ASSOCIATE OF SCIENCE IN BIOLOGY

ACADEMIC PROGRAM REVIEW 2025

MEET OUR TEAM

James Tutt
Professor
School of STEM Dean

M.A., Western New Mexico University
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Associate Professor
Program Lead

Ph.D., M.S., Maharishi Int'l University
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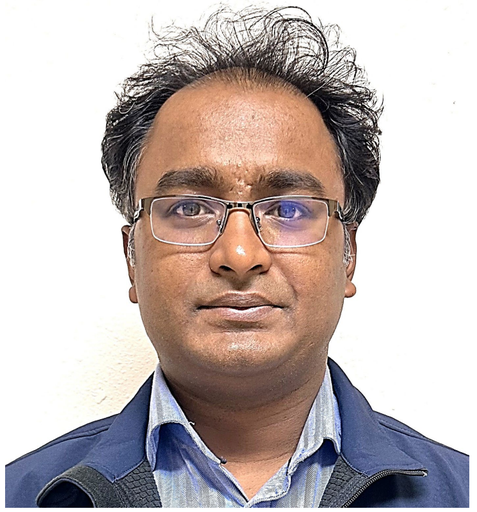


Partha S. Saha, Ph.D.
Assistant Professor
Biology Faculty

Postdoc. Training, University of South Dakota
Ph.D., South Dakota State University
M.S., Katholieke Universiteit Leuven
M.S., University of Aberdeen
B.S., Noth South University

MISSION & Goals

Program Mission Statement
The AS in Biology program will have adequate preparation for students to continue their education in Biological Sciences or pursue a job in a related field.

Program Goals
AS Biology 1. Students will take the basic science prerequisites for biology technician work, or for further academic programs in biology or related areas. 2. Students will understand and be able to integrate important relationships between their traditional Diné knowledge and the western science knowledge. 3. Students will understand relationships between the core fundamental sciences and their professional career work and goals in the biological sciences.

Overview Data Summary

Overview – Fall Only	Fall 2020	Fall 2021	Fall 2022	Fall 2023
Undergraduate Headcount	20	19	23	36
Total Student Full-time Enrollment	11	9	11	21
Total Student Part-time Enrollment	9	10	12	15
Total Students that graduated (fall & spring)	3	5	4	8
Cohorts: The data shown here are cohorts by term.	**Fall 2020**	**Fall 2021**	**Fall 2022**	**Fall 2023**
# of students in cohort (FTF & NT)				
Persistence Trend (fall to spring)	75%	50%	44%	44%
Retention Trend	25%	50%	44%	44%
Graduation Trend				
Following a Cohort of students from 2018 over the course of six years, ALL programs at the institution have a 7% chance of students declaring a major and graduating with the major.				

The AS Biology program is a traditional education program designed to help students obtain a good job or successful enrollment in a higher-level academic program in order to obtain a good job. It also provides our students with an understanding of nature from the western science point of view and in turn how their Native cultural knowledge relates to their discipline knowledge.

This origin of the AS Biology program at Dine' College is lost in time. We believe the program started approximately between 1968 to 1975, by the biology faculty at the time. AS Biology programs serve as steps to BS Biology programs and 2-year professional programs, such as nursing.

Changes since the last APR

01

Last reviewed through APR in 2021. The Checklist was updated to make sure BS Biology prerequisites were taken by the time the student would transfer to the junior year of the BS Biology program.

02

This also included updating math content required for AGEC-S (MTH 190 and MTH 213 or MTH 191).

DEGREE PROGRAM OVERVIEW

Biology (A.S.)
Students selecting Biology will complete a broad program in biological and related physical sciences. They will be prepared to pursue employment or further studies in fields such as zoology, botany, microbiology, ecology, wildlife biology, molecular biology, biotechnology, as well as many other fields of biology according to their interests.

CURRICULUM

BIO 181 and 182 General Biology I & II 4, 4

>Choice of one (1):
(Note: BS Biology program requires CHM 151 and 152
before Junior year)
Either CHM 151 and 152 General Chemistry I & II 4, 4
Or CHM 130 and 300 Fundamental Chemistry and Organic Chemistry 4, 4 (sequence admissible as professional degree's prerequisite, e.g., nursing, MD, Vet Science, etc.)
(Note: BS Biology students take organic chemistry in Junior year)

Choice of two (2): 8 credits:
MTH 190 Pre-Calculus
And MTH 213/PSY 213 Statistics Or MTH 191 Calculus I
Or MTH 251 Calculus for Life Science and Business (4)
(Note: The AGEC-S block for Math & Science majors
requires MTH 191 or MTH 213. BS Biology program requires MTH 190 and either 213 or 191 before junior year.)

