

NORTH DAKOTA STATE UNIVERSITY

Academic Program Prioritization
Final Report Draft

NORTH DAKOTA
STATE UNIVERSITY

Introduction

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INTRODUCTION AND EXECUTIVE SUMMARY

Introduction

Huron Project Team

Huron's core team includes six members with significant experience working with colleges and universities to deliver academic program prioritization assessments.



Peter Stokes, Managing Director pstokes@hcg.com 617-226-5507

Over a 20-year career, Peter has worked with a diverse array of higher education institutions as they have sought to establish strategies for differentiation and growth, optimize their program portfolios, develop innovative curricular models, support the work readiness for their graduate, and engage meaningfully with their alumni and employer partners. Peter provided leadership and guidance throughout the project.



Mike Cogan, Director mcoogan@hcg.com 612-206-6270

Mike has spent more than 30 years in a higher education environment at the executive, consultant, staff, and faculty level. He has led more than 35 academic portfolio reviews and cost-to-educate projects across the country with an emphasis on faculty effort analysis, academic resource allocation, and organizational transformation. Mike has extensive campus level experience in institutional planning, decision support, budget redesign, organizational transformation, and grant development. Mike oversaw the direction of the project and lead all engagement with the NDSU community.



Mara Hill, Associate

Mara has nearly seven years of experience in the higher education industry. She focuses on supporting institutions across the higher education industry in achieving their objectives related to academic portfolio optimization, optimal financial management, and administrative efficiency and effectiveness. During this project, Mara managed the team's day-to-day operations.

Introduction

Huron Project Team

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Danielle Bailey, Associate

Danielle comes from a varied background in higher education, having spent 8 years at a large, private research institution in the northeast. Prior to joining Huron, she planned and implemented new strategies in immigration, enrollment management, selection & recruitment, and global management. Danielle has developed the Cost to Educate model for NDSU, allowing the institution to assess academic resource allocation using various metrics, and identify levers to pull to enhance performance.



Hunter Burson, Associate

During his time at Huron, Hunter has worked with public and private institutions on projects focused on assessing and identifying opportunities to enhance strategic positioning, evaluating the academic portfolio, identifying cost reduction opportunities, and planning for university-wide administrative transformations. Prior to Huron, he worked on executive-level strategic initiatives at a financial services company. Hunter supported the NDSU team with synthesizing the findings and identifying opportunities.



Matt Williams, Analyst

Matt came to Huron with a background in curriculum design and instruction. Prior to consulting, he created content at the Smithsonian Institution, taught high school, and led professional development with Teach For America. He focuses on helping institutions assess academic offerings in the context of their strategic plans and changing market conditions. During this project, Matt produced a market positioning study to evaluate student demand and occupational trends for NDSU's programs.

Introduction



Project Timeline

During this engagement, Huron was able to:

1. **Present and discuss opportunities** for NDSU to optimize academic resources in the following areas:
 - Course Economics
 - Graduate Education
 - Faculty Effort and Pay
 - Program Growth
 - Academic Overhead

2. **Align on next steps** for sharing college-level opportunities with each Dean

PROJECT PHASE	Jan 18	Jan 25	Feb 1	Feb 8	Feb 15	Feb 22	Mar 1	Mar 8	Mar 15	Mar 22	Mar 29	Apr 5
Gather NDSU Input and Perspective	Data Collection and Campus Interviews			Town Hall and Campus Survey			Model Development*			Socialize Assessment Results		
Project Phases												
1. Project Initiation	★											
2. Academic Portfolio Assessment				★	★							
3. Positioning Study								★				
4. Campus Engagement										★		★

Project Phase Key Meeting 
 Individual Dean Engagement 

The Cost-to-Educate model created by Huron’s team and NDSU’s academic leaders has produced an array of data-driven opportunities for NDSU to manage academic costs.

Introduction

Project Objectives

This assessment consists of a holistic academic cost management analysis intended to provide NDSU with an in-depth view of academic program economics and the consequent impact of local academic policies, norms, and exceptions.

Desired outcomes of this initiative include:

- 1 **Detailed analysis** of course economics, program structures, academic policies (with a focus on the impact on faculty instructional effort), and market performance metrics;
- 2 A framework that allows for **data-informed, objective comparisons of NDSU's academic offerings**, focusing on mission alignment, productivity, portfolio sustainability, and overall viability within the greater market landscape;
- 3 An **MS Excel-based model** that allows for the University to roll-up revenues and expenses to the academic unit level and outlines the various contribution margins of each credit hour; and
- 4 A **summary report outlining significant findings, takeaways, and potential opportunities** for enhanced academic decision making. These include, but may not be limited to:
 - Trends in course/program growth and efficiencies
 - Estimated contribution margin by program
 - Summary of faculty effort and supplemental pay practices
 - Opportunities to streamline costs within the academic portfolio through new management practices or changes to the portfolio
 - Market positioning summary of trends, opportunities, and challenges presented by the market in relation to NDSU programming

Introduction

Project Outputs and Deliverables

The academic portfolio initiative led to the development of a cost-to-educate model that reflects input from members of the NDSU academic community, as well as a summary report which includes a framework for future reviews.

Findings Summary Report



Contents:

- *Takeaways and Recommendations*
- *Detailed Analysis and Findings*
- *Methodology and Assumptions*

Dynamic MS Excel Model



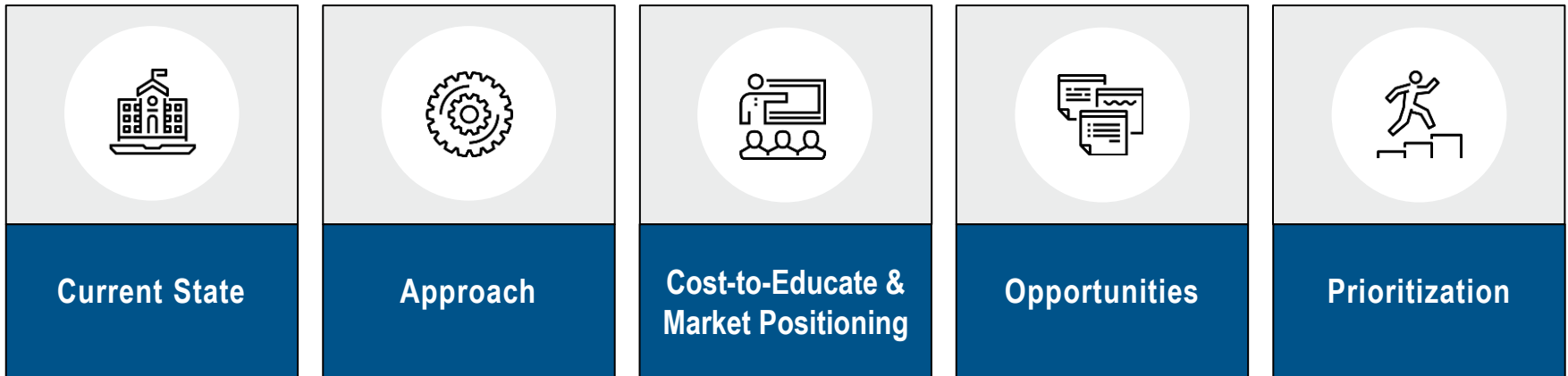
Contents

- *Inputs for Measuring Instructional Load*
- *Summary Tabs for Cost, Capacity, Utilization*
- *Cleaned Data for Additional Ad-hoc Analyses*

Executive Summary

A Path to Academic Resource Optimization

Establishing a sound methodological approach to understanding the costs associated with curriculum delivery at NDSU is an important supplement to assure mission responsiveness, student success, and financial viability.



How did we get here?

NDSU's enrollment has been declining since it peaked in AY2015, reducing state appropriations and net revenue from tuition, and leading to multiple rounds of incremental budget cuts to reduce academic expenditures.

How do we measure?

In collaboration with the NDSU community, Huron integrated key institutional datasets and accounted for local policies and norms to co-create an academic cost-accounting model that reflects the nuances of each academic unit.

What did we learn?

The average cost per credit hour produced at NDSU was \$340, with significant variability across academic units and program levels. Relatively low academic overhead reflects the reality of previous budget cuts, but material opportunities exist.

What do we do?

Graduate education at NDSU was found to be expansive and expensive, and Huron has provided an array of short and long-term opportunities to academic improve efficiency and address enrollment declines.

How do we do it?

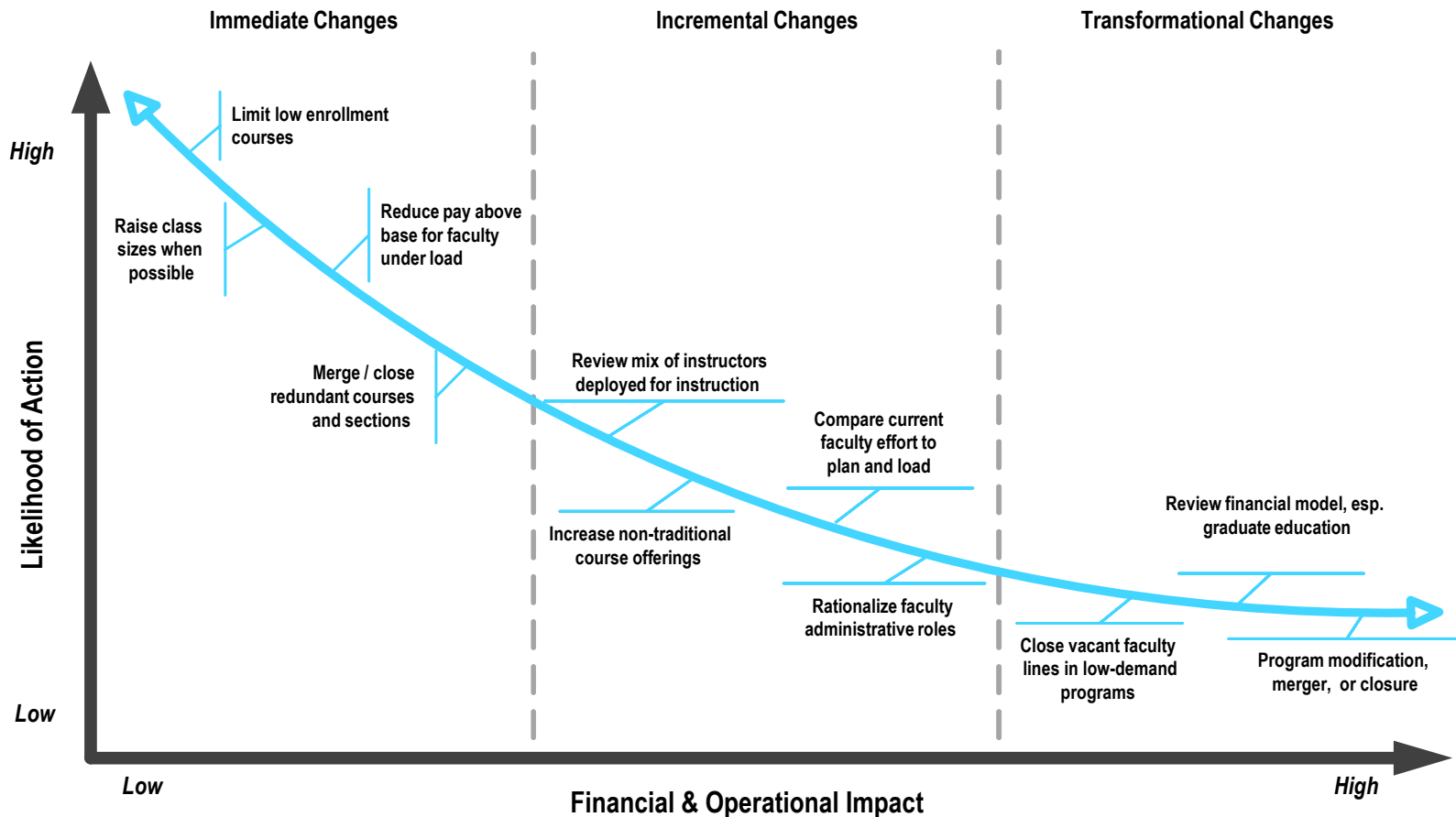
Huron worked with each NDSU Dean and other institutional leaders to consider how the cost-to-educate model can inform key decisions, which must be made in the context of available resources and strategic priorities.

Working collaboratively with leadership and faculty, Huron developed a customized costing model and market positioning analysis in order to identify opportunities to maximize resources within NDSU's academic portfolio.

Executive Summary

Academic Resource Management

Huron recommends evaluating an array of opportunities to optimize academic resources, to select those that align with NDSU's strategic priorities, mitigate risks, and achieve desired outcomes at the college and university level.



Executive Summary

Academic Resource Optimization Opportunities

Huron encourages NDSU to consider the potential benefits and unique challenges that each opportunity presents for an individual unit, North Dakota State University, and the surrounding region and community.

