

Montana University System
PROGRAM REVIEW

Institution: **Montana State University**

Program Years: **AY2016-AY2022**

List of the programs reviewed:

Department of Physics

- BS Physics
 - Professional Option
 - Astronomy and Astrophysics Option
 - Interdisciplinary Option
 - Teaching Option
- Minor Physics (Non-Teaching)
- MS in Physics
- PhD in Physics

Department of Engineering (Undergraduate)

- [Bachelor of Science in Biological Engineering](#)
 - [Bachelor of Science in Biomedical Engineering](#)
 - [Bachelor of Science in Chemical Engineering](#)
 - [Bachelor of Science in Civil Engineering](#)
 - [Bachelor of Science in Computer Engineering](#)
 - [Bachelor Degrees in Computer Science](#)
 - Bachelor of Science Interdisciplinary Option
 - Bachelor of Science Professional Option
 - Bachelor of Arts in Computer Science
 - Accelerated BS/MS in Computer Science
 - [Bachelor of Science in Construction Engineering Technology](#)
 - [Bachelor of Science in Electrical Engineering](#)
 - [Bachelor of Science in Environmental Engineering](#)
 - [Bachelor of Science in Financial Engineering](#)
 - [Bachelor of Science in Industrial and Management Systems Engineering](#)
 - [Bachelor of Science in Mechanical Engineering](#)
 - [Bachelor of Science in Mechanical Engineering Technology](#)
 - Minors
 - Aerospace
 - Biomedical Engineering
 - Computer Engineering
 - Computer Science
 - Electrical Engineering
 - Engineering Management
 - Financial Engineering
-

Montana University System

PROGRAM REVIEW

Health and Human Development: Counseling Programs

- MS Counseling Options
 - Mental Health Counseling
 - Marriage and Family Counseling
- MED Education: School Counseling Option

Health and Human Development: Dietetics

- BS Nutrition Science
- BS Dietetics
- Graduate Certificate: Montana Dietetics Internship

Decision(s) concerning the future of the program(s), based on the program review criteria established at the campus:

See decisions by department/program below.

Rationale or justification for the decision based on the program review process established at the campus. Include graduation numbers and student majors for each of the last seven (7) years for every program under review.

See decisions by department/program below.

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PROGRAM REVIEW

Department of Physics

- BS Physics
 - Professional Option
 - Astronomy and Astrophysics Option
 - Interdisciplinary Option
 - Teaching Option
- Minor Physics (Non-Teaching)
- MS in Physics
- PhD in Physics

Decision(s) concerning the future of the program(s), based on the program review criteria established at the campus:

The Department of Physics, housed in the College of Letters and Sciences, offers a BS degree in Physics with four options: Professional, Astronomy and Astrophysics, Interdisciplinary, and Teaching, a non-teaching minor in Physics, and graduate MS and PhD programs in Physics.

All degrees and options will be retained

Rationale or justification for the decision based on the program review process established at the campus. Include graduation numbers and student majors for each of the last seven (7) years for every program under review.

The review team included Professor Patrik Callis (Department of Chemistry and Biochemistry, Montana State University), Professor Paul Cassak (Department of Physics and Astronomy, West Virginia University), and Professor Brett Gunnink (Norm Asbjornson College of Engineering, Montana State University).

The department provides excellence in undergraduate and graduate academic programs for their majors and exemplary instruction in their courses that serve the rest of the university. The department offers Bachelor of Science (BS), Master of Science (MS), Master of Science Non-Thesis, and Doctor of Philosophy (Ph.D.) degrees. The department conscientiously works to continually improve its programs. They offer modern, evidence-based pedagogy in their large service courses and rigorous advanced courses for their majors and graduate students. The department excels in providing high-quality, cutting-edge research opportunities for its students, which greatly contributes to the strong placement of its students post-graduation. The Department of Physics grants among the highest number of Ph.D. degrees of any program at MSU, and the research intensity is a key factor in MSU retaining its Carnegie Very High Research Activity (R1) status. This is enabled by faculty members having a teaching load consistent with other physics departments at R1 institutions nationwide.

Reviewers noted that the quality and rigor of the undergraduate and graduate academic programs are exemplary. Students graduating from the department are well-prepared for careers in physics and astronomy, as evidenced by the successful placement of students at all levels. A number of efforts to continually improve the academic programs were noted, including but not limited to: revamping graduate courses; responding to high graduate student attrition by overhauling the written qualifier exam process;

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improvements to graduate recruiting and moving to holistic graduate admissions, including the removal of GRE scores on graduate applications; adopting evidence-based instruction using “tutorials” in algebra-based undergraduate College Physics classes; hiring an undergraduate Student Success Coordinator; obtaining new undergraduate laboratory equipment; creating a Diversity, Equity, and Inclusivity (DEI) committee; hosting a Conference for Undergraduate Women in Physics (CUWiP) meeting; and enhancing diversity of the faculty.

