Student Experience in Academic Programs in the PBSci Division

2018-2022 UC Undergraduate Experience Survey (UCUES)

Report by IRAPS[1], August 2023

This report shows the results for the undergraduate programs in the Physical and Biological Sciences Division based on the 2022 UC Undergraduate Experience Survey (UCUES), conducted in April-July 2022. The summary tables cover the following aspects of student experience in an academic program:

- Instruction and courses in the major
- Faculty pedagogy
- Program requirements and policies
- Access to faculty, research opportunities, and other co-curricular resources
- Advising, including suggestions for improvement
- Experiences with diverse peers and perspectives
- Climate for diversity and inclusion
- Sense of belonging to campus
- Overall experience at UCSC

The summary tables include all respondents with a declared major in the PBSci Division: most (77%) were seniors and 22% were juniors (class level is based on credits as of Winter 2022).

For comparison, we included the results from the 2020 and 2018 surveys that largely covered students' experiences prior to the COVID-19 pandemic. In the survey students are asked about their experiences during the time they have been a student in that major or during the academic year they have taken the survey (e.g., 2019-20 in the 2020 survey).

The summary tables allow us to make several types of comparisons: across years for the same question and/or across questions within the same year, both in the division and any specific program or programs. Number of respondents in each program for every year of the survey is shown in Table A.[2]

Table A. Number of Respondents from Each Department by UCUES year

	UCUES 2022 (N)	UCUES 2020 (N)	UCUES 2018 (N)
Chemistry	67	100	139
Earth and Planetary Sciences (EPS)	56	66	65
Ecology and Evolutionary Biology (EEB)	106	156	202
Mathematics	53	57	78
Molecular, Cell and Developmental Biology (MCDB)	320	327	433
Physics	83	75	92
Total	685	781	1009

[1] If you have any questions about this report, you may email IRAPS survey analyst at surveys@ucsc.edu.

[2] The 2022 survey results were weighted to adjust for differences in response rates across student characteristics.

Instruction and Courses in Major

Students reported their levels of satisfaction with quality and availability of courses.

- Division-wide, PBSci students' satisfaction with the quality of faculty instruction has remained around 60% between 2018 and 2022: it was 60% in 2022, 64% in 2020, and 58% in 2018.
- Division-wide, two areas have consistently received relatively low ratings (under 50%) in 2018-2022: (a) quality of lower-division courses (41-45%) and (b) availability of courses needed for graduation (42-46%) and/or GE courses (37-49%).

Table 1. Quality of Instruction and Courses

How satisfied are you with each of the following aspects of your educational experience in the major? (Percent satisfied/very satisfied)		Chemistry	EPS	EEB	Math	MCDB	Physics	PBSci division
Quality of faculty instruction	2022	54%	71%	80%	64%	52%	56%	60%
	2020	68%	81%	68%	66%	59%	57%	64%
	2018	51%	77%	67%	62%	51%	47%	57%
Quality of upper-division courses in your major	2022	61%	79%	80%	66%	62%	59%	66%
	2020	75%	84%	79%	81%	68%	80%	75%
	2018	59%	79%	76%	58%	58%	55%	63%
Quality of lower-division courses in your major	2022	39%	55%	37%	68%	44%	41%	45%
	2020	46%	51%	37%	38%	41%	55%	43%
	2018	38%	62%	37%	27%	42%	51%	41%
Quality of teaching by graduate students (TAs, AIs)	2022	54%	69%	76%	73%	56%	76%	64%
	2020	71%	92%	72%	58%	68%	73%	71%
	2018	53%	85%	64%	69%	47%	54%	56%
Variety of courses available in your major	2022	39%	63%	66%	67%	49%	42%	52%
	2020	55%	71%	62%	51%	52%	61%	57%
	2018	42%	69%	66%	53%	46%	56%	54%
Availability of courses needed for graduation	2022	44%	51%	46%	67%	43%	42%	46%
	2020	57%	66%	46%	54%	36%	48%	46%
	2018	36%	63%	52%	62%	32%	41%	42%
Availability of courses for general education or breadth requirements	2022	48%	47%	49%	51%	50%	46%	49%
	2020	48%	60%	46%	52%	40%	50%	46%
	2018	29%	55%	38%	47%	35%	40%	37%

Faculty Pedagogy

Students reported the frequency with which they had experienced various aspects of faculty pedagogy and interaction with students.