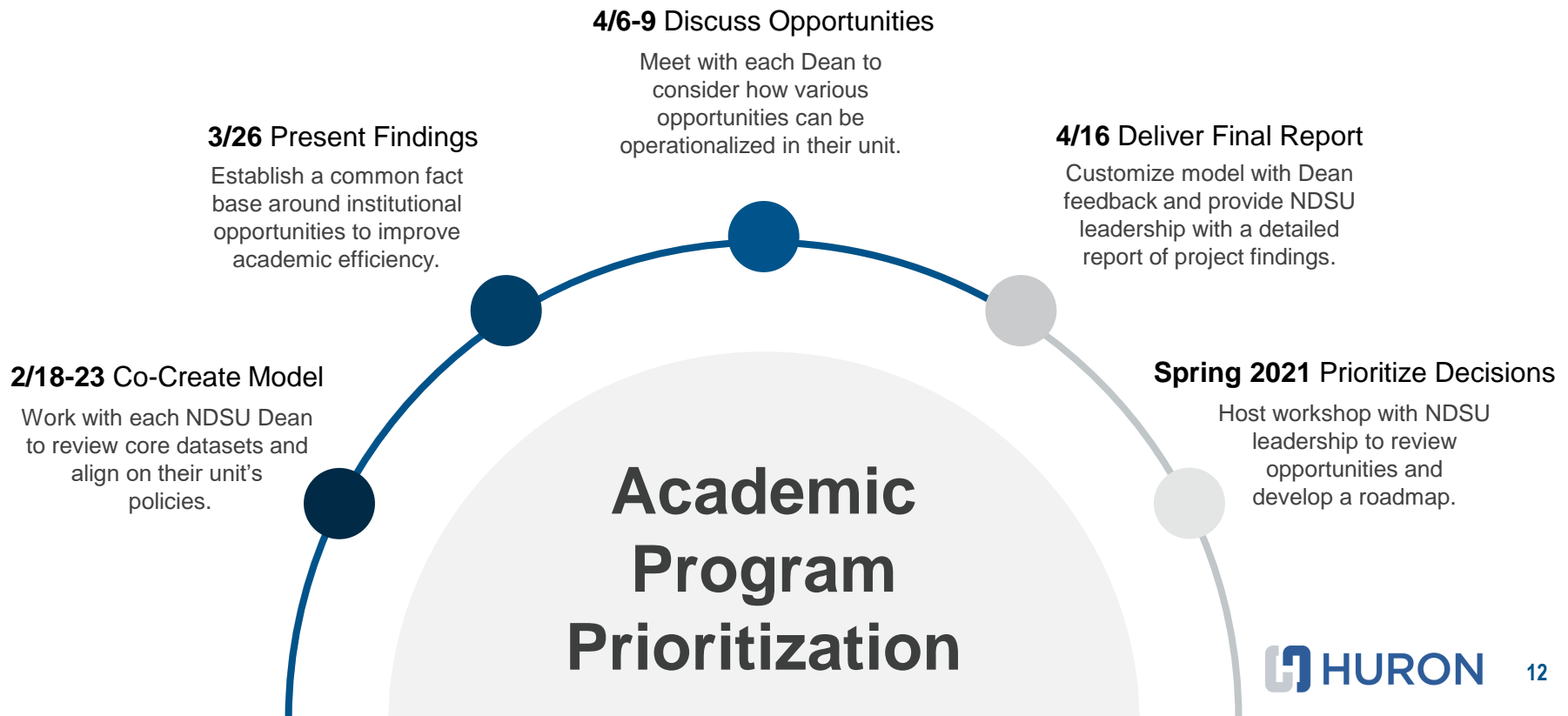
	Opportunity	Detail	Financial Impact	Community Impact
1	Section Enrollments	Dictate the median headcount per section expected from each unit; decide if low-enrolled sections should count towards load		
2	CHP by Faculty Type	Increase expectations for departmental credit hour production from T/TL faculty, especially in units that primarily support other programs		
3	Non-teaching Activity	Align expectations for non-teaching activities (research and service) based on mission alignment and faculty level		
4	Academic Organization	Evaluate the purpose of each academic unit to consolidate departments with curricular overlap and service-oriented offerings		
5	Academic Overhead	Reduce faculty administrative tasks and identify opportunities to share services in more efficient ways		
6	Graduate Education	Reduce graduate waivers in specific programs with sub-optimal enrollment and negative margins		

Ultimately, opportunities must not only address resource constraints, but also align academic resource allocation decisions with the NDSU’s mission as North Dakota’s Land Grant university.

Executive Summary

Project Milestones & Next Steps

The Deans' contributions to developing the Cost to Educate model allowed each unit's curricula to be linked with finances in a meaningful manner, creating a common fact-base that can now be used for thoughtful decision making.



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PROJECT OVERVIEW

Project Overview

NDSU Interviews

Huron interviewed a variety of stakeholders to better understand NDSU, its academic programming, and its market position.

Name	Title/Role
Rebecca Bahe	Director of the Career & Advising Center
Scott Beaulier	Dean
David Bertolini	Dean
Canan Bilen-Green	Vice Provost for Faculty & Equity
Bruce Bollinger	Vice President for Finance and Administration
Jeff Boyer	Director of Assessment and Accreditation
Dean Bresciani	President
Jim Deal	Dean
Stacy Duffield	Director of the Office of Teaching & Learning
Benton Duncan	Interim Dean
Margaret Fitzgerald	Provost
Matthew Friedmann	Student Body President
Karin Hegstad	Associate VP for Finance and Administration
Philip Hunt	Registrar
Michael Kessler	Dean
Gregory Lardy	VP and Dean

Name	Title/Role
Margaret Latterell	Staff Senate President
Seinquis Leinen	Interim Director of Admissions
Don Miller	Faculty Senate Budget Committee Chair
Joe Mocnik	Dean
Jill Nelson	Dean
Laura Oster-Aaland	VP for Stu. Affairs & Enrollment Management
Casey Peterson	Dean of Students
Charles Peterson	Dean
Cindy Rott	Budget Director
Florin Salajan	President of the Faculty Senate
Jane Schuh	VP for Research and Creative Activity
Molly Secor-Turner	Co-Chair of SPC
Steve Swiontek	Alumni and Trustee Representative
Kimberly Wallin	Dean
Marc Wallman	VP for Information Technology
Chris Wilson	Chief of Staff

Project Overview

Interview Themes

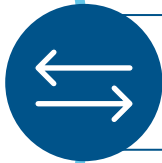
Huron had the opportunity to speak with more than 50 members of the NDSU community to understand the University, its organizational structure, and the nuances of its academic programming. The following key themes emerged:



Strategic Priorities: Conversations revealed wide variability regarding NDSU's institutional identity and purpose. Interviewees highlighted leadership turnover, a lack of clarity regarding mission and vision, and a lack of alignment between resource allocation and strategic goals.



Decentralization: Campus stakeholders highlighted multiple areas where distributed decision-making is perceived as a barrier to strategic growth, primarily through internal competition for enrollment, uneven service delivery, and an inconsistent student experience across NDSU.



Call for Change: Participants noted that prolonged historical resistance to academic programming changes has recently dissipated, as the community has recognized and embraced the need for short and long-term transformations in response to ongoing enrollment declines.



Openness to Innovation: Many campus stakeholders demonstrated a willingness to reflect on recent challenges and identify innovative approaches, with commonly identified solutions including adjustments to the academic structure and/or programming, recruitment of non-traditional students, and online degree expansion, among others.



Community Integration: Conversations revealed many interviewees are aware of the University's distinct role in the community and state, with special attention given to NDSU's Land Grant status, relationships with the Fargo-Moorhead area, and ongoing support of education, research, and economic growth across North Dakota.

The NDSU community is passionate, driven, and hopeful when considering the future of the university and the communities it serves, but obstacles (e.g., across the board cuts) have hindered innovative efforts in recent years.

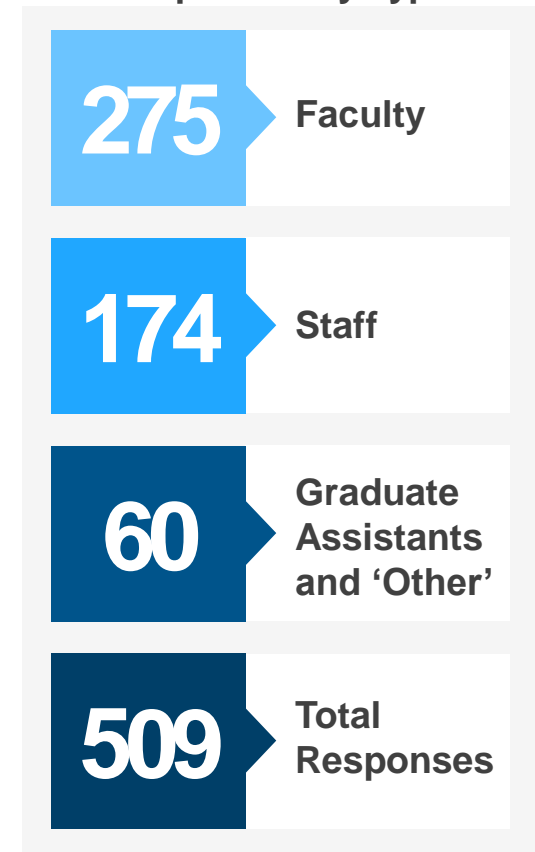
Project Overview

Survey Themes

Huron sent a survey to more than 3,800 members of the NDSU community to gather additional feedback from faculty, staff, and graduate assistants regarding academic program prioritization. The following key themes emerged:

- Similar to interview results, respondents perceived a **lack of alignment between competing strategic priorities**, specifically referring to **three alternate missions**:
 - **Land Grant:** Supplying North Dakota with education, research, and well-prepared graduates in Agriculture, Engineering, and Education
 - **Research:** Maintaining status as a major research institution with an emphasis on undergraduate research opportunities
 - **Enrollment:** Growing enrollment by investing in high-demand programs
- **Interdisciplinary collaboration** was praised as an **institutional strength** by some respondents and identified as an **opportunity for growth** by others
- Overall, respondents were **open to the idea of program closures and consolidations**, asking for **data-driven decisions** and focusing particularly on programs that have:
 - **Redundancy with regional and local peers**, such as the Tri-College partners and other NDUS institutions
 - **Low and/or inconsistent enrollment**
 - **Unclear alignment with NDSU’s land-grant mission**
- Current **resource allocation** practices were identified as a common **growth limitation**, with many respondents expressing frustration that **low-enrolled programs** are **holding back programs with strong demand** and capacity to grow

Responses by Type



Project Overview

Land Grant

As a land grant institution, NDSU has been charged with assuring both the liberal and practical education of students. This mission intends to produce students who excel in their chosen professions and contribute to their communities.

Teaching: Morrill Act of 1862

NDSU begins as an Agricultural College in 1890 in a pursuit to educate the industrial classes in **agricultural and mechanical arts**. Other colleges are added to the University over time to broaden educational expertise to address the **liberal arts** portion of the Act's academic charge.

Service: Smith-Lever Act of 1914

To enable the dissemination of research conducted through the University's Experiment Station, NDSU forms **Extension**. Experiment Station researchers work collaboratively to develop and share information with outlying communities through Extension programming .



Research: Hatch Act of 1887

Land grant universities are provided resources to conduct **basic and applied agricultural research**, leading to NDSU's own Agricultural Experiment Station in 1890. The goal of the Experiment Station is to discover agricultural opportunities "For the Land and its People."

Who is NDSU today?
Who will NDSU be tomorrow?

Project Overview

Key Terms

Huron will discuss the financial and academic activities of NDSU from the perspective of key stakeholder conversations, external reports, the cost-to-educate model, and market positioning. Context for terms used throughout is provided below.

Section: Course IDs that are cross-listed or dual-listed with others will be counted towards one full “section” together with any of its cross-listed course IDs when considering faculty load. Since there may be 2+ courses cross-listed in a single section, Course ID counts delivered in an academic year will typically exceed section counts.

Instructional Margin: Figures derived from Huron’s AY 2019-2020 Cost-to-Educate Model use a variety of sources and methods to arrive at a comprehensive costing tool. These include direct (salaries & benefits) and indirect (department, college, and provost overhead) expenses associated with academic units.

Overhead: Includes operating expenses derived from the NDSU General Ledger, categorized by department, college (or dean), **Provost***, and Graduate School. Expenses include only academic support and instruction functions from unrestricted funds within Academic Affairs.

Provost Overhead: Includes all central expenditures shared across colleges, including Provost Office, Libraries, Information Technology, etc.

Faculty Load: This is a metric for measuring faculty instruction, usually in the form of courses taught by schedule type, used to determine the allocation of instructional resources according to department needs and expectations.

Academic Year: To keep consistent with market-focused data sets and available financial data, our analysis sets the academic year beginning in the Summer term and ending in the Spring. AY 2019-2020, therefore, runs from Summer 2019 – Spring 2020.

Project Overview

Key Terms (continued)

Huron will discuss the financial and academic activities of NDSU from the perspective of key stakeholder conversations, external reports, the cost-to-educate model, and market positioning. Context for terms used throughout is provided below.

Competitors / Competitive Landscape: A group of eight institutions, selected by leadership, that students admitted to NDSU often enroll at. The competitive landscape includes NDSU and these eight competitors, with NDSU's market share representing its portion of the competitive landscape's total program completions.