The reviewers also identified some suggestions for improving student persistence at both the undergraduate and graduate levels. For undergraduates, suggestions include evaluation of course series modification to enhance mathematical material to better prepare majors for upper division courses; removing some courses and redistributing material to other upper division core courses; and discussing whether a Bachelor of Arts option with reduced mathematical requirements would improve persistence. For graduate students, suggestions include developing a peer mentorship program and evaluation of core course time commitment.

ENROLLMENT										
DEGREE	MAJOR 1, 2, 2nd DEGREE	CONCENTRATION	CONC	2016	2017	2018	2019	2020	2021	2022
BS	Physics	Astronomy and Astrophysics	PHAS						1	25
BS	Physics	Interdisciplinary	PHID	35	32	32	33	30	22	19
BS	Physics	Professional	PHPR	72	89	79	73	73	64	41
BS	Physics	Teaching	PHPT	2	3	4	3	2	2	2
TOTAL UNDERGRADUATE ENROLLMENT:				109	123	115	109	105	89	87
DEGREE	MAJOR	CONCENTRATION	CONC	2016	2017	2018	2019	2020	2021	2022
MS	Physics		PHYS	3	5	0	3	4	2	1
MS	Optics and Photonics		OPT	4	4	1	4	8	4	7
PhD	Materials Science		MTSI	1	1	1	1	1	0	0
PhD	Physics		PHYS	61	62	75	61	64	68	64
TOTAL GRADUATE ENROLLMENT:				69	72	77	69	77	74	72
TOTAL ENROLLED:				178	195	192	178	182	163	159
	MINOR DESCRIPTION		CONC	2016	2017	2018	2019	2020	2021	2022
	Physics		PHYS	9	7	7	18	12	7	10
	Optics and Photonics		OPTI	2	3	1	2	2	2	1
	Materials		MTRL	9	12	10	9	9	6	9
	Astrobiology		ASBO	15	15	14	7	6	8	15
TOTAL MINOR ENROLLED:				35	37	32	36	29	23	35

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AWARDED DEGREES										
DEGREE	MAJOR	CONCENTRATION	CONC	2016	2017	2018	2019	2020	2021	2022
BS	Physics	Astronomy and Astrophysics	PHAS							1
BS	Physics	Interdisciplinary	PHID	2	2	2	8	1	6	9
BS	Physics	Professional	PHPR	7	7	8	9	9	12	8
BS	Physics	Teaching	PHPT	0	0	0	0	0	0	0
MS	Physics		PHYS	11	6	17	6	10	7	10
MS	Optics and Photonics		OPT	0	0	2	2	0	0	1
PhD	Materials Science		MTSI	0	0	0	0	0	0	1
PhD	Physics		PHYS	5	6	5	6	6	2	10
TOTAL DEGREES AWARDED:				25	21	34	31	26	27	40
AWARDED MINORS										
	MINOR DESCRIPTION		CONC	2016	2017	2018	2019	2020	2021	2022
	Physics		PHYS	1	2	0	2	4	3	4
	Optics		OPTI	2	2	2	0	2	2	2
	Materials		MTRL	4	3	3	4	3	4	5
	Astrobiology		ASBO		4	5	7	3	4	1
TOTAL MINORS AWARDED:				7	11	10	13	12	13	12

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Department of Engineering (Undergraduate)

- [Bachelor of Science in Biological Engineering](#)
- [Bachelor of Science in Biomedical Engineering](#)
- [Bachelor of Science in Chemical Engineering](#)
- [Bachelor of Science in Civil Engineering](#)
- [Bachelor of Science in Computer Engineering](#)
- [Bachelor Degrees in Computer Science](#)
 - Bachelor of Science Interdisciplinary Option
 - Bachelor of Science Professional Option
 - Bachelor of Arts in Computer Science
 - Accelerated BS/MS in Computer Science
- [Bachelor of Science in Construction Engineering Technology](#)
- [Bachelor of Science in Electrical Engineering](#)
- [Bachelor of Science in Environmental Engineering](#)
- [Bachelor of Science in Financial Engineering](#)
- [Bachelor of Science in Industrial and Management Systems Engineering](#)
- [Bachelor of Science in Mechanical Engineering](#)
- [Bachelor of Science in Mechanical Engineering Technology](#)
- Minors
 - Aerospace
 - Biomedical Engineering
 - Computer Engineering
 - Computer Science
 - Electrical Engineering
 - Engineering Management
 - Financial Engineering

Decision(s) concerning the future of the program(s), based on the program review criteria established at the campus:

The Norm Asbjornson College of Engineering, offers 13 undergraduate degrees across engineering and computing disciplines and 7 minors.