- In 2022 in the division, the vast majority (84%) of students reported that faculty consistently (*often* or *very often*) maintained respectful interactions in class. This is an increase from 75% in 2018. The most notable improvements in this area between 2018 and 2022 were reported by students in programs sponsored by EEB and MCDB departments.
- By 2022 we noted an improvement in regular (*often*/*very often*) opportunities for active participation in lecture and discussion classes division-wide from 54% in 2018 to 67% in 2022 due to improvements in every department (except EPS where the majority of students, 72%, had already been reporting regular opportunities for active participation since 2018).
- Since 2018 PBSci faculty improved in providing prompt and useful feedback but this area of student support still remains less regularly available relative to other areas of pedagogy. Under half (46-47%) of PBSci majors reported having experienced it *often/very often* in 2020-2022.

Table 2. Faculty Pedagogy

How often did you experience... (Percent often/very often)		Chemistry	EPS	EEB	Math	MCD Bio	Physics	PBSci division
Students treated fairly by the faculty	2022	59%	86%	74%	85%	64%	69%	69%
	2020	64%	80%	64%	70%	52%	62%	61%
	2018	63%	77%	66%	64%	48%	63%	58%
Faculty being open to discuss student needs, concerns, and suggestions	2022	57%	64%	72%	62%	54%	67%	60%
	2020	48%	53%	54%	53%	42%	54%	48%
	2018	39%	70%	45%	38%	35%	39%	40%
Having an instructor who increases your enthusiasm for the subject	2022	49%	69%	67%	61%	53%	48%	56%
	2020	64%	71%	67%	64%	50%	53%	59%
	2018	54%	77%	64%	51%	48%	42%	54%
Faculty providing prompt and useful feedback on student work	2022	50%	49%	50%	57%	47%	33%	47%
	2020	46%	60%	52%	49%	38%	46%	46%
	2018	33%	60%	46%	45%	34%	37%	39%
Faculty maintaining respectful interactions in classes	2022	80%	87%	93%	85%	81%	80%	84%
	2020	81%	86%	75%	87%	75%	81%	78%
	2018	77%	87%	76%	75%	66%	82%	73%
Opportunities for active participation in lecture and discussion classes	2022	59%	75%	77%	71%	65%	60%	67%
	2020	63%	72%	70%	58%	57%	62%	62%
	2018	48%	72%	69%	47%	44%	53%	53%
Faculty clearly explaining what constitutes plagiarism	2022	74%	79%	78%	70%	84%	66%	78%
	2020	79%	76%	79%	55%	77%	71%	75%
	2018	71%	75%	76%	64%	75%	58%	71%

Program Requirements and Policies

Students evaluated the clarity and quality of communication of department rules and major requirements.

- Over time and division-wide, the vast majority (over 90%) of PBSci majors have consistently reported that program requirements, description of the major in the catalog and the purpose of the requirements were clearly communicated.
- Relative to other areas of communication, the results show that department rules and policies are not as clearly communicated, division-wide and especially in EEB, EPS and Chemistry departments.

Table 3. Clarity of Program Requirements

(Percent yes)		Chemistry	EPS	EEB	Math	MCD Bio	Physics	PBSci division
Are the program requirements well defined?	2022	91%	84%	91%	93%	88%	96%	90%
	2020	92%	88%	90%	93%	93%	90%	92%
	2018	89%	92%	96%	94%	90%	93%	92%
Is the description of the major in the catalog accurate?	2022	89%	91%	96%	97%	91%	86%	91%
	2020	97%	94%	92%	97%	90%	93%	93%
	2018	92%	98%	95%	90%	89%	94%	92%
Are department rules and policies clearly communicated?	2022	84%	84%	81%	88%	86%	91%	86%
	2020	89%	87%	85%	84%	77%	88%	83%
	2018	80%	95%	88%	83%	75%	87%	82%
Do you understand how the requirements of your major combine to produce a coherent understanding of a field of study?	2022	94%	92%	95%	80%	92%	96%	92%
	2020	94%	95%	91%	94%	90%	92%	92%
	2018	87%	100%	95%	86%	89%	94%	91%

Access to faculty, research opportunities and other co-curricular resources

Students reported their levels of satisfaction.