Classification of Instructional Programs (CIP): The taxonomy created by the National Center for Education Statistics (NCES) to track program completions across different higher education institutions, which organizes similar programs into six-digit codes, four-digit groups, and two-digit families.

Standard Occupational Classifications (SOC): The system is used by Federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. All workers are classified into one of about 775 detailed occupations according to their occupational definition, which are combined to form about 450 broad occupations, about 95 minor groups, and 23 major groups.

Labor Market: Includes jobs available in North Dakota and Minnesota for the SOC(s) mapped to each CIP, based on the NCES' crosswalk, excluding occupations that do not require that degree level or do require more than five years of prior work experience (e.g., Chief Executive Officer).

Program Market Positioning: A plot of NDSU programs based on their recent change in completions and occupations, used to compare student demand and workforce needs.

Project Overview

Limitations and Enablers

Over the course of the analysis, several limitations and enablers have been identified, which influence the ability of the NDSU community to allocate academic resources to the source of the expense; however, there is minimal impact on overall cost.

LIMITATIONS:

- A lack of standardization in policies regarding load equivalencies and expectations for full time faculty leads to an inability to fully and precisely capture capacity and utilization of direct instructional expenses.
- Available data sources for the market analysis assume that graduates will find employment in a related field, thus reducing the scope of probable occupations available to program graduates.

ENABLERS:

- Availability and transparency of various stakeholder groups across campus led to productive conversations and a deeper understanding of the culture and context behind the numbers.
- Well-organized student, employee, and financial data allowed for a more targeted, timely and accurate analysis.

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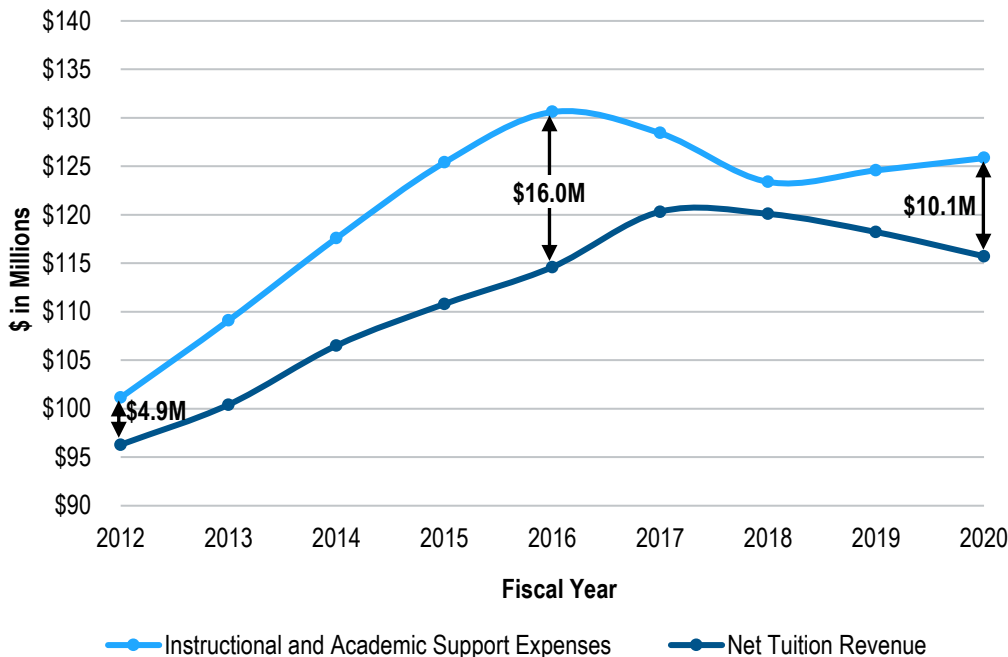
CURRENT STATE

Current State

Academic Overview

NDSU relies on appropriations to cover the gap between net tuition revenue and academic expenditures, which grew at average annual rates of 2.3% and 2.8% respectively between FY 2012-2020, with net tuition revenue declining since 2017.

Net Tuition Revenue and Academic Expenditures (Fiscal Years 2012-2020)



Academic Summary

Departments ¹	Majors	Minors	Programs ²	
48	211	84	283	
Other Measures		FY 2012	FY 2020	8-year CAGR
Fall Census Enrollment		14,399	13,173	-1.1%

Financial Summary

Revenues	FY 2012	FY 2020	8-year CAGR
State Appropriations	\$91.7M	\$115.7M	2.9%
Net Tuition Revenue	\$96.3M	\$115.7M	2.3%
Expenditures	FY 2012	FY 2020	8-year CAGR
Instructional Expenditures	\$76.9M	\$95.2M	2.7%
Acad. Support Expenditures	\$24.3M	\$30.7M	3.0%
Total Academic Expenditures	\$101.1M	\$125.9M	2.8%

NDSU’s reliance on appropriations makes academic budget units susceptible to legislative changes, increasing the pressure to grow new tuition revenue and optimize the allocation of limited resources.

Notes: ¹Includes 43 departments and 5 schools
²Counting all degree types conferred for every CIP offered
 Source: NDSU Audited Financial Reports

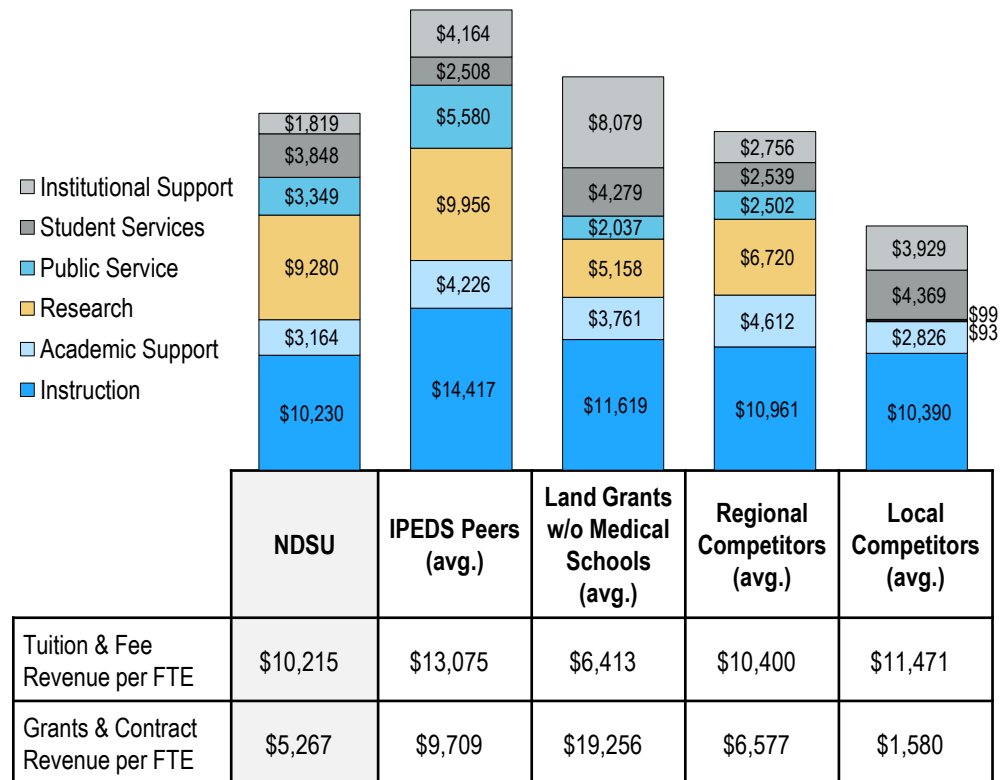
Current State

Peer Expense Comparison

Based on FY 2019 financials, NDSU spends less per student FTE on instruction and academic support, and more on research and service, than its regional competitors and other land grant institutions without medical schools.

- **NDSU spent less on instruction and academic support per student FTE** than its IPEDS peers, regional competitors, and other land-grant institutions without medical schools on average; \$13.4K compared to, \$18.6K, \$15.6K, and \$15.4K respectively
- **NDSU spends more on research and service per student FTE** than its regional competitors and other land-grant institutions without medical schools on average, but also has less Grants and Contract revenue per FTE than these groups
- **Student services expenditures** for NDSU and select peers **include intercollegiate athletic costs**; selecting peers who only include athletic costs in student services adjusts the IPEDS peer average to \$3.5k and Regional peer average to \$3.1k

Expense per FTE Enrollment (FY 2019)



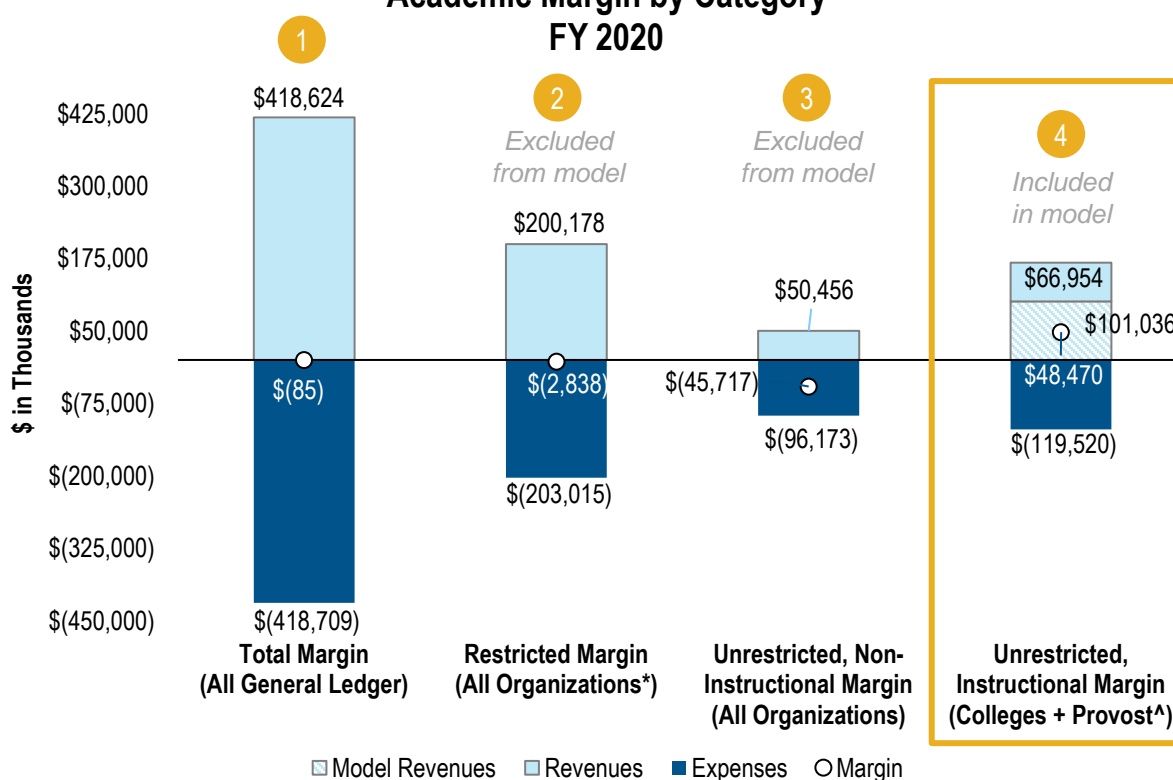
Institutional spending on academics, research, and public service expenditures should reflect the reality of where revenue is coming from.

Current State

Marginal Analysis

The proceeding analyses focus primarily on operating revenues (net tuition and academic fees) and expenses tied to instruction. This accounts for approximately \$119.5M of NDSU's \$418.7M in total operating expenditures.

Academic Margin by Category
FY 2020



- Total Margin** represents the **change in net assets** from activities found within the FY 2020 Statement of Revenues, Expenses, and Other Changes in Net Position.
- Restricted Margin** represents operating revenues and expenses **on restricted funds**, including research, auxiliaries, gifts, capital, and others. These funds are excluded from the cost-to-educate model.
- Unrestricted, Non-Instructional Margin** represents operating revenues and expenses for **activities not considered instruction or academic support** (e.g., research, auxiliaries, student services), and thus are excluded from the cost-to-educate model.
- Unrestricted, Instructional Margin** represents the **net tuition[†]** from the FY 2020 tuition file **less instructional expenses included in the model** such as direct (instructor cost) and indirect (departmental support, materials and supplies, provost overhead, etc.)

Comparing net tuition and fee revenue to the direct and indirect costs of instruction provides an initial snapshot of NDSU's instructional margin at an institutional level.