All degrees and options will be retained

Rationale or justification for the decision based on the program review process established at the campus. Include graduation numbers and student majors for each of the last seven (7) years for every program under review.

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The Norm Asbjornson College of Engineering has two computer science programs, nine engineering programs, and two engineering technology programs, primarily accredited by ABET during a visit and board review in 2022. As of 2022, the college had 3,587 students supported by 97 full-time faculty members and 34 part-time faculty members. The college produced 631 Bachelor of Science graduates in the 2020-21 academic year, 454 of which were from EAC- accredited programs. Approximately 40 percent of the students are from out-of-state. Enrollment across engineering and computer science majors remains strong, and although numbers have decreased in the last 5 years this comes after substantial growth over the prior 10 years. Upon review through the ABET process, for most of the programs, no deficiencies, weaknesses, or concerns were found, particularly in course content and student learning outcomes. Where weaknesses or concerns were identified, departments have responded and improved the programs and courses and responded to the board such that most of the issues have been deemed 'resolved' by the accrediting board. Programs have responded and are taking measures to address longer-term issues including enhancing programs around student persistence.

Reviewers noted high level industry involvement and support for programs. This support included mentoring of student competition teams, delivering guest lectures and providing field trips, and hiring student interns. Students indicated that industry involvement in the program was one of the highlights of their educational experience. Such a strong level of industry engagement significantly improves student learning of construction practices and ensures the program and its graduates remain current with industry trends and needs.

Note was made of the many opportunities available to students to participate in research. The involvement in research has motivated students to consider graduate school. This research experience gives graduates an advantage when applying to graduate school or going to work in industry. Over 50 percent of graduates from the Chemical and Biological Engineering programs pursue advanced degrees.

The Environmental Engineering program faculty members were noted to be passionate about enhancing student learning and have pursued extramural funding to transform their curriculum. One example is the NSF-funded program "Revolutionizing Engineering Departments" targeting integrated and project-based learning geared toward innovating engineering education in Environmental Engineering at the university. This approach will create high-value educational experiences for students and produce graduates who are ready to enter professional practice.

Overall, the reviewers recognized a strong commitment to advancing the gender diversity of the faculty and students in the Norm Asbjornson College of Engineering. These efforts have resulted in an increase in female tenured/tenure-track faculty members from 9.1 to 26.2 percent in 10 years, which is significantly greater than the national average of 17 percent. The increase enriches the learning environment for all students, enhances the retention and graduation rate of female students, and better prepares students for the workplace.

ENROLLMENT										
DEGREE	MAJOR 1, 2, 2nd DEGREE	CONCENTRATION	CONC	2016	2017	2018	2019	2020	2021	2022
Bs	BioEngineering			42	46	17	16	17	17	14
BS	Biological Engineering			137	156	146	136	126	97	73
BS	Biomedical Engr.							21	85	108
BS	Civil Engineering			360	330	356	342	351	308	282

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BS	Civil Engineering	Bio Resource Option		122	137	73	29	5	1	1
BS	Chemical Engineering			438	450	391	361	299	233	217
BS	Computer Engineering			147	147	130	124	136	126	128
BS	Computer Science	Interdisc. Option		126	119	132	124	125	97	84
BS	Computer Science	Professional Option		398	410	360	350	351	366	380
BA	Computer Science				15	40	54	43	74	75
BS	Constr. Engr. Tech.			218	192	192	186	171	180	180
BS	Environmental Engr.				1	81	118	153	152	149
BS	Electrical Engineering			279	269	272	219	189	198	209
BS	Financial Engineering			61	65	65	60	55	48	49
	General Engineering			130	100	98	121	102	69	66
BS	Ind & Man Syst Engr			133	123	125	111	101	80	59
BS	Mechanical Engr.			999	1021	977	972	968	914	883
BS	Mech. Engr. Tech			260	245	228	214	227	217	248
TOTAL UNDERGRADUATE ENROLLMENT:				3852	3826	3683	3537	3442	3264	3203
DEGREE	MAJOR	CONCENTRATION	CONC	2016	2017	2018	2019	2020	2021	2022
TOTAL GRADUATE ENROLLMENT:										
TOTAL ENROLLED:										
	MINOR DESCRIPTION		CONC	2016	2017	2018	2019	2020	2021	2022
	Aerospace			64	69	52	62	74	74	88
	Biomedical Engr			7	27	36	36	25	26	14
	Computer Engr			20	24	27	16	11	16	16
	Computer Science			34	30	28	36	39	35	38
	Data Science						14	25	35	45

