field was great preparation for graduate school.

The research focus and exposure is unparalleled across undergraduate majors.
Versatility and rigour
Allows for more customized coursework for an Engineering degree

Q17 - What changes in the Engineering Physics curriculum would you recommend? Why?

What changes in the Engineering Physics curriculum would you recommend? Why?
I wish I had more advising opportunities from students and professors in the EP department, as I spent most of my freshman year skimping out on courses where I could have fit in more - ended up missing out on a couple classes that I could've accelerated some portions of the curriculum in order to lessen credit loads later on.
That's a hard question, because it is a program that evolves as research does.
Tell students to front load math classes, especially math 321 and 322. In general, we spend too much time on theory, and not enough time learning how to actually do things. Physical skills: soldering, o-scopes, design and computer skills were either not taught at all or not emphasized enough. I'd personally like to see more classes work in coding elements, like ME 364 does.
The focus on graduate school can seem constricting at times, almost like there isn't any other option but to go to go on to further learning.
None come to mind
Can't think of any. Ideally ditch some of the required college of engineering course classes but that's probably not possible.
Drop statics and dynamics in favor of their physics equivalents (I did this as an option, but I think it should be the preferred sequence). These courses prepare you much better for future physics coursework. If there's space to introduce a bit more flexibility for peoples interests, that would be nice - I took more than 4 years so I was able to take astronomy courses which helped me find a sub-field I love. Plus, being able to take a non-STEM course every so often was a nice mental break.
There needs to be a mechanism to make substitutions to the curriculum, particularly for the higher level courses towards the end (heat transfer, eg). By the time I reached my last semesters I knew what I would be doing after graduation and I wish I could have taken a course or two to prepare me for it, instead of taking courses I knew wouldn't be helpful to me in order to check boxes. I also wish we could have learned more about the research going on in the department during the research sequence. I think that would have been more helpful to me than many of the activities we did. Having a graduate student or faculty member come in once in a while and present their work would have been really nice.
More hands on lab courses in nanotechnology
The program was small and nimble when I went through. Without knowing what it looks like today, it is difficult to make recommendations for change. That sais, part of why it was such a great curriculum is that it was nimble. Don't lose that.
I wouldn't have the EP 468-569 classes, I didn't get much from those courses. I liked the senior thesis research aspect, but I just think it should be between the student and the advisor. The classes didn't really help me complete my thesis any faster.
There is a strong focus on courses related to computing and plasma, leaving the nanoengineering focus area less prepared for research in their field.
More opportunities for breadth of coursework
More options to focus area (nanotechnology, plasmas, and scientific computing were the options at the time)
Allow for a physics thermodynamics class instead of ME
An ethics/social impacts class
Allowing for more academically well-rounded curriculum might be helpful in producing thoughtful and well-spoken scientists who can think critically about a range of issues.
I recommend to fit some engineering course closer to specific research direction. eg. if one choose nano engineering

as direction, he/she should take the thermal/heat transfer course in materials department instead of mechanical engineering department

Require a programming class instead of the "computing for engineers" using Matlab

I think the focus areas could be made more general to include other advanced technology or up-and-coming areas of research.

More statistics. Every discipline is becoming more statistical and there needs to be more emphasis on the fundmentals of stats. In the same line, statisitcal mechanics is a really important core physics class I had no idea really existed in undergrad. The conceptual understanding from a stat mech course is a needed pre-requisite to truely understand solid state and condensed matter physics. I would even go as far as to drop the quantum mechanics requirement in favor of stat mech.

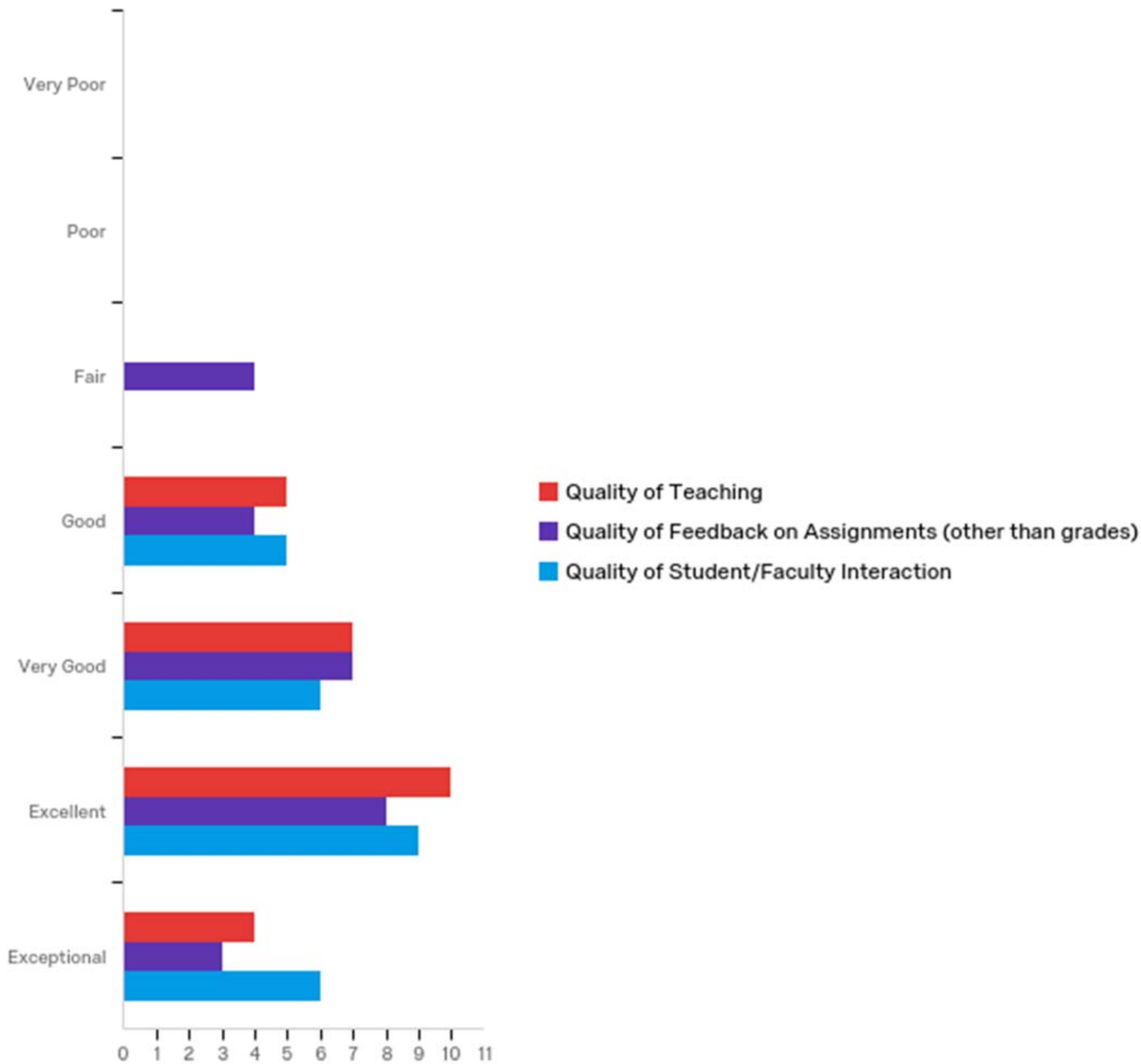
I can’t think of any changes.

Incorporate more computing courses, especially for coding languages specific to your focus area.

I like it a lot. I would try to recruit more people to it.

Reduce exclusive focus on an academia career path

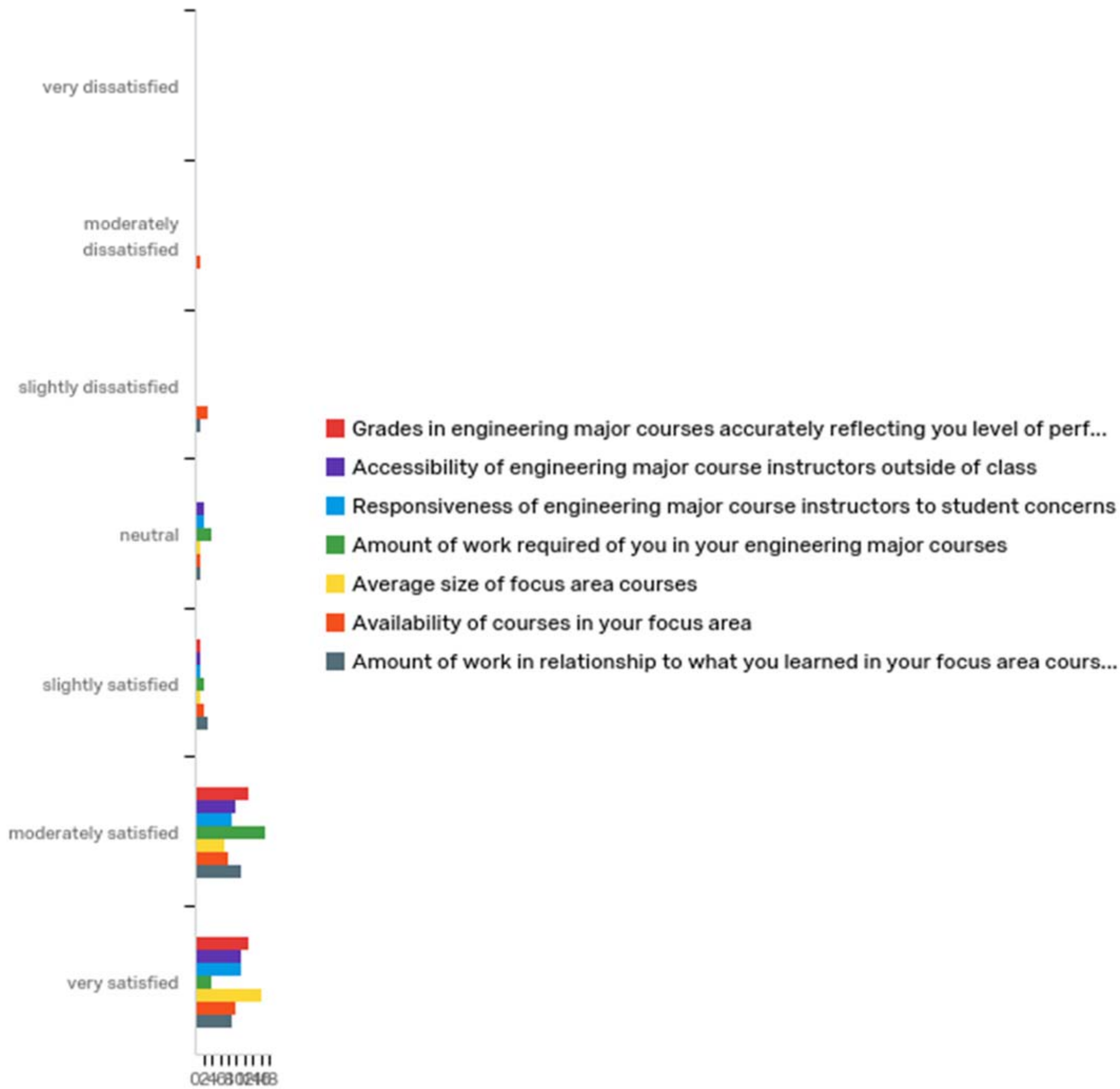
Q18 - Instruction and Faculty in Engineering Physics   Satisfaction with:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Quality of Teaching	4.00	7.00	5.50	0.97	0.94	26
2	Quality of Feedback on Assignments (other than grades)	3.00	7.00	5.08	1.24	1.53	26
3	Quality of Student/Faculty Interaction	4.00	7.00	5.62	1.04	1.08	26

#	Question	Very Poor		Poor		Fair		Good		Very Good		Excellent		Exceptional		Total
1	Quality of Teaching	0.00%	0	0.00%	0	0.00%	0	19.23%	5	26.92%	7	38.46%	10	15.38%	4	26
2	Quality of Feedback on Assignments (other than grades)	0.00%	0	0.00%	0	15.38%	4	15.38%	4	26.92%	7	30.77%	8	11.54%	3	26
3	Quality of Student/Faculty Interaction	0.00%	0	0.00%	0	0.00%	0	19.23%	5	23.08%	6	34.62%	9	23.08%	6	26

Q19 - Satisfaction with:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Grades in engineering major courses accurately reflecting you level of performance	5.00	7.00	6.44	0.57	0.32	27
2	Accessibility of engineering major course instructors outside of class	4.00	7.00	6.25	0.88	0.77	24
3	Responsiveness of engineering major course instructors to student concerns	4.00	7.00	6.26	0.90	0.80	23
4	Amount of work required of you in your engineering major courses	4.00	7.00	5.78	0.87	0.77	27
5	Average size of focus area courses	4.00	7.00	6.52	0.75	0.57	25
6	Availability of courses in your focus area	2.00	7.00	5.72	1.51	2.28	25
7	Amount of work in relationship to what you learned in your focus area courses	3.00	7.00	6.04	1.00	1.00	25

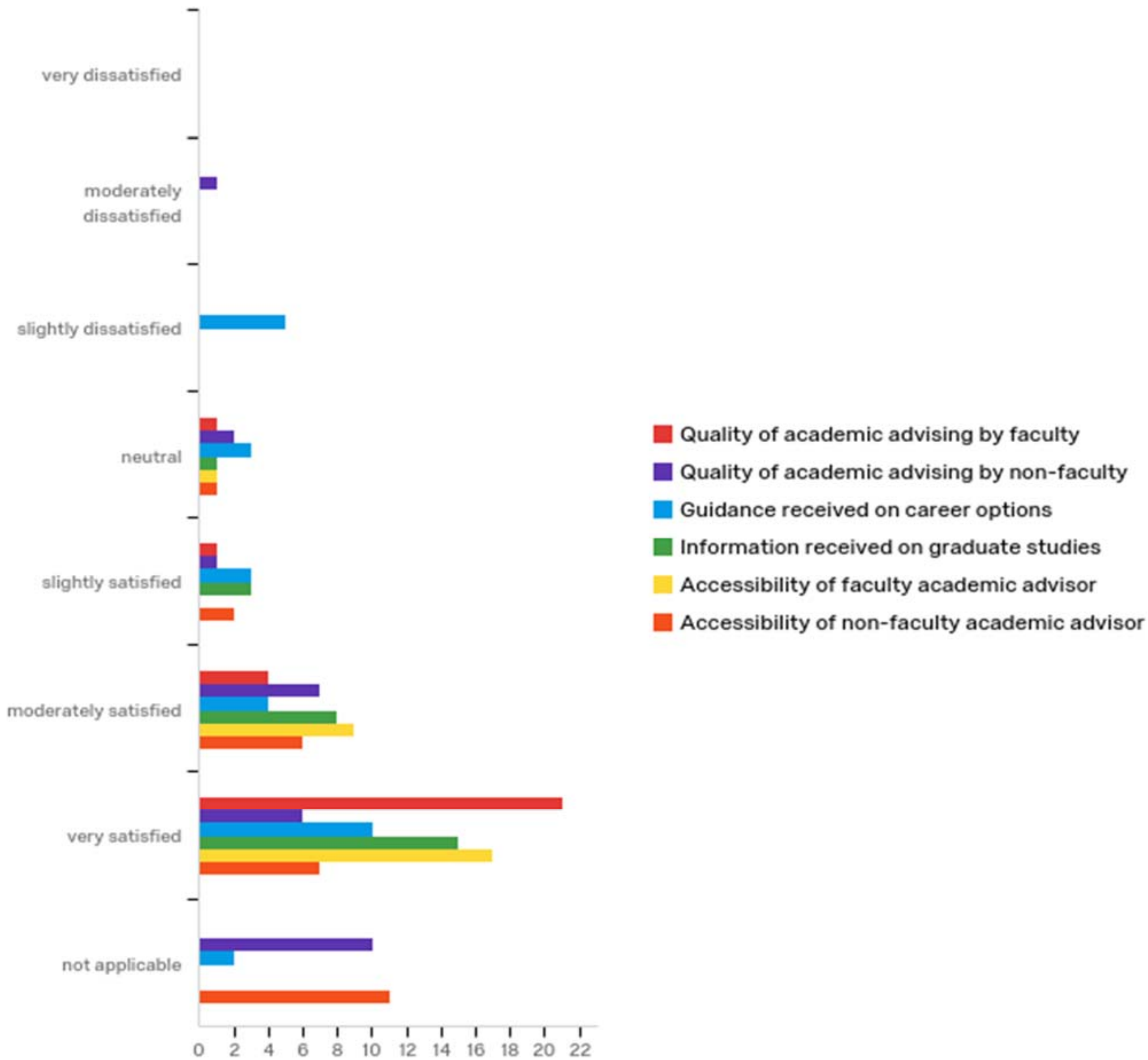
#	Question	very dissatisfied		moderately dissatisfied		slightly dissatisfied		neutral		slightly satisfied		moderately satisfied		very satisfied		Total
1	Grades in engineering major courses accurately reflecting you level of performance	0.00%	0	0.00%	0	0.00%	0	0.00%	0	3.70%	1	48.15%	13	48.15%	13	27
2	Accessibility of engineering major course instructors outside of class	0.00%	0	0.00%	0	0.00%	0	8.33%	2	4.17%	1	41.67%	10	45.83%	11	24
3	Responsiveness of engineering major course instructors to student concerns	0.00%	0	0.00%	0	0.00%	0	8.70%	2	4.35%	1	39.13%	9	47.83%	11	23

4	Amount of work required of you in your engineering major courses	0.00%	0	0.00%	0	0.00%	0	14.81%	4	7.41%	2	62.96%	17	14.81%	4	27
5	Average size of focus area courses	0.00%	0	0.00%	0	0.00%	0	4.00%	1	4.00%	1	28.00%	7	64.00%	16	25
6	Availability of courses in your focus area	0.00%	0	4.00%	1	12.00%	3	4.00%	1	8.00%	2	32.00%	8	40.00%	10	25
7	Amount of work in relationship to what you learned in your focus area courses	0.00%	0	0.00%	0	4.00%	1	4.00%	1	12.00%	3	44.00%	11	36.00%	9	25

Q20 - If you were dissatisfied with the amount of work in your courses, was there too much work or not enough? Please explain.

If you were dissatisfied with the amount of work in your courses, was there too much work or not enough? Please explain.
I feel like it varies, but some courses I have been overburdened by work relative to what I learn. I don't think ther are courses that have under-worked me relative to what I learn.
Wish I could be concerned about not having enough work. (:
There was a shitton of work. I probably would have learned just as much and been less miserable if the coursework was dialed back a bit.
All of the courses I took for my EP major required significant time investment. It's easy to wish the same level of learning could be accomplished with less effort, but I highly doubt that. The EP program has high standards and that requires a lot of hard work. Every day in my job I'm grateful for the robust education I got from the Engineering Physics major.
Too much if anything.
Usually a reasonable amount

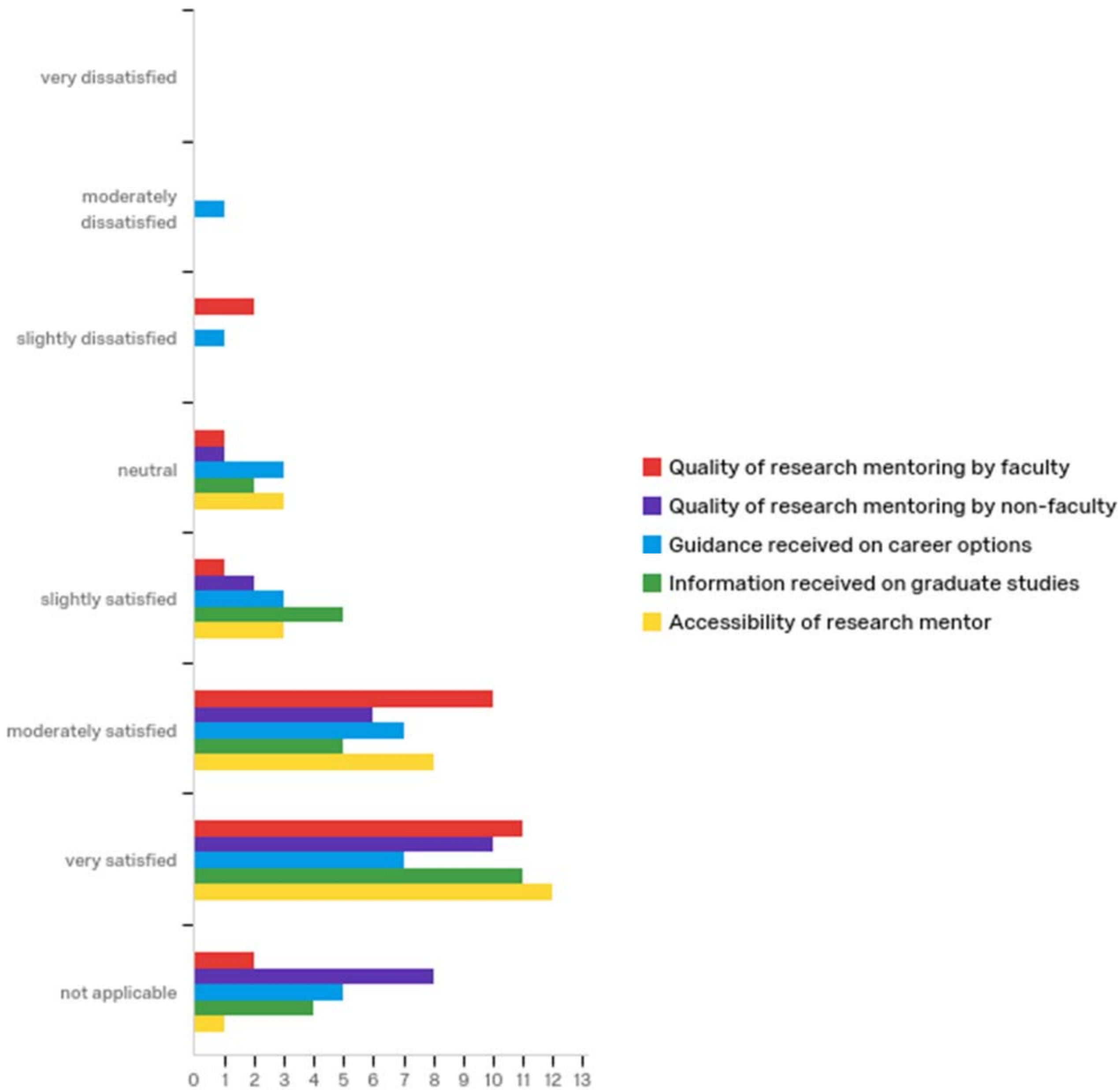
Q22 - Academic Advising   Satisfaction with:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Quality of academic advising by faculty	4.00	7.00	6.67	0.72	0.52	27
2	Quality of academic advising by non-faculty	2.00	8.00	6.63	1.49	2.23	27
3	Guidance received on career options	3.00	8.00	5.63	1.66	2.75	27
4	Information received on graduate studies	4.00	7.00	6.37	0.82	0.68	27
5	Accessibility of faculty academic advisor	4.00	7.00	6.56	0.68	0.47	27
6	Accessibility of non-faculty academic advisor	4.00	8.00	6.93	1.12	1.25	27

#	Question	very dissatisfied		moderately dissatisfied		slightly dissatisfied		neutral		slightly satisfied		moderately satisfied		very satisfied		not applicable		Total
1	Quality of academic advising by faculty	0.00%	0	0.00%	0	0.00%	0	3.70%	1	3.70%	1	14.81%	4	77.78%	21	0.00%	0	27
2	Quality of academic advising by non-faculty	0.00%	0	3.70%	1	0.00%	0	7.41%	2	3.70%	1	25.93%	7	22.22%	6	37.04%	10	27
3	Guidance received on career options	0.00%	0	0.00%	0	18.52%	5	11.11%	3	11.11%	3	14.81%	4	37.04%	10	7.41%	2	27
4	Information received on graduate studies	0.00%	0	0.00%	0	0.00%	0	3.70%	1	11.11%	3	29.63%	8	55.56%	15	0.00%	0	27
5	Accessibility of faculty academic advisor	0.00%	0	0.00%	0	0.00%	0	3.70%	1	0.00%	0	33.33%	9	62.96%	17	0.00%	0	27
6	Accessibility of non-faculty academic advisor	0.00%	0	0.00%	0	0.00%	0	3.70%	1	7.41%	2	22.22%	6	25.93%	7	40.74%	11	27