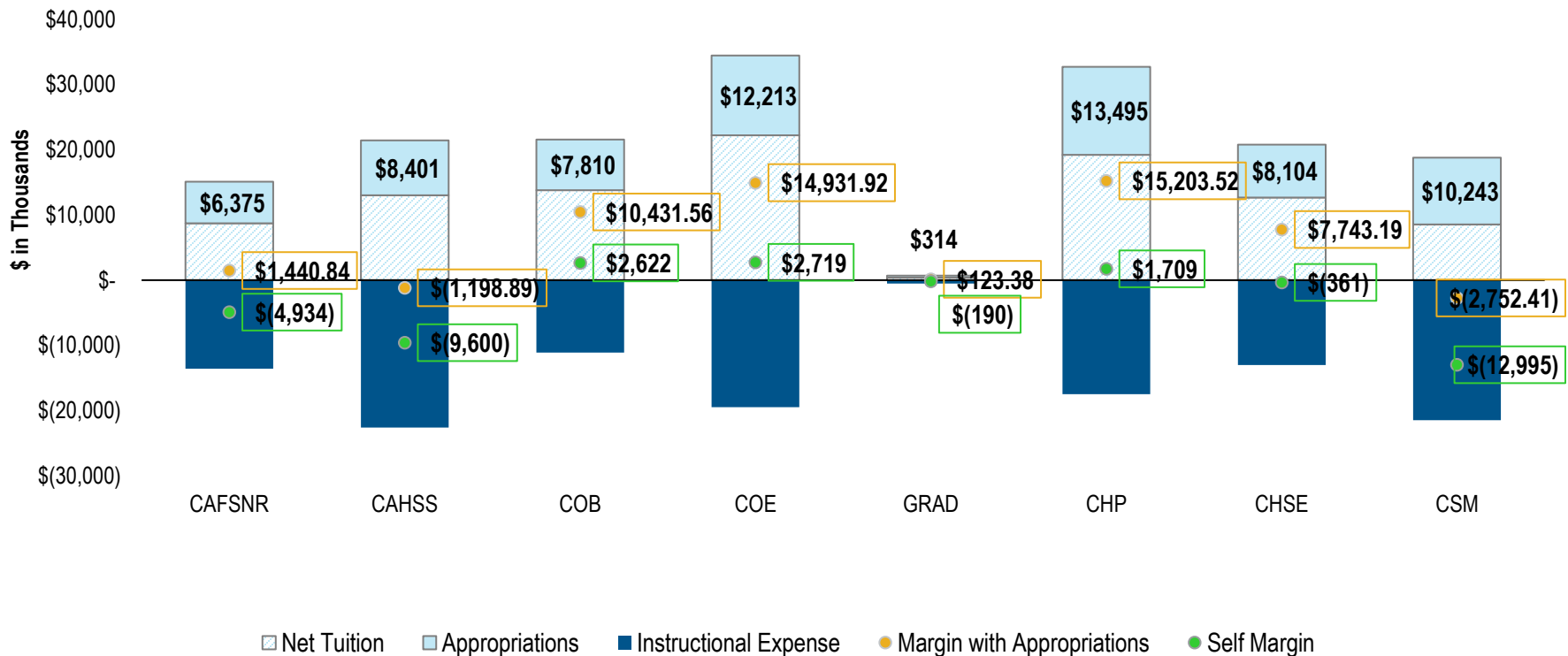
* Excludes instructional grant and student fee funds treated as unrestricted components in analyses
 ^ Includes all units reporting to the Provost except Research & Creative Activities and the Family Healthcare Pharmacy
 † Model net tuition includes tuition less waivers, and is exclusive of student fees and financial aid
 Sources: FY20 General Ledger & Cost to Educate Model

Current State

Marginal Analysis

The chart below is a surplus and deficit view of the model, wherein net tuition revenue (tuition less waivers) is attributed to each unit according to students' most recent, primary program of study.

**Net Academic Margin by School
FY 2020**



Figures may differ from externally reported figures by <1% due to minor variances in classifications
 Source: Tuition figures derived from AIR tuition database; Costs derived from Cost-to-Educate model. Non-degree and undeclared programs were not counted within any academic units for revenue; Excludes student fees

Cost to Educate Model

Key Considerations

The following views of NDSU's programs do not prescribe action, rather depict trends and allow NDSU to use the provided model and other tools to evaluate an appropriate action (if any).

Instructional Cost Per CH

High Cost, Enrollment Decline

- What is driving the cost of the program and is it inherent to the program's pedagogical approach?
- Can the programs be scaled or restructured to reduce the cost burden?
- Should institutional investment be reduced, or should the program be phased out?

High Cost, Enrollment Growth

- Can the cost structure be addressed without diminishing the program's perceived quality and value?
- Do these programs help to round out our offerings?
- Are there opportunities to reduce expenses by adjusting faculty mix?

Low Cost, Enrollment Decline

- Can any of these programs be refined to better appeal to the student market with minimal investments?
- How do we communicate the value of these programs?
- Are there opportunities to partner with outside entities to increase enrollment?

Low Cost, Enrollment Growth

- Can these programs sustain their growth patterns (through class demand and/or outcomes/employability)?
- Are these programs that align with the institutional mission and identity?
- Do these programs warrant additional investment to further grow?

Average Annual Enrollment Growth

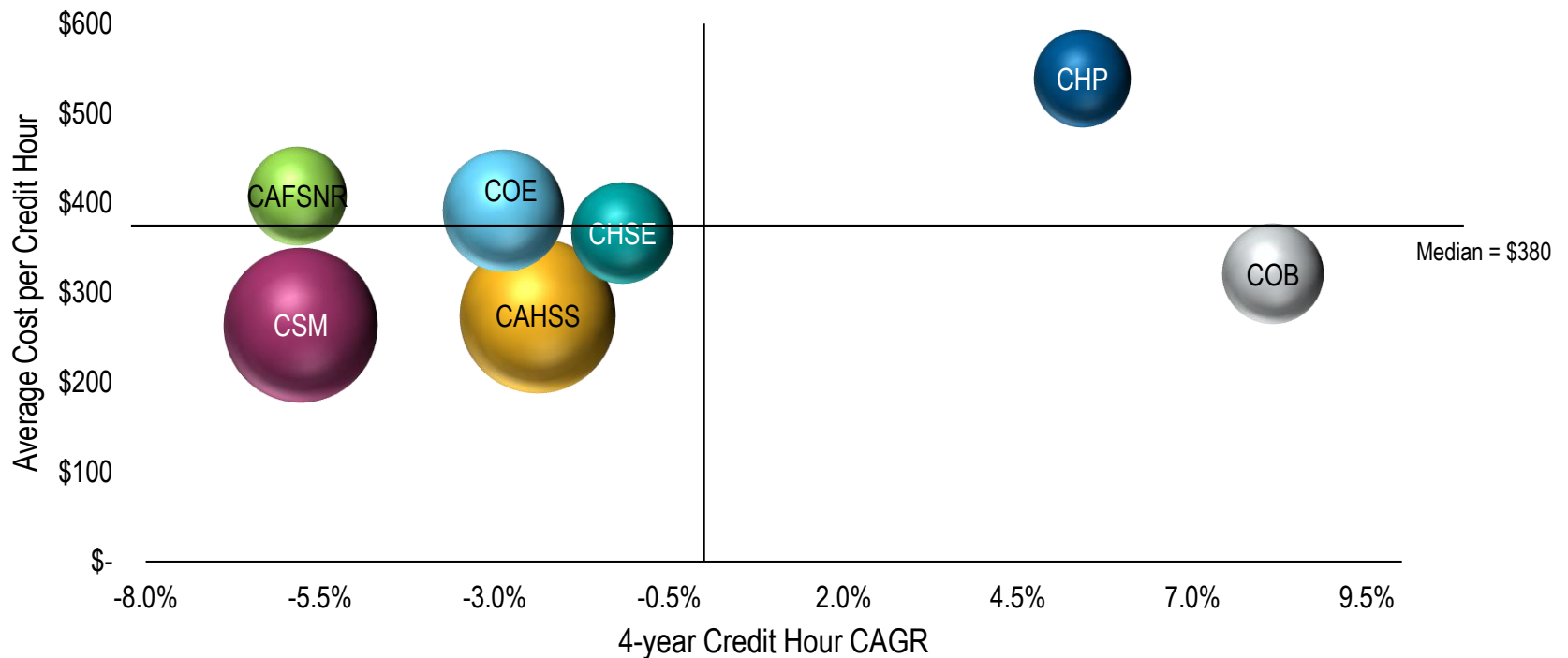
-6.0% -4.0% -2.0% 0.0% 2.0% 4.0% 6.0%

Current State

Credit Hour Summary by College

Portfolios are commonly balanced with growth engines and “steady-staters”, high-cost and low-cost, and “at-scale” and “still below scale”. The objective of this lens is not only comparative, but also to observe the balance.

**Credit Hour Volume, Growth, and Cost
By College* (AY 2015-2016 to AY 2019-2020)**



The weighted cost per credit at North Dakota State University is \$340 when considering credits produced for the 2019-2020 academic year; however, a number of high-volume colleges have experience negative growth since 2016.

*The Graduate School falls outside the parameters of this chart at \$808 per credit hour. The size of each bubble represents the volume of credit hours produced in AY2020. Source: Cost-to-Educate Model

Current State

Academic Resource Optimization Opportunities

Huron has identified possible opportunities for optimizing NDSU's academic resources to align with each of the components of the cost-to-educate model that most noticeably impact efficiency and effectiveness.

Category	Opportunity	Detail
Coursework	CHP by Faculty Type	Are there opportunities to increase credit hour production within various faculty types?
	Section Size	Would it be possible to increase the median headcount per section across the university?
	Graduate Education	What factors are considered when determining graduate education budgets?
Faculty Effort	Faculty Course Reassignments	How would you describe the impact of T/TL course reassignments on academic expenditures?
	Out-of-Load Activity	What are the most common reasons for assigning a T/TL faculty member to out-of-load activity?
Compensation	Supplemental Pay	What are the primary drivers of supplemental pay for instructional activity?
Overhead	Academic Overhead	How do you determine the appropriate resource allocation for academic support?
	Research	What factors do you consider when distributing IDCs?

In conjunction with exploring the above questions, Huron has analyzed market demand and capacity to ensure that opportunities for transformation through growth are properly aligned with academic costs and industry trends.

4



PROJECT APPROACH

Approach

Curriculum & Resource Allocation

Generally, higher education has diluted the linkage between curricular and resource allocation decisions resulting in a lack of integrated information to make informed decisions from a disciplinary perspective.

Curriculum

Faculty, in collaboration with academic leadership, generally have the responsibility and authority to make curricular decisions involving courses, programs, and majors.



Coursework

Course offerings at a university are normally under the purview of a department chair or program director who balances instructor availability, student need, and other factors.



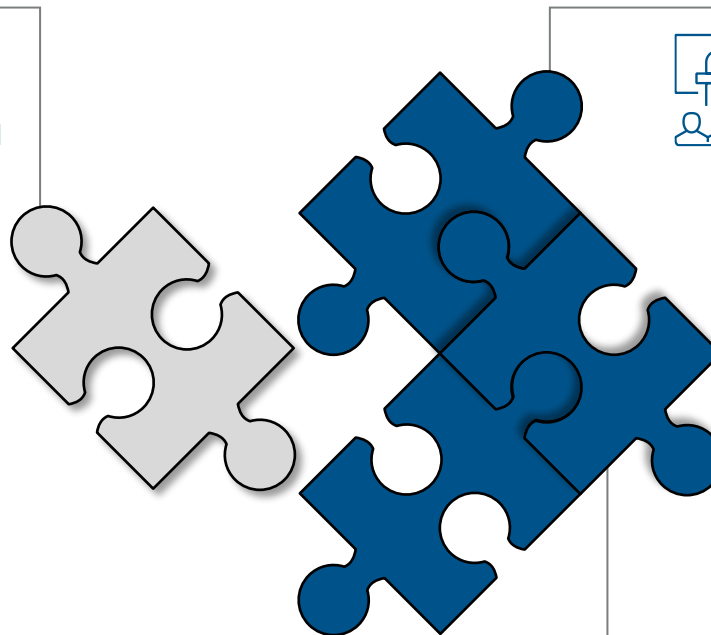
Overhead Costs

Academic administrative support is typically the purview of academic leaders and includes direct and indirect support of instruction, research, and service.



Instructor Compensation

Academic Deans, with their budget authority, are typically responsible for compensation. This is especially true when considering the allocation of faculty lines and faculty mix.









Strengthening the connection between curriculum and resource allocation approaches is critical, as decisions at the curricular level impact academic programming, instructional compensation, and overhead costs.

Approach

Academic Resource Optimization

Building the academic cost management tool calls for a nuanced approach to working with the Deans and benefits from a mutual understanding of key components impacting the cost to deliver the university curriculum.

Task	Component	Objective
Establish Academic Taxonomy	 Curriculum	<ol style="list-style-type: none"> I. Confirm understanding of the academic structure II. Map coursework to the taxonomy to set foundation for cost allocation
Measure Credit Hour Production	 Coursework	<ol style="list-style-type: none"> I. Inventory courses and calculate credit hours produced by department/program II. Evaluate credit hour growth trends and determine load value
Define Instructional Load	 Faculty Effort	<ol style="list-style-type: none"> I. Establish college level understanding of faculty effort II. Discuss load calculation caveats including load requirements, reassigned time, and co-curricular activity
Map Direct Cost of Instruction	 Compensation	<ol style="list-style-type: none"> I. Review variability between in load and overload pay II. Confirm methodology for distributing salary across instruction, service, and professional development
Allocate Overhead Costs	 Overhead	<ol style="list-style-type: none"> I. Confirm understanding and application of functional expense classifications with schools and departments II. Determine metrics for allocating expenses and revenues
Develop Academic Template	 Program Positioning	<ol style="list-style-type: none"> I. Analyze trends in program completions for direct competitors and regional occupational data to position each program II. Identify programs with growth potential; develop recommendations

Dean responses enabled Huron to identify concerns regarding the decision support necessary for effective academic cost management, resulting in a formative tool for each unit with recommendations for improvement.