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	Electrical Engr			10	14	8	7	7	8	6
	Financial Engr			6	5	4	2	2		
	Ind & Man Syst Engr			2	1					
	Engr Management			7	6	6	8	5	9	12
	Building Energy Syst			1	3	4	4	13	7	11
	Mate3rials			12	10	9	9	6	9	13
	Mechatronics			25	26	33	20	16	19	29
	Optics & Photonics			3	1	2	2	2	1	1
TOTAL MINOR ENROLLED:				201	216	221	216	223	229	273
AWARDED DEGREES										
DEGREE	MAJOR	CONCENTRATION	CONC	2016	2017	2018	2019	2020	2021	2022
BS	BioEngineering			13	19	23	10	3	7	7
BS	Biological Engineering			25	19	21	22	28	23	23
BS	Biomedical Engr.									4
BS	Civil Engineering			60	54	59	49	68	62	72
BS	Civil Engineering	Bio Resource Option		20	23	30	34	21	4	1
BS	Chemical Engineering			95	82	119	108	87	85	70
BS	Computer Engineering			13	18	20	26	22	17	14
BS	Computer Science	Interdisc. Option		24	21	19	27	23	34	24
BS	Computer Science	Professional Option		36	41	68	63	57	62	68
BA	Computer Science					3	3	5	4	10
BS	Constr. Engr. Tech.			31	40	35	43	42	32	38
BS	Environmental Engr.						1	5	18	22
BS	Electrical Engineering			40	37	58	52	47	38	32
BS	Financial Engineering			2	10	6	12	15	11	10
BS	Ind & Man Syst Engr			23	34	22	23	23	33	25
BS	Mechanical Engr.			155	138	162	162	163	179	171
BS	Mech. Engr. Tech			61	52	52	44	46	54	39
TOTAL DEGREES AWARDED:				598	588	697	679	656	663	631

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AWARDED MINORS										
	MINOR DESCRIPTION		CONC	2016	2017	2018	2019	2020	2021	2022
	Aerospace			30	37	45	26	36	48	40
	Biomedical Engr				3	5	11	13	11	17
	Computer Engr			16	8	7	12	8	5	5
	Computer Science			10	18	12	9	12	8	17
	Data Science							5	15	22
	Electrical Engr			2	3	8	2	4	2	3
	Financial Engr				1				1	
	Ind & Man Syst Engr					1				
	Engr Management				5	4	2	5		5
	Building Energy Syst				1		4	3	9	3
	Materials			3	3	4	3	4	5	3
	Mechatronics			9	12	10	14	9	11	6
	Optics & Photonics			2	2		2	2	2	
TOTAL MINORS AWARDED:				72	93	95	85	101	117	121

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PROGRAM REVIEW

Health and Human Development: Counseling Programs

- MS Counseling Options
 - Mental Health Counseling
 - Marriage and Family Counseling
- MED Education: School Counseling Option

Decision(s) concerning the future of the program(s), based on the program review criteria established at the campus:

The Counseling Programs are housed in the College of Education, Health and Human Development. The department of Health and Human Development offers an MS in Counseling with two options: Mental Health Counseling and Marriage and Family Counseling and offers an MEd option in School Counseling.

All degrees and options will be retained

Rationale or justification for the decision based on the program review process established at the campus. Include graduation numbers and student majors for each of the last seven (7) years for every program under review.

The Counseling Programs are all housed in the College of Education, Health and Human Development in one broad department. All three degree options are accredited by the Council for Accreditation of Counseling and Related Education Programs (CACREP). The Board of Directors for CACREP met January 12-14, 2023 and reaffirmed accreditation for all three programs.

All three programs are functionally housed together, with students taking Core Counseling courses together. They have a clinic, where all students learn counseling skills and Mental Health Counseling and Marriage and Family Counseling students complete Practicum while School Counseling student complete Practicum at schools. Internships are completed at community sites as well as the clinic. The Department Chair is a counselor educator and currently the institution is moving to separate counseling into its own department (currently is housed with several other programs).