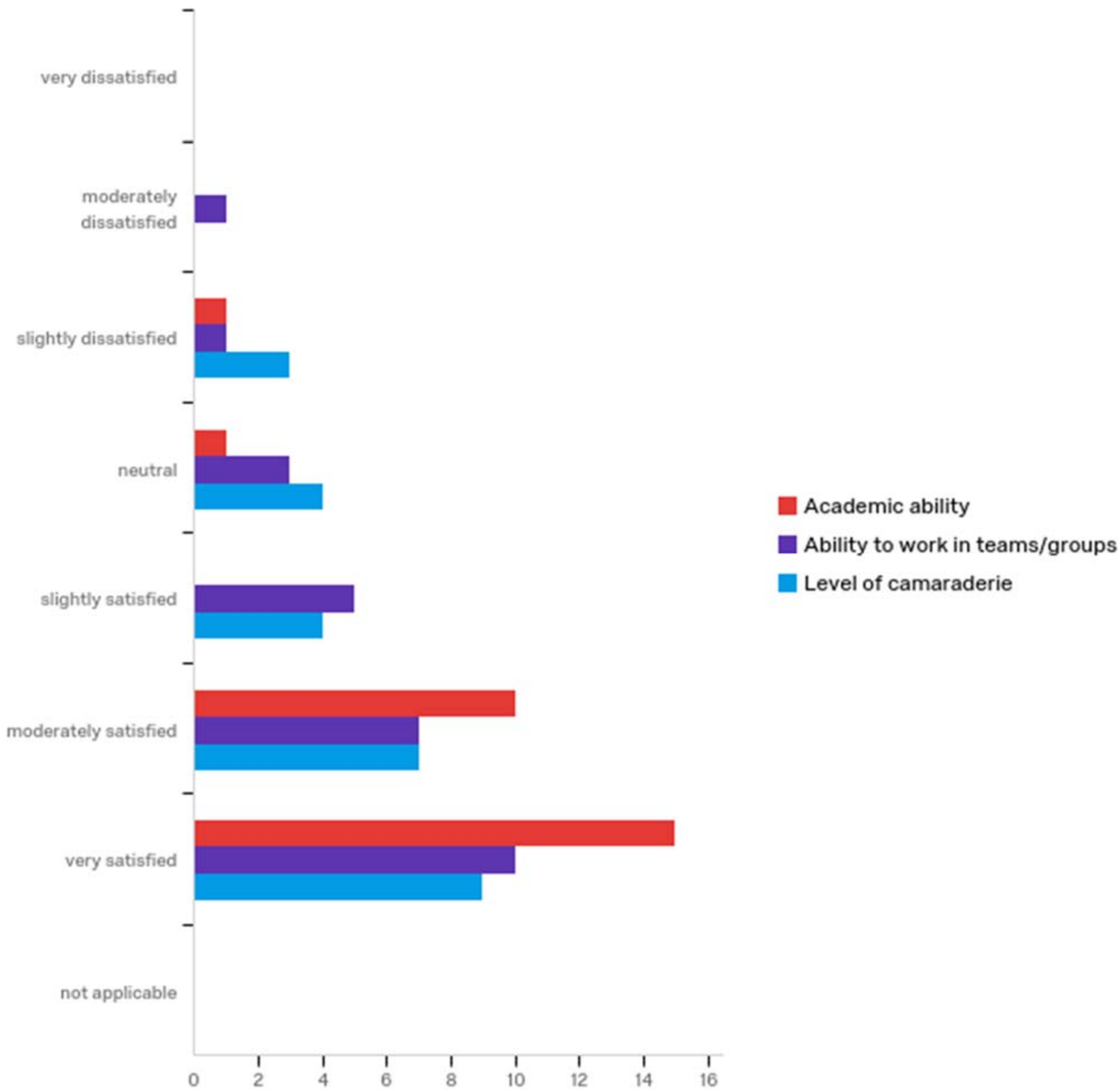
Q23 - Research Mentoring Satisfaction with:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Quality of research mentoring by faculty	3.00	8.00	6.22	1.23	1.51	27
2	Quality of research mentoring by non-faculty	4.00	8.00	6.81	1.06	1.11	27
3	Guidance received on career options	2.00	8.00	6.04	1.57	2.48	27
4	Information received on graduate studies	4.00	8.00	6.37	1.16	1.34	27
5	Accessibility of research mentor	4.00	8.00	6.19	1.06	1.11	27

#	Question	very dissatisfied		moderately dissatisfied		slightly dissatisfied		neutral		slightly satisfied		moderately satisfied		very satisfied		not applicable		Total
1	Quality of research mentoring by faculty	0.00%	0	0.00%	0	7.41%	2	3.70%	1	3.70%	1	37.04%	10	40.74%	11	7.41%	2	27
2	Quality of research mentoring by non-faculty	0.00%	0	0.00%	0	0.00%	0	3.70%	1	7.41%	2	22.22%	6	37.04%	10	29.63%	8	27
3	Guidance received on career options	0.00%	0	3.70%	1	3.70%	1	11.11%	3	11.11%	3	25.93%	7	25.93%	7	18.52%	5	27
4	Information received on graduate studies	0.00%	0	0.00%	0	0.00%	0	7.41%	2	18.52%	5	18.52%	5	40.74%	11	14.81%	4	27
5	Accessibility of research mentor	0.00%	0	0.00%	0	0.00%	0	11.11%	3	11.11%	3	29.63%	8	44.44%	12	3.70%	1	27

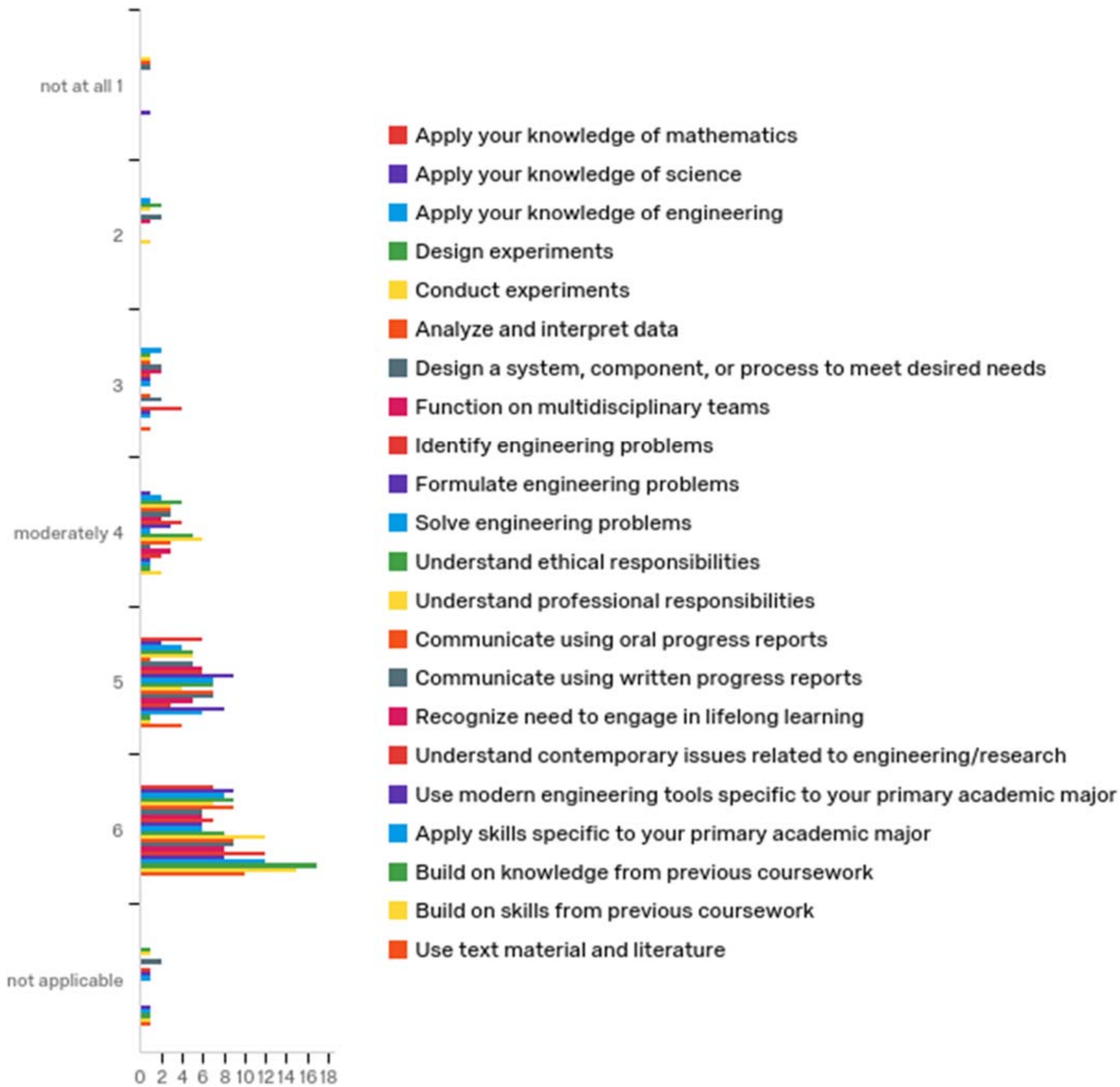
Q24 - Classmates   Satisfaction with characteristics of your fellow students:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Academic ability	3.00	7.00	6.37	0.95	0.90	27
2	Ability to work in teams/groups	2.00	7.00	5.70	1.36	1.84	27
3	Level of camaraderie	3.00	7.00	5.56	1.37	1.88	27

#	Question	very dissatisfied		moderately dissatisfied		slightly dissatisfied		neutral		slightly satisfied		moderately satisfied		very satisfied		not applicable		Total
1	Academic ability	0.00%	0	0.00%	0	3.70%	1	3.70%	1	0.00%	0	37.04%	10	55.56%	15	0.00%	0	27
2	Ability to work in teams/groups	0.00%	0	3.70%	1	3.70%	1	11.11%	3	18.52%	5	25.93%	7	37.04%	10	0.00%	0	27
3	Level of camaraderie	0.00%	0	0.00%	0	11.11%	3	14.81%	4	14.81%	4	25.93%	7	33.33%	9	0.00%	0	27

Q21 - Program Outcomes and Assessment   To what degree did your engineering education enhance your ability to:

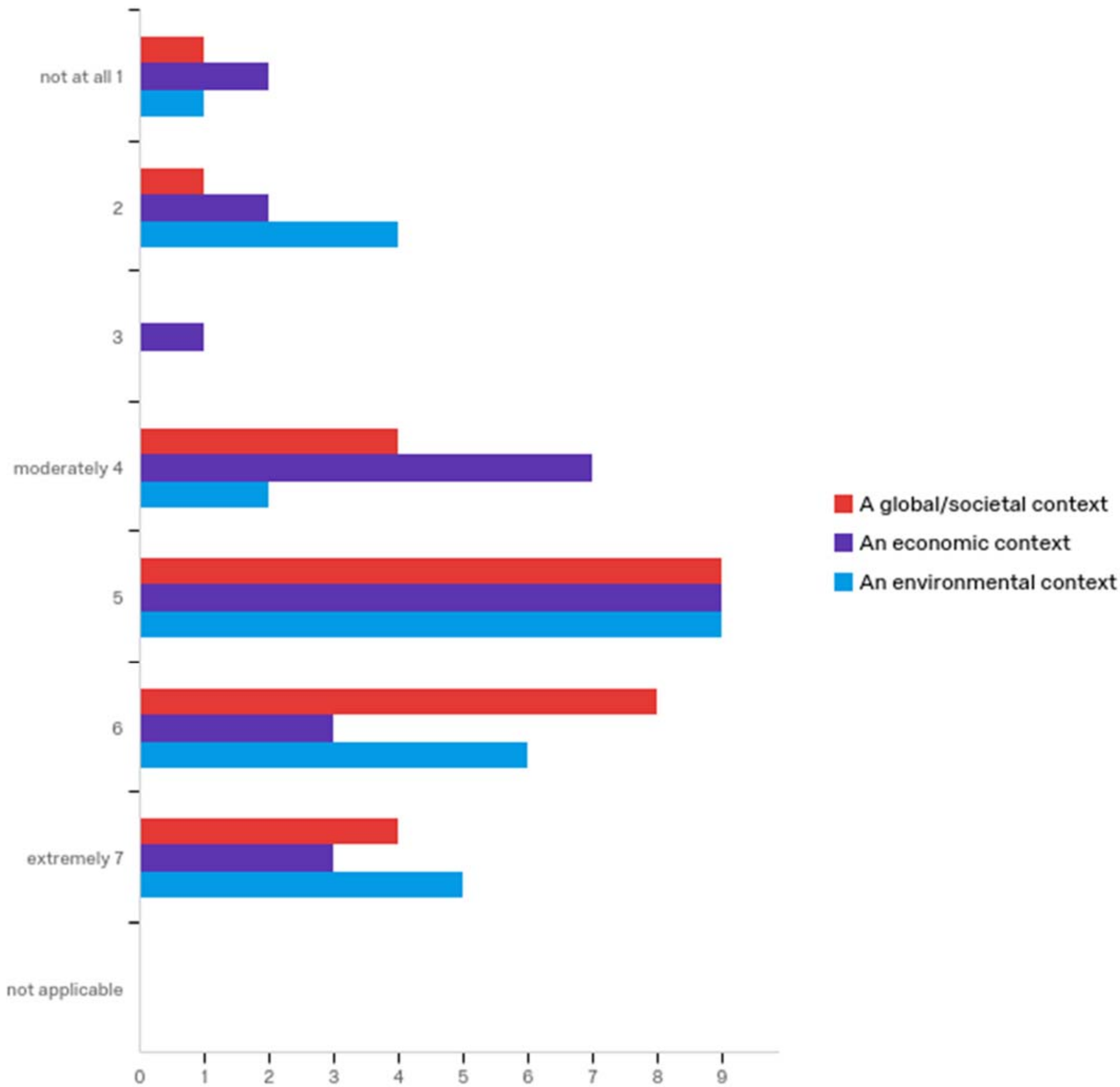


#		Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1		Apply your knowledge of mathematics	5.00	6.00	5.54	0.50	0.25	13
2		Apply your knowledge of science	4.00	6.00	5.67	0.62	0.39	12
3		Apply your knowledge of engineering	2.00	6.00	4.94	1.26	1.58	17
4		Design experiments	2.00	8.00	5.00	1.41	2.00	22
5		Conduct experiments	1.00	8.00	4.89	1.59	2.52	19
6		Analyze and interpret data	1.00	6.00	5.00	1.46	2.13	15
7		Design a system, component, or process to meet desired needs	1.00	8.00	4.76	1.80	3.23	21
8		Function on multidisciplinary teams	2.00	6.00	4.82	1.20	1.44	17
9		Identify engineering problems	3.00	8.00	5.21	1.10	1.22	19
10		Formulate engineering problems	3.00	8.00	5.20	1.03	1.06	20
11		Solve engineering problems	3.00	8.00	5.38	1.05	1.11	16
12		Understand ethical responsibilities	4.00	6.00	5.15	0.79	0.63	20
13		Understand professional responsibilities	2.00	6.00	5.13	1.08	1.16	23
14		Communicate using oral progress reports	3.00	6.00	5.20	0.87	0.76	20
15		Communicate using written progress reports	3.00	6.00	5.21	0.95	0.90	19
16		Recognize need to engage in lifelong learning	4.00	6.00	5.31	0.77	0.59	16
17		Understand contemporary issues related to engineering/research	3.00	6.00	5.10	1.19	1.42	21
18		Use modern engineering tools specific to your primary academic major	1.00	8.00	5.20	1.36	1.86	20
19		Apply skills specific to your primary academic major	3.00	8.00	5.57	0.95	0.91	21
20		Build on knowledge from previous coursework	4.00	8.00	5.95	0.67	0.45	20
21		Build on skills from previous coursework	4.00	8.00	5.84	0.81	0.66	19
22		Use text material and literature	3.00	8.00	5.69	0.98	0.96	16

#	Question	not at all 1		2		3		moderately 4		5		6		not applicable		Total
1	Apply your knowledge of mathematics	0.00%	0	0.00%	0	0.00%	0	0.00%	0	46.15%	6	53.85%	7	0.00%	0	13
2	Apply your knowledge of science	0.00%	0	0.00%	0	0.00%	0	8.33%	1	16.67%	2	75.00%	9	0.00%	0	12
3	Apply your knowledge of engineering	0.00%	0	5.88%	1	11.76%	2	11.76%	2	23.53%	4	47.06%	8	0.00%	0	17
4	Design experiments	0.00%	0	9.09%	2	4.55%	1	18.18%	4	22.73%	5	40.91%	9	4.55%	1	22
5	Conduct experiments	5.26%	1	5.26%	1	5.26%	1	15.79%	3	26.32%	5	36.84%	7	5.26%	1	19
6	Analyze and interpret data	6.67%	1	0.00%	0	6.67%	1	20.00%	3	6.67%	1	60.00%	9	0.00%	0	15
7	Design a system, component, or process to meet desired needs	4.76%	1	9.52%	2	9.52%	2	14.29%	3	23.81%	5	28.57%	6	9.52%	2	21
8	Function on multidisciplinary teams	0.00%	0	5.88%	1	11.76%	2	11.76%	2	35.29%	6	35.29%	6	0.00%	0	17
9	Identify engineering problems	0.00%	0	0.00%	0	5.26%	1	21.05%	4	31.58%	6	36.84%	7	5.26%	1	19
10	Formulate engineering problems	0.00%	0	0.00%	0	5.00%	1	15.00%	3	45.00%	9	30.00%	6	5.00%	1	20
11	Solve engineering problems	0.00%	0	0.00%	0	6.25%	1	6.25%	1	43.75%	7	37.50%	6	6.25%	1	16
12	Understand ethical responsibilities	0.00%	0	0.00%	0	0.00%	0	25.00%	5	35.00%	7	40.00%	8	0.00%	0	20
13	Understand professional responsibilities	0.00%	0	4.35%	1	0.00%	0	26.09%	6	17.39%	4	52.17%	12	0.00%	0	23
14	Communicate using oral progress reports	0.00%	0	0.00%	0	5.00%	1	15.00%	3	35.00%	7	45.00%	9	0.00%	0	20
15	Communicate using written progress reports	0.00%	0	0.00%	0	10.53%	2	5.26%	1	36.84%	7	47.37%	9	0.00%	0	19
16	Recognize need to engage in lifelong learning	0.00%	0	0.00%	0	0.00%	0	18.75%	3	31.25%	5	50.00%	8	0.00%	0	16
1	Understand	0.00	0	0.00	0	19.05	4	9.52%	2	14.29	3	57.14	1	0.00%	0	21

7	contemporary issues related to engineering/research	%		%		%				%		%	2			
18	Use modern engineering tools specific to your primary academic major	5.00%	1	0.00%	0	5.00%	1	5.00%	1	40.00%	8	40.00%	8	5.00%	1	20
19	Apply skills specific to your primary academic major	0.00%	0	0.00%	0	4.76%	1	4.76%	1	28.57%	6	57.14%	12	4.76%	1	21
20	Build on knowledge from previous coursework	0.00%	0	0.00%	0	0.00%	0	5.00%	1	5.00%	1	85.00%	17	5.00%	1	20
21	Build on skills from previous coursework	0.00%	0	0.00%	0	0.00%	0	10.53%	2	5.26%	1	78.95%	15	5.26%	1	19
22	Use text material and literature	0.00%	0	0.00%	0	6.25%	1	0.00%	0	25.00%	4	62.50%	10	6.25%	1	16

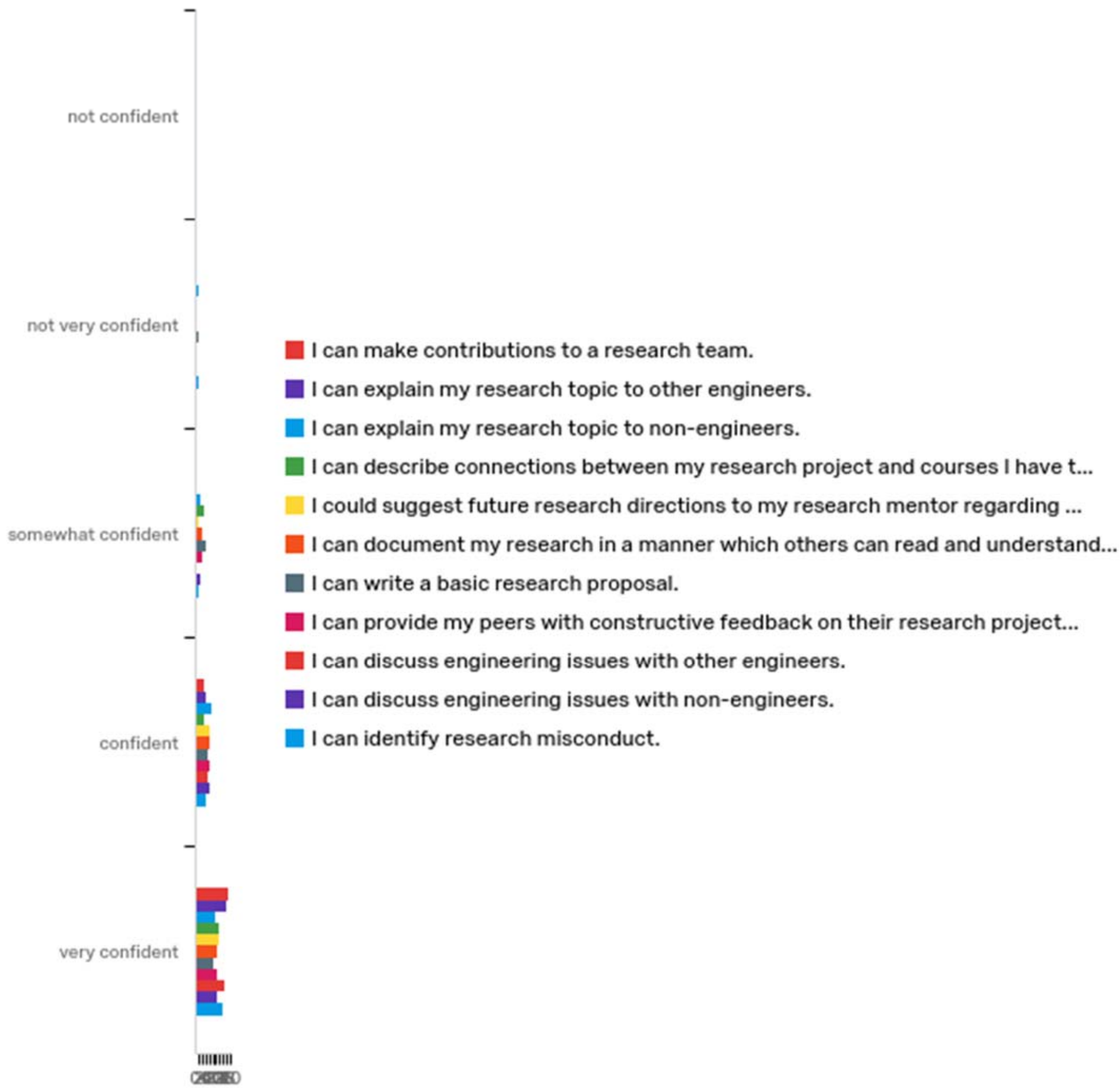
Q25 - To what degree did your engineering education enhance your ability to understand the impact of engineering solutions in:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	A global/societal context	1.00	7.00	5.19	1.39	1.93	27
2	An economic context	1.00	7.00	4.48	1.60	2.55	27
3	An environmental context	1.00	7.00	4.93	1.72	2.96	27

#	Question	not at all 1		2		3		moderately 4		5		6		extremely 7		not applicable		Total
1	A global/societal context	3.70%	1	3.70%	1	0.00%	0	14.81%	4	33.33%	9	29.63%	8	14.81%	4	0.00%	0	27
2	An economic context	7.41%	2	7.41%	2	3.70%	1	25.93%	7	33.33%	9	11.11%	3	11.11%	3	0.00%	0	27
3	An environmental context	3.70%	1	14.81%	4	0.00%	0	7.41%	2	33.33%	9	22.22%	6	18.52%	5	0.00%	0	27