Approach

Demand Alignment

In conjunction with academic cost analyses, an assessment of the positioning of NDSU's programs relative to the location of its graduates, labor market trends, and program competition can support strategic academic decision making.

NDSU Program Completions

Identify internal trends in the type of students that NDSU sends into the labor market to meet the workforce needs of North Dakota, the Fargo-Moorhead Metropolitan Statistical Area (MSA), and surrounding region



Competitive Landscape

Measure the program market saturation of NDSU programs and analyze regional institution program offerings to identify opportunities for differentiation and innovation



Emsi Labor Market Data

Compare trends in program completions with external occupational data to identify alignment and gaps between NDSU program completions and the job market

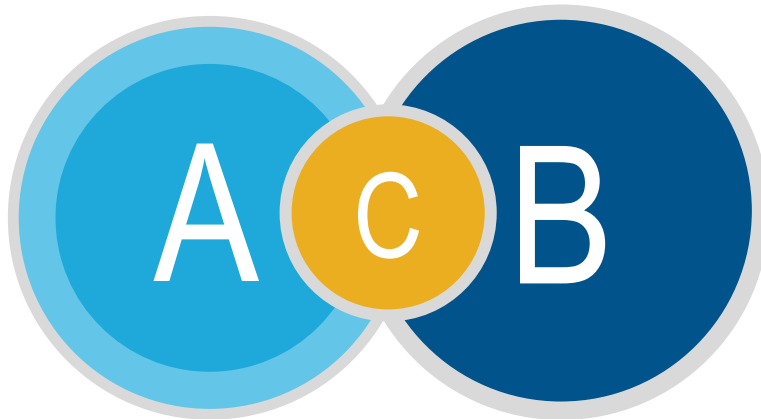


Internal and external program growth, program market share, and growth in corresponding occupations should be considered in conjunction with cost when conducting academic program prioritization.

Approach

Dual Transformation

In Huron's experience, it is valuable to differentiate transformative opportunities into two groups that are both anchored in the University's strategic vision and unique capabilities.



TRANSFORMATION A
STRENGTHEN THE CORE BUSINESS

TRANSFORMATION B
IDENTIFY NEW GROWTH OPPORTUNITIES

STRATEGIC EXECUTION
LEVERAGE UNIQUE CAPABILITIES

<p>TRANSFORMATION A Strengthen and reposition the core business for sustainability</p>	<p>TRANSFORMATION B Identify new opportunities to drive long-term growth and impact</p>	<p>STRATEGIC EXECUTION Leverage capabilities and build internal capacity to execute across A and B</p>
<p><i>Financial Stability:</i> What are the key financial performance trends that may impact institutional sustainability?</p>	<p><i>Innovation Capability:</i> Are there appropriate mechanisms in place to stimulate and accelerate good ideas?</p>	<p><i>People and Performance:</i> Do you have the right capabilities in the right areas to execute on your vision?</p>
<p><i>Academic Foundation:</i> Is the academic portfolio optimally structured and positioned relative to peers and market trends?</p>		<p><i>Organizational Effectiveness:</i> Is the institution optimized to enable effective planning, execution, and accountability?</p>

Today's presentation will explore opportunities for NDSU within both transformation groups.

Approach

Dual Transformation Examples

NDSU has an array of opportunities to prioritize limited academic resources, including modifying existing policies and practices, investing in or divesting from specific programs, and reorganizing existing academic structures.

TRANSFORMATION A	<h3>INTRODUCE</h3> <ul style="list-style-type: none"> • Introduce consistent faculty load policies to accurately and equitably track effort and meet need 	<h3>REDESIGN</h3> <ul style="list-style-type: none"> • Reevaluate policies on minimum section sizes • Reconsider optimal faculty effort by rank and unit 	<h3>REORGANIZE</h3> <ul style="list-style-type: none"> • Scale successful approaches to shared services to improve quality and reduce costs 	<h3>DIVEST</h3> <ul style="list-style-type: none"> • Allow low-enrolled, non-mission aligned programs to naturally decrease over time
TRANSFORMATION B	<ul style="list-style-type: none"> • Establish partnerships with community colleges in the NDUS, other local institutions, or regional employers • Launch new programs aligned with student demand and workforce needs 	<ul style="list-style-type: none"> • Rethink expectations for and investment in major, service, and other units • Create online offerings of existing programs • Market online programs to non-traditional students, such as adult learners and rural students 	<ul style="list-style-type: none"> • Divide and relocate units with interdisciplinary programs or limited control of curricula to optimize service delivery • Consolidate similar units to save on administrative costs and increase collaboration 	<ul style="list-style-type: none"> • Reallocate resources according to program demand, growth potential, workforce needs, and mission-alignment • Realign part-time faculty and administrative positions as student demand shifts

Some opportunities exist at the institutional-level, and Huron will work with each Dean to understand how the cases discussed today apply to their unit, so that each College can plan a sustainable path forward.

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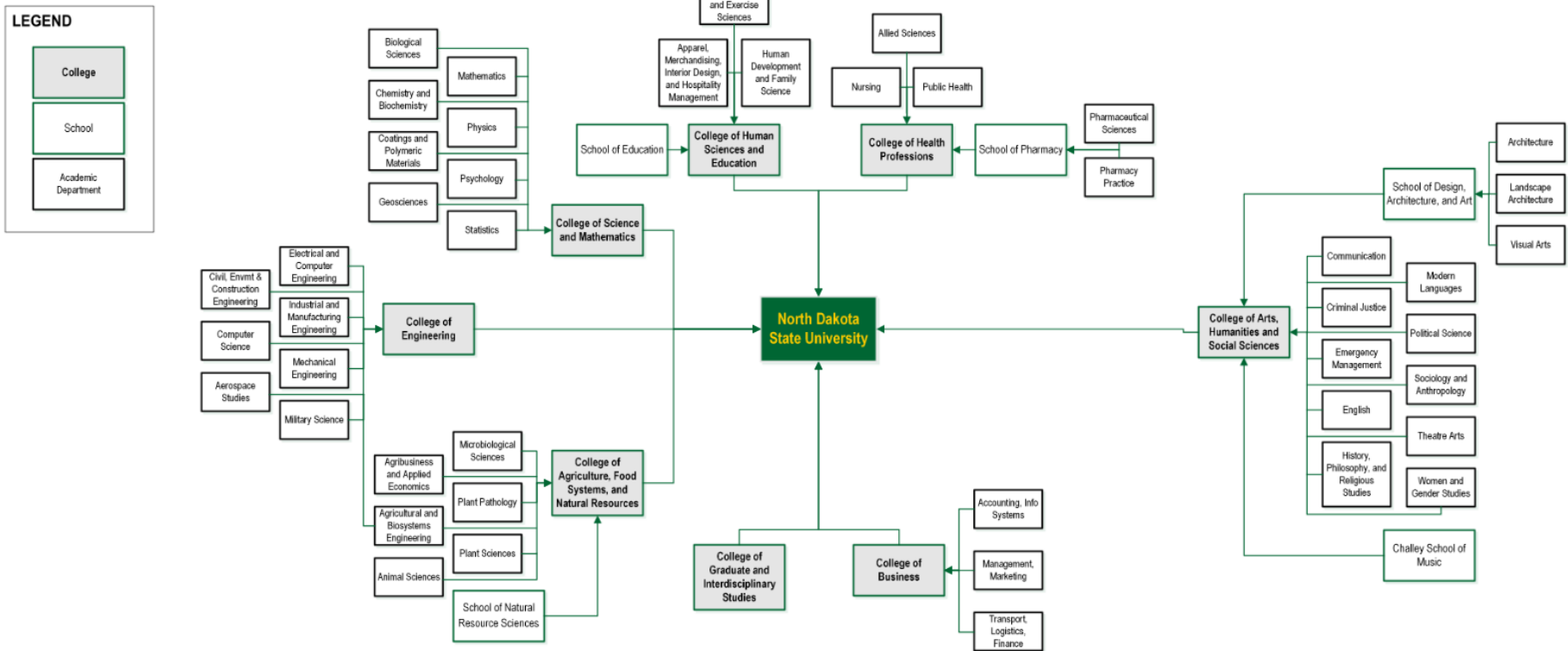


COST TO EDUCATE MODEL

Cost to Educate Model

Academic Taxonomy

The discipline specific organization for the academic portfolio assessment aligns each of the 43 departments and five schools to one of NDSU's eight colleges in order to form a basis for understanding the university's academic cost structure.



Cost to Educate Model

Academic Cost Drivers

Once an academic framework has been established, Huron recommends isolating each component cost so that these expenses may be allocated at the level the expenditure is occurring (e.g., Biology absorbs their own overhead costs).

	Cost Component	Allocation Method	Total Expense	Per Credit	Impact on Cost
1	Instructor Costs	Section Assignment	\$46.2M	\$131	High
2	Other Faculty Effort	Department Assignment	\$27.1M	\$77	Moderate
3	Department Overhead*	Department Credit Hour	\$17.5M	\$50	Moderate
4	College Overhead*	College Credit Hour	\$11.1M	\$31	Low
5	Provost Overhead*	Credit Hour	\$17.6M	\$50	Low
	Total	--	\$119.5M	\$340	--

These components typically represent an area of significant department control and the primary variability in degree related expense

These components account for significant institutional expense but do not typically vary significantly by course and/or level

Management of academic expenditures are largely under the purview of department chairs or program directors who have significant influence over coursework delivery, faculty assignments, and operational expenditures.

* Overhead costs normally include instructional and academic support activities and exclude auxiliaries, institutional support, etc.
Source: Cost to Educate Model

Cost to Educate Model

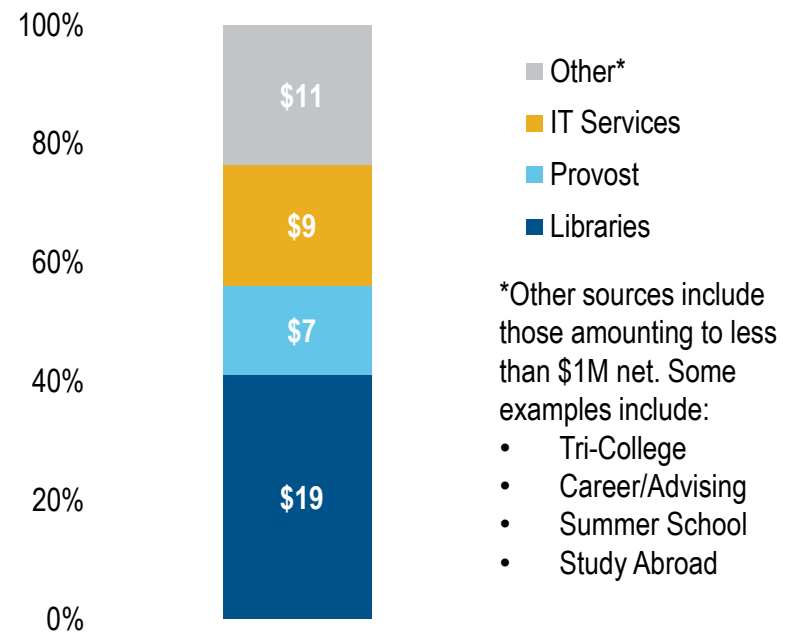
Academic Cost Drivers: Overhead

Overhead accrued at the College and Department levels are considered unit-driven, while centrally shared expenditures (collectively labeled “Provost Overhead”) are distributed proportionally across units according to credit hour productivity.