- Between 2018 and 2022 students' satisfaction with access to faculty outside of class has increased at a division-wide level from 46% to 55% being *satisfied* or *very satisfied*. There was a notable increase in satisfaction among MCDB department majors.
- Division-wide, students' satisfaction with opportunities for research experience stayed relatively stable between 2018 and 2022 (around 40%). Notable increases (14-16%) in students' satisfaction with opportunities for research experiences were found in the Chemistry department and MCDB department.
- Division-wide, satisfaction with access to small classes has stayed relatively low between 2018 and 2022: 26% and 28% respectively with an improvement in 2020 (34%). In two departments – EPS and Physics – satisfaction with access to small classes has declined in 2022 compared to 2018. See Table 4.

Table 4. Access to faculty and co-curricular resources

How satisfied are you with... (Percent satisfied/very satisfied)		**Chemistry**	**EPS**	**EEB**	**Math**	**MCD Bio**	**Physics**	**PBSci division**
Access to faculty outside of class	2022	48%	64%	61%	59%	51%	57%	55%
	2020	66%	73%	57%	58%	43%	61%	54%
	2018	43%	75%	50%	51%	34%	56%	44%
Opportunities for research experience or to produce creative products	2022	45%	48%	44%	23%	40%	53%	42%
	2020	42%	50%	50%	30%	30%	44%	39%
	2018	31%	57%	49%	28%	28%	66%	38%
Access to small classes	2022	33%	47%	26%	53%	22%	24%	28%
	2020	32%	72%	32%	41%	24%	42%	34%
	2018	20%	72%	25%	39%	16%	35%	26%
Availability of library resources	2022	60%	76%	74%	55%	67%	69%	67%
	2020	68%	65%	70%	65%	63%	56%	65%
	2018	52%	65%	60%	47%	49%	62%	54%
Educational enrichment programs (e.g., study abroad, internships)	2022	32%	33%	45%	28%	34%	30%	34%
	2020	44%	44%	49%	32%	34%	34%	39%
	2018	30%	52%	52%	42%	27%	40%	36%

Advising

Questions on advising have been revised or added to the 2022 survey, so only the 2022 results are reported here.

The results show that satisfaction with access to advising is highly correlated with quality of advising.

- Satisfaction with access to and quality of academic advising was 44-45% division-wide and the highest among Chemistry department majors (67-69%). See Table 5a.

Table 5a. Overall Satisfaction with Access and Quality of Advising

How satisfied are you with... (Percent satisfied/very satisfied)		Chemistry	EPS	EEB	Math	MCD Bio	Physics	PBSci division
Access to academic advising	2022	69%	52%	39%	59%	37%	45%	45%
Quality of academic advising	2022	67%	61%	46%	43%	32%	58%	44%

Students reported the frequency of their communications with staff advisors in their major in the 2021-22 academic year. See Table 5b.

- The percentage of students who emailed a staff advisor in their major at least once was highest among the Chemistry department majors (90%).
- The percentage of students who met at least once with a staff advisor in their major (in-person or by video call) for at least 15 minutes was highest among the Chemistry department (83%).

Table 5b. Frequency of communications with Staff Advisors in the major (2021-2022 academic year)

This academic year (since September 2021), how many times have you...		Chemistry	EPS	EEB	Math	MCD Bio	Physics	PBSci division
Emailed your staff advisor in your major	Did not email	10%	18%	34%	19%	26%	21%	24%
	1-2 times	27%	36%	30%	40%	37%	54%	38%
	3-5 times	40%	33%	23%	29%	25%	18%	26%
	6 or more	23%	13%	13%	12%	12%	7%	13%
Met (either on Zoom or in-person) with your staff advisor in your major for at least 15 minutes	Did not meet	17%	22%	47%	48%	45%	32%	39%
	1-2 times	49%	30%	37%	42%	41%	49%	42%
	3-5 times	26%	45%	9%	10%	11%	15%	16%
	6 or more	9%	4%	7%	0%	3%	3%	4%

Students indicated their satisfaction with various aspects of advising. See Table 5c.

- Satisfaction with the availability of in-person meeting times was highest in the Math department (77%) and Chemistry department (75%). See Table 5c.