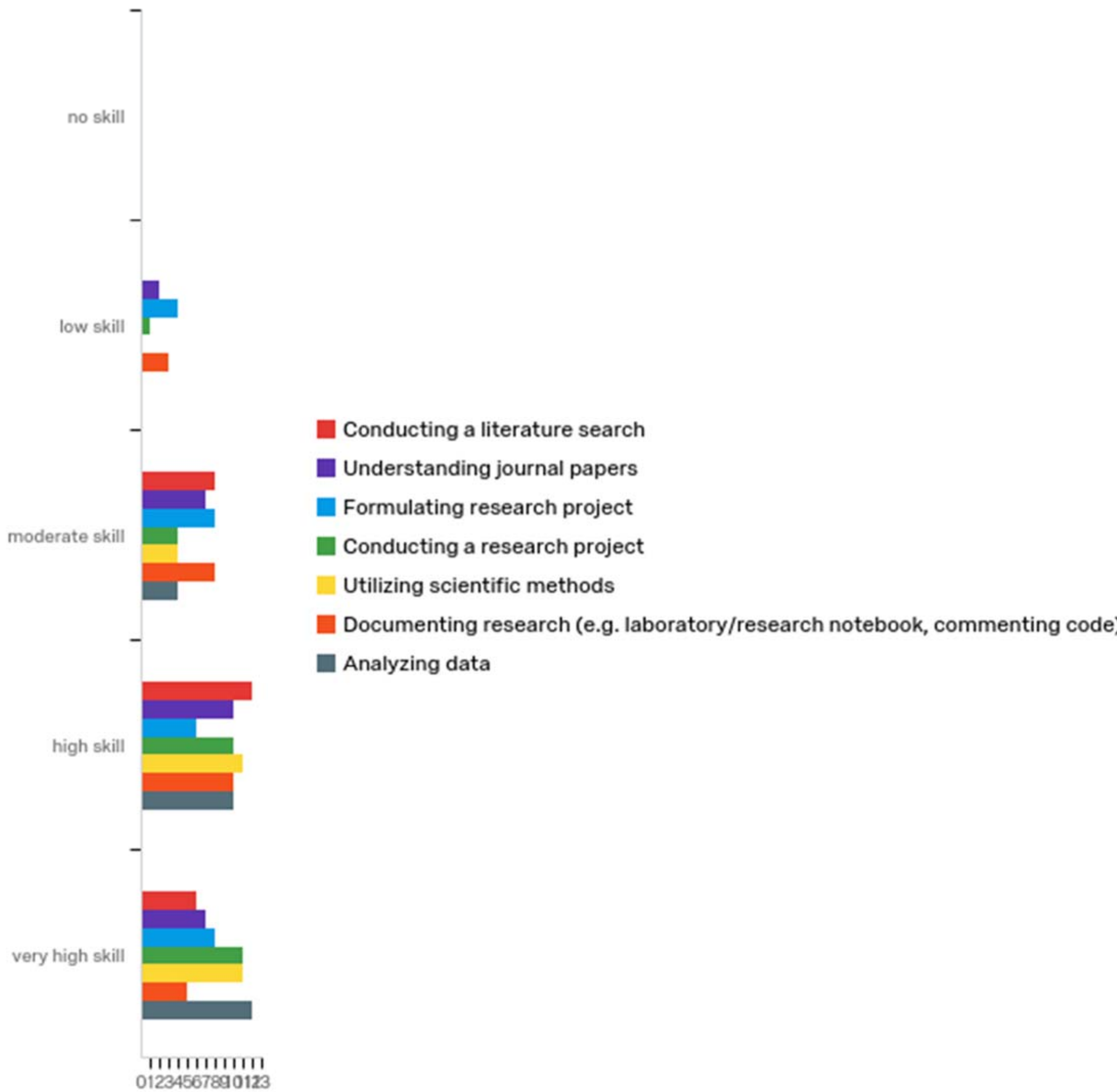
Q26 - Conduct of Research Rate your confidence in the following areas:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I can make contributions to a research team.	2.00	5.00	4.62	0.74	0.54	26
2	I can explain my research topic to other engineers.	2.00	5.00	4.64	0.69	0.47	25
3	I can explain my research topic to non-engineers.	2.00	5.00	4.16	0.92	0.85	25
4	I can describe connections between my research project and courses I have taken.	1.00	5.00	4.24	1.03	1.06	25
5	I could suggest future research directions to my research mentor regarding my research project.	1.00	5.00	4.36	0.93	0.87	25
6	I can document my research in a manner which others can read and understand.	1.00	5.00	4.23	0.97	0.95	26
7	I can write a basic research proposal.	1.00	5.00	3.88	1.12	1.26	26
8	I can provide my peers with constructive feedback on their research projects.	1.00	5.00	4.23	0.97	0.95	26
9	I can discuss engineering issues with other engineers.	1.00	5.00	4.50	0.89	0.79	26
10	I can discuss engineering issues with non-engineers.	1.00	5.00	4.19	1.04	1.08	26
11	I can identify research misconduct.	2.00	5.00	4.38	0.92	0.85	26

#	Question	not confident		not very confident		somewhat confident		confident		very confident		Total
1	I can make contributions to a research team.	0.00%	0	3.85%	1	3.85%	1	19.23%	5	73.08%	19	26
2	I can explain my research topic to other engineers.	0.00%	0	4.00%	1	0.00%	0	24.00%	6	72.00%	18	25
3	I can explain my research topic to non-engineers.	0.00%	0	8.00%	2	12.00%	3	36.00%	9	44.00%	11	25
4	I can describe connections between my research project and courses I have taken.	4.00%	1	0.00%	0	20.00%	5	20.00%	5	56.00%	14	25
5	I could suggest future research directions to my research mentor regarding my research project.	4.00%	1	0.00%	0	8.00%	2	32.00%	8	56.00%	14	25
6	I can document my research in a manner which others can read and understand.	3.85%	1	0.00%	0	15.38%	4	30.77%	8	50.00%	13	26
7	I can write a basic research proposal.	3.85%	1	7.69%	2	23.08%	6	26.92%	7	38.46%	10	26
8	I can provide my peers with constructive feedback on their research projects.	3.85%	1	0.00%	0	15.38%	4	30.77%	8	50.00%	13	26
9	I can discuss engineering issues with other engineers.	3.85%	1	0.00%	0	3.85%	1	26.92%	7	65.38%	17	26
10	I can discuss engineering issues with non-engineers.	3.85%	1	3.85%	1	11.54%	3	30.77%	8	50.00%	13	26
11	I can identify research misconduct.	0.00%	0	7.69%	2	7.69%	2	23.08%	6	61.54%	16	26

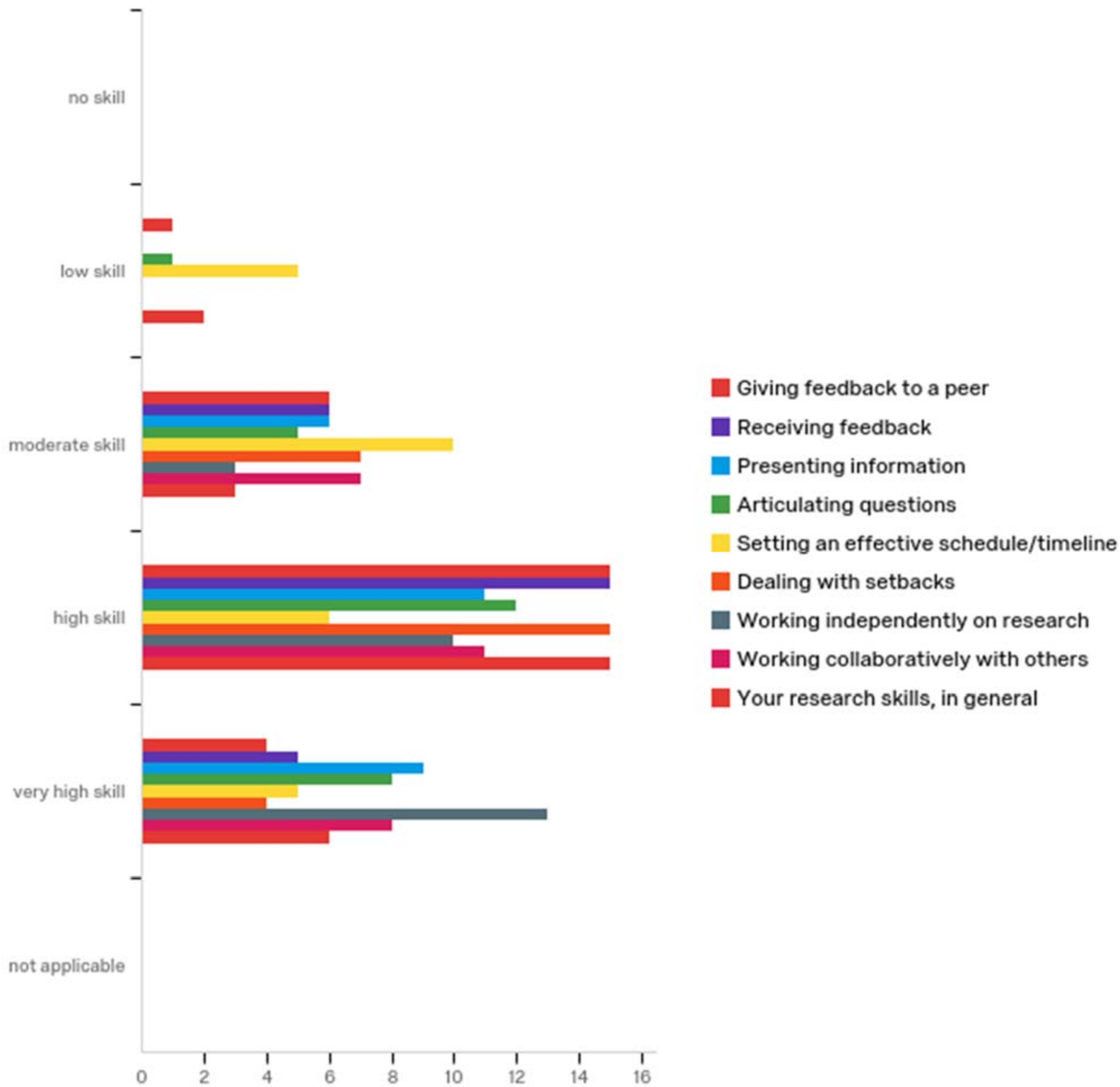
Q27 - Rate your skill level in the following areas:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Conducting a literature search	3.00	5.00	3.92	0.73	0.53	26
2	Understanding journal papers	2.00	5.00	3.85	0.91	0.82	26
3	Formulating research project	2.00	5.00	3.69	1.07	1.14	26
4	Conducting a research project	2.00	5.00	4.19	0.83	0.69	26
5	Utilizing scientific methods	3.00	5.00	4.27	0.71	0.50	26
6	Documenting research (e.g. laboratory/research notebook, commenting code)	2.00	5.00	3.65	0.92	0.84	26
7	Analyzing data	3.00	5.00	4.31	0.72	0.52	26

#	Question	no skill		low skill		moderate skill		high skill		very high skill		Total
1	Conducting a literature search	0.00%	0	0.00%	0	30.77%	8	46.15%	12	23.08%	6	26
2	Understanding journal papers	0.00%	0	7.69%	2	26.92%	7	38.46%	10	26.92%	7	26
3	Formulating research project	0.00%	0	15.38%	4	30.77%	8	23.08%	6	30.77%	8	26
4	Conducting a research project	0.00%	0	3.85%	1	15.38%	4	38.46%	10	42.31%	11	26
5	Utilizing scientific methods	0.00%	0	0.00%	0	15.38%	4	42.31%	11	42.31%	11	26
6	Documenting research (e.g. laboratory/research notebook, commenting code)	0.00%	0	11.54%	3	30.77%	8	38.46%	10	19.23%	5	26
7	Analyzing data	0.00%	0	0.00%	0	15.38%	4	38.46%	10	46.15%	12	26

Q28 - Rate your skill level in the following areas:



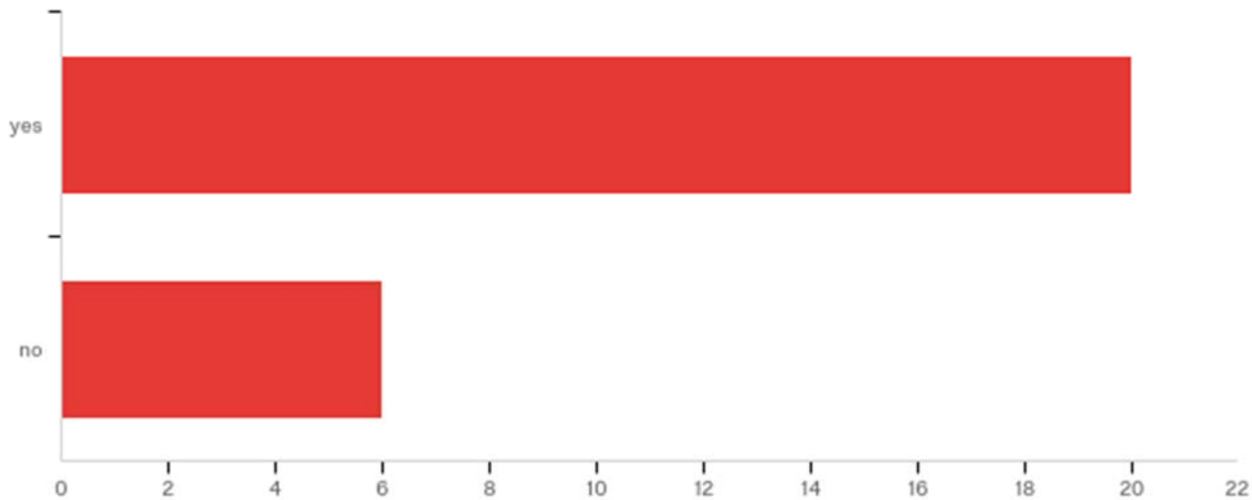
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Giving feedback to a peer	2.00	5.00	3.85	0.72	0.51	26
2	Receiving feedback	3.00	5.00	3.96	0.65	0.42	26
3	Presenting information	3.00	5.00	4.12	0.75	0.56	26
4	Articulating questions	2.00	5.00	4.04	0.81	0.65	26
5	Setting an effective schedule/timeline	2.00	5.00	3.42	1.01	1.01	26
6	Dealing with setbacks	3.00	5.00	3.88	0.64	0.41	26
7	Working independently on research	3.00	5.00	4.38	0.68	0.47	26
8	Working collaboratively with others	3.00	5.00	4.04	0.76	0.58	26
9	Your research skills, in general	2.00	5.00	3.96	0.81	0.65	26

#	Question	no skill		low skill		moderate skill		high skill		very high skill		not applicable		Total
1	Giving feedback to a peer	0.00%	0	3.85%	1	23.08%	6	57.69%	15	15.38%	4	0.00%	0	26
2	Receiving feedback	0.00%	0	0.00%	0	23.08%	6	57.69%	15	19.23%	5	0.00%	0	26
3	Presenting information	0.00%	0	0.00%	0	23.08%	6	42.31%	11	34.62%	9	0.00%	0	26
4	Articulating questions	0.00%	0	3.85%	1	19.23%	5	46.15%	12	30.77%	8	0.00%	0	26
5	Setting an effective schedule/timeline	0.00%	0	19.23%	5	38.46%	10	23.08%	6	19.23%	5	0.00%	0	26
6	Dealing with setbacks	0.00%	0	0.00%	0	26.92%	7	57.69%	15	15.38%	4	0.00%	0	26
7	Working independently on research	0.00%	0	0.00%	0	11.54%	3	38.46%	10	50.00%	13	0.00%	0	26
8	Working collaboratively with others	0.00%	0	0.00%	0	26.92%	7	42.31%	11	30.77%	8	0.00%	0	26
9	Your research skills, in general	0.00%	0	7.69%	2	11.54%	3	57.69%	15	23.08%	6	0.00%	0	26

Q29 - Outside Activities while working towards BS in Engineering Physics   Were you or are you currently a member of a student organization? If so, which one(s)?

Outside Activities while working towards BS in Engineering Physics   Were you or are you currently a member of a student organization? If so, which one(s)?
Club Tennis
Technically ANS and APS
Taekwondo Club, AHA
Engineers Without Borders (Ecuador), Daily Cardinal
Atheists, humanists, and agnostics
UW Physics Club
American Nuclear Society, LEED Scholars, Phi Kappa Psi Fraternity
Engineers Without Borders, Japanese Karate
n/a
Euchre Club, Ultimate Frisbee Club
Theta Tau, Tau Beta Pi, Kendo Club, Quiz Bowl
Hoofers Sailing club
INSIGHT, NOBE, Madison AI, Socratic Society, Special Topics in Philosophy and Science, Madison Swing
Theta Tau

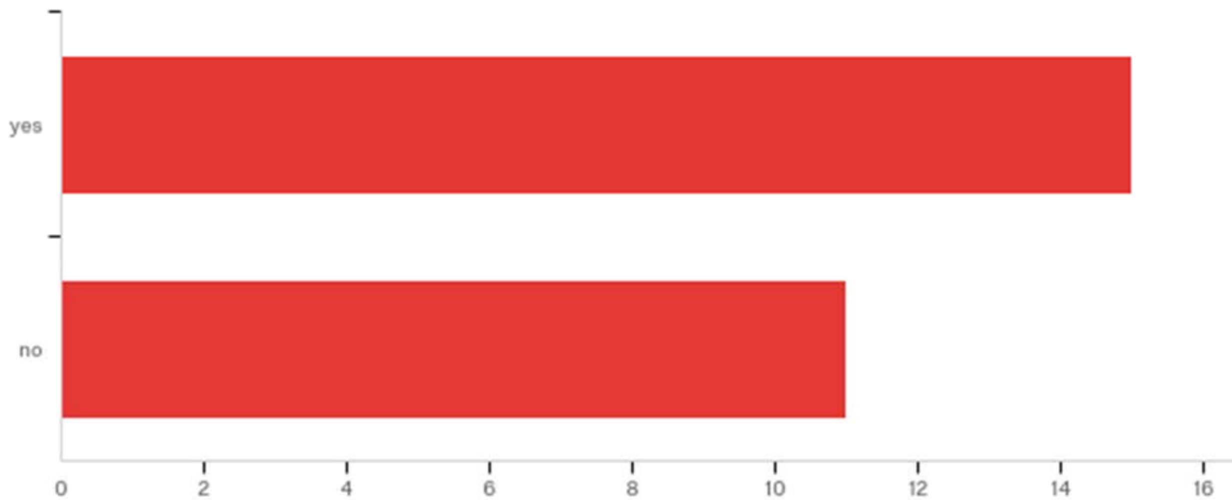
Q30 - Did you or have you performed any volunteer service in the community?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Did you or have you performed any volunteer service in the community?	1.00	2.00	1.23	0.42	0.18	26

#	Answer	%	Count
1	yes	76.92%	20
2	no	23.08%	6
	Total	100%	26

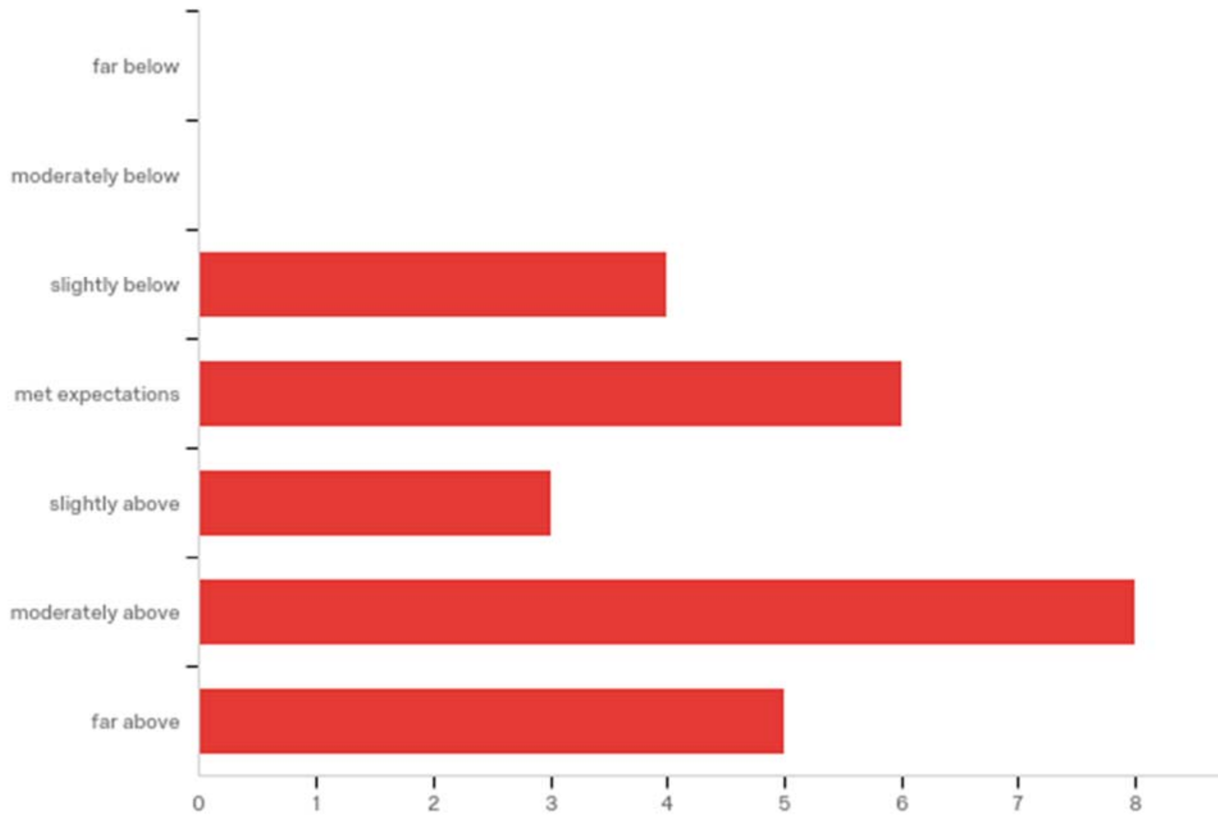
Q31 - Did you or have you taken on any type of leadership position?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Did you or have you taken on any type of leadership position?	1.00	2.00	1.42	0.49	0.24	26

#	Answer	%	Count
1	yes	57.69%	15
2	no	42.31%	11
	Total	100%	26

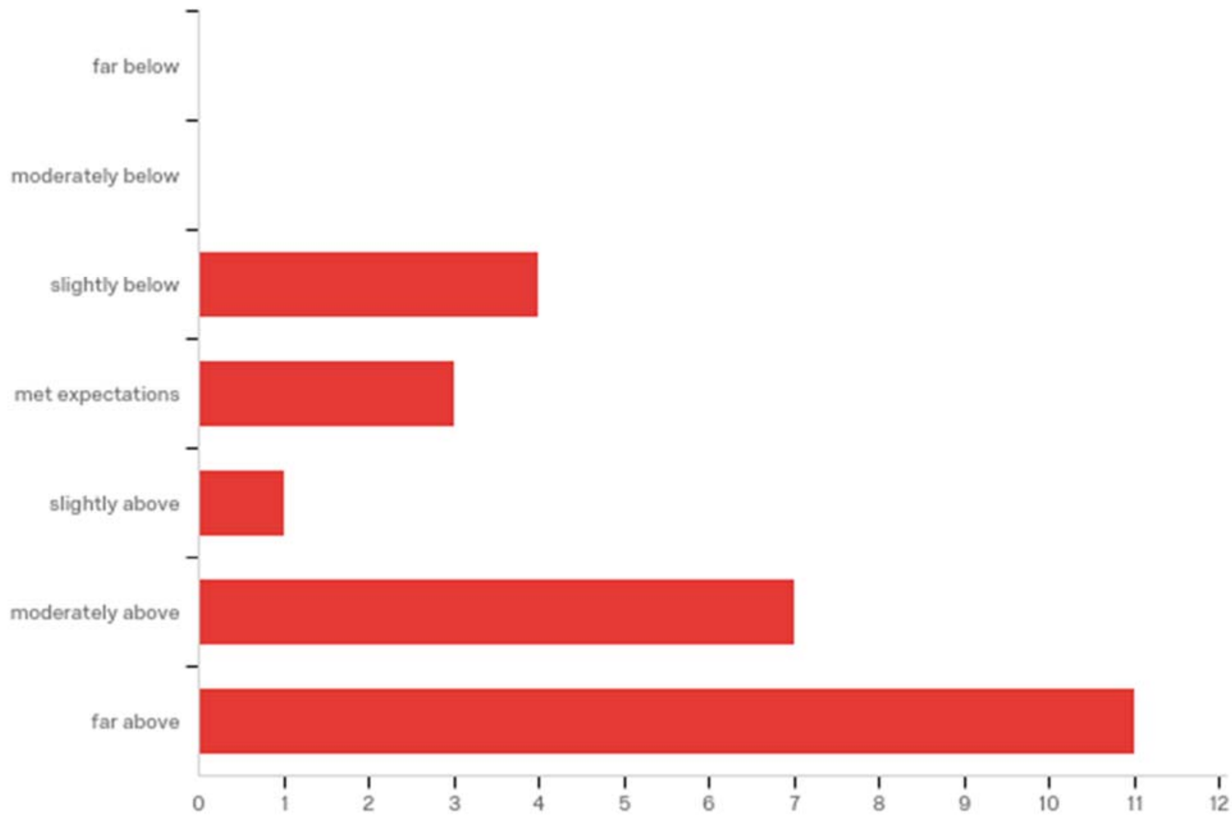
Q32 - The Bottom Line – Overall Satisfaction   To what extent did the Engineering Physics program experience fulfill your expectations?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Bottom Line – Overall Satisfaction To what extent did the Engineering Physics program experience fulfill your expectations?	3.00	7.00	5.15	1.38	1.90	26

#	Answer	%	Count
1	far below	0.00%	0
2	moderately below	0.00%	0
3	slightly below	15.38%	4
4	met expectations	23.08%	6
5	slightly above	11.54%	3
6	moderately above	30.77%	8
7	far above	19.23%	5
	Total	100%	26

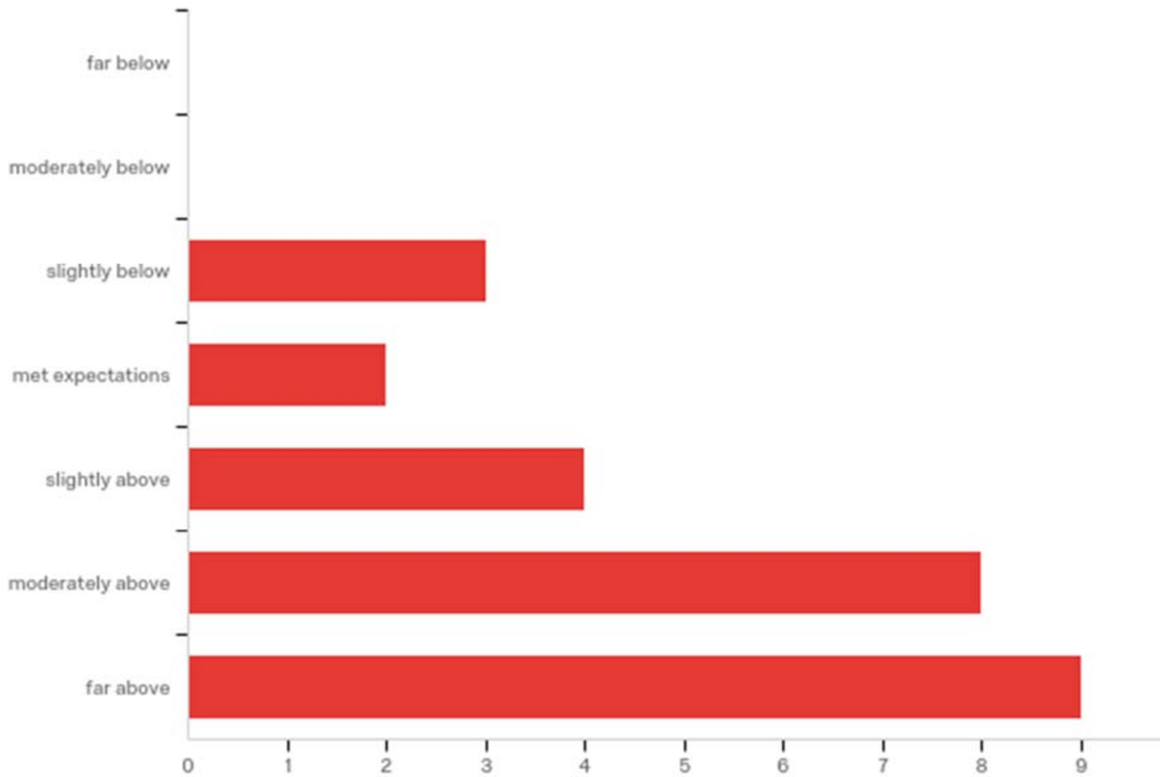
Q33 - When you compare the expense to the quality of your education, how do you rate the value of the investment you made in the Engineering Physics program?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	When you compare the expense to the quality of your education, how do you rate the value of the investment you made in the Engineering Physics program?	3.00	7.00	5.69	1.49	2.21	26

#	Answer	%	Count
1	far below	0.00%	0
2	moderately below	0.00%	0
3	slightly below	15.38%	4
4	met expectations	11.54%	3
5	slightly above	3.85%	1
6	moderately above	26.92%	7
7	far above	42.31%	11
	Total	100%	26

Q34 - How inclined are you to recommend the Engineering Physics major to a student interested in engineering and science?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How inclined are you to recommend the Engineering Physics major to a student interested in engineering and science?	3.00	7.00	5.69	1.32	1.75	26

#	Answer	%	Count
1	far below	0.00%	0
2	moderately below	0.00%	0
3	slightly below	11.54%	3
4	met expectations	7.69%	2
5	slightly above	15.38%	4
6	moderately above	30.77%	8
7	far above	34.62%	9
	Total	100%	26

Q35 - Any other comments that you would like to make which were not covered above?