Unit-Driven Overhead

- **Unrestricted expenses allocated to Deans Offices and academic departments of each College, only includes Instruction & Academic Support functions**
- Salaries & Wages/Benefits (Including Graduate Students)
- Travel
- Supplies & Materials
- Equipment & Leases/Rentals
- Other Miscellaneous

Central (Provost) Overhead



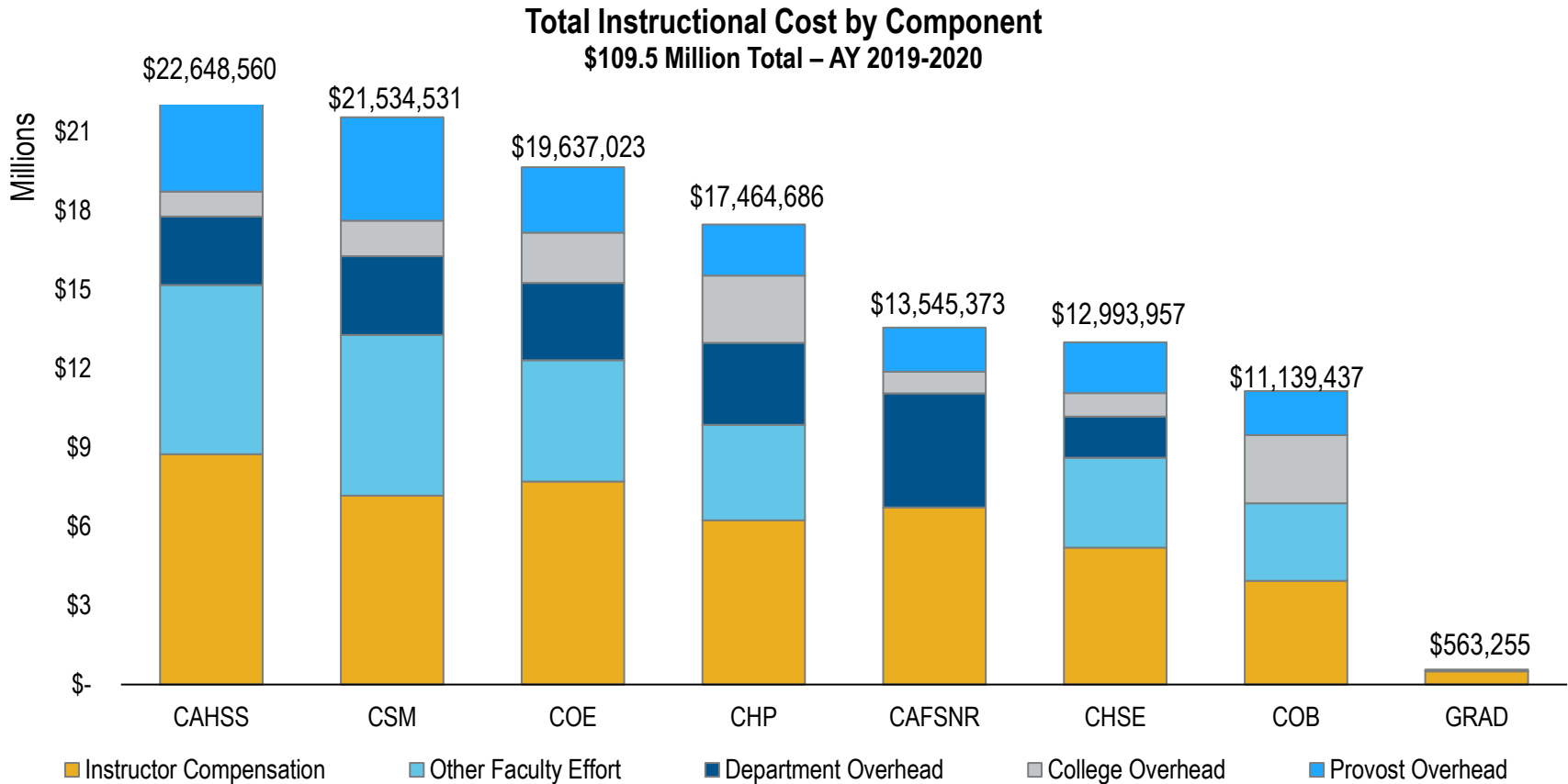
Together, centrally shared services amount to \$45 per credit hour produced across the University

The majority of overhead across most academic units was driven primarily by college and department-level expenses, with centrally shared services accounting for an average of 13% of the cost per credit hour.

Cost to Educate Model

Total Instructional Cost by College

Total instructional costs and the distribution of cost components varied widely across NDSU's colleges, with total costs ranging from \$22.7M (CAHSS) to \$563K (Graduate & Interdisciplinary Studies).



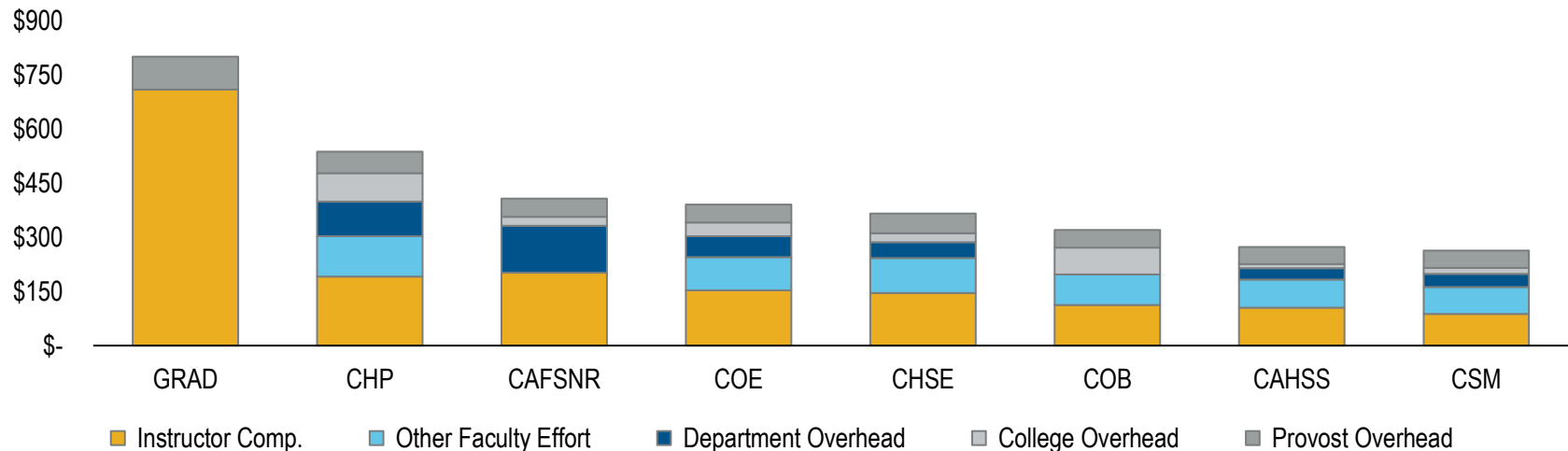
Instructor compensation, the primary focal point of this review, accounts for 39% of the institution-wide instructional cost per credit hour (\$131). The second largest proportion of the cost-to-educate is other faculty effort.

Cost to Educate Model

Total Instructional Cost per Credit by College

The cost-to-educate model identified a weighted average college credit hour cost of approximately \$340 which varies by academic unit, ranging from \$263 (Science & Mathematics) to \$801 (Graduate & Interdisciplinary Studies).

Instructional Cost per Credit Hour by Component
AY 2019-2020



Cost Per Credit Hour	GRAD	CHP	CAFSNR	COE	CHSE	COB	CAHSS	CSM
Instructor Compensation	\$710	\$192	\$202	\$153	\$146	\$113	\$106	\$88
Other Faculty Effort	\$0	\$112	\$0	\$92	\$96	\$85	\$78	\$75
Department Overhead	\$0	\$96	\$130	\$59	\$44	\$0	\$31	\$37
College Overhead	\$0	\$79	\$25	\$38	\$25	\$74	\$11	\$17
Provost Overhead	\$91	\$60	\$50	\$50	\$55	\$48	\$48	\$48
Cost Per Credit Hour	\$801	\$538	\$407	\$391	\$366	\$320	\$274	\$263

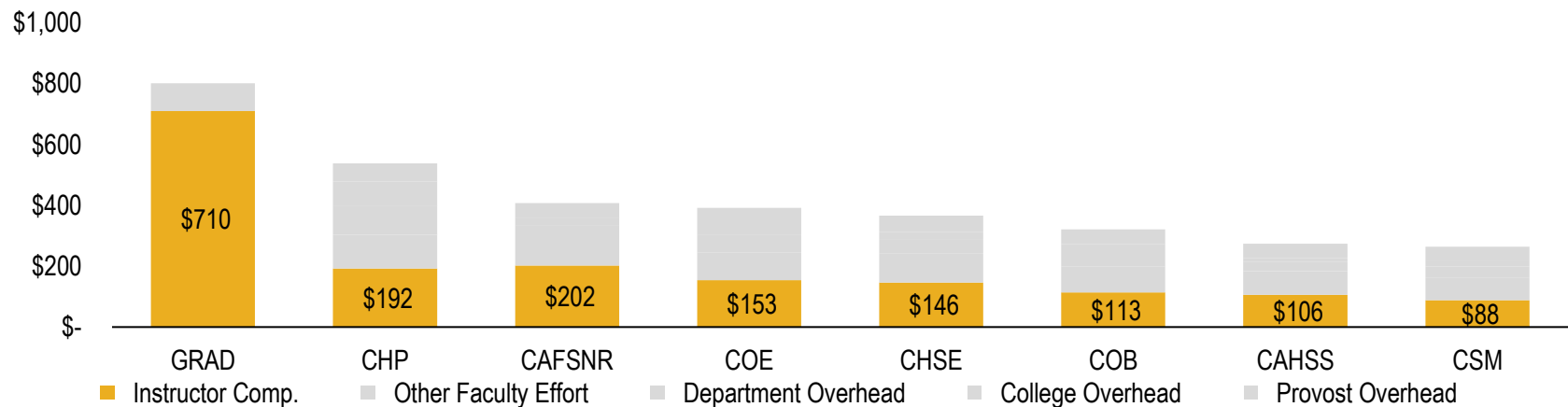
Note: Totals may not foot due to rounding.
Source: Cost-to-Educate Model

Cost to Educate Model

Instructor Compensation (Direct Costs)

Across NDSU, over one third of the total instructional cost per credit hour relates to instructor compensation, which is influenced in aggregate by average compensation, distribution of credit hours produced, and faculty mix.

Instructional Cost per Credit Hour by Component
AY 2019-2020



Instructor Compensation Per Credit Hour	GRAD	CHP	CAFSNR	COE	CHSE	COB	CAHSS	CSM
% of College Credit Hrs. Prod by FT Instructors	94.0%	70.8%	71.5%	74.0%	50.4%	67.2%	53.4%	60.7%
Tenure and Tenure Track	82.2%	17.5%	57.5%	61.1%	34.4%	58.6%	48.8%	45.7%
Full-Time Non Tenure	11.8%	53.3%	14.0%	12.9%	16.1%	8.5%	4.6%	15.0%
Other Non Tenure & Staff	6.0%	29.2%	28.5%	26.0%	49.6%	32.8%	46.6%	39.3%
Total Instructor Compensation Per CH	\$710	\$192	\$202	\$153	\$146	\$113	\$106	\$88

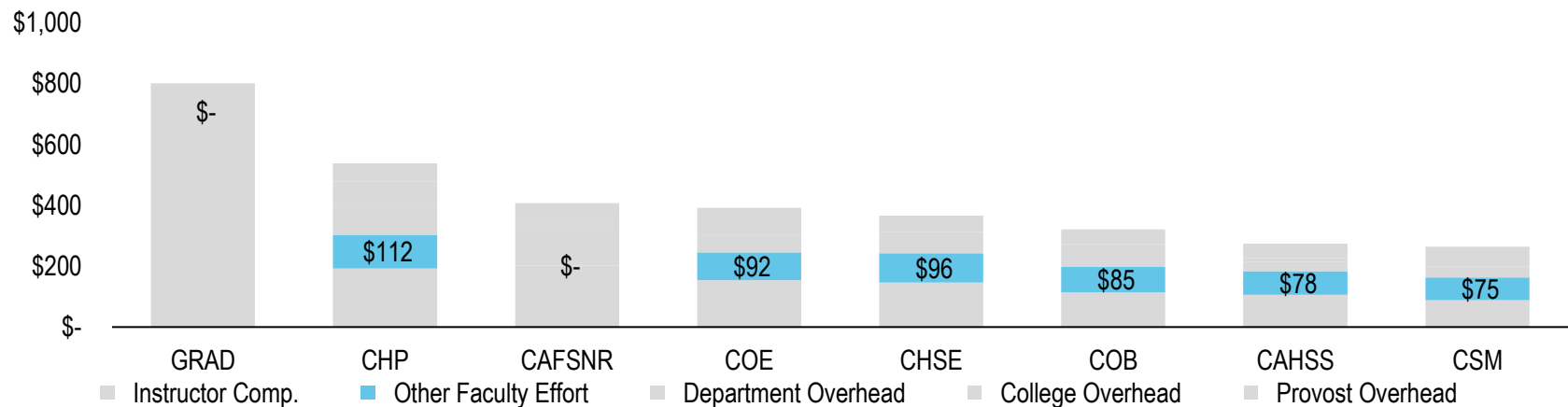
Note: Totals may not foot due to rounding.
Source: Cost-to-Educate Model

Cost to Educate Model

Other Faculty Effort (Indirect Costs)

Other faculty effort compensation makes up approximately 23% of the total cost per credit at NDSU and comprises research, service and advising components of instructor compensation.