Table 5c. Satisfaction with Aspects of Advising

How satisfied are you with... (Percent satisfied/very satisfied)	Chemistry	EPS	EEB	Math	MCD Bio	Physics	PBSci division
Clarity of information in email communications from advising	87%	88%	84%	94%	85%	87%	86%
Availability of in-person meeting times	75%	64%	52%	77%	62%	72%	65%
Availability of online (Zoom) meeting times	85%	77%	55%	85%	71%	84%	74%
Timeliness of email responses	90%	69%	77%	93%	78%	57%	77%
Usefulness of advice given by phone	86%	86%	76%	77%	77%	86%	80%

Suggestions for Improving Advising

Students offered suggestions in response to the question, "What is the SINGLE, MOST IMPORTANT thing that advisors could realistically do or keep doing, to create a better undergraduate advising experience for students like you?". Comments included below refer to advising in the major (rather than advising in colleges) or are about advising in general without specifying which type of advising. Suggestions are organized by students' major and are sorted generally by frequency of mentions or how specific the comment is to the program. Other more general suggestions mentioned by only 1 or 2 students are listed as "also mentioned" suggestions for each program.

Chemistry department majors: Advisors should be providing students with a list of GE classes available to be taken for each quarter, supplying information about applying for internships and research/field experiences, supporting students in making decisions, being more open about research opportunities, checking in with students, creating detailed four-year academic plans, conveying the correct advising information for transfer students, informing students about career and internship opportunities, helping students organize classes needed for graduation, giving tips on how to apply for graduate school, encouraging students to seek advising, giving out accurate information about classes, making advising meetings mandatory, meeting with students for longer, making clear what resources are available to students, emailing reminders to students about courses they need to take, emailing students following an advising appointment, emailing students reminders about upcoming dates, reviewing students' academic planners, having more advisors, and clarifying when students will receive final grades. Some students also mentioned that advisors should be supporting students in finding internships and jobs in the major, preparing for post-graduation, and linking students to professors who are doing research.

EPS department majors: Advisors should be engaging more with students, having alumni talk about their experiences after graduation, responding to students in a timely manner, having more advising appointments available at the beginning and end of the quarter, making the environment calm and welcoming, making it mandatory to meet with your major advisor, opening more drop-in hours, keeping information consistent between advisors, be engaging to students, helping students understand the graduation requirements, giving students more time to figure out the pathway to completing requirements, keeping all information up-to-date, providing job postings via email, helping students create an academic plan, creating a schedule of important dates for major declaration, and understanding students' workload. Some students also mentioned that advisors should be providing more availability of times for advising, having more major advisors.

EEB department majors: Advisors should be giving realistic advice on how long the major will take a student at a given pace, giving advice for post-college plans, assuring that students are completing their requirements on track for graduation, reaching out to students before they begin the program with resources, reaching out to transfer students, having more availability for advising meetings, helping undergraduate students in times of stress, providing information about life after college, providing information to students during their meeting/not rescheduling, requiring advising meetings, reaching out to students via email, explain more scholarship, financial aid and research opportunities, having more drop-in sessions, providing pointed and helpful advice, including internship and research opportunities in newsletters, assistance with enrollment and scheduling when desired classes are full, learning more about students personally and providing personal recommendations, sending students more information on classes, make advising meetings mandatory for senior year, informing students on how to be a competitive applicant for graduate school, updating the major website to include enrollment and graduation information, reaching out to students personally, taking more time with each students and having less rushed meetings, and trusting students in their academic choices. Some students also mentioned that advisors should be having more availability for students in-person, zoom and via email, providing more information on internships and how to get experience, and providing prompt email responses.

Mathematics department majors: Advisors should be asking students to be specific about what they need, talking to students about their specific situation and providing support, supporting students in the major, connecting

undergraduate students to graduate students in the program, helping students with coordinating with minor departments who have similar classes, getting to know students personally, asking students what they think the right choice is for them, providing accurate information on what classes to take, assisting students with completing required forms, providing information about research opportunities for undergraduates, and providing useful information about pathways in the major. They should be giving advice about future careers and providing information about internship and job opportunities within the department. Some students also mentioned sending out updates on a students' progress towards graduation.