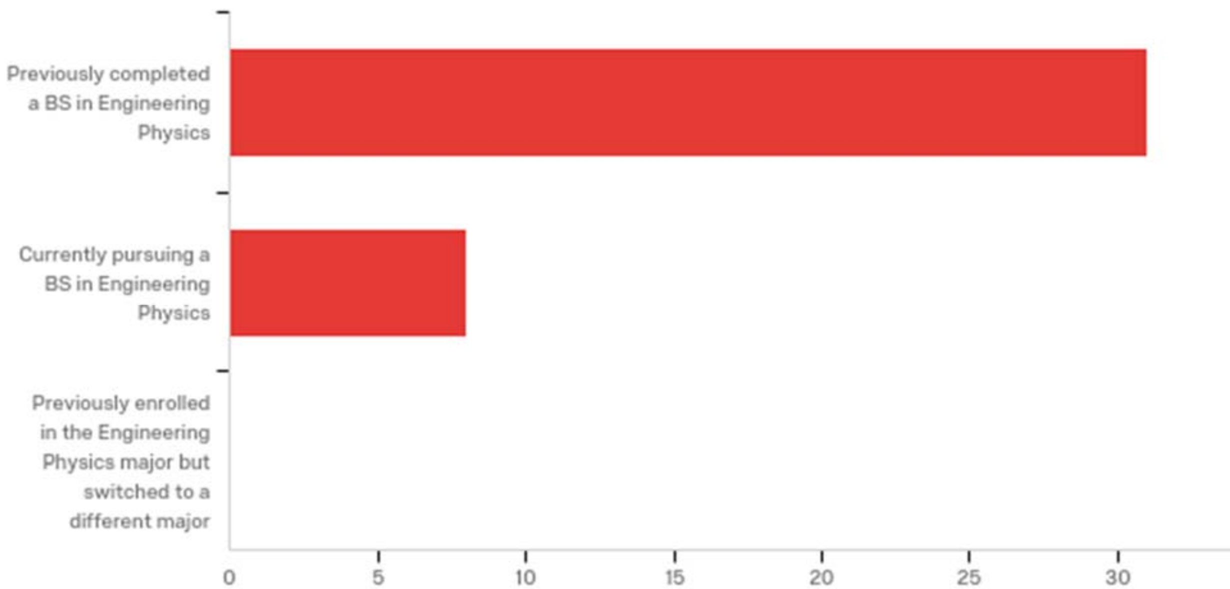
Any other comments that you would like to make which were not covered above?
I think, overall, this program is the best at the university for students in engineering who want access to a more theoretical side of engineering and need/have a desire to challenge themselves. With the options and depth that the EP curriculum presents the sky is the limit for a motivated student who is willing to push themselves while getting experience and skills in research.
Only reason I wouldn't recommend Engineering Physics is because I think it's something people should choose. But it's one of the best choices I've ever made.
If scheduling is not done in a careful order, I worry that students will see physics before they're prepared to handle it. Also, computer literacy will help almost everywhere. Hammer math and comp sci into their heads before letting them touch a physics book.
The EP degree program was fantastic and I couldn't recommend it enough.
Looking back, it seems that EP was pretty similar to AMEP—both meant to be interdisciplinary, both aimed toward grad school, many people are involved in undergrad research (though admittedly it isn't a requirement). But AMEP offers much more freedom to pick courses and of course not being charged differential tuition is a plus. Had I known more about it starting out, I probably would have picked AMEP. So, I think EP needs a way to distinguish itself. Additionally, I think engineering career services needs to be more aware of EP. Not all of us go to grad school, and I think many of us would be interested in doing a coop or internship. I did a coop and found it really really valuable, but I only was offered the job because I was in EMA at the time (I switched to EP later; I asked the HR rep at the company whether they would have hired me had I been in EP instead and she said probably not because she didn't know what it was). A friend of mine who also graduated with an EP major had a really really hard time finding a job after graduation, even with a pretty good economy. It took him six months, and what he ended up with was an internship, not a full time position. I think it's likely that was also because companies don't know what EP is, and it doesn't seem like ECS is doing much to fix that.
The Engineering Physics program has very high standards and is extremely challenging, but every day I work with engineers whose undergraduate programs were not as robust and they start every new project at a disadvantage because of it. The interdisciplinary nature of EP affords many great insights not available to those exposed to just one field's pedagogy.
I'm not sure if this program alone is worth out of state tuition, but I think that's more a refection on the university tuition policies as a whole. If the student can afford it and knows what he/she are interested in, then I would recommend EP.
More and higher quality marketing should be done to incoming students and graduate schools/employers.
College is overly expensive in general
Everything was great- the hands on experience, guidance/advising, career preparation through EPD resources and job fair, access to resources of every kind- I was very successful right out of school, I feel very fortunate to have had the opportunity to go through the EP undergrad program.

survey 2015-16 report

EP Self Study Survey - 2015-16

March 21st 2019, 5:56 pm CDT

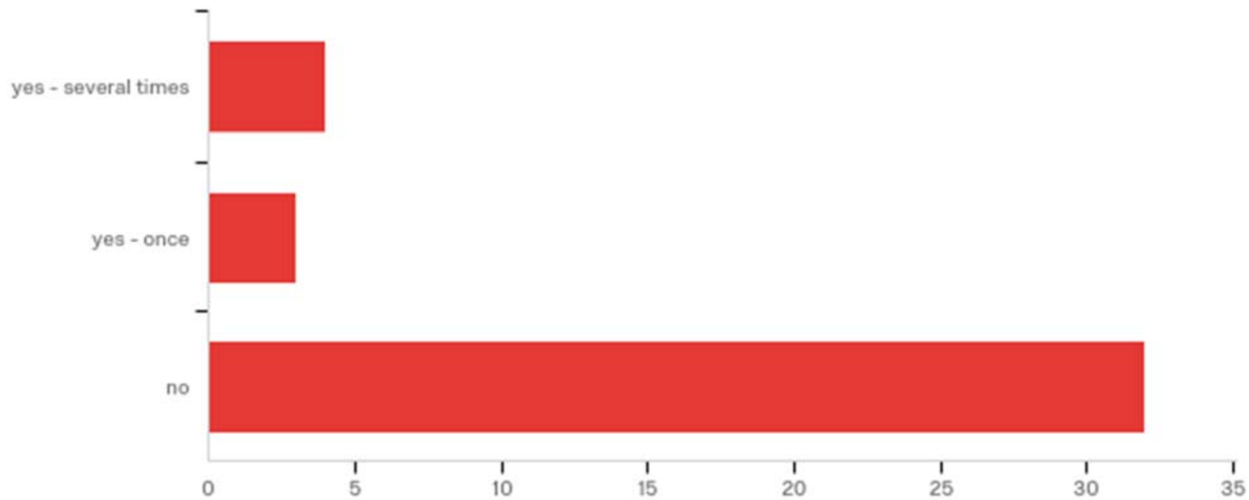
Q1 - What is your current relationship to the Engineering Physics undergraduate degree program?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is your current relationship to the Engineering Physics undergraduate degree program?	1.00	2.00	1.21	0.40	0.16	39

#	Answer	%	Count
1	Previously completed a BS in Engineering Physics	79.49%	31
2	Currently pursuing a BS in Engineering Physics	20.51%	8
3	Previously enrolled in the Engineering Physics major but switched to a different major	0.00%	0
	Total	100%	39

Q2 - After entering the Engineering Physics program, did you or are you currently considering switching to a different major?



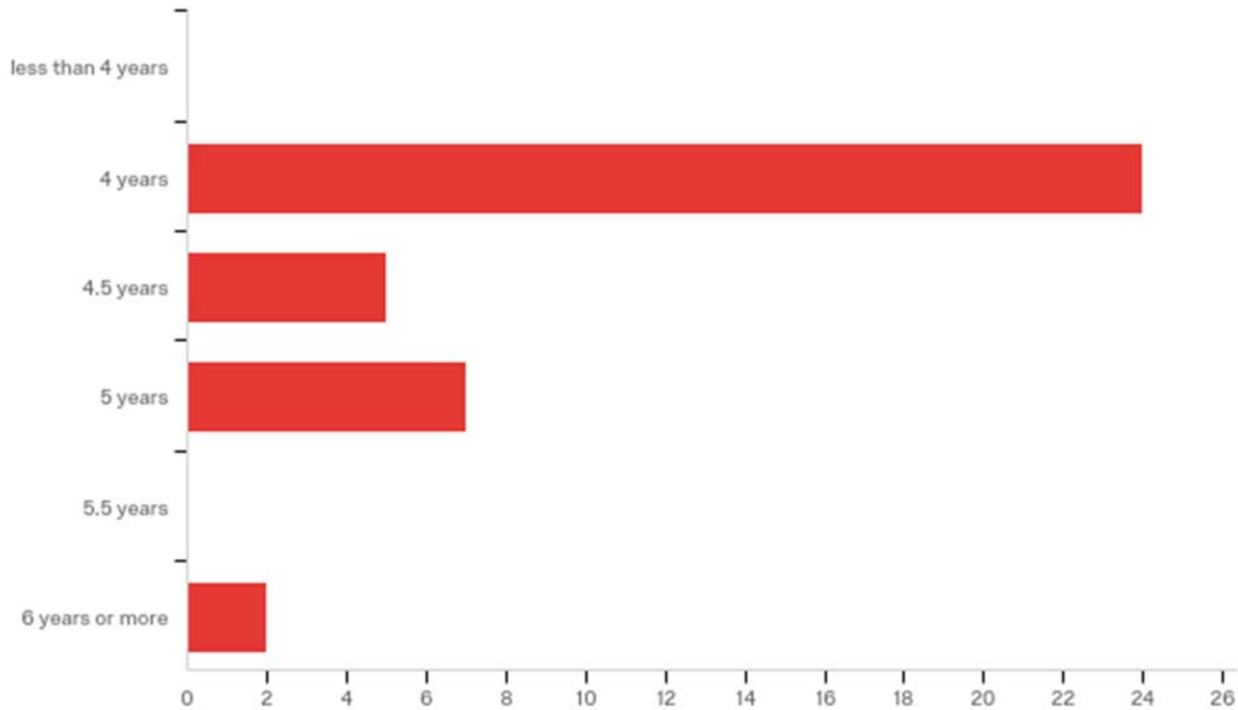
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	After entering the Engineering Physics program, did you or are you currently considering switching to a different major?	1.00	3.00	2.72	0.64	0.41	39

#	Answer	%	Count
1	yes - several times	10.26%	4
2	yes - once	7.69%	3
3	no	82.05%	32
	Total	100%	39

Q3 - If so, why?

If so, why?
I got a bad first semester GPA which would not allow me to due engineering physics.
I am interested in electrical engineering, and wished I could have taken more electives in that department
I considered switching to nuclear engineering, because I felt I would receive a similar education with more potential employment upside.
Discovered a deep interest in Comp Sci after entering EP. Decided against, since most of my curriculum was already on-track for CoE requirements and not for L&S.
Undecided on what I want to do

Q4 - Time to Degree   How long did you take or do you anticipate it will take for you to complete the requirements for the BS degree in Engineering Physics, including time spent at other schools if you transferred here, and excluding time spent as a coop, intern, or off campus research experience program:

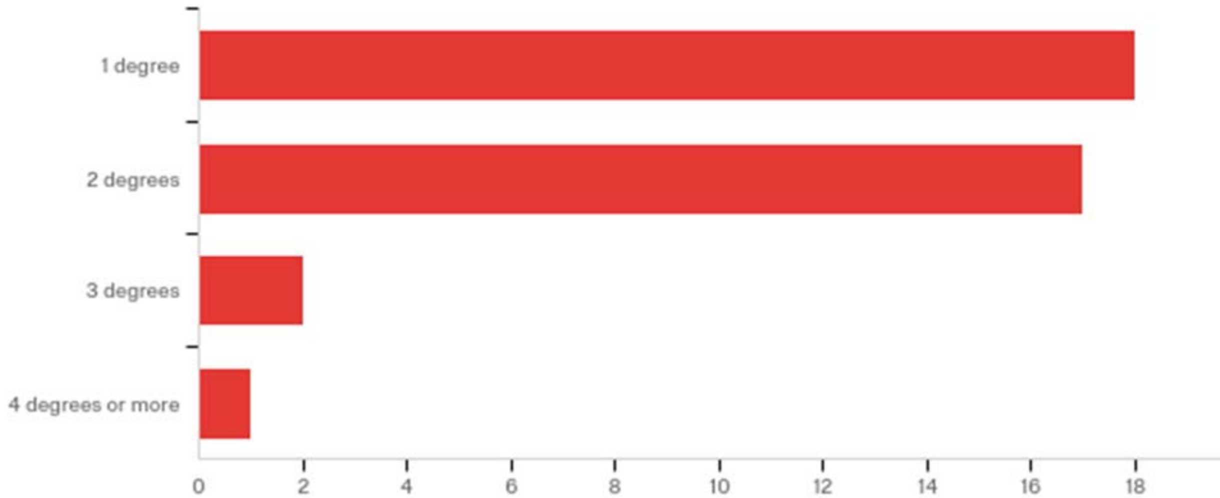


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Time to Degree How long did you take or do you anticipate it will take for you to complete the requirements for the BS degree in Engineering Physics, including time spent at other schools if you transferred here, and excluding time spent as a coop, intern, or off campus research experience program:	2.00	6.00	2.71	1.10	1.21	38

#	Answer	%	Count
1	less than 4 years	0.00%	0
2	4 years	63.16%	24
3	4.5 years	13.16%	5

4	5 years	18.42%	7
5	5.5 years	0.00%	0
6	6 years or more	5.26%	2
	Total	100%	38

Q5 - Including the Engineering Physics major, how many BS degrees did you or do you plan to receive upon graduation?



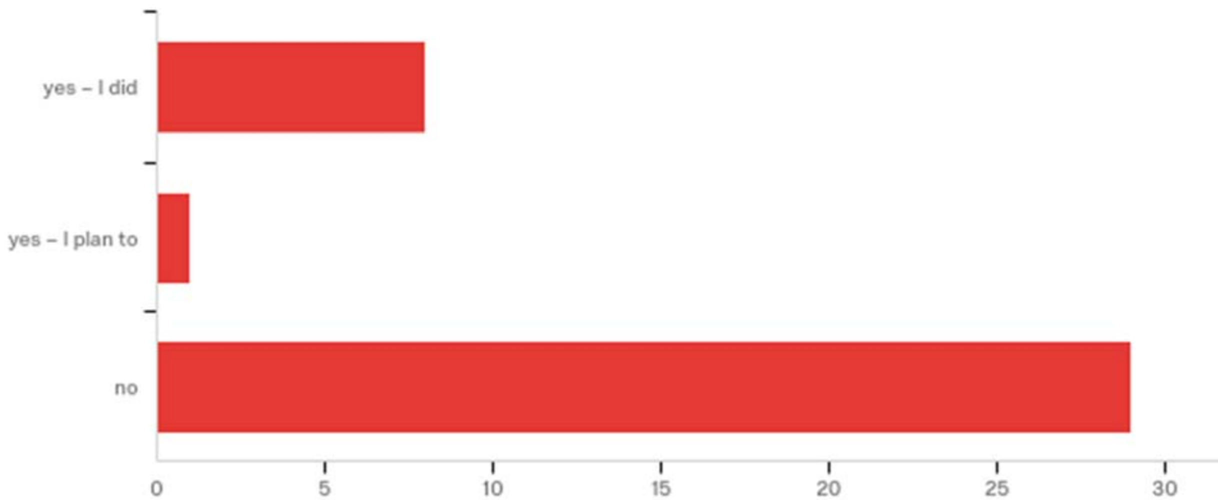
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Including the Engineering Physics major, how many BS degrees did you or do you plan to receive upon graduation?	1.00	4.00	1.63	0.70	0.50	38

#	Answer	%	Count
1	1 degree	47.37%	18
2	2 degrees	44.74%	17
3	3 degrees	5.26%	2
4	4 degrees or more	2.63%	1
	Total	100%	38

Q6 - Which Certificate Programs did you or do you plan to complete?

Which Certificate Programs did you or do you plan to complete?
Physics, math
International Engineering
Physics
None
None
None
None
Physics
Acquired certificates in Computer Science and Physics -- also majored in Math
Certificate in Mathematics
Computer Science
Physics
Don't remember, the materials one?
Math major
Physics

Q7 - Did you or do you plan to participate in a study or work abroad program?



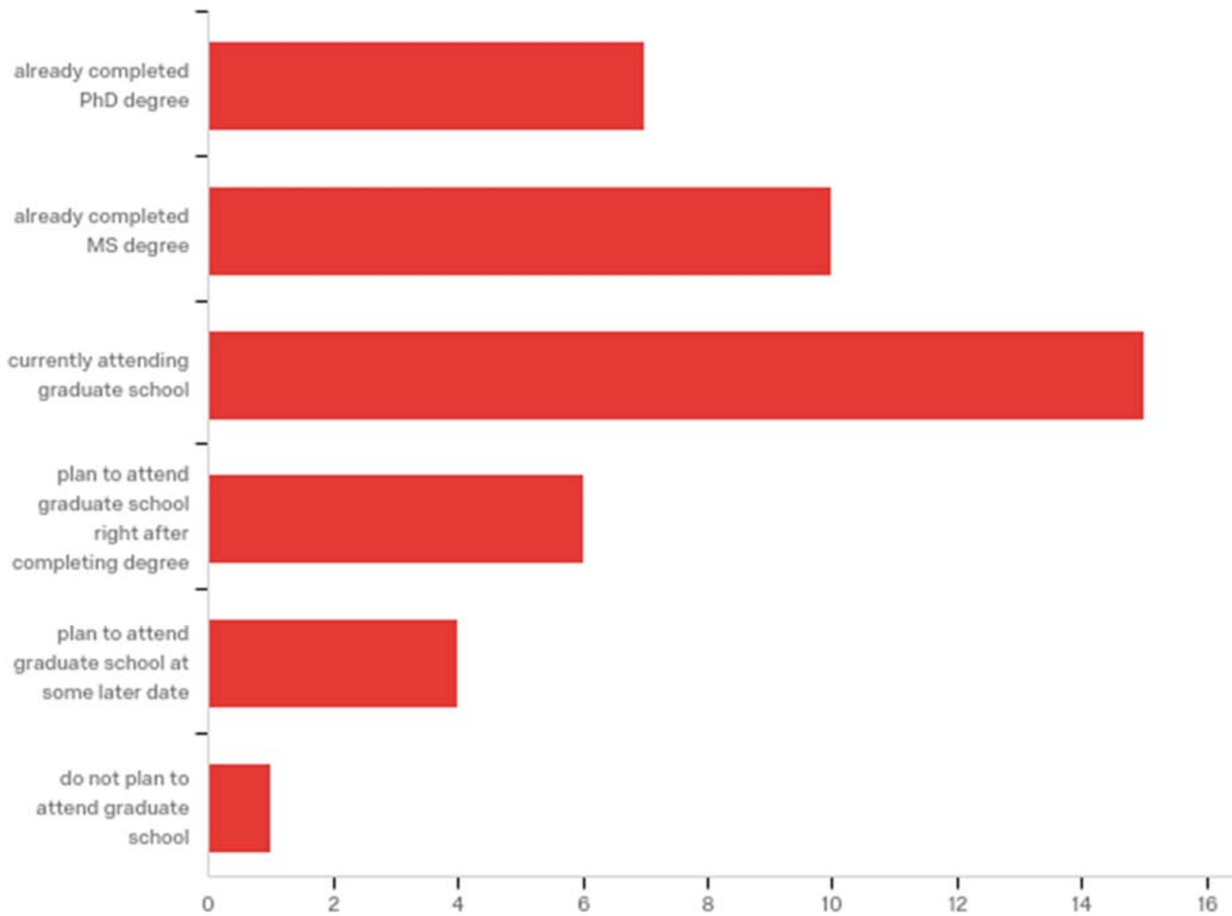
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Did you or do you plan to participate in a study or work abroad program?	1.00	3.00	2.55	0.82	0.67	38

#	Answer	%	Count
1	yes – I did	21.05%	8
2	yes – I plan to	2.63%	1
3	no	76.32%	29
	Total	100%	38

Q8 - What other are factors affected or are affecting your time to complete your undergraduate studies?

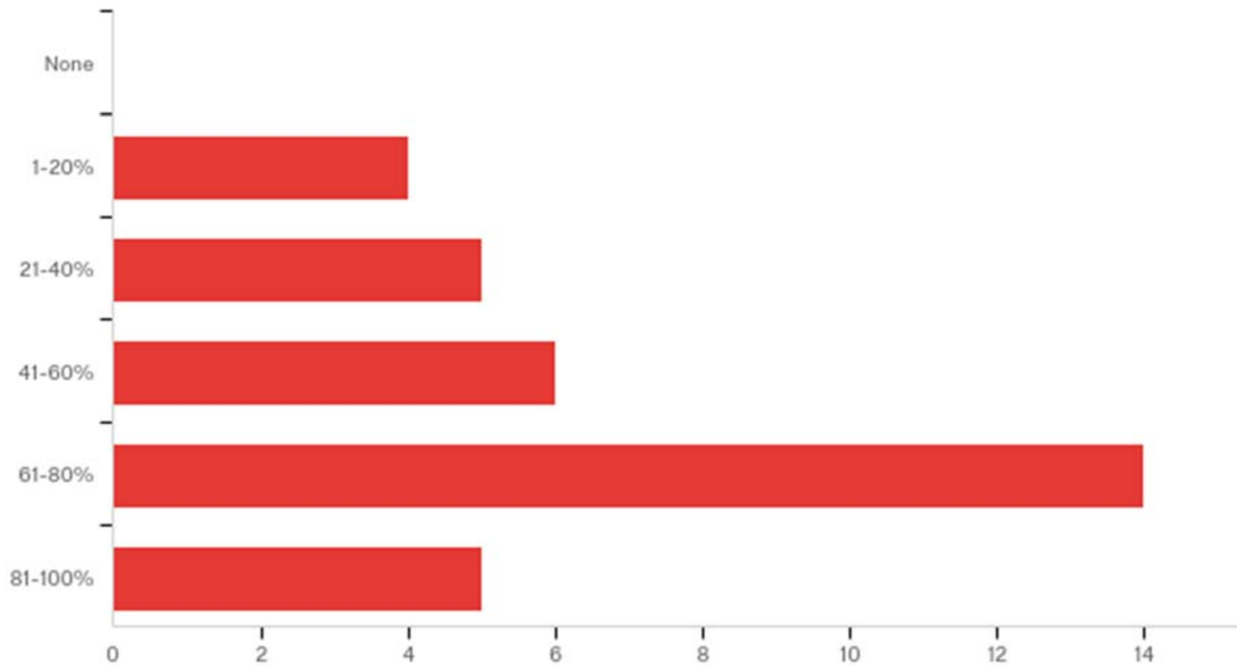
What other are factors affected or are affecting your time to complete your undergraduate studies?
I had a lot of credits before college
None
None
Double major, completion of research thesis
Completing study abroad would have likely extended the time necessary to complete the degree
A few changes in major
Some classes for plasma physics were only offered every 2 years.
Had a TON of credit coming into freshman year from AP and other college courses in high school.
I switched from nuclear engineering
Student-Athlete responsibilities
I took 2 classes the summer after my senior year.
I switched into engineering physics junior year so I was already behind, and it is a very credit heavy major.
Research shenanigans
Im majoring in a Language in the College of L&S which is a heavy commitment so I may have to spread out my studies to 5 years.
Course load and GPA requirements

Q10 - Graduate Studies   Did you or do you plan to attend graduate school?