>Biology Electives
Any two 200-level or above Biology lab courses, 8 credits

Total Program Credits: 24
General Education 39-41
Total Credits Earned: 63-65

DINE IDENTITY & PROGRAM UNIQUENESS

Diné language is incorporated within the program curriculum.

This is required within the General Education program. It is also mentioned by faculty as they understand how it relates to the courses being taught. New faculty take DEP (Dine' Education Philosophy) courses on Friday's, as a requirement in their first few years, and optionally throughout their tenure.

Diné history and culture are infused within content of the program curriculum:

As indicated above, this is required within the General Education and related to students according to the Instructor's background and understanding. Additionally, some Instructors have term papers and end-of-term presentations designed around a Dine' perspective related to the discipline of the course. For instance, students would choose to research and write about some aspect, of their choice, about Dine' perspectives of anatomy and physiology, general biology principles, genetics, chemistry, etc.. Students might be encouraged to interview family elders and Dine' medicine men or women to get this information. Students enjoy these activities and find them meaningful.

INSTRUCTION METHODS

This program can be completed only in person in Tsaile, Tuba City and Shiprock. There are some online aspects to some courses, for instance some chemistry and biology courses are delivered partially online with lecture, partially in person with lab. Most or all labs are face to face. Lectures can be zoom in person but synchronous for off campus students, and recorded for asynchronous viewing. Homework can be online tutorial programs, like McGraw Hill's Connect programs, which are popular among faculty. Testing can also be done online through Connect with digital proctoring, or in person.

Most faculty are working towards being credentialed to teach online through the Quality Matters program. However, science courses with labs are preferred to not be taught online by faculty, and there is now a requirement for faculty to teach in person on the main campuses, and not teach through distance education. There is an advantage to teaching online in some cases. For instance, General Education Biology courses must be taken by all students at all campuses, but only 3 of the 6 campuses have lab teaching facilities. Therefore BIO 100 is a popular online General Education lab course. Another advantage is one faculty can teach popular course lectures (BIO 181/182) to all campus sites through zoom, freeing up the biology faculty at the other campuses to teach the labs only for the courses.

ASSESSMENT OF STUDENT LEARNING OUTCOMES

Program Student Learning Outcomes

PSLO#1---Students will be able to recognize and describe the relationships among structure, function, and processes at all biological levels.

PSLO#2---Students will be able to solve problems, apply appropriate scientific methodologies, and quantitatively interpret results through oral and written communication.

PSLO#3---Student will apply foundational content knowledge in the biological sciences to evaluate phenomena that occur in the natural world.

PSLO#4---Students will use and integrate biological themes into the Dine Way of Life; articulating their relationship and importance.

PSLO#5---Students will demonstrate ethical integrity, professionalism, and a commitment to learning.

This academic year, 2024-2025, Program faculty are assessing PSLO #1. A rubric will be applied to the designated artifact for BIO 181 and 182, the courses articulated with PSLO #1, which is the final test/exam. Criteria are Met = 80-100% score; Partially Met = 70-80%; Not Met = $\leq$ 69%
Assessment results are calculated and discussed during Faculty Assessment Days, May 13-14.

PROGRAM FACULTY

PROGRAM FACULTY PROFILE

all non -native

1B. **Karen Hannah Freedman**, MS, (Tsaile since 2024) BIO 181 General Biology I, BIO 205 Microbiology

2B. **Shazia Hakim**, Ph.D., (Tuba City since 2018) BIO 181 General Biology I, BIO 205 Microbiology, BIO 182 General Biology II, BIO 201/202 Human Anatomy & Physiology

3B. **Partha Saha**, Ph.D., (Shiprock since 2023) BIO 181 General Biology I, BIO 205 Microbiology, BIO 182 General Biology II, BIO 201/202 Human Anatomy & Physiology

4C. **Shreeta Acharya**, Ph.D. (Tsaile since 2024) CHM 130 Introductory General Chemistry, CHM 151 General Chemistry I, CHM 152 General Chemistry II, CHM 300 Introductory Organic Chemistry