CACREP reviewers recognized the strengths of the intentional programming by the faculty, academic preparation for the workforce noted by students and alumni, the order of course progression and the opportunity to learn from faculty who themselves are clinicians. Program alumni reported that the group experience was very meaningful to their understanding and skills in providing group therapy. Reviewers found that adding graduate teaching assistants provided important support and mentorship from more advanced students to more beginning students. CACREP reviewers noted the faculty's flexibility during Covid and ability to pivot towards and teach telemental health skills as valuable in navigating a quickly changing mental health system. No specific requirements were placed on the program to attain accreditation and suggestions included methods for providing consistency in syllabi and clearer transparency in curricular standards.

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Reviewers commended the program’s formalization of a commitment to an inclusive learning environment geared toward student and faculty diversity and recommended the program include these efforts during their annual program evaluation process.

ENROLLMENT										
DEGREE	MAJOR	CONCENTRATION	CONC	2017	2018	2019	2020	2021	2022	2023
MS	Counseling	Mental Health Counseling; Marriage and Family Counseling	CNSL	29	32	31	37	37	41	40
MED	School Counseling		SCNS	9	10	12	13	14	14	10
TOTAL GRADUATE ENROLLMENT:				38	42	43	50	51	55	50
TOTAL ENROLLED:				38	42	43	50	51	55	50
AWARDED DEGREES										
DEGREE	MAJOR	CONCENTRATION	CONC	2017	2018	2019	2020	2021	2022	2023
MS	Counseling	Mental Health Counseling; Marriage and Family Counseling	CNSL	8	9	19	10	19	17	16
MED	School Counseling		SCNS	3	4	5	5	6	6	8
TOTAL DEGREES AWARDED:				11	13	24	15	25	23	24

Montana University System

PROGRAM REVIEW

Health and Human Development: Dietetics

- BS Nutrition Science
- BS Dietetics
- Graduate Certificate: Montana Dietetics Internship

Decision(s) concerning the future of the program(s), based on the program review criteria established at the campus:

The Dietetics programs are housed in the Department of Health and Human Development and include a BS in Nutrition Science, BS in Dietetics, and a Graduate Certificate in a Montana Dietetics Internship.

All degrees and options will be retained

Rationale or justification for the decision based on the program review process established at the campus. Include graduation numbers and student majors for each of the last seven (7) years for every program under review.

The Dietetics programs are reviewed by the Accreditation Council for Education in Nutrition and Dietetics (ACEND), the accrediting agency for the Academy of Nutrition and Dietetics. Accreditation was granted on April 10, 2023 for a maximum enrollment of 26 first-year graduate and 26 second-year graduate interns for a total maximum enrollment of 52. The program has been accredited to offer remote supervised practice and distance education.

Program strengths recognized by reviewers included strong administrative support; strong advising, leadership, and communication with students; collaborative relationship between the BS and internship programs; well-developed curriculum with knowledge requirements clearly indicated on the course syllabi and assignments; and faculty and leadership team collaborations. The reviewers commented on the internship program’s robust diversity, equity, and inclusion initiatives; variety of rotation experiences; strong, knowledgeable, and dedicated preceptors; communications among the program director, preceptors, and interns; and the sustainability focus that utilizes local food system resources and attract applicants.

ENROLLMENT										
DEGREE	MAJOR 1, 2, 2nd DEGREE	CONCENTRATION	CONC	2017	2018	2019	2020	2021	2022	2023
BS	Nutrition Science		FNSC	37	33	29	26	28	27	28
BS	Dietetics		FNDS	89	92	110	102	99	72	68
TOTAL UNDERGRADUATE ENROLLMENT:				126	125	139	128	127	99	96
DEGREE	MAJOR	CONCENTRATION	CONC	2017	2018	2019	2020	2021	2022	2023

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Graduate Cert	Montana Dietetics Internship		MDIO	23	25	26	25	16	3	4
TOTAL GRADUATE ENROLLMENT:				23	25	26	25	16	3	4
TOTAL ENROLLED:				23	25	26	25	16	3	4
AWARDED DEGREES										
DEGREE	MAJOR	CONCENTRATION	CONC	2017	2018	2019	2020	2021	2022	2023
BS	Nutrition Science		FNSC	4	8	6	8	9	5	7
BS	Dietetics		FNDS	28	17	9	31	25	23	20
TOTAL DEGREES AWARDED:				32	25	15	39	34	28	27