#	Answer	%	Count
1	already completed PhD degree	16.28%	7
2	already completed MS degree	23.26%	10
3	currently attending graduate school	34.88%	15
4	plan to attend graduate school right after completing degree	13.95%	6
5	plan to attend graduate school at some later date	9.30%	4
6	do not plan to attend graduate school	2.33%	1
	Total	100%	43

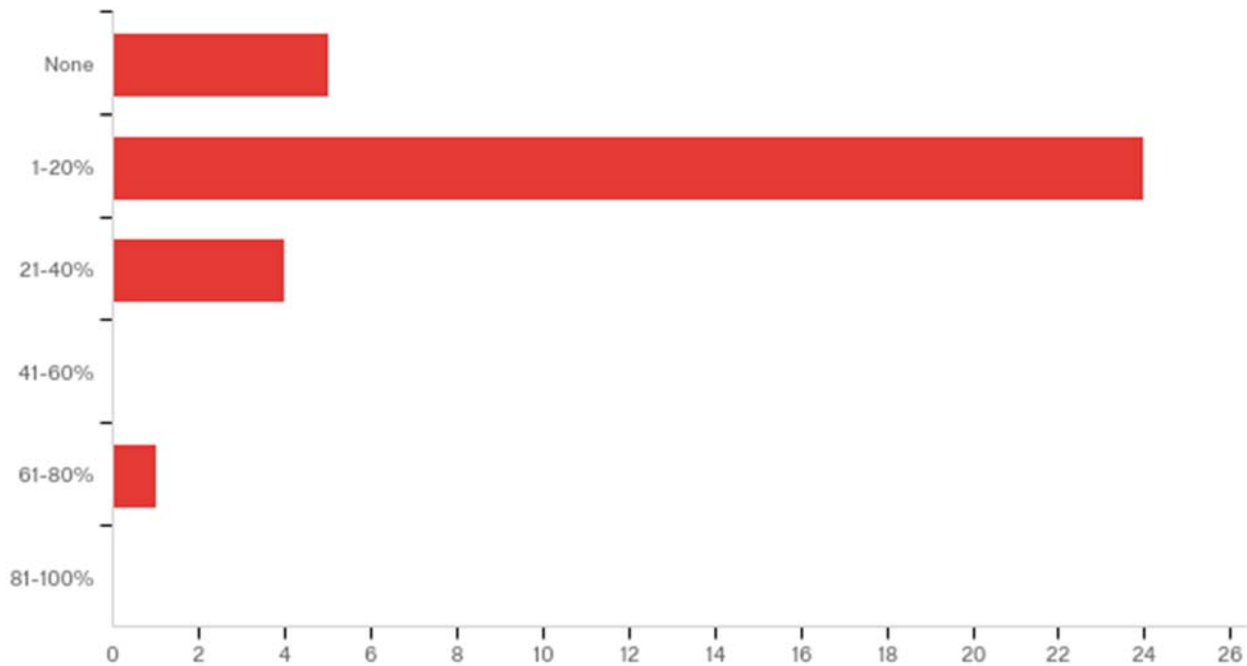
Q11 - Instruction and Faculty in Required Courses Percentage of instructors in your required courses you rate as excellent:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Instruction and Faculty in Required Courses Percentage of instructors in your required courses you rate as excellent:	2.00	6.00	4.32	1.23	1.51	34

#	Answer	%	Count
1	None	0.00%	0
2	1-20%	11.76%	4
3	21-40%	14.71%	5
4	41-60%	17.65%	6
5	61-80%	41.18%	14
6	81-100%	14.71%	5
	Total	100%	34

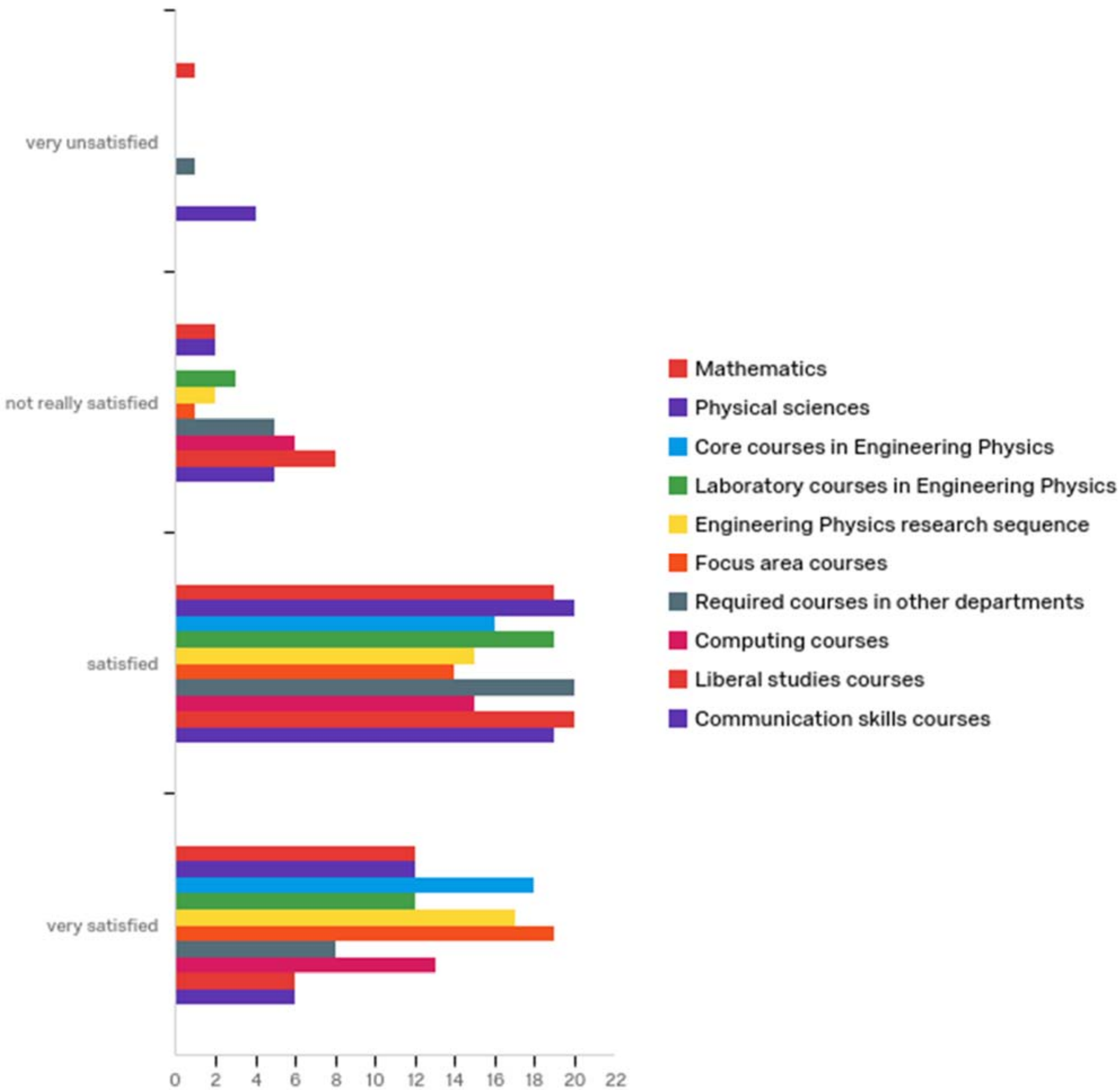
Q12 - Percentage of instructors in your required courses you rate as poor:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Percentage of instructors in your required courses you rate as poor:	1.00	5.00	2.06	0.73	0.53	34

#	Answer	%	Count
1	None	14.71%	5
2	1-20%	70.59%	24
3	21-40%	11.76%	4
4	41-60%	0.00%	0
5	61-80%	2.94%	1
6	81-100%	0.00%	0
	Total	100%	34

Q13 - Satisfaction with the following sections of the curriculum:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Mathematics	1.00	4.00	3.24	0.69	0.47	34
2	Physical sciences	2.00	4.00	3.29	0.57	0.33	34
3	Core courses in Engineering Physics	3.00	4.00	3.53	0.50	0.25	34
4	Laboratory courses in Engineering Physics	2.00	4.00	3.26	0.61	0.37	34
5	Engineering Physics research sequence	2.00	4.00	3.44	0.60	0.36	34

6	Focus area courses	2.00	4.00	3.53	0.55	0.31	34
7	Required courses in other departments	1.00	4.00	3.03	0.71	0.50	34
8	Computing courses	2.00	4.00	3.21	0.72	0.52	34
9	Liberal studies courses	2.00	4.00	2.94	0.64	0.41	34
10	Communication skills courses	1.00	4.00	2.79	0.87	0.75	34

#	Question	very unsatisfied		not really satisfied		satisfied		very satisfied		Total
1	Mathematics	2.94%	1	5.88%	2	55.88%	19	35.29%	12	34
2	Physical sciences	0.00%	0	5.88%	2	58.82%	20	35.29%	12	34
3	Core courses in Engineering Physics	0.00%	0	0.00%	0	47.06%	16	52.94%	18	34
4	Laboratory courses in Engineering Physics	0.00%	0	8.82%	3	55.88%	19	35.29%	12	34
5	Engineering Physics research sequence	0.00%	0	5.88%	2	44.12%	15	50.00%	17	34
6	Focus area courses	0.00%	0	2.94%	1	41.18%	14	55.88%	19	34
7	Required courses in other departments	2.94%	1	14.71%	5	58.82%	20	23.53%	8	34
8	Computing courses	0.00%	0	17.65%	6	44.12%	15	38.24%	13	34
9	Liberal studies courses	0.00%	0	23.53%	8	58.82%	20	17.65%	6	34
10	Communication skills courses	11.76%	4	14.71%	5	55.88%	19	17.65%	6	34

Q14 - Which courses were the most satisfying learning experiences?

Which courses were the most satisfying learning experiences?
Computing courses and xrd lab
I think I got the most out of my physics courses as they taught me a lot of skills also used in math and engineering
My Plasma courses, fluid dynamics
Fracture mechanics, math and physics courses, special topics (micromechanics)
The required physics classes were very good. In addition, the freedom to pick electives from a fairly wide range of subjects resulted in some interesting classes.
Fracture mechanics, Technical communication
I enjoyed some of the higher level engineering class; heat transfer and signals and systems were two classes I really enjoyed. For me, the engineering classes were more satisfying than the pure physics courses.
I found Advanced Mechanics of Materials very helpful in understanding tensors and materials in general. I also found the research courses effective in preparing me for my Masters research.
My focus area courses, plasma courses to be specific
Advanced mechanics of materials, quantum mechanics, the upper level physics optics course/lab.
The various special topics courses including Intro to nanotechnology, micro- and nano- fluidics, biofluidics, and flexible electronics.
Adv. mechanics of mtrls. - Prof. Drugan; Intro to XRD - Prof. Eom; Struct. and property relationships in solids - Prof. Babcock
Focus area courses
Philosophy, mathematics, and EP 471
Research experience was critical
Courses involving lab work were the most satisfying and applicable to my current career.
cfd, seminars, numerical methods, scientific computing
Specific classes in my focus area.
My upper level physics courses and subject area courses (plasma) were most satisfying, along with my upper level lab
Computing focused courses, such as CS 513 and EP 476
Electricity and magnetism, Plasma laboratory, nuclear physics
In hindsight I wish I would have done the scientific computing focus instead of plasma because I found all the computer science classes to be the most fun and engaging. My math courses were also enjoyable for the most part.
mathematics, mechanics
Research sequence (which was very important skill for me to build) and computing courses
Mathematics

I've not taken many courses yet.

EP Research sequence and ME 361 363

The computer science course

Q15 - Which courses did you find least satisfying? Why?

Which courses did you find least satisfying? Why?
Quantum and solid state physics. Professors
I didn't get much out of taking math courses, the department at madison seems to be very theoretical and it's difficult to apply anything you learn in their classes.
electric circuits , not well taught
Heat transfer, thermodynamics
I found that mechanics of materials lab was a bit of a waste of time. Lab courses are good for demonstrating abstract concepts or learning speicific skills. I felt like I accomplished neither in the required mechanics of materials lab.
Introduction to Thermodynamics - didn't focus enough on a conceptual foundation of the field
I thought the communications classes were poor. Particularly, the EPD speech class had very little utility and simply prevented me from taking a different class I would have benefited more from. Nothing is taught in the EPD speech class that isn't taught in EPD 397.
Linear Algebra was horribly taught the summer I took it. It's an important course and the instructor was absolutely awful.
ECE 376, MSE 350, bad professors
EP/EMA 615, the course has a great premise, and the writing portion is great, but some more rigorous lectures on mechanics as applied to micro/nano scale systems would've been nice.
I found the instruction for several of the physics courses underwhelming, especially Quantum Mechanics.
Physical sciences courses - Instruction was disappointing for a few courses.
Drafting: the instructor was crass, conceited, and haughty. The required communication course also; the entire course was group work.
Mechanical engineering courses were over-crowded with occasionally disinterested faculty.
Comm arts- the teacher was a joke, the class was a waste of time and effort, it dragged down my GPA
Some of the math and physics courses were not instructed the best in that the professor could have done better to engage the students to ensure that the material was successfully transferred into the student's brains.
graphical drawing, folklore
Laboratory courses in my focus area (there weren't that many offered during my time there)
I found many of the lower-level engineering classes wildly unsatisfying - it felt like I was only being told half the story and the goal was only to complete simplistic problem sets, rather than the development of meaningful understanding. I did not use much, if any, of the information in these courses again. The math courses were also unsatisfying because it was clear that the professors could not care less about the courses (calculus, ODEs, linear algebra).
Lower level laboratory courses in engineering and chemistry
Thermodynamics (poorly taught), Plasma heating and confinement (poorly taught), Plasma kinetic theory (focused on computational methods rather than theory),
The EPD sequence is rendered somewhat irrelavant due to the research sequence. Additionally, I didn't learn anything in MSE 350 or circuits but I know those are required classes for all engineering degrees so that may just be

a college problem in general. Finally, I wish we took a class that actually taught us solidworks or a similar program, instead of the one graphics class we are required to take where we just learn to draw straight lines for a whole semester.

physics (esp. quantum) suffered from poor instructors

Liberal studies. They didn't feel as applicable as other courses.

I've not taken many courses yet.

none

the graphics course-i forget the exact title. We never used computer graphics which seemed like the interesting and relevant part. We also had an unit on screws and screw-holes. I think that was one of the most boring experiences in undergrad. It helped convince me that I wanted to do physics and not engineering. I guess in that sense it was useful, but it was not satisfying.

Q16 - What are the strong points of the Engineering Physics curriculum?

What are the strong points of the Engineering Physics curriculum?
Professors in EP courses were excellent
The flexibility to focus on what you need.
research experience and thesis
Research focus, curriculum flexibility
The freedom to select a wide range of electives and add electives if need be.
Breadth of subjects touched
The research sequence is a good preparation for graduate school, and the advanced coursework is also good.
Flexibility of curriculm, great opportunity to experience research, highly-motivated peers
Allows you to take courses that I wouldn't be able to take with other majors
The plethora of elective courses one has to choose from, coupled with the 4 semester research sequence.
Flexibility of course selection allows for a great deal of graduate level courses.
Focus area courses, research sequence
Support and motivation for undergraduate research. Choice in focus. (Mostly) rigorous curriculum.
Research and lab components are very useful. I would recommend increasing.
Research and publishing experience, strong emphasis on math and physics, close work with a PI
It is highly applicable to various engineering endeavors.
scientific computing, working with a researcher and writing thesis
Preparation for Graduate School
The emphasis on research and the upper level labs are very helpful
Taking focus area courses and completing a thesis on original research
Starting graduate course work early, RESEARCH! And not just a few random semesters, really digging into a research topic for 2 years was great preparation for grad school.
It was very good about pushing me to go out and engage with professors about thier research and conduct research of my own.
establishes very good foundation of fundamental mathematics, physics, chemistry, and engineering for future studies
The freedom to choose courses and the inclusion of a research sequence
The research sequence, hands down.
comprehensive course work including physics and engineering

I think that it was a helpful introduction into what research is like and how it is conducted. Without a class like that you could go through college and get a degree physics or engineering without ever having an idea of research is like, which is absurd in a way.

Q17 - What changes in the Engineering Physics curriculum would you recommend? Why?

What changes in the Engineering Physics curriculum would you recommend? Why?
Have a technical writing course for EP/research
I think the flexibility makes the EP curriculum fine as it is.
more nuclear engineering classes
More emphasis on coops/outside research experiences would help prepare for grads school.
For the nanoenginering elective, I think an electronic properties of materials class should be required, instead of soild state physics. Removing the mechanics of materials lab requirement would be good as well. I think computation is going to become more important for science in the future, so I would advocate for any courses which blend computational aspects into their curriculum. However, I think some of the fundamental computer science classes (such as one I took on numerical methods; the advanced matlab course was not offered that semester) are less helpful than applied courses in computation. However, for the scientific computation focus area, this might not be the case.
Since the major is in some sense geared towards preparing students for graduate school, provide a short course in the last year around applying for graduate school and scholarships. The EP department can then collect information on successful applicants and the students can share with each other strategies for improving their chances at being accepted to various programs.
The focus area electives (at least for nano) or very lacking. I was able to take very few courses I would consider to be nanotechnology related; I think the fact that the students in EP are strong academically, they should have more freedom to choose electives they're interested in.
When I graduated, the EP curriculum wasn't accredited yet, so there could have been issues if I'd applied to graduate work outside of the UW. This may have been resolved already, but if not, definitely make sure the EP curriculum gets accredited.
I would have the thesis regulated more by the research advisor rather than the professor, and I would add more traditional engineering courses
Maybe a requirement for one more advanced coding based CS class (more advanced coding techniques, practice with more advanced langauges for future research)
None that I can think of
Add a statistics course - In grad school and early in my career I've felt that I would benefit from a stronger background in statistics -- principles of data analysis, correlation, modeling, etc.
It would be great if the program can be ABET accredited as an engineering program somehow.
I would emphasize the importance of maintaining a top GPA. I focused too much on my research and my GPA fell (sound advice for graduate students but devastating for undergraduates). This was a huge problem when applying for grad school and in finding funding. Many faculty feel unable to assess the quality of undergraduate research and rely simply on GPA instead.
Today's engineering workplace requires a lot of "big data" analysis, which is not often supported by the curriculum of universities.
Maybe lower GPA requirements to allow more students. I had to fight to get into the program.
More experimental work. I feel that the biggest weakness was that it was too theoretical, and conducting field experiments now would benefit from more experimental work during the Engineering Physics education.
none. it allows you to take out whatever you want to put in

Increase the number of lab courses for the nano focus area.

Create more flexibility in the lower-level engineering courses - I would have gotten far more out of a few additional electrical engineering classes than I did from Mechanics of Materials (as an example). This may be due to my specific focus area (plasma), which is why I suggest it as a flexibility rather than an outright cut.

Taking the technical writing course and writing the thesis is somewhat redundant. That material should be covered in the research sequence.

None.

I just really wish the graphics class we took actually taught us useful information.

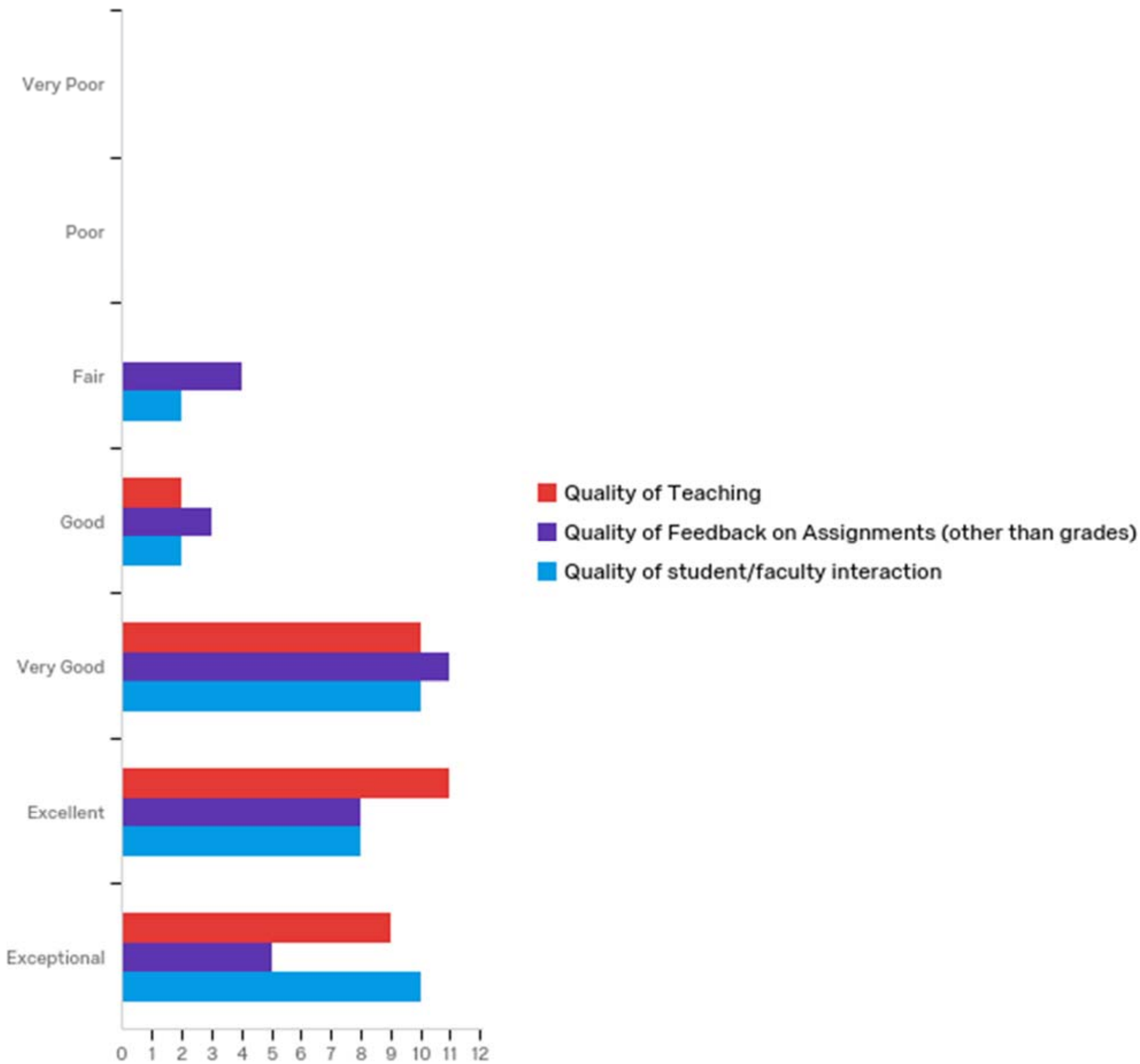
too long ago to remember or make useful suggestions

Having more students in the program would be tremendously helpful. But that's difficult to plan. This would allow younger students a better advice pool.

student can have more courses for their focus area.

I remember some of the discussions that we had as a group didn't seem particularly helpful or interesting (although some definitely were). I suppose that the curriculum for the discussion class that we had could use some editing. Although I don't really have any suggestions for good things to discuss that we didn't discuss, so maybe that isn't as helpful.