5CB. **Barb Klein**, MS. (Tsaile since 2003) CHM 130 Introductory General Chemistry, CHM 151 General Chemistry I, CHM 152 General Chemistry II, CHM 300 Introductory Organic Chemistry

6C. **Babatunde Ojo**, Ph.D (Tuba City since 2018). CHM 130 Introductory General Chemistry, CHM 151 General Chemistry I, CHM 152 General Chemistry II, CHM 300 Introductory Organic Chemistry

7M. **Chengde Wang**, Ph.D. (Tsaile since 2006) all MTH courses especially MTH 191 Calculus

8M. **Oleksandr Mekeyev**, Ph.D (Tsaile since 2014), all MTH courses especially MTH 213 Statistics

	2020-21	2021-22	2022-23	2023-24
Average Student to Faculty Ratio	17:1	11:1	13:1	15:1

STUDENT TO FACULTY RATIO

REFLECTION ON FACULTY MANAGEMENT, CONTRIBUTION & EVALUATION

At Dine' College each faculty are observed in their course teaching by a peer faculty in the same discipline area during Spring semester. The Dean also evaluates the faculty in the Spring. Contracts are renewed in the Spring based on these two evaluations. Mentoring usually takes place informally by senior faculty in the discipline area of the new faculty, then ongoing through collegial interaction with all other faculty.

Strengths: students are happy with their classes and are successful with their degree program. Faculty enjoy the College and the School of STEM overall. Opportunities to improve: Faculty are always improving their teaching, their lab activities, their research involvement. There seems to be a consensus that not all faculty are "buddy-buddy" but we manage to get along enough, although it could be better through more collegial behavior towards each other.

STUDENT PROFILE

AS Biology students are trying out biology and may move into the BS Biology program, or choose one of the other BS programs, Biomedical, Agriculture, Public Health. Some are transfer students wishing to go to one of the regional universities, usually in Arizona or New Mexico. Some are taking advantage of the low tuition (lowest in the southwest, maybe even in the country). Since the federal government requires students to declare a major as a freshman, it is not surprising to see them go anywhere once they graduate, or earlier. The other AS programs precludes enrollment by students interested in environmental science, health occupations or public health.

STUDENT PROFILE OVERVIEW

	2020-21	2021-22	2022-23	2023-24
Full-Time & Part-Time Students – unduplicated, includes fall, spring and summer terms	28	27	37	52
First Time First Year Enrollees	4	1	10	7
Transfer Students	0	1	3	2
Pell Grant Recipient – at least one term	20	17	22	38
Gender = F/M	22/6	22/5	21/16	32/20
Race/Ethnic = Native/Non-Native	28/0	27/0	37/0	52/0
Age Range:				
13-17	0	0	0	1
18-21	3	8	18	30
22-24	16	14	7	10
25-34	7	3	10	6
35-49	2	2	2	4
50 & Older	0	0	0	1

Student by Chapter affiliation – Top 6 over a 4-year period

Chapter	Total # of students enrolled
NULL – Student did not disclose/no data in J1	10
Tuba City	9
St. Michaels	8
Shiprock	5
Chinle	5

STUDENT ENGAGEMENT & LEARNING OPPORTUNITIES

Dine’ College has a First Year Program but STEM is not directly involved. Our math placement program has been more successful lately, with higher percentages of graduates from all first-year math courses. We have undergraduate research for sophomores and above. We have lab assistant positions for sophomores and above also. We have a summer research internship for high achieving sophomores and above. The AS Biology program does not have a capstone course or project requirement. Most students pass the courses in the program to transfer into BS programs at Dine’ College or other regional universities, or to get a job with their AS degree on the Reservation. There are a lot of jobs on the Reservation for AS Biology graduates.

COMMUNITY ENGAGEMENT

Dr. Hakim has activities in Tuba City for AS students, the local community, Junior High, and high schools. Many research activities which AS students can be involved are progressing in collaboration with the local community, Chapter Houses, and institutions in neighboring towns. They include: water quality and purification, wastewater reclamation project, wildlife biology research in collaboration with the Navajo Nation Fish and Wildlife Department. While the Land Grant Office has interns who can be AS Biology students who involve themselves in ranching-related activities for example, sheep shearing, hoof care and maintenance, and community gardening, etc..