Instructional Cost per Credit Hour by Component
AY 2019-2020



Other Faculty Effort Per Credit Hour	GRAD	CHP	CAFSNR	COE	CHSE	COB	CAHSS	CSM
% of College Credit Hrs. Prod by FT Instructors	94.0%	70.8%	71.5%	74.0%	50.4%	67.2%	53.4%	60.7%
Tenure and Tenure Track	82.2%	17.5%	57.5%	61.1%	34.4%	58.6%	48.8%	45.7%
Full-Time Non Tenure	11.8%	53.3%	14.0%	12.9%	16.1%	8.5%	4.6%	15.0%
Other Non Tenure & Staff	6.0%	29.2%	28.5%	26.0%	49.6%	32.8%	46.6%	39.3%
Total Other Effort Per CH	\$0	\$112	\$0	\$92	\$96	\$85	\$78	\$75

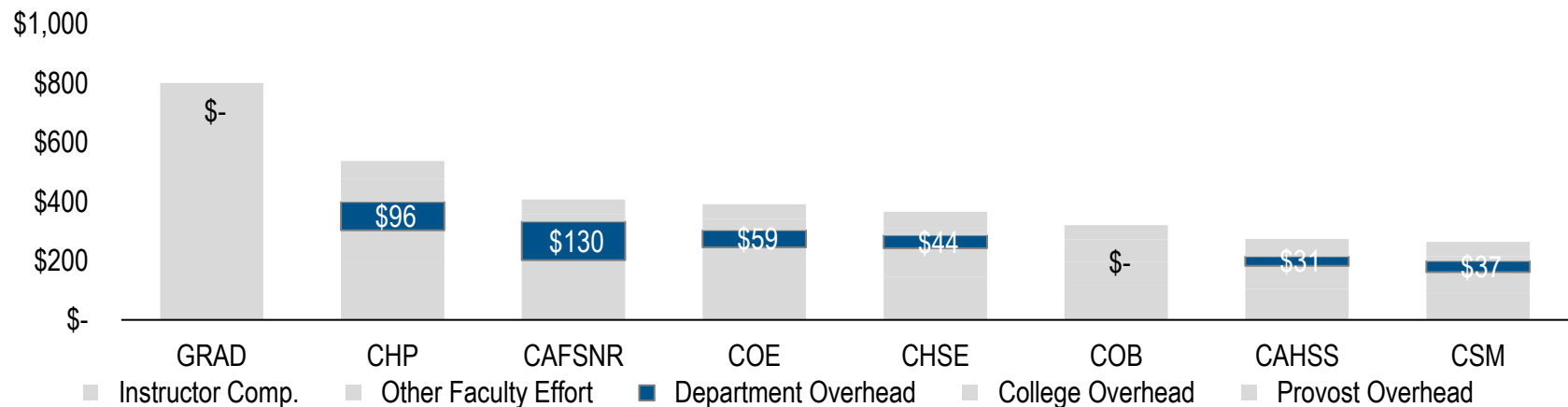
Note: Totals may not foot due to rounding.
Source: Cost-to-Educate Model

Cost to Educate Model

Department Overhead (Indirect Costs)

Department overhead is calculated using the academic support and instruction expenses that are allocated in the general ledger to academic departments from an unrestricted fund.

Instructional Cost per Credit Hour by Component
AY 2019-2020



Department Overhead Per Credit Hour	GRAD	CHP	CAFSNR	COE	CHSE	COB	CAHSS	CSM
Non-Instructional Salaries	\$0	\$2,525,958	\$3,913,728	\$2,361,146	\$982,360	\$0	\$1,460,625	\$2,445,871
Academic Support	\$0	\$245,318	\$0	\$2,444	\$3,853	\$0	\$380,256	\$49,065
Instruction	\$0	\$12,621,227	\$8,283,567	\$14,615,390	\$9,602,951	\$0	\$16,792,045	\$16,125,224
Total Department Overhead Per CH	\$0	\$96	\$130	\$59	\$44	\$0	\$31	\$37

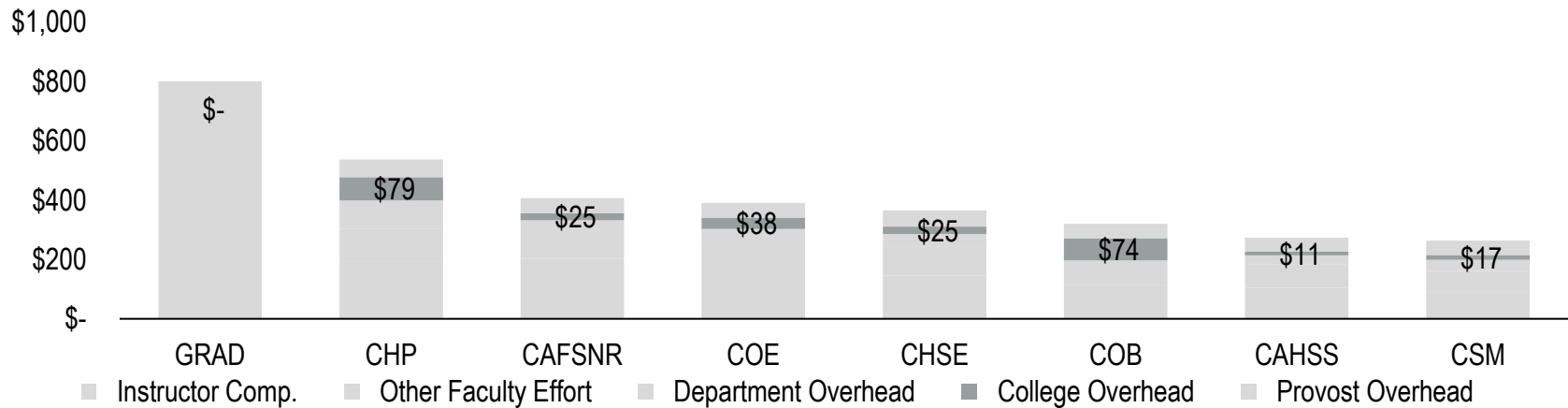
Note: Totals may not foot due to rounding.
Source: Cost-to-Educate Model

Cost to Educate Model

College Overhead (Indirect Costs)

Academic support and instruction expenses allocated to Dean accounts or otherwise not assigned to academic departments are proportionally distributed across departments based on productivity to account for use of shared services.

Instructional Cost per Credit Hour by Component
AY 2019-2020



College Overhead Per Credit Hour	GRAD	CHP	CAFSNR	COE	CHSE	COB	CAHSS	CSM
Non-Instructional Salaries	\$1,649,041	\$2,169,165	\$643,196	\$1,565,359	\$669,248	\$2,130,448	\$720,187	\$1,212,359
Academic Support	\$1,700,454	\$1,527,374	\$188,341	\$1,612,881	\$804,722	\$921,578	\$789,240	\$1,444,609
Instruction	\$263,240	\$1,166,009	\$636,072	\$330,097	\$117,966	\$8,273,005	\$152,980	\$38,481
Total College Overhead Per CH	\$0	\$79	\$25	\$38	\$25	\$74	\$11	\$17

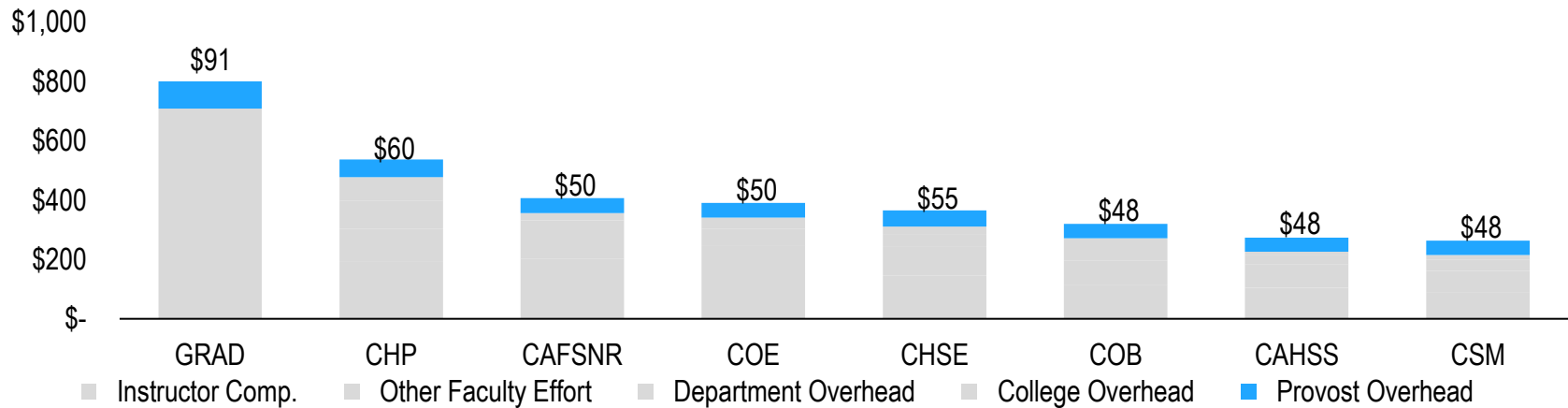
Note: Totals may not foot due to rounding.
Source: Cost-to-Educate Model

Cost to Educate Model

Provost & Graduate Overhead (Indirect Costs)

Provost Overhead includes central services from non-academic units reporting to Academic Affairs (excluding Research) as well as the Graduate School and is applied cross-college at a proportional rate based on credit hour productivity.

Instructional Cost per Credit Hour by Component
AY 2019-2020



Provost Overhead Per Credit Hour	GRAD	CHP	CAFSNR	COE	CHSE	COB	CAHSS	CSM
Total Provost Costs	\$31,696	\$1,463,667	\$1,499,015	\$2,262,387	\$1,599,965	\$1,567,367	\$3,728,759	\$3,684,753
Total Graduate Costs	\$32,577	\$475,178	\$172,162	\$224,194	\$336,940	\$111,299	\$214,267	\$241,056
% of Graduate Credit Hours Produced	2.2%	8.9%	11.8%	15.3%	23.1%	7.6%	14.5%	16.5%
Total Provost Overhead Per CH	\$91	\$60	\$50	\$50	\$55	\$48	\$48	\$48

Note: Totals may not foot due to rounding.
Source: Cost-to-Educate Model

4



MARKET POSITIONING

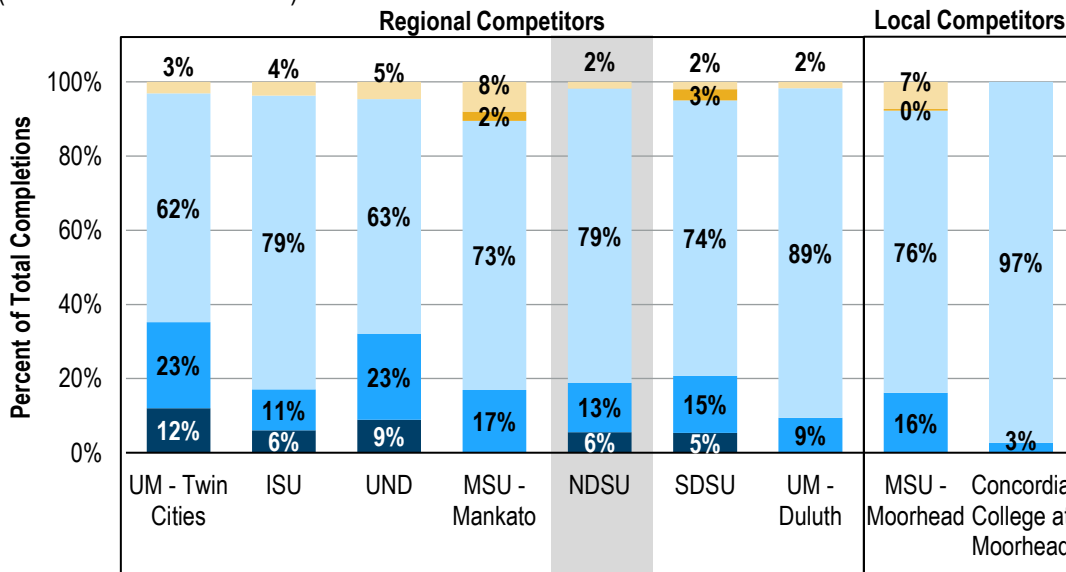
Market Positioning

Competitive Landscape

NDSU's program completions were evaluated relative to the market, which includes other four-year institutions in the Fargo-Moorhead MSA and a selection of regional schools that NDSU applicants often attend.

Completions by Level (Academic Year 2018-2019)

■ Doctor's ■ Master's ■ Bachelor's ■ Associate's ■ Certificates



Completions	14,576	9,311	3,527	3,415	3,259	2,727	2,434	1,631	555
Programs¹	277	176	144	160	157	129	103	114	51
Completions per Program	52.6	52.9	24.5	21.3	20.8	21.1	23.6	14.3	10.9

Observations

- NDSU produces program completions at the Bachelor's, Master's, Doctor's, and Certificate level, with a **predominantly Bachelor's-focused program mix** at 79% of total AY 2019 completions
- As a portion of total program completions, NDSU produces **fewer Master's, Doctor's, and Certificate completions than its competitors on average**
- In AY 2019, NDSU conferred 3,259 awards for 157 unique programs¹, offering **a wider array of programs per graduate than all regional competitors**

Relative to the competitive landscape, NDSU appears to be a primarily undergraduate institution with a robust program portfolio. Does this align with the institution's strategic vision?