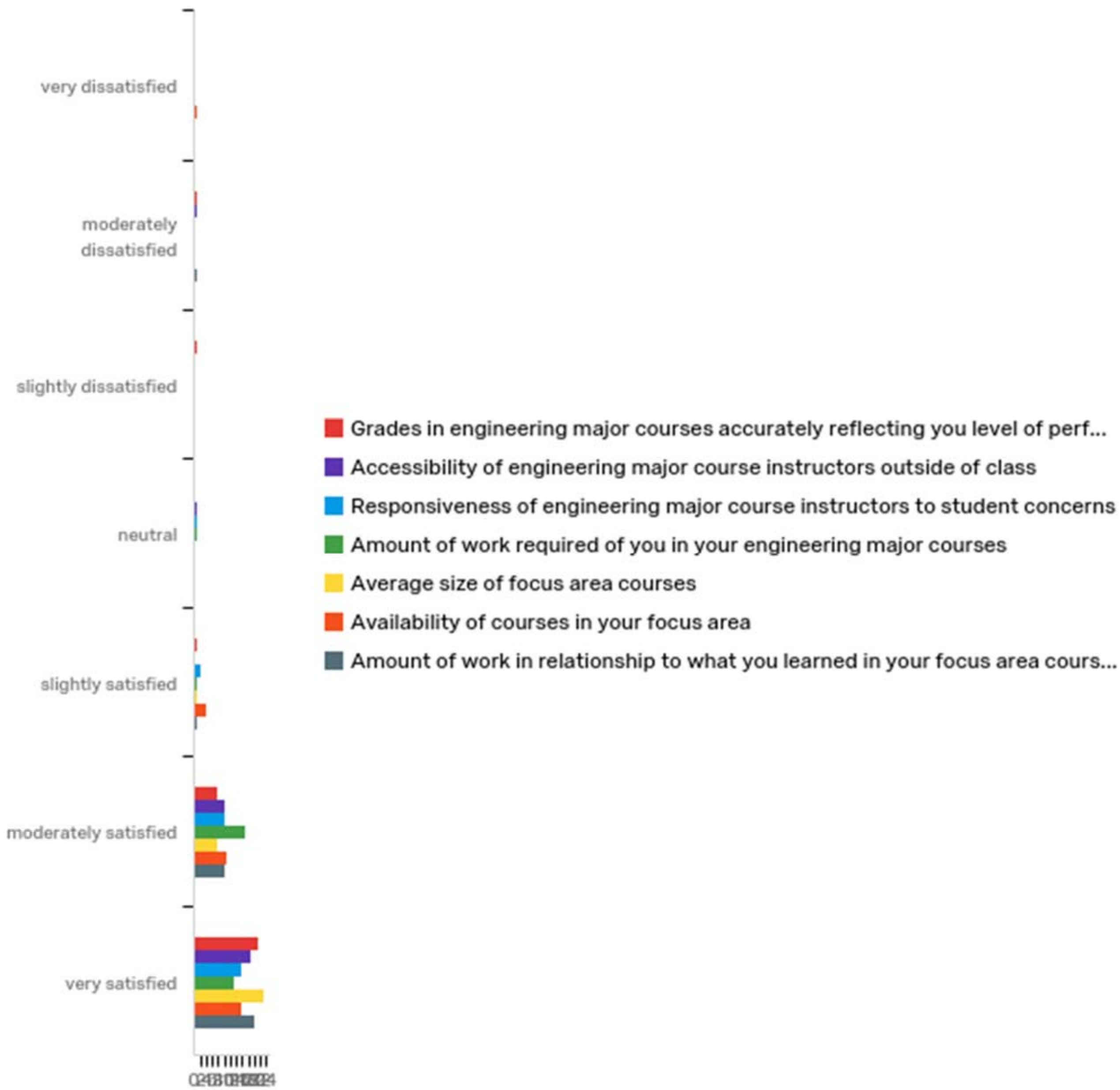
Q18 - Instruction and Faculty in Engineering Physics   Satisfaction with:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Quality of Teaching	4.00	7.00	5.84	0.91	0.82	32
2	Quality of Feedback on Assignments (other than grades)	3.00	7.00	5.23	1.21	1.47	31
3	Quality of student/faculty interaction	3.00	7.00	5.69	1.16	1.34	32

#	Question	Very Poor		Poor		Fair		Good		Very Good		Excellent		Exceptional		Total
1	Quality of Teaching	0.00%	0	0.00%	0	0.00%	0	6.25%	2	31.25%	10	34.38%	11	28.13%	9	32
2	Quality of Feedback on Assignments (other than grades)	0.00%	0	0.00%	0	12.90%	4	9.68%	3	35.48%	11	25.81%	8	16.13%	5	31
3	Quality of student/faculty interaction	0.00%	0	0.00%	0	6.25%	2	6.25%	2	31.25%	10	25.00%	8	31.25%	10	32

Q19 - Satisfaction with:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Grades in engineering major courses accurately reflecting you level of performance	2.00	7.00	6.41	1.14	1.30	32
2	Accessibility of engineering major course instructors outside of class	2.00	7.00	6.42	1.04	1.08	31
3	Responsiveness of engineering major course instructors to student concerns	4.00	7.00	6.41	0.77	0.59	29
4	Amount of work required of you in your engineering major courses	4.00	7.00	6.31	0.68	0.46	32

5	Average size of focus area courses	5.00	7.00	6.69	0.53	0.28	32
6	Availability of courses in your focus area	1.00	7.00	6.22	1.17	1.36	32
7	Amount of work in relationship to what you learned in your focus area courses	2.00	7.00	6.47	0.97	0.94	32

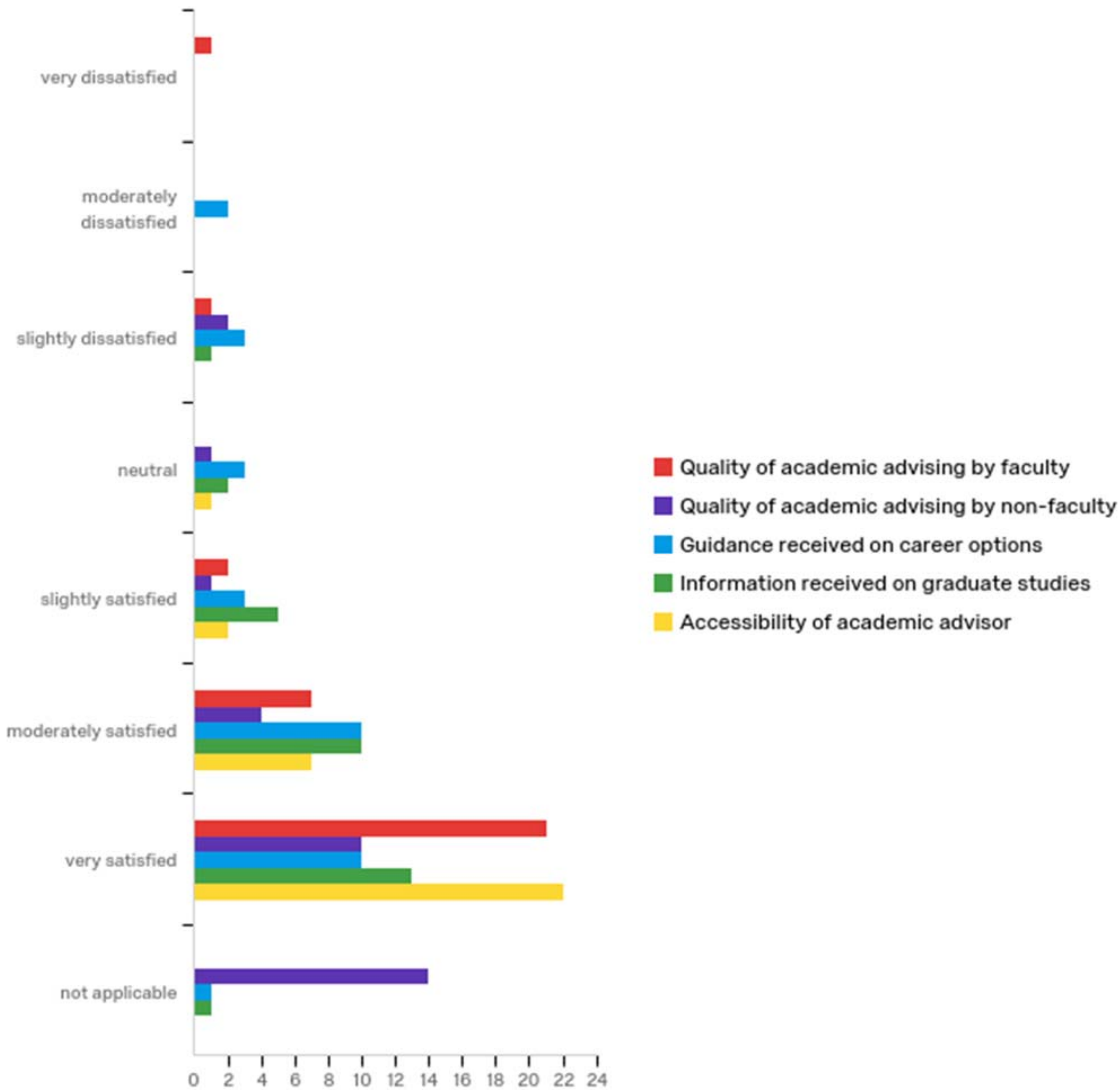
#	Question	very dissatisfied		moderately dissatisfied		slightly dissatisfied		neutral		slightly satisfied		moderately satisfied		very satisfied		Total
1	Grades in engineering major courses accurately reflecting you level of performance	0.00%	0	3.13%	1	3.13%	1	0.00%	0	3.13%	1	25.00%	8	65.63%	21	32
2	Accessibility of engineering major course instructors outside of class	0.00%	0	3.23%	1	0.00%	0	3.23%	1	0.00%	0	32.26%	10	61.29%	19	31
3	Responsiveness of engineering major course instructors to student concerns	0.00%	0	0.00%	0	0.00%	0	3.45%	1	6.90%	2	34.48%	10	55.17%	16	29
4	Amount of work required of you in your engineering major courses	0.00%	0	0.00%	0	0.00%	0	3.13%	1	3.13%	1	53.13%	17	40.63%	13	32
5	Average size of focus area courses	0.00%	0	0.00%	0	0.00%	0	0.00%	0	3.13%	1	25.00%	8	71.88%	23	32

6	Availability of courses in your focus area	3.13%	1	0.00%	0	0.00%	0	0.00 %	0	12.50 %	4	34.38%	11	50.00 %	16	32
7	Amount of work in relationship to what you learned in your focus area courses	0.00%	0	3.13%	1	0.00%	0	0.00 %	0	3.13%	1	31.25%	10	62.50 %	20	32

Q20 - If you were dissatisfied with the amount of work in your courses, was there too much work or not enough? Please explain.

If you were dissatisfied with the amount of work in your courses, was there too much work or not enough? Please explain.
Some of my favorite courses had a lot of work, and others were good at rewarding 'smart work'. I think students should be encouraged to form study groups to support each other.
The EP major was very demanding in terms of time per credit hour. That said, I feel I learned a great deal more than students in less-demanding curricula, so I felt it was well worth it and in keeping with the elevated expectations for those seeking an EP major.
it's engineering. there should be the amount of work there is
there was one really hard semester which had many classes which required lots of HW hours. If spread out between semester it wouldn't have been a problem.

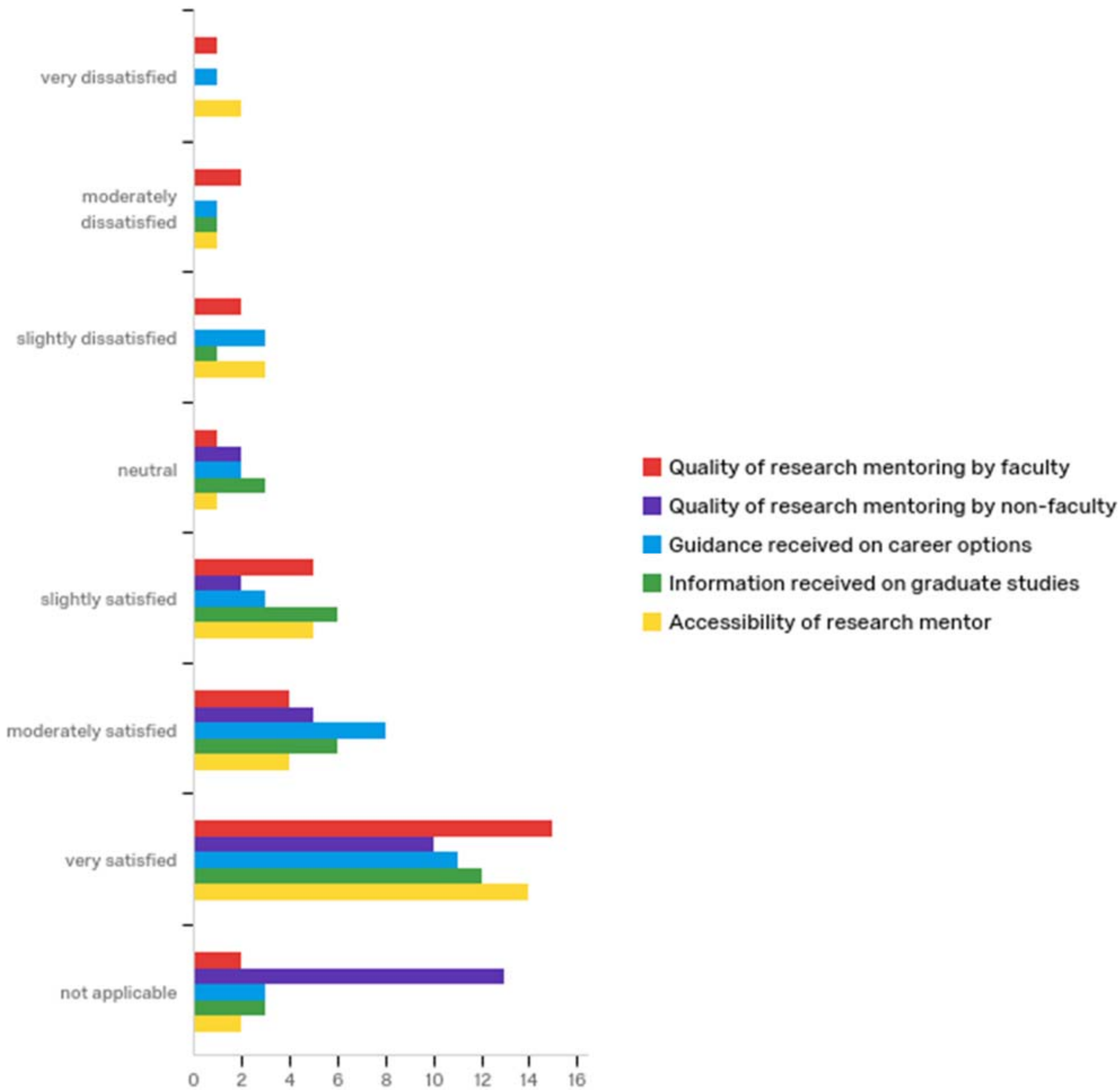
Q22 - Academic Advising Satisfaction with:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Quality of academic advising by faculty	1.00	7.00	6.34	1.29	1.66	32
2	Quality of academic advising by non-faculty	3.00	8.00	6.91	1.40	1.96	32
3	Guidance received on career options	2.00	8.00	5.56	1.60	2.56	32
4	Information received on graduate studies	3.00	8.00	6.09	1.10	1.21	32
5	Accessibility of academic advisor	4.00	7.00	6.56	0.75	0.56	32

#	Question	very dissatisfied		moderately dissatisfied		slightly dissatisfied		neutral		slightly satisfied		moderately satisfied		very satisfied		not applicable		Total
1	Quality of academic advising by faculty	3.13%	1	0.00%	0	3.13%	1	0.00%	0	6.25%	2	21.88%	7	65.63%	21	0.00%	0	32
2	Quality of academic advising by non-faculty	0.00%	0	0.00%	0	6.25%	2	3.13%	1	3.13%	1	12.50%	4	31.25%	10	43.75%	14	32
3	Guidance received on career options	0.00%	0	6.25%	2	9.38%	3	9.38%	3	9.38%	3	31.25%	10	31.25%	10	3.13%	1	32
4	Information received on graduate studies	0.00%	0	0.00%	0	3.13%	1	6.25%	2	15.63%	5	31.25%	10	40.63%	13	3.13%	1	32
5	Accessibility of academic advisor	0.00%	0	0.00%	0	0.00%	0	3.13%	1	6.25%	2	21.88%	7	68.75%	22	0.00%	0	32

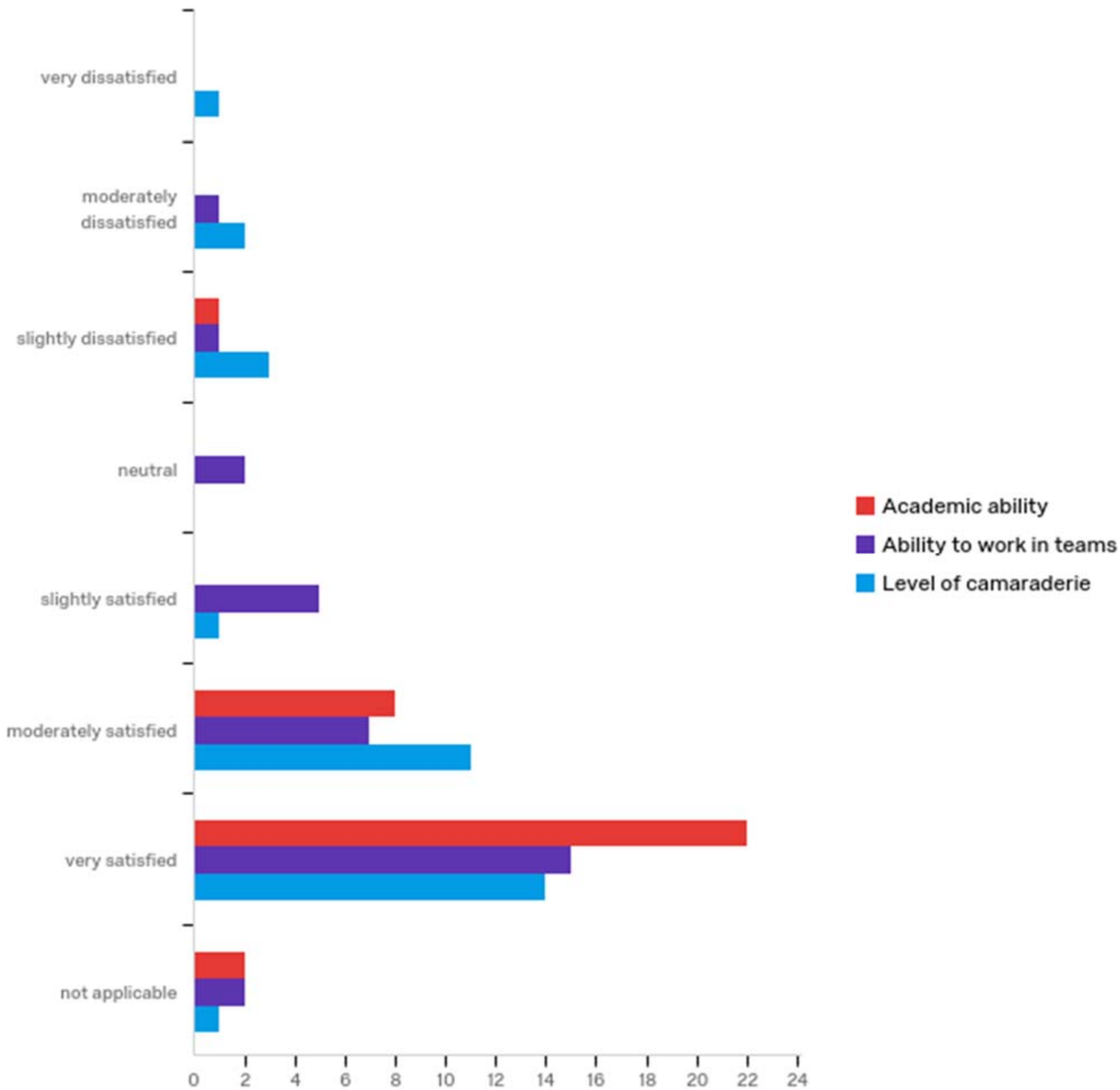
Q23 - Research Mentoring Satisfaction with:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Quality of research mentoring by faculty	1.00	8.00	5.78	1.82	3.30	32
2	Quality of research mentoring by non-faculty	4.00	8.00	6.94	1.17	1.37	32
3	Guidance received on career options	1.00	8.00	5.75	1.77	3.13	32
4	Information received on graduate studies	2.00	8.00	5.97	1.45	2.09	32
5	Accessibility of research mentor	1.00	8.00	5.63	1.93	3.73	32

#	Question	very dissatisfied		moderately dissatisfied		slightly dissatisfied		neutral		slightly satisfied		moderately satisfied		very satisfied		not applicable		Total
1	Quality of research mentoring by faculty	3.13%	1	6.25%	2	6.25%	2	3.13%	1	15.63%	5	12.50%	4	46.88%	15	6.25%	2	32
2	Quality of research mentoring by non-faculty	0.00%	0	0.00%	0	0.00%	0	6.25%	2	6.25%	2	15.63%	5	31.25%	10	40.63%	13	32
3	Guidance received on career options	3.13%	1	3.13%	1	9.38%	3	6.25%	2	9.38%	3	25.00%	8	34.38%	11	9.38%	3	32
4	Information received on graduate studies	0.00%	0	3.13%	1	3.13%	1	9.38%	3	18.75%	6	18.75%	6	37.50%	12	9.38%	3	32
5	Accessibility of research mentor	6.25%	2	3.13%	1	9.38%	3	3.13%	1	15.63%	5	12.50%	4	43.75%	14	6.25%	2	32

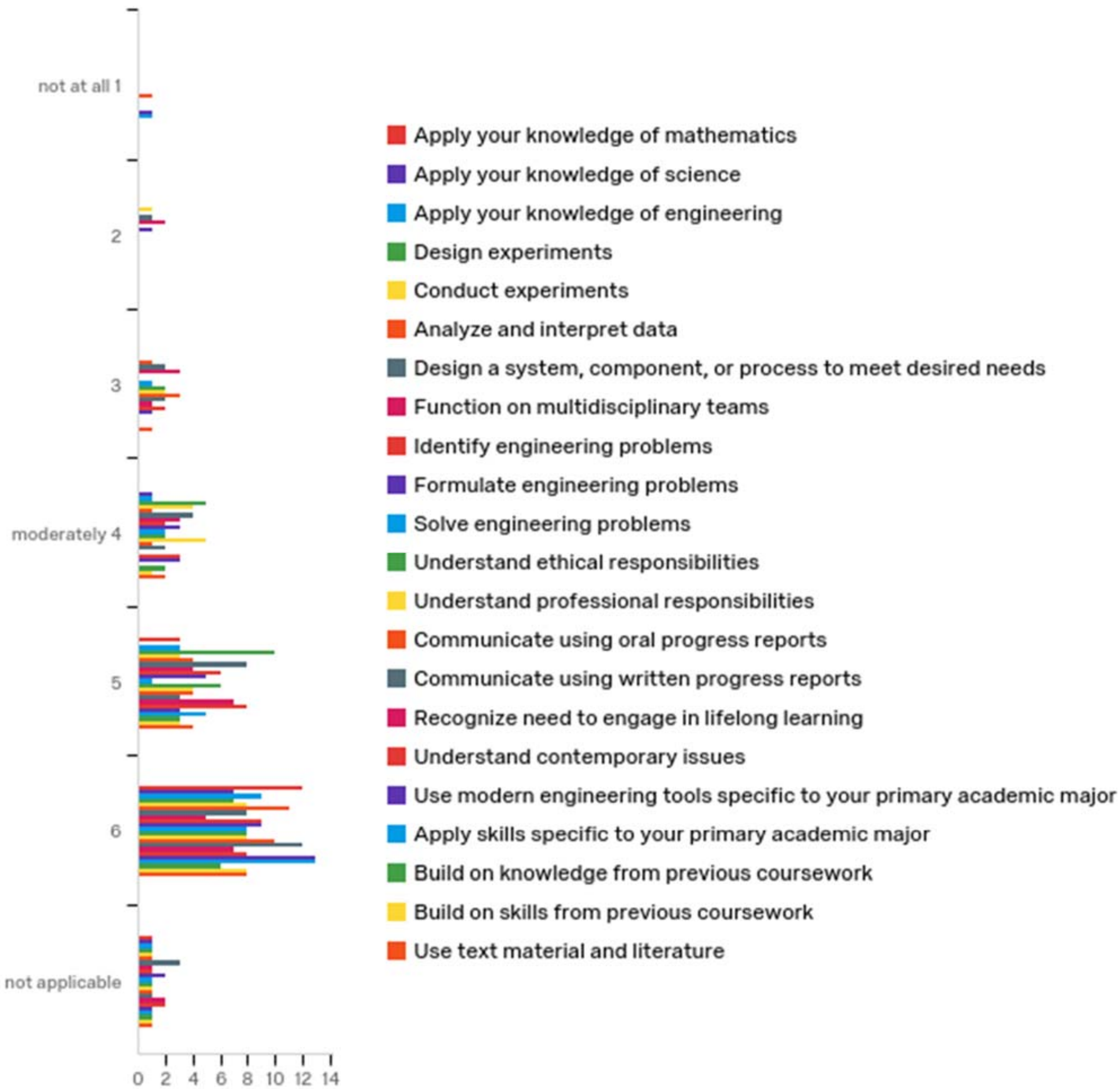
Q24 - Classmates   Satisfaction with characteristics of your fellow students:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Academic ability	3.00	8.00	6.70	0.83	0.70	33
2	Ability to work in teams	2.00	8.00	6.09	1.36	1.84	33
3	Level of camaraderie	1.00	8.00	5.79	1.75	3.08	33

#	Question	very dissatisfied		moderately dissatisfied		slightly dissatisfied		neutral		slightly satisfied		moderately satisfied		very satisfied		not applicable		Total
1	Academic ability	0.00%	0	0.00%	0	3.03%	1	0.00%	0	0.00%	0	24.24%	8	66.67%	22	6.06%	2	33
2	Ability to work in teams	0.00%	0	3.03%	1	3.03%	1	6.06%	2	15.15%	5	21.21%	7	45.45%	15	6.06%	2	33
3	Level of camaraderie	3.03%	1	6.06%	2	9.09%	3	0.00%	0	3.03%	1	33.33%	11	42.42%	14	3.03%	1	33

Q21 - Program Outcomes and Assessment To what degree did your engineering education enhance your ability to:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Apply your knowledge of mathematics	5.00	8.00	5.94	0.66	0.43	16
2	Apply your knowledge of science	4.00	8.00	6.00	0.94	0.89	9
3	Apply your knowledge of engineering	4.00	8.00	5.79	0.86	0.74	14
4	Design experiments	4.00	8.00	5.22	0.93	0.87	23