HIGH IMPACT PRACTICES

- Our math placement program has been more successful lately, with higher percentages of graduates from all first-year math courses.
- Undergraduate research for sophomores and above, lab assistant positions for sophomores and above.
- Summer research internship for high achieving sophomores and above.
- The AS Biology program does not have a capstone course or project requirement.
- Most students pass the courses in the program to transfer into BS programs at Dine' College or other regional universities, or to get a job with their AS degree on the Reservation.
- There are a lot of jobs on the Reservation for AS graduates: NN Government, public health, public assistance, education, hospital work.

CO-CURRICULAR

Library Services

We have an excellent library with the largest selection of books and periodicals in the area. We have faculty-level expert librarians that assist students, Instructors and courses from freshman to graduate students. The Tsaile library was remodeled in 2018 to increase study rooms and carrels. There are also libraries at Shiprock and Crown Point campuses.

Student Success Services

We have computer science, math, chemistry and English tutors available to our students through out Student Services. There are a lot of cultural and intellectual and artistic and entertainment presentations almost on a daily basis available to all students and the College community. Student Services provides a rich co-curricular variety of activities and services that seem to only increase and improve over time.

COURSE SATISFACTION & GRADUATION SURVEY

Course Satisfaction

The College Assessment Program for STEM programs, for the AS Biology program, summarized above, has found most courses meet the assessment criteria. There have been some new faculty that have had difficulty with student satisfaction, but faculty mentors and the Dean have been able to successfully negotiate the problems and train these faculty for improved Instructional outcomes.

Graduation Survey

As indicated in the 3-year Program Assessment Report above, the most recent Program Assessment PSLO #5 outcome was “Met” by students, which indicates their “ethical integrity, professionalism, and a commitment to learning. This was seen through three measures: Attendance and Class Participation (measure 1), Percent Assignments turned in (measure 2), and their “Confidence in their scientific knowledge” (measure 3).

PROGRAM RESOURCES

FACILITIES & OPERATING BUDGET

Facilities

Tsaile: 4 lab classrooms, 2 for biology, 1 for chemistry, 1 for environmental science.
Shiprock has a biology and a chemistry classroom in a new Math Science building.
Tuba City has one science lab classroom and two small research labs for training, one for molecular biology and one for Biochemistry

Faculty office space: We have one Administrative Assistant office in Tsaile, and all faculty in Tsaile, Tuba City and Shiprock have their own offices.

Digital databases for academic use, computer labs, conference rooms, and other equipment. We have a computer science lab classroom in Tsaile. There are several computer student learning centers, one at each campus.

The College in Tsaile had a large auditorium until the Student Union fire, but also has a recently renovated large auditorium classroom in the Ned Hatathlie Center (NHC). There are many labs at the College, three for the MS Biology program, run by Dr's Hakim, Makeyev, and Skaltsas.

The STEM School and the College are responsible for all of our faculties. It should be noted that indirect costs from grant money helps with this as well.

Operating Budget
Costs are from infrastructure maintenance such as utilities and repair, and also renovation in some cases of lab spaces requiring structures such as sinks, cabinets, tables, chairs, etc. Faculty and staff salaries are costs. Supplies and equipment for labs are paid for by grants as much as possible, but STEM College finances anything that is not related to grant objectives. Many faculty have research grants that are used in part for most of the kinds of these costs. Actual dollar amounts of these costs by category should be supplied by the College finance team.

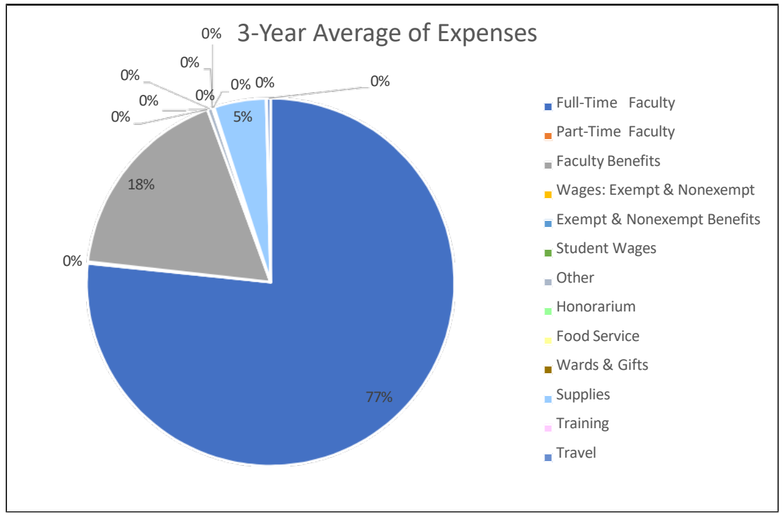
A total of 24 undergrads, AS and BS students, supported for summer research on wastewater reclamation via the USDA-NIFA-TCRGP grant from 2021-2024 at Tuba City center