MCDB department majors: Advisors should be holding workshops which explain major pathways, providing students with spreadsheets of course options, helping students create an academic plan, caring about students personally, providing help in a friendly manner, widening the hours for advising, providing accurate information, hiring more major advisors, being comforting to students as they work through the major, have more information about major and minor planning, providing more information to students on how to get research experience, being approaching and personal with students, provide clear and accurate information about graduation requirements, clarifying pass/no pass requirements, improving the line of communication, providing advice specific to students with two majors, connecting students with alumni, emailing students after an advising appointment, alerting students to classes only offered once a year, hiring more advisors, providing help for transfer students, and listening to student concerns about their timeline. Some students also mentioned that advisors should be providing more availability for drop-in advising and appointments, replying to emails promptly, reaching out to students more often, advising students on internship opportunities and career pathways.

Physics department majors: Advisors should be providing consistent access to advising, tailoring their interactions to students, updating the contact emails for advisors on the website, being kind during advising, having one on one student meetings, checking in on students, keeping emails relevant, and giving realistic and practical answers. Other suggestions focused on major-specific issues: helping balance taking the required classes over four years, keeping students full academic plan up to date, sending notifications to students about events in the major, providing a course schedule for future quarters, providing advice to students about GE timing, providing information on graduate school requirements, providing students with information about internships, giving students a sense of the difficulty of each class, advertising the different classes available, updating the catalogs online, and understanding the difficulty of each course and which to take together. Some students also mentioned that advisors should be providing more availability for drop-in and scheduled advising appointments, providing more information on how to participate in research, and responding to emails more promptly.

Engagement with Diverse Peers and Perspectives

Students reported the frequency with which they had engaged with diverse peers and perspectives in the 2021-22 year in the classroom and outside the classroom.[3]

- There has been a notable division-wide increase in frequency of engagements with diverse peers and perspectives in the classroom reported by PBSci students between 2018 and 2022. See Table 6a.
- Similarly, there has been a notable division-wide increase in frequency of engagements with diverse peers and perspectives outside the classroom reported by PBSci students between 2018 and 2022. See Table 6b.
- PBSci students reported more frequent opportunities to interact with diverse peers and perspectives outside the classroom than in the classroom.

Table 6a. Engagement with Diverse Peers and Perspectives in the Classroom

This academic year, how often have you done each of the following? *(Percent often/very often)*		Chemistry	EPS	EEB	Math	MCD Bio	Physics	PBSci division
Interacted with someone with views that are different from your own in the classroom	2022	54%	49%	29%	41%	42%	41%	42%
	2020	27%	32%	38%	43%	38%	36%	36%
	2018	29%	27%	29%	28%	33%	33%	31%
Understood the world from someone else's perspective in the classroom	2022	50%	53%	46%	41%	44%	34%	44%
	2020	30%	45%	38%	40%	40%	35%	38%
	2018	25%	36%	36%	20%	32%	27%	31%
Discussed controversial issues in the classroom	2022	30%	25%	24%	29%	30%	16%	27%
	2020	17%	28%	26%	17%	18%	24%	21%
	2018	16%	20%	24%	18%	21%	13%	20%

Table 6b. Engagement with Diverse Peers and Perspectives Outside the Classroom

This academic year, how often have you done each of the following? *(Percent often/very often)*		Chemistry	EPS	EEB	Math	MCD Bio	Physics	PBSci division
Interacted with someone with views that are different from your own outside the classroom	2022	61%	51%	49%	50%	50%	49%	51%
	2020	41%	52%	39%	50%	43%	42%	43%
	2018	47%	34%	41%	45%	39%	39%	41%
Understood the world from someone else's perspective outside the classroom	2022	65%	67%	59%	46%	59%	50%	58%
	2020	46%	60%	54%	59%	55%	44%	53%
	2018	44%	51%	49%	40%	45%	45%	46%
Discussed controversial issues outside the classroom	2022	47%	48%	47%	53%	49%	46%	49%
	2020	29%	45%	38%	41%	37%	52%	39%
	2018	36%	42%	39%	41%	34%	40%	37%

[3] Wording in 2020 and 2018 was "Appreciate the world from someone else's perspective", and in 2018 was "Discuss and navigate controversial issues".

Climate for Diversity and Inclusion

Students evaluated the climate for diversity and inclusion in each of the three contexts: major, classes, and campus.