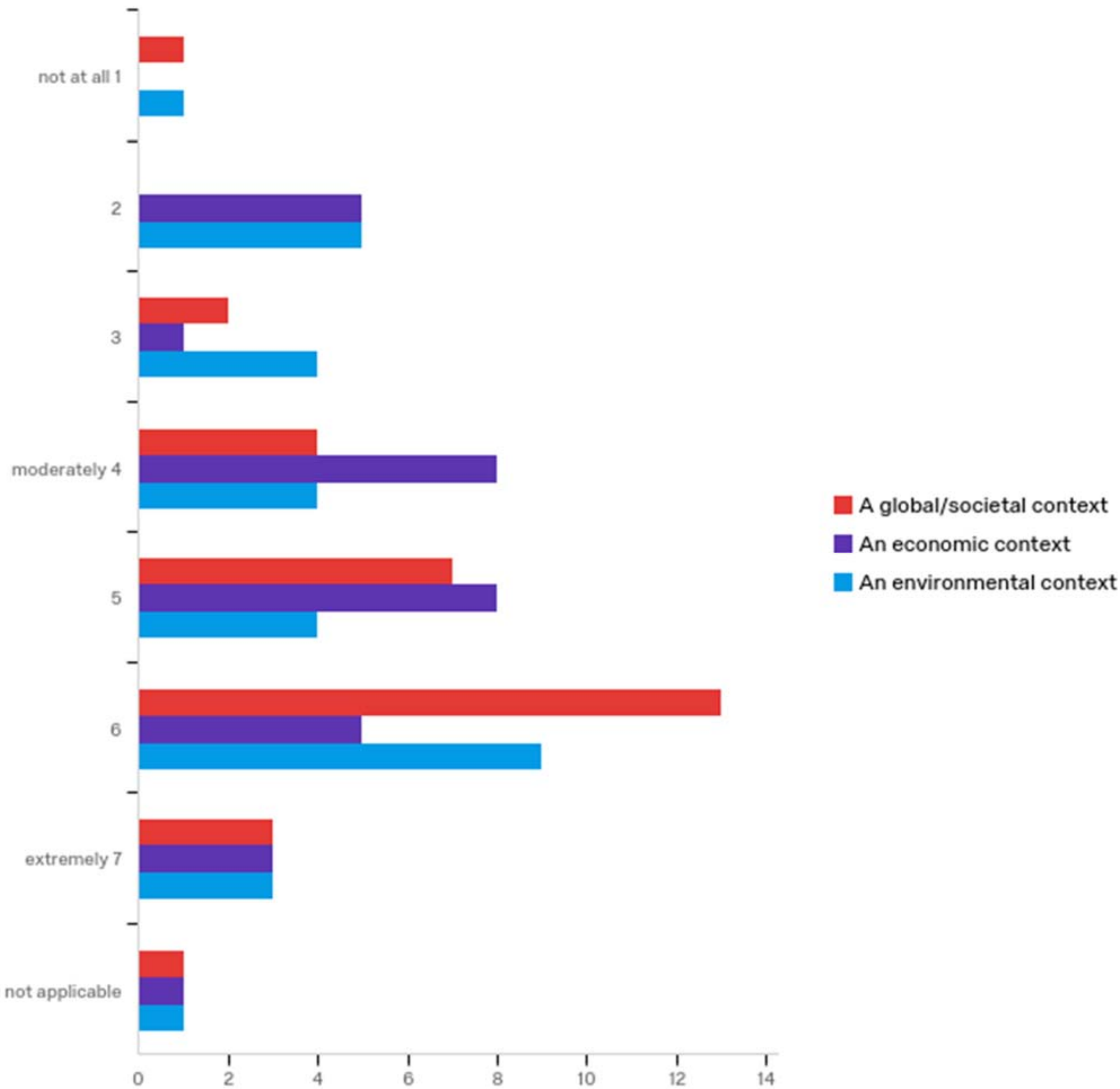
5	Conduct experiments	2.00	8.00	5.24	1.31	1.71	17
6	Analyze and interpret data	3.00	8.00	5.61	1.01	1.02	18
7	Design a system, component, or process to meet desired needs	2.00	8.00	5.23	1.45	2.10	26
8	Function on multidisciplinary teams	2.00	8.00	4.61	1.57	2.46	18
9	Identify engineering problems	4.00	8.00	5.56	0.90	0.80	18
10	Formulate engineering problems	2.00	8.00	5.45	1.32	1.75	20
11	Solve engineering problems	3.00	8.00	5.54	1.22	1.48	13
12	Understand ethical responsibilities	3.00	8.00	5.26	1.16	1.35	19
13	Understand professional responsibilities	3.00	8.00	5.10	1.22	1.49	20
14	Communicate using oral progress reports	1.00	8.00	5.10	1.55	2.39	20
15	Communicate using written progress reports	3.00	8.00	5.45	1.16	1.35	20
16	Recognize need to engage in lifelong learning	3.00	8.00	5.65	1.13	1.29	17
17	Understand contemporary issues	3.00	8.00	5.30	1.23	1.52	23
18	Use modern engineering tools specific to your primary academic major	1.00	8.00	5.32	1.39	1.94	22
19	Apply skills specific to your primary academic major	1.00	8.00	5.60	1.24	1.54	20
20	Build on knowledge from previous coursework	4.00	8.00	5.58	1.04	1.08	12
21	Build on skills from previous coursework	4.00	8.00	5.77	0.89	0.79	13
22	Use text material and literature	3.00	8.00	5.44	1.12	1.25	16

#	Question	not at all 1		2		3		moderately 4		5		6		not applicable		Total
1	Apply your knowledge of mathematics	0.00%	0	0.00%	0	0.00%	0	0.00%	0	18.75%	3	75.00%	12	6.25%	1	16
2	Apply your knowledge of science	0.00%	0	0.00%	0	0.00%	0	11.11%	1	0.00%	0	77.78%	7	11.11%	1	9
3	Apply your knowledge of engineering	0.00%	0	0.00%	0	0.00%	0	7.14%	1	21.43%	3	64.29%	9	7.14%	1	14
4	Design experiments	0.00%	0	0.00%	0	0.00%	0	21.74%	5	43.48%	10	30.43%	7	4.35%	1	23

5	Conduct experiments	0.00%	0	5.88%	1	0.00%	0	23.53%	4	17.65%	3	47.06%	8	5.88%	1	17
6	Analyze and interpret data	0.00%	0	0.00%	0	5.56%	1	5.56%	1	22.22%	4	61.11%	11	5.56%	1	18
7	Design a system, component, or process to meet desired needs	0.00%	0	3.85%	1	7.69%	2	15.38%	4	30.77%	8	30.77%	8	11.54%	3	26
8	Function on multidisciplinary teams	0.00%	0	11.11%	2	16.67%	3	16.67%	3	22.22%	4	27.78%	5	5.56%	1	18
9	Identify engineering problems	0.00%	0	0.00%	0	0.00%	0	11.11%	2	33.33%	6	50.00%	9	5.56%	1	18
10	Formulate engineering problems	0.00%	0	5.00%	1	0.00%	0	15.00%	3	25.00%	5	45.00%	9	10.00%	2	20
11	Solve engineering problems	0.00%	0	0.00%	0	7.69%	1	15.38%	2	7.69%	1	61.54%	8	7.69%	1	13
12	Understand ethical responsibilities	0.00%	0	0.00%	0	10.53%	2	10.53%	2	31.58%	6	42.11%	8	5.26%	1	19
13	Understand professional responsibilities	0.00%	0	0.00%	0	10.00%	2	25.00%	5	20.00%	4	40.00%	8	5.00%	1	20
14	Communicate using oral progress reports	5.00%	1	0.00%	0	15.00%	3	5.00%	1	20.00%	4	50.00%	10	5.00%	1	20
15	Communicate using written progress reports	0.00%	0	0.00%	0	10.00%	2	10.00%	2	15.00%	3	60.00%	12	5.00%	1	20
16	Recognize need to engage in lifelong learning	0.00%	0	0.00%	0	5.88%	1	0.00%	0	41.18%	7	41.18%	7	11.76%	2	17
17	Understand contemporary issues	0.00%	0	0.00%	0	8.70%	2	13.04%	3	34.78%	8	34.78%	8	8.70%	2	23
18	Use modern engineering tools specific	4.55%	1	0.00%	0	4.55%	1	13.64%	3	13.64%	3	59.09%	13	4.55%	1	22

	to your primary academic major														
19	Apply skills specific to your primary academic major	5.00%	1	0.00%	0	0.00%	0	0.00%	0	25.00%	5	65.00%	13	5.00%	1	20
20	Build on knowledge from previous coursework	0.00%	0	0.00%	0	0.00%	0	16.67%	2	25.00%	3	50.00%	6	8.33%	1	12
21	Build on skills from previous coursework	0.00%	0	0.00%	0	0.00%	0	7.69%	1	23.08%	3	61.54%	8	7.69%	1	13
22	Use text material and literature	0.00%	0	0.00%	0	6.25%	1	12.50%	2	25.00%	4	50.00%	8	6.25%	1	16

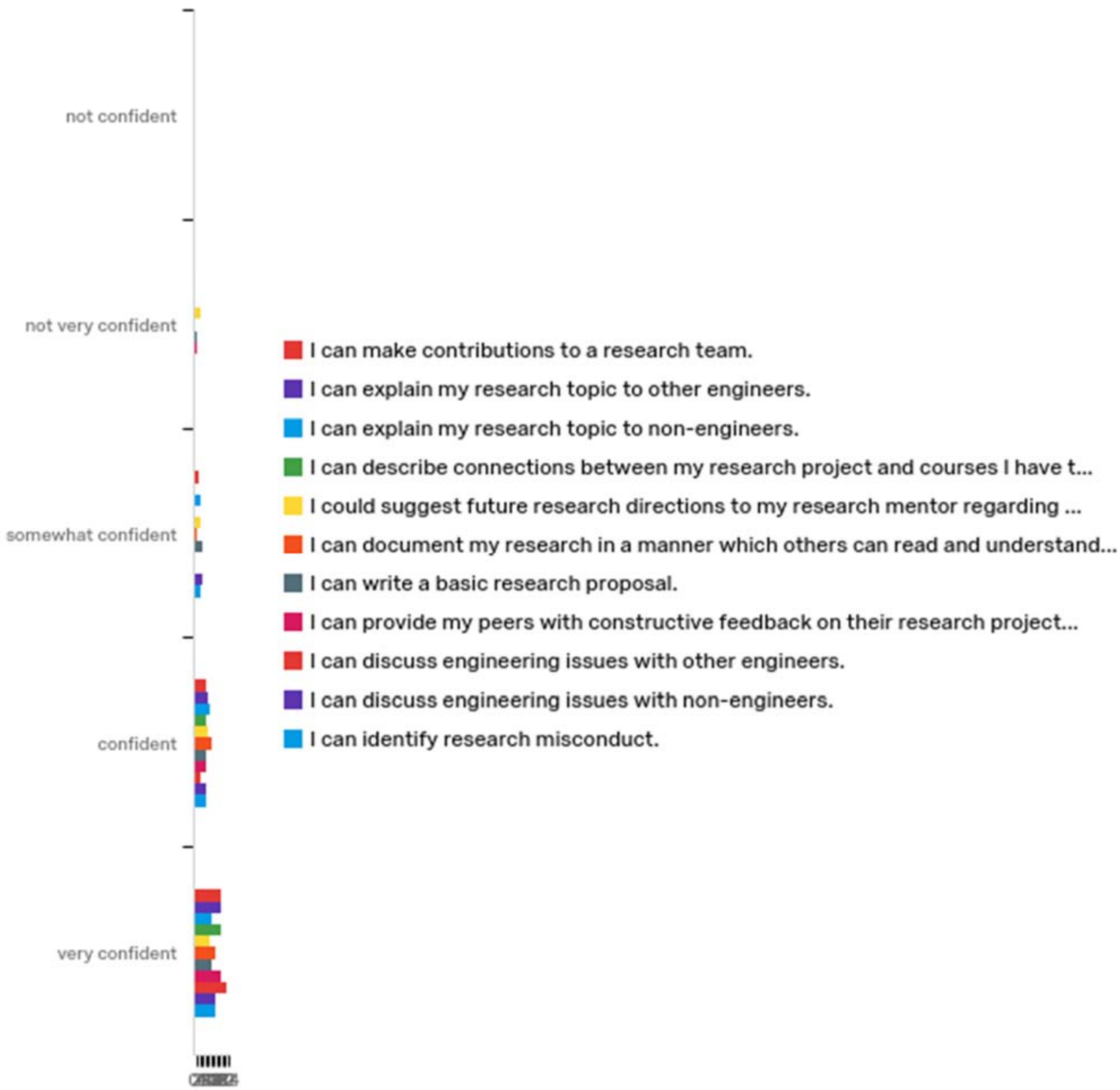
Q25 - To what degree did your engineering education enhance your ability to understand the impact of engineering solutions in:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	A global/societal context	1.00	8.00	5.32	1.38	1.90	31
2	An economic context	2.00	8.00	4.65	1.60	2.55	31
3	An environmental context	1.00	8.00	4.58	1.85	3.40	31

#	Question	not at all 1		2		3		moderately 4		5		6		extremely 7		not applicable		Total
1	A global/societal context	3.23%	1	0.00%	0	6.45%	2	12.90%	4	22.58%	7	41.94%	13	9.68%	3	3.23%	1	31
2	An economic context	0.00%	0	16.13%	5	3.23%	1	25.81%	8	25.81%	8	16.13%	5	9.68%	3	3.23%	1	31
3	An environmental context	3.23%	1	16.13%	5	12.90%	4	12.90%	4	12.90%	4	29.03%	9	9.68%	3	3.23%	1	31

Q26 - Conduct of Research   Rate your confidence in the following areas:



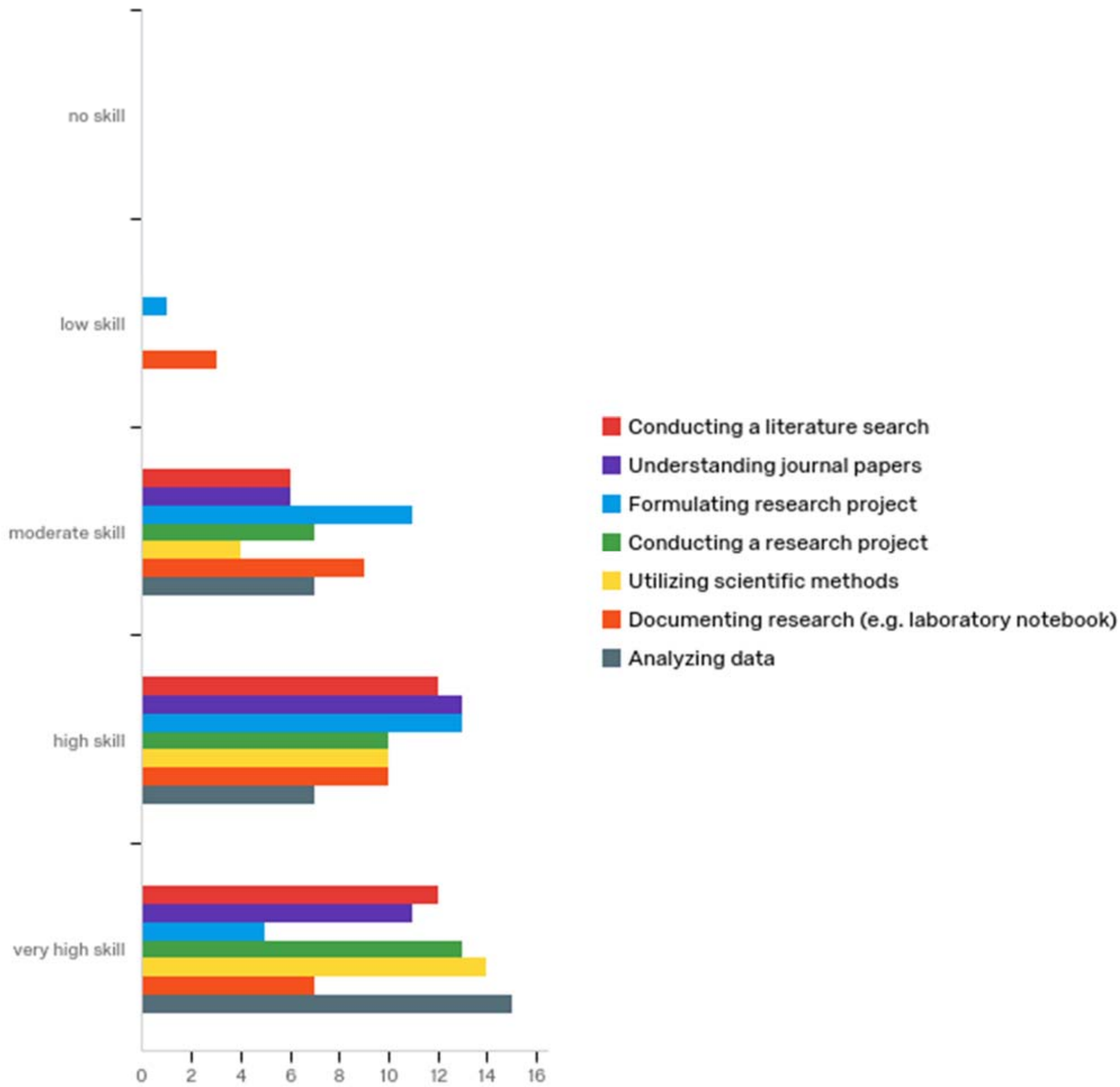
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I can make contributions to a research team.	3.00	5.00	4.53	0.67	0.45	30
2	I can explain my research topic to other engineers.	3.00	5.00	4.60	0.55	0.31	30
3	I can explain my research topic to non-engineers.	1.00	5.00	4.17	0.93	0.87	30
4	I can describe connections between my research project and courses I have taken.	3.00	5.00	4.62	0.55	0.30	29
5	I could suggest future research directions to	2.00	5.00	3.97	1.03	1.07	29

	my research mentor regarding my research project.						
6	I can document my research in a manner which others can read and understand.	1.00	5.00	4.33	0.87	0.76	30
7	I can write a basic research proposal.	1.00	5.00	3.97	1.08	1.17	30
8	I can provide my peers with constructive feedback on their research projects.	2.00	5.00	4.47	0.85	0.72	30
9	I can discuss engineering issues with other engineers.	2.00	5.00	4.72	0.64	0.41	29
10	I can discuss engineering issues with non-engineers.	3.00	5.00	4.31	0.79	0.63	29
11	I can identify research misconduct.	2.00	5.00	4.27	0.85	0.73	30

#	Question	not confident		not very confident		somewhat confident		confident		very confident		Total
1	I can make contributions to a research team.	0.00%	0	0.00%	0	10.00%	3	26.67%	8	63.33%	19	30
2	I can explain my research topic to other engineers.	0.00%	0	0.00%	0	3.33%	1	33.33%	10	63.33%	19	30
3	I can explain my research topic to non-engineers.	3.33%	1	0.00%	0	16.67%	5	36.67%	11	43.33%	13	30
4	I can describe connections between my research project and courses I have taken.	0.00%	0	0.00%	0	3.45%	1	31.03%	9	65.52%	19	29
5	I could suggest future research directions to my research mentor regarding my research project.	0.00%	0	13.79%	4	13.79%	4	34.48%	10	37.93%	11	29
6	I can document my research in a manner which others can read and understand.	3.33%	1	0.00%	0	6.67%	2	40.00%	12	50.00%	15	30
7	I can write a basic research proposal.	3.33%	1	6.67%	2	20.00%	6	30.00%	9	40.00%	12	30
8	I can provide my peers with	0.00%	0	6.67%	2	3.33%	1	26.67%	8	63.33%	19	30

	constructive feedback on their research projects.											
9	I can discuss engineering issues with other engineers.	0.00%	0	3.45%	1	0.00%	0	17.24%	5	79.31%	23	29
10	I can discuss engineering issues with non-engineers.	0.00%	0	0.00%	0	20.69%	6	27.59%	8	51.72%	15	29
11	I can identify research misconduct.	0.00%	0	3.33%	1	16.67%	5	30.00%	9	50.00%	15	30

Q27 - Rate your skill level in the following areas:

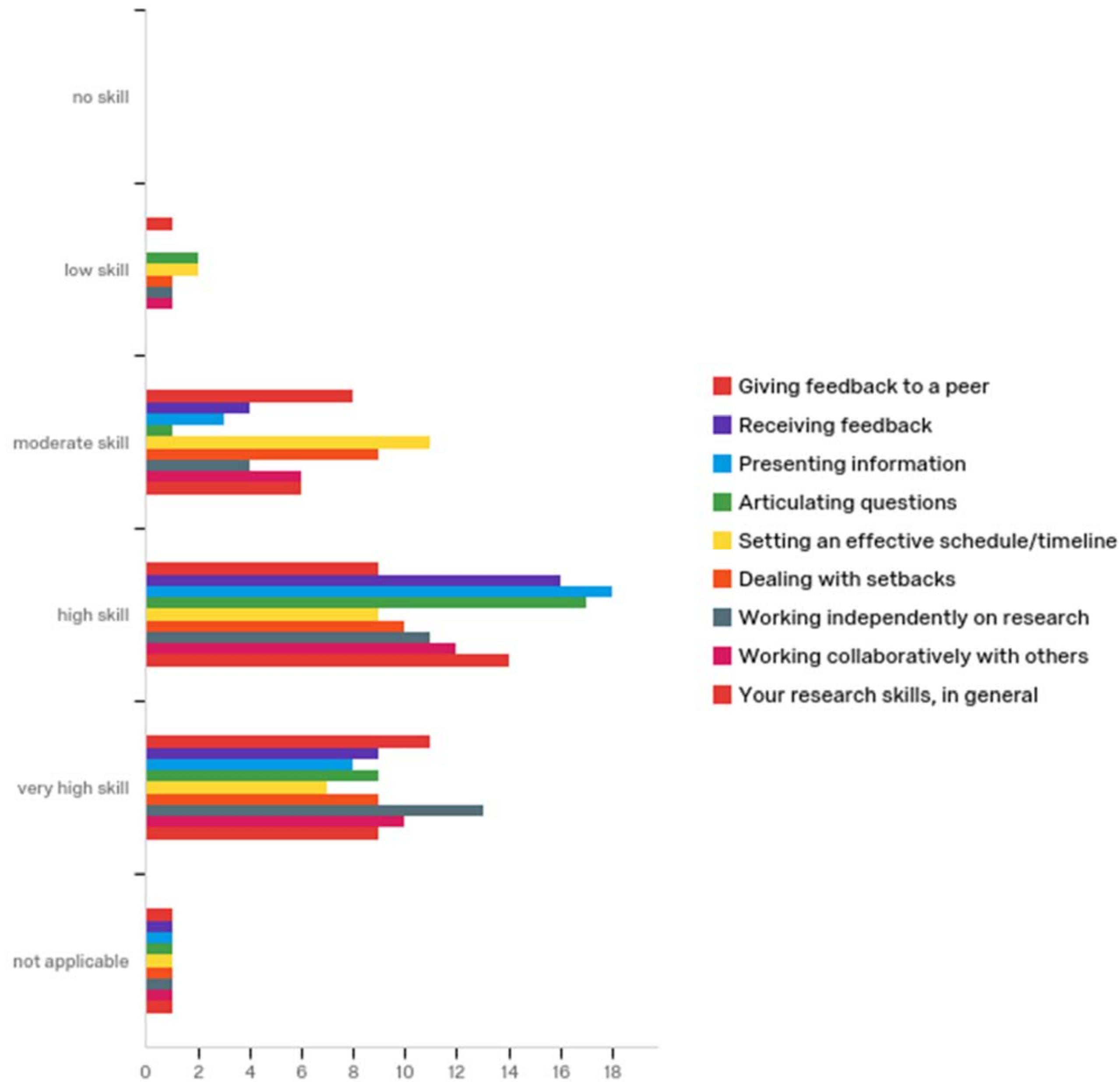


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Conducting a literature search	3.00	5.00	4.20	0.75	0.56	30
2	Understanding journal papers	3.00	5.00	4.17	0.73	0.54	30
3	Formulating research project	2.00	5.00	3.73	0.77	0.60	30
4	Conducting a research project	3.00	5.00	4.20	0.79	0.63	30
5	Utilizing scientific methods	3.00	5.00	4.36	0.72	0.52	28

6	Documenting research (e.g. laboratory notebook)	2.00	5.00	3.72	0.94	0.89	29
7	Analyzing data	3.00	5.00	4.28	0.83	0.68	29

#	Question	no skill		low skill		moderate skill		high skill		very high skill		Total
1	Conducting a literature search	0.00%	0	0.00%	0	20.00%	6	40.00%	12	40.00%	12	30
2	Understanding journal papers	0.00%	0	0.00%	0	20.00%	6	43.33%	13	36.67%	11	30
3	Formulating research project	0.00%	0	3.33%	1	36.67%	11	43.33%	13	16.67%	5	30
4	Conducting a research project	0.00%	0	0.00%	0	23.33%	7	33.33%	10	43.33%	13	30
5	Utilizing scientific methods	0.00%	0	0.00%	0	14.29%	4	35.71%	10	50.00%	14	28
6	Documenting research (e.g. laboratory notebook)	0.00%	0	10.34%	3	31.03%	9	34.48%	10	24.14%	7	29
7	Analyzing data	0.00%	0	0.00%	0	24.14%	7	24.14%	7	51.72%	15	29