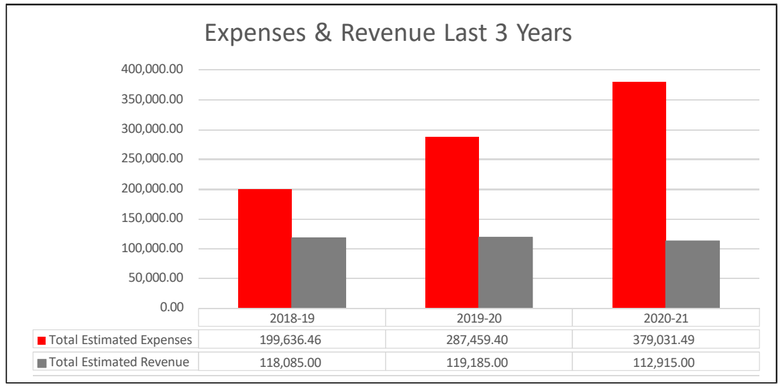
Personnel Expenses	BIO		
	2018-19	2019-20	2020-21
Full- Time Faculty	$151,591.29	$216,871.41	$295,609.78
Part-Time Faculty	$0.00	$0.00	$1,435.65
Faculty Fringe Benefits	$35,801.96	$53,331.44	$63,640.51
Wages: Exempt	$0.00	$0.00	$0.00
Wages: Non Exempt	$0.00	$0.00	$0.00
Fringe Benefits: Exempt			
Fringe Benefits: Nonexempt	$0.00	$0.00	$0.00
Wages: Students	$0.00	$0.00	$0.00
Total Personnel Expenses	$187,393.25	$270,202.85	$360,685.94

Other Expenses	BIO		
	2018-19	2019-20	2020-21
Advertising/Promotion			
Contract: Honorarium	$0.00	$0.00	-$300.00
Food Service			
Awards & Gifts	$625.00	$0.00	$600.00
R & M: Equipment	$0.00	$3,665.00	$0.00
R & M: Other	$115.81	$0.00	$0.00
Rental: Equipment			
Scholarship: Fee Remission			
Supplies: Dues/Subscription	$300.00	$734.00	$1,422.18
Supplies: Instructional	$9,729.60	$11,766.51	$15,577.18
Supplies: Office	$135.05	$0.00	$0.00
Supplies: Operating			
Supplies: Postage/Freight	$11.25	$0.00	$0.00
Supplies: Printing/Binding	$0.00	$52.00	$0.00
Training: Seminar Fees	$0.00	$0.00	$524.19
Travel Expense	$1,210.65	$902.63	$522.00
Travel: Assigned Vehicle	$115.85	$136.41	$0.00
Vacancy Advertisement			
Total Other Expenses	12243.21	17256.55	18345.55

Revenue	BIO		
	2018-19	2019-20	2020-21
Course/Lab/Program fee			
State Grants			
Federal Grants			
Course Enrollments	551	561	520
Student Credit Hours (SCH)	2147	2167	2053
Tuition Rate	55	55	55
Estimated Revenue based on SCH	$118,085.00	$119,185.00	$112,915.00
Total Revenue	$118,085.00	$119,185.00	$112,915.00

	BIO		
	2018-19	2019-20	2020-21
Total Estimated Expenses	199,636.46	287,459.40	379,031.49
Total Estimated Revenue	118,085.00	119,185.00	112,915.00
Est. Revenue minus Est. Expense	-81,551.46	-168,274.40	-266,116.49
Ratio (Revenue / Expense)	0.59150017	0.414615073	0.297904008





Notes:
2024-25 "Other Expenses" amount is approx. $43,000. Other Expenses money comes from lapsed salary funds – salary not used before going back into General Fund at end of academic year.

Salary amounts are totals from faculty based on BIO courses taught. The amount is from the faculty's contract and does not include the percent paid by the faculty's grants.

"Revenue" does not include grant money spent on Personnel and Other Expenses.

"STEM 2020" NSF grant, 2015-2022, was a 2.5 million grant paying for 3 faculty positions (1 was biology), student wages (2 were bio lab assistants, and 15 summer biology research interns each summer) and Other Expenses

THANK YOU!

Questions?