- Since 2018 PBSci Division students' perceptions of the climate for diversity and inclusion have improved from 52-53% in 2018 to 57-59% of students feeling fully comfortable across the three contexts.
- In 2022, the highest proportion (63-67%) of students who felt comfortable in their major and in their classes was in the EEB department. See Table 7.

Table 7. Climate in Major, Classes and on Campus

Do you agree or disagree with these statements? (Percent agree/strongly agree)		Chemistry	EPS	EEB	Math	MCD Bio	Physics	PBSci division
Overall, I feel comfortable with the climate for diversity and inclusion in my major	2022	54%	52%	63%	55%	58%	50%	57%
	2020	46%	59%	54%	39%	55%	56%	52%
	2018	50%	59%	54%	48%	53%	48%	52%
Overall, I feel comfortable with the climate for diversity and inclusion in my classes	2022	59%	62%	67%	53%	57%	55%	59%
	2020	50%	63%	53%	40%	58%	57%	55%
	2018	48%	59%	55%	51%	52%	53%	53%
Overall, I feel comfortable with the climate for diversity and inclusion at this campus	2022	57%	62%	56%	55%	58%	67%	59%
	2020	52%	56%	49%	40%	49%	61%	51%
	2018	54%	52%	51%	57%	52%	50%	52%

** Wording in 2020 and before was "climate for inclusiveness" in all three questions*

Sense of Belonging to Campus

- The percentage of PBSci students who reported that UC Santa Cruz is a welcoming campus was higher in 2022 than in 2020 and 2018.
- The percentage of students who reported that UC Santa Cruz is a welcoming campus was highest in Physics (69%) and EPS (67%) departments.
- The proportion of PBSci students who would still choose to enroll at UCSC knowing what they know now has remained around 50% in 2018-2022. In 2022, the highest proportion - around 60% of students - was in EPS, EEB, and Physics departments. See Table 8.

Table 8. Sense of Belonging to Campus

Do you agree or disagree with these statements? (Percent agree/strongly agree)		Chemistry	EPS	EEB	Math	MCD Bio	Physics	PBSci division
UC Santa Cruz is a welcoming campus	2022	61%	67%	53%	59%	64%	69%	62%
	2020	56%	60%	55%	54%	58%	66%	58%
	2018	55%	66%	59%	55%	57%	59%	57%
I feel that I belong at this university	2022	47%	50%	57%	46%	50%	46%	50%
	2020	53%	61%	56%	44%	42%	56%	49%
	2018	45%	62%	53%	48%	42%	49%	47%
Knowing what I know now, I would still choose to enroll at this campus	2022	47%	60%	59%	46%	47%	59%	52%
	2020	53%	54%	55%	53%	43%	62%	50%
	2018	47%	68%	57%	60%	46%	59%	52%
I feel valued as an individual at this institution	2022	33%	30%	33%	35%	39%	38%	36%
	2020	32%	44%	33%	33%	26%	30%	31%
	2018	29%	40%	32%	33%	29%	26%	30%

Overall Experience at UC Santa Cruz

- PBSci students' satisfaction with their overall academic experience at UCSC has notably improved from 44% in 2018 to 58% fully satisfied in 2022.
- In 2022 the majority (68-72%) of students in the EPS and EEB departments were fully satisfied with their overall academic experience at UCSC.
- Of note, UCSC students across the divisions have historically reported relatively low ratings of "value of their education for the price they are paying." See Table 9.

Table 9. Satisfaction with Overall Experience

How satisfied are you with... (Percent satisfied/very satisfied)		**Chemistry**	**EPS**	**EEB**	**Math**	**MCD Bio**	**Physics**	**PBSci division**
Overall academic experience	2022	44%	68%	72%	36%	59%	56%	58%
	2020	49%	60%	51%	54%	44%	58%	50%
	2018	38%	65%	52%	56%	37%	46%	44%
Overall social experience	2022	38%	36%	38%	45%	44%	49%	42%
	2020	43%	45%	50%	48%	41%	45%	44%
	2018	34%	50%	37%	45%	37%	40%	38%
Value of your education for the price you are paying	2022	28%	27%	19%	22%	26%	29%	25%
	2020	30%	22%	14%	26%	17%	31%	21%
	2018	17%	28%	24%	32%	18%	19%	21%