Q28 - Rate your skill level in the following areas:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Giving feedback to a peer	2.00	6.00	4.10	0.94	0.89	30
2	Receiving feedback	3.00	6.00	4.23	0.72	0.51	30
3	Presenting information	3.00	6.00	4.23	0.67	0.45	30
4	Articulating questions	2.00	6.00	4.20	0.83	0.69	30
5	Setting an effective schedule/timeline	2.00	6.00	3.80	0.98	0.96	30

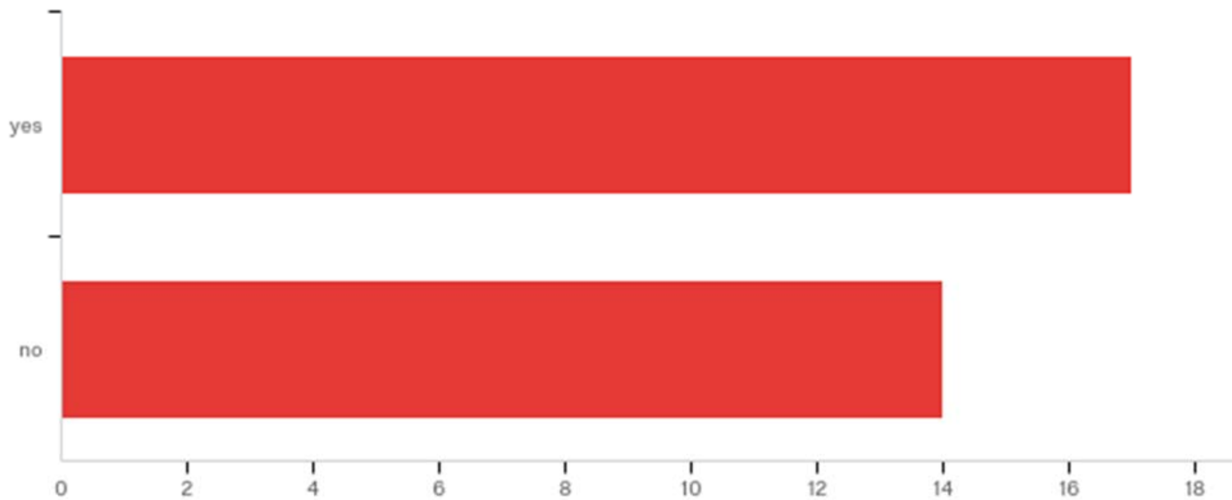
6	Dealing with setbacks	2.00	6.00	4.00	0.93	0.87	30
7	Working independently on research	2.00	6.00	4.30	0.86	0.74	30
8	Working collaboratively with others	2.00	6.00	4.13	0.88	0.78	30
9	Your research skills, in general	3.00	6.00	4.17	0.78	0.61	30

#	Question	no skill		low skill		moderate skill		high skill		very high skill		not applicable		Total
1	Giving feedback to a peer	0.00%	0	3.33%	1	26.67%	8	30.00%	9	36.67%	11	3.33%	1	30
2	Receiving feedback	0.00%	0	0.00%	0	13.33%	4	53.33%	16	30.00%	9	3.33%	1	30
3	Presenting information	0.00%	0	0.00%	0	10.00%	3	60.00%	18	26.67%	8	3.33%	1	30
4	Articulating questions	0.00%	0	6.67%	2	3.33%	1	56.67%	17	30.00%	9	3.33%	1	30
5	Setting an effective schedule/timeline	0.00%	0	6.67%	2	36.67%	11	30.00%	9	23.33%	7	3.33%	1	30
6	Dealing with setbacks	0.00%	0	3.33%	1	30.00%	9	33.33%	10	30.00%	9	3.33%	1	30
7	Working independently on research	0.00%	0	3.33%	1	13.33%	4	36.67%	11	43.33%	13	3.33%	1	30
8	Working collaboratively with others	0.00%	0	3.33%	1	20.00%	6	40.00%	12	33.33%	10	3.33%	1	30
9	Your research skills, in general	0.00%	0	0.00%	0	20.00%	6	46.67%	14	30.00%	9	3.33%	1	30

Q29 - Outside Activities while working towards BS in Engineering Physics   Were you or are you currently a member of a student organization? If so, which ones?

Outside Activities while working towards BS in Engineering Physics   Were you or are you currently a member of a student organization? If so, which ones?
GUTS, Lacrosse club
Yes, physics learning center (tutoring)
Engineering Expo; Musical Groups
Marching Band
ANS, Model UN
No
Engineering Physics Society
I do not remember.
Theta Tau
No
ans, aps
UW - Madison Physics Club
American Nuclear Society
Fencing club, Hoofers, Tau Beta Pi, drop in tutoring,
Tau Beta Pi, GUTS tutoring
N/A

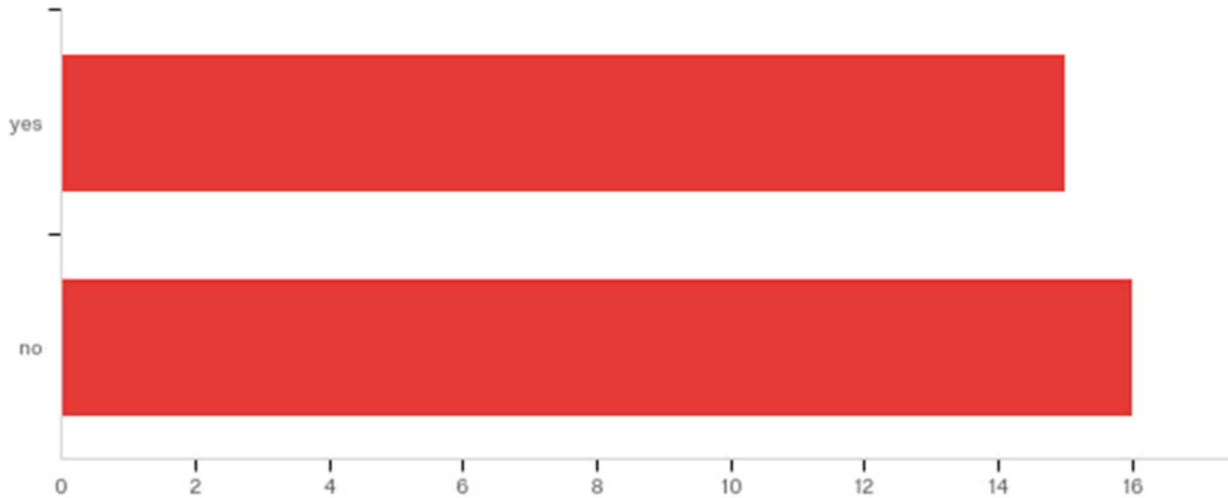
Q30 - Did you or have you performed any volunteer service in the community?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Did you or have you performed any volunteer service in the community?	1.00	2.00	1.45	0.50	0.25	31

#	Answer	%	Count
1	yes	54.84%	17
2	no	45.16%	14
	Total	100%	31

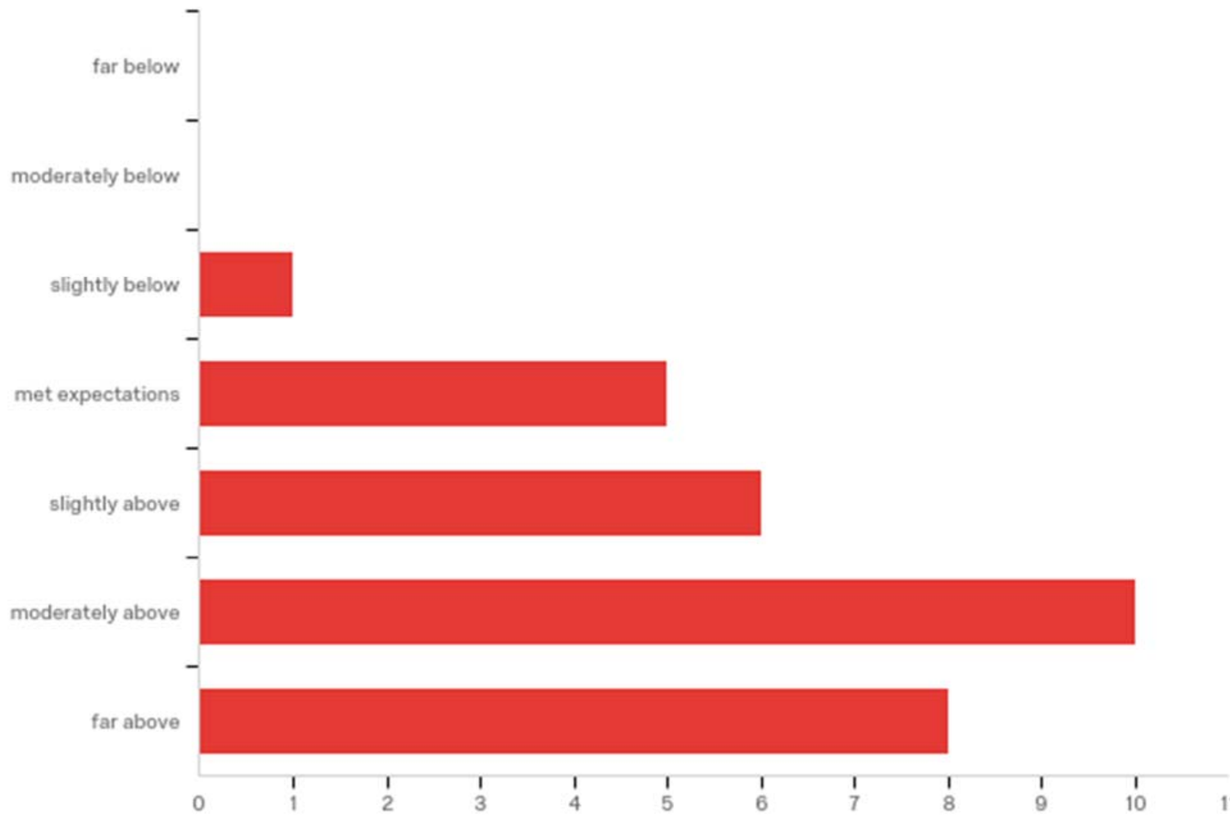
Q31 - Did you or have you taken on any type of leadership position?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Did you or have you taken on any type of leadership position?	1.00	2.00	1.52	0.50	0.25	31

#	Answer	%	Count
1	yes	48.39%	15
2	no	51.61%	16
	Total	100%	31

Q32 - The Bottom Line – Overall Satisfaction   To what extent did the Engineering Physics program experience fulfill your expectations?

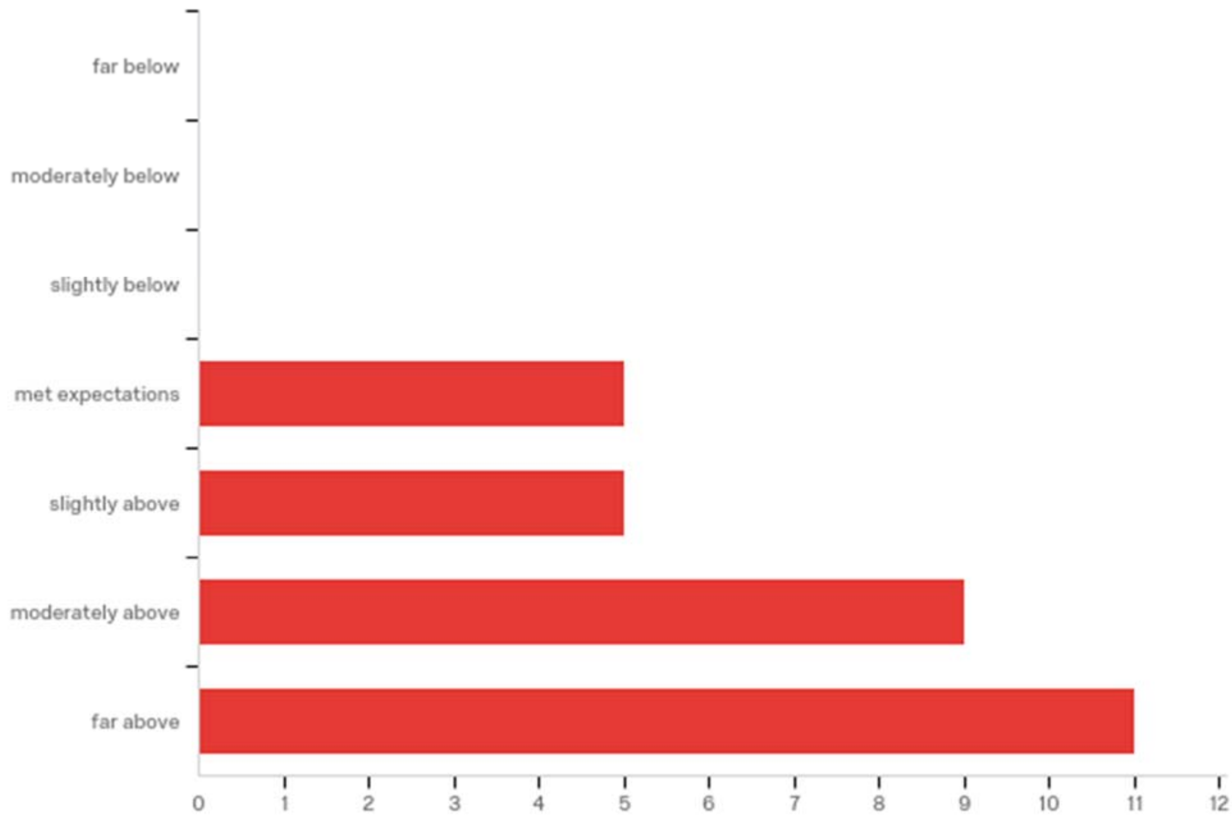


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Bottom Line – Overall Satisfaction To what extent did the Engineering Physics program experience fulfill your expectations?	3.00	7.00	5.63	1.14	1.30	30

#	Answer	%	Count
1	far below	0.00%	0
2	moderately below	0.00%	0
3	slightly below	3.33%	1
4	met expectations	16.67%	5
5	slightly above	20.00%	6

6	moderately above	33.33%	10
7	far above	26.67%	8
	Total	100%	30

Q33 - When you compare the expense to the quality of your education, how do you rate the value of the investment you made in the Engineering Physics program?

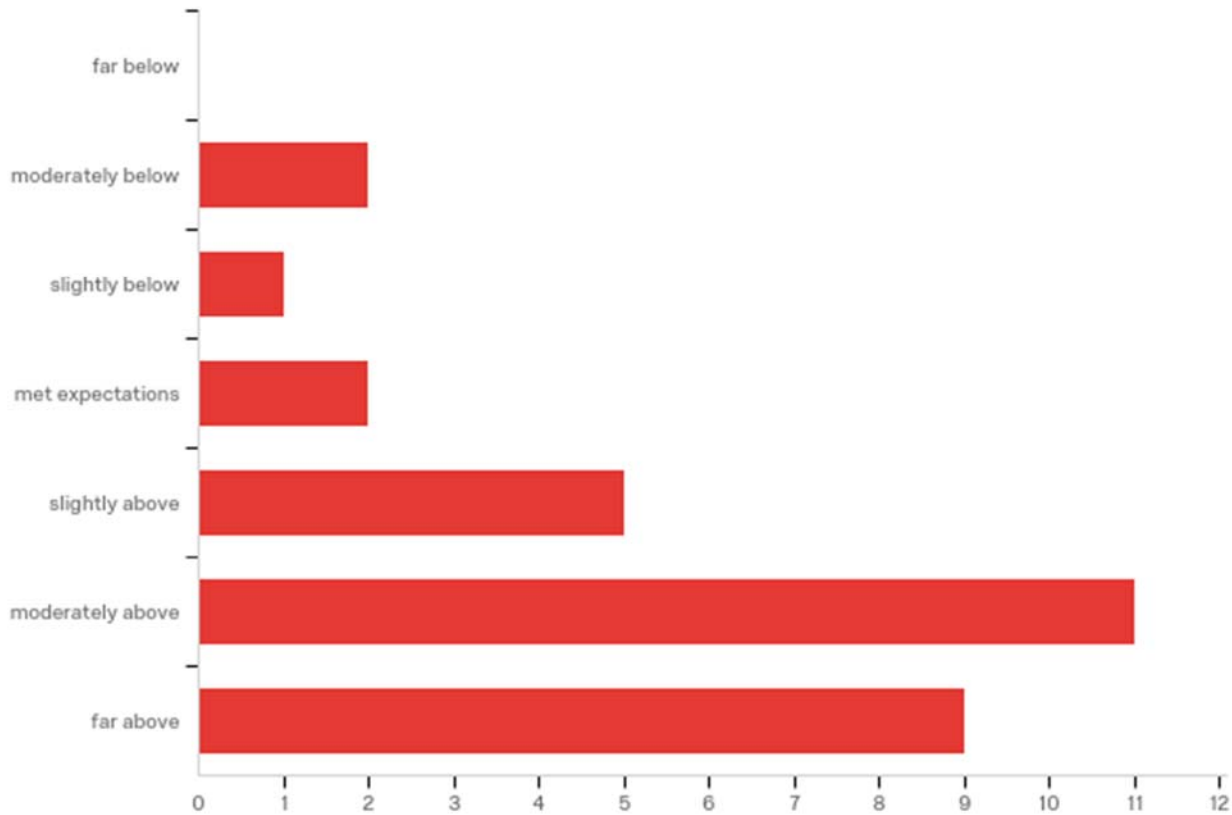


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	When you compare the expense to the quality of your education, how do you rate the value of the investment you made in the Engineering Physics program?	4.00	7.00	5.87	1.09	1.18	30

#	Answer	%	Count
1	far below	0.00%	0
2	moderately below	0.00%	0
3	slightly below	0.00%	0
4	met expectations	16.67%	5
5	slightly above	16.67%	5

6	moderately above	30.00%	9
7	far above	36.67%	11
	Total	100%	30

Q34 - How inclined are you to recommend the Engineering Physics major to a student interested in engineering and science?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How inclined are you to recommend the Engineering Physics major to a student interested in engineering and science?	2.00	7.00	5.63	1.40	1.97	30

#	Answer	%	Count
1	far below	0.00%	0
2	moderately below	6.67%	2
3	slightly below	3.33%	1
4	met expectations	6.67%	2
5	slightly above	16.67%	5

6	moderately above	36.67%	11
7	far above	30.00%	9
	Total	100%	30

Q35 - Any other comments that you would like to make which were not covered above?

Any other comments that you would like to make which were not covered above?
It is a great fit for self driven, grad school oriented students, but not for everyone in engineering.
This is a great program for motivated students who want a rigorous understanding of scientific and engineering topics. Thank!
I found the Engineering Physics major's breadth and depth challenging but rewarding. When I mention the major to most people, they think it's a double major and in many ways it is. The demanding multidisciplinary nature of the EP major really taught me how to apply critical engineering skills across a broad range of applications.
I would only recommend the Engineering Physics major to someone who is extremely passionate about the focus area that they are interested in. I believe the major will be a good investment, but I will only see the return on that investment after I complete graduate school. I think getting a degree in nuclear engineering can have the same benefits as well as give you an option not to pursue graduate education and have an easier transition into industry.
I consider myself to be a successful professional. EP program and Engr Career Services were critical in achieving my goals. I use skills learned in EP on a daily basis.

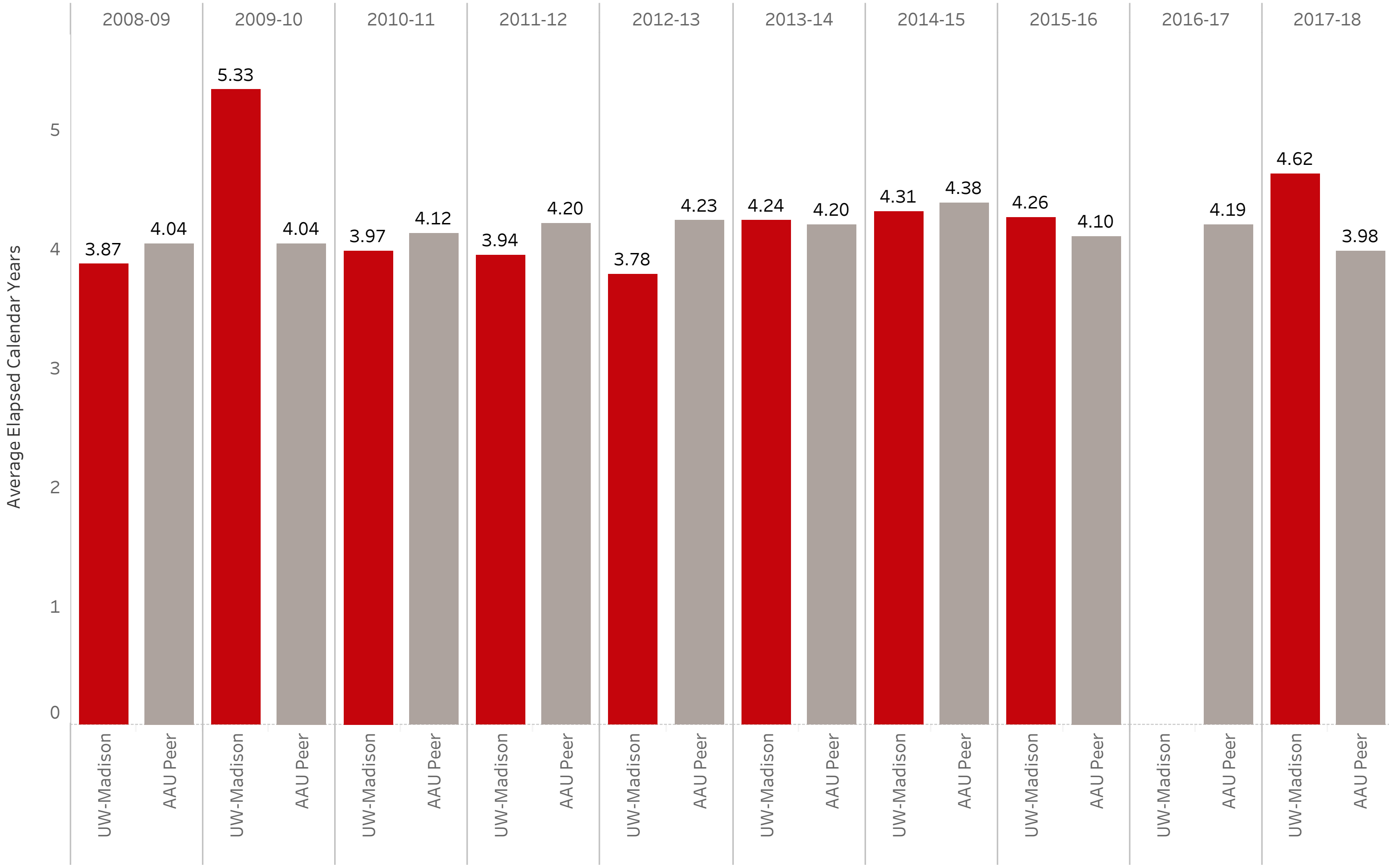
Undergraduate Time-to-Degree: Peer Comparison by Major

Major
Engineering Physics

Note:
Peer exchange of overall time-to-degree began in 2013-14.

The name of majors here reflects UW-Madison's name. The peer majors have similar curriculum, based on Federal Clasification of Instructional Program (CIP) codes, but may have different names.

UW-Madison or AAU Public Peer
UW-Madison
AAU Peer



This visualization was created by Academic Planning and Institutional Research, Office of the Provost. Questions should be directed to Clare Huhn, clare.huhn@wisc.edu.

Undergraduate Time-to-Degree: UW-Madison Trend Table

School/College (of Student)
All

School/College (of Major)
Engineering

Department of Major
All

Major
All

Time-to-Degree (elapsed calendar years) for Bachelors Degree Recipients, by Academic Year of Degree

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Biomedical Engineering	4.13	4.19	4.10	4.09	4.09	4.04	4.17	4.04	4.30	4.10
Chemical Engineering	4.57	4.44	4.45	4.35	4.58	4.52	4.52	4.60	4.42	4.40
Civil Engineering	4.62	4.72	4.53	4.60	4.56	4.82	4.57	4.50	4.61	4.48
Computer Engineering	4.64	4.59	4.21	4.18	4.26	4.29	4.23	4.37	4.13	3.99
Electrical Engineering	4.73	4.82	4.64	4.27	4.66	4.87	4.74	4.43	4.39	4.35
Engineering Mechanics	4.65	4.41	4.58	4.40	4.96	4.52	4.94	4.75	4.52	4.46
Engineering Physics	3.87	5.33	3.97	3.94	3.78	4.24	4.31	4.26		4.62
Geological Engineering	4.03	4.34	5.56	4.57	4.30	4.35	4.31	4.52	4.62	4.53
Industrial Engineering	4.42	4.51	4.48	4.26	4.20	4.57	4.32	4.25	4.08	4.06
Materials Science and Engineering	4.53	4.38	4.38	4.14	4.41	4.92	4.73	4.63	4.41	4.24
Mechanical Engineering	4.61	4.66	4.42	4.54	4.77	4.77	4.48	4.33	4.50	4.39
Naval Science	3.01	3.85	4.01	5.24	4.33	4.43	4.33		4.33	3.95
Nuclear Engineering	4.69	5.00	4.77	4.93	4.48	4.25	4.40	4.40	4.10	4.05

WISCONSIN
UNIVERSITY OF WISCONSIN–MADISON

This visualization was created by Academic Planning and Institutional Research, Office of the Provost. Questions should be directed to Clare Huhn, clare.huhn@wisc.edu.