Note: ¹Unique CIP Code Completions
Source: Emisi 2019 Program Completion Table (NCES IPEDS: NDSU and Competitors)

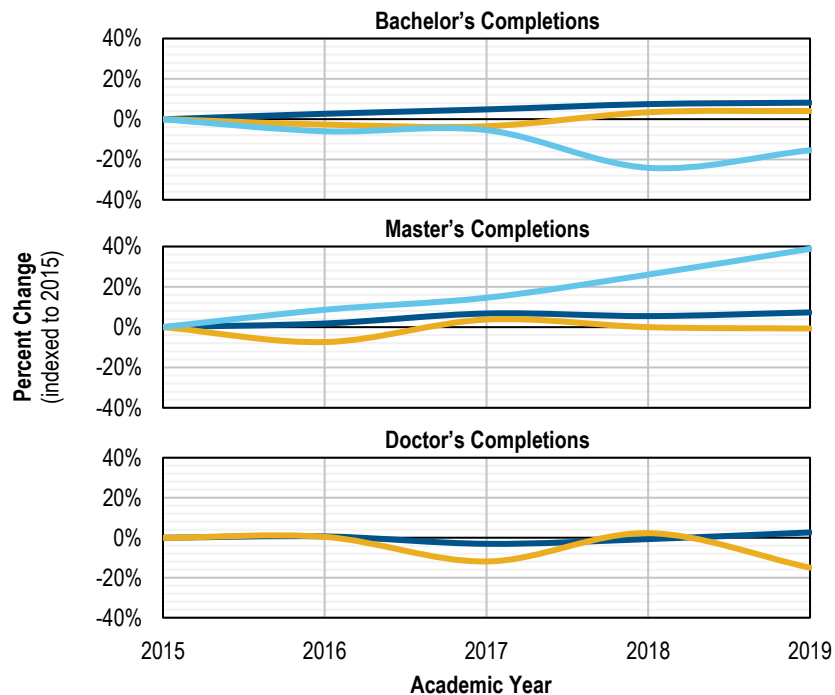
Market Positioning

Program Level Trends

Change over time in program completions indicates shifting regional and local demand, enabling analysis of the market-share that NDSU is capturing relative to its competitors at each program level.

Change in Program Completions
(Academic Years 2015-2019)

— Region
— NDSU
— Local



Program Level	4-Year Avg. Annual Growth Rate			Completions per Program		
	Region	NDSU	Local	Region	NDSU	Local
Bachelor's	2.2%	1.0%	-3.0%	39	24	12
Master's	1.9%	-0.2%	12.9%	11	6	13
Doctor's	0.7%	-3.4%	---	7	4	---

Observations

- Between 2015-2019, NDSU **Bachelor's completions** grew by 1% and declined by 3.0% for its local competitors
- During this period, **Master's and Doctor's completions** declined at NDSU and experienced growth, on average, for its competitors
- NDSU's Doctoral program completions have fluctuated in recent years, with **92% of NDSU Doctor's programs producing 5 or fewer completions in 2019**
- NDSU offers a **broader portfolio of Bachelor's, Master's, and Doctor's programs** than its regional competitors on average, reflecting an observation from multiple survey respondents that "NDSU cannot be all things to all possible students"

There appears to be substantial room for growth in the local and regional markets for Master's degrees, with declines in NDSU's graduate degree completions suggesting potential misalignment with student demand.

Market Positioning

Program Family Growth

Although NDSU's market has grown overall, completions have declined or stayed flat for half of the program families offered,¹ potentially creating increased competition in families with slowed growth and pockets of high demand for growing families.

Change in CIP Family Completions (Academic Years 2015-2019)

	UM – Twin Cities	ISU	UND	MSU – Mankato	NDSU	SDSU	UM – Duluth	MSU – Moorhead	CC – Moorhead	Total Change
Communications Technologies/Technicians And Support Services	0	0	6	0	0	0	15	7	0	28
Computer And Information Sciences And Support Services	330	408	26	25	31	35	35	23	4	917
Engineering/Engineering-Related Technologies/Technicians	0	52	(3)	6	63	(1)	9	0	0	126
Engineering	107	598	54	14	(11)	45	79	0	0	886
Agricultural/Animal/Plant/Veterinary Science And Related Fields	45	80	0	(3)	5	85	0	0	0	212
Business, Management, Marketing, And Related Support Services	179	144	30	60	48	29	42	32	2	566
Mathematics And Statistics	67	10	4	9	(10)	(9)	2	(1)	(1)	71
Public Administration And Social Service Professions	35	10	7	(3)	0	0	22	(8)	(11)	52
Health Professions And Related Programs	183	(10)	98	35	(56)	(14)	(10)	(9)	(12)	205
Education	(63)	11	(10)	38	29	64	(25)	108	(15)	137
Transportation And Materials Moving	0	0	9	2	1	0	0	0	0	12
Physical Sciences	24	12	(20)	5	(2)	17	(14)	6	(2)	26
DHS, Law Enforcement, Firefighting And Related Protective Services	0	109	4	(64)	(18)	0	0	(19)	0	12
Architecture And Related Services	(33)	18	0	5	(7)	22	0	0	0	5
Biological And Biomedical Sciences	7	58	6	(15)	(3)	(13)	(16)	(6)	4	22
Communication, Journalism, And Related Programs	66	15	18	(1)	(32)	13	(22)	(21)	(27)	9
Family And Consumer Sciences/Human Sciences	(48)	22	0	(6)	33	(3)	0	0	0	0
Social Sciences	59	(43)	22	(36)	(1)	8	(46)	6	(21)	0
Area, Ethnic, Cultural, Gender, And Group Studies	14	(7)	(2)	1	1	1	(9)	(1)	(2)	(2)
Psychology	(36)	49	33	(70)	5	(24)	(11)	8	(8)	(52)
Natural Resources And Conservation	36	(14)	7	(9)	(13)	(33)	11	(1)	(1)	(4)
Visual And Performing Arts	(30)	14	8	7	6	(6)	(16)	(32)	(19)	(54)
Parks, Recreation, Leisure, Fitness, And Kinesiology	24	23	(19)	(22)	(1)	(5)	(19)	(25)	(25)	(17)
Philosophy And Religious Studies	(3)	(2)	3	(4)	3	0	(3)	2	(5)	(68)
Foreign Languages, Literatures, And Linguistics	(29)	3	(26)	(8)	6	6	13	(1)	(14)	(69)
Multi/Interdisciplinary Studies	(46)	(97)	29	31	4	(1)	7	(13)	10	(9)
Legal Professions And Studies	(96)	0	26	0	0	12	0	0	0	(50)
English Language And Literature/Letters	(152)	10	3	(2)	9	(9)	3	(10)	(22)	(76)
History	5	(44)	(9)	(1)	(16)	(5)	(7)	4	(8)	(58)
Liberal Arts And Sciences, General Studies And Humanities	(4)	9	2	(162)	0	48	3	(8)	(1)	(170)
Culinary, Entertainment, And Personal Services	(14)	0	0	0	0	0	0	0	0	(81)
Construction Trades	(24)	0	0	0	0	0	0	0	0	(113)
Total Change	603	1,438	306	(168)	74	262	43	41	(174)	2,425

Highest
Average Annual Growth Rate in Total Completions
Lowest

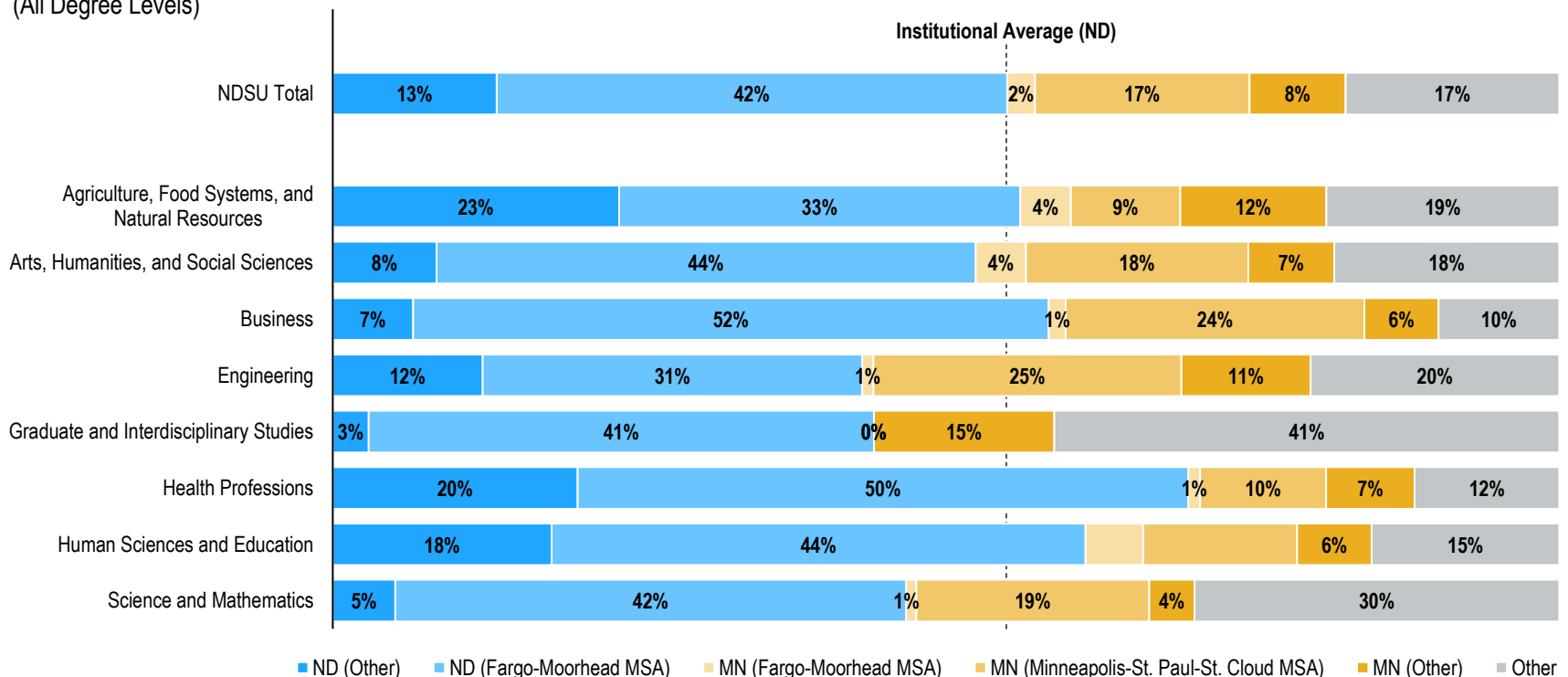
Note: ¹Program families are denoted by the first two digits of each program's CIP code
Source: Emsi 2015 - 2019 Program Completion Tables (NCES IPEDS: NDSU and Competitors)

Market Positioning

Occupational Regions

The most popular employment locations for NDSU graduates are the Fargo-Moorhead and Twin Cities Metropolitan Statistical Areas (MSA), with 55% of NDSU graduates from the past two years employed within North Dakota.

Employment Locations of 2019 and 2020 Graduates¹ (All Degree Levels)



NDSU is successfully recruiting students from outside of North Dakota and retaining a substantial number of them after graduation, contributing to the state’s workforce needs and fulfilling its land-grant mission.

Notes: ¹Excludes survey responses without an NDSU College or employment location; "Other" includes all locations outside of ND and MN, domestic and abroad; Totals may not add up to 100 due to rounding

Market Positioning

Occupation Group Growth

Occupational growth in North Dakota has not mirrored that of Minnesota and the nation, with some occupational groups declining in North Dakota and growing elsewhere.

Change in Jobs by SOC Group¹ (2015 – 2019)

Highest
National Occupation CAGR
Lowest

	Fargo-Moorhead (ND-MN)	North Dakota	Minneapolis- St. Paul- Bloomington (MN-WI)	Minnesota	United States
Protective Service	(5)	(14)	60	34	1,614
Business and Financial Operations	288	486	11,616	14,070	1,205,531
Management	(120)	(550)	7,333	7,059	1,088,737
Computer and Mathematical	(497)	(711)	7,587	6,131	426,703
Sales and Related	(68)	(69)	1,207	1,350	85,358
Transportation and Material Moving	20	86	658	668	12,365
Community and Social Service	306	62	3,262	6,120	212,791
Healthcare Practitioners and Technical	1,832	1,835	12,298	20,094	517,407
Architecture and Engineering	(49)	126	1,686	2,345	156,462
Life, Physical, and Social Science	203	156	1,371	692	85,607
Legal	4	(12)	758	972	44,811
Arts, Design, Entertainment, Sports, and Media	(107)	(258)	712	1,697	84,659
Educational Instruction and Library	463	(408)	(4,677)	(6,140)	142,525
Farming, Fishing, and Forestry	(2)	(80)	93	39	(851)
Office and Administrative Support	(12)	(24)	(184)	(231)	(6,432)
Total Change	2,255	625	43,779	54,899	4,057,286

Observations

- Protective Science, Management, Sales, Computer / Mathematical, Art / Design / Entertainment / Sports / Media occupations are declining in ND but growing in MN and the US
- In ND and MN, Healthcare occupations have grown the most, adding 21,929 new jobs between 2015 and 2019
- Education has grown disproportionately in the Fargo-Moorhead MSA, adding 463 new jobs, while declining across North Dakota and Minnesota

Occupational trends help to explain some of the change in program family completions, such as Engineering and Computer Science, which both lost jobs in the Fargo-Moorhead MSA.

Note: ¹Standard Occupational Classification (US federal job classification system)
Source: Emsi 2015 - 2019 Occupation Tables (Bureau of Labor Statistics: QCEW and Non-QCEW Employees; US Census Bureau: Self-employed individuals)

7



INSTITUTIONAL OPPORTUNITIES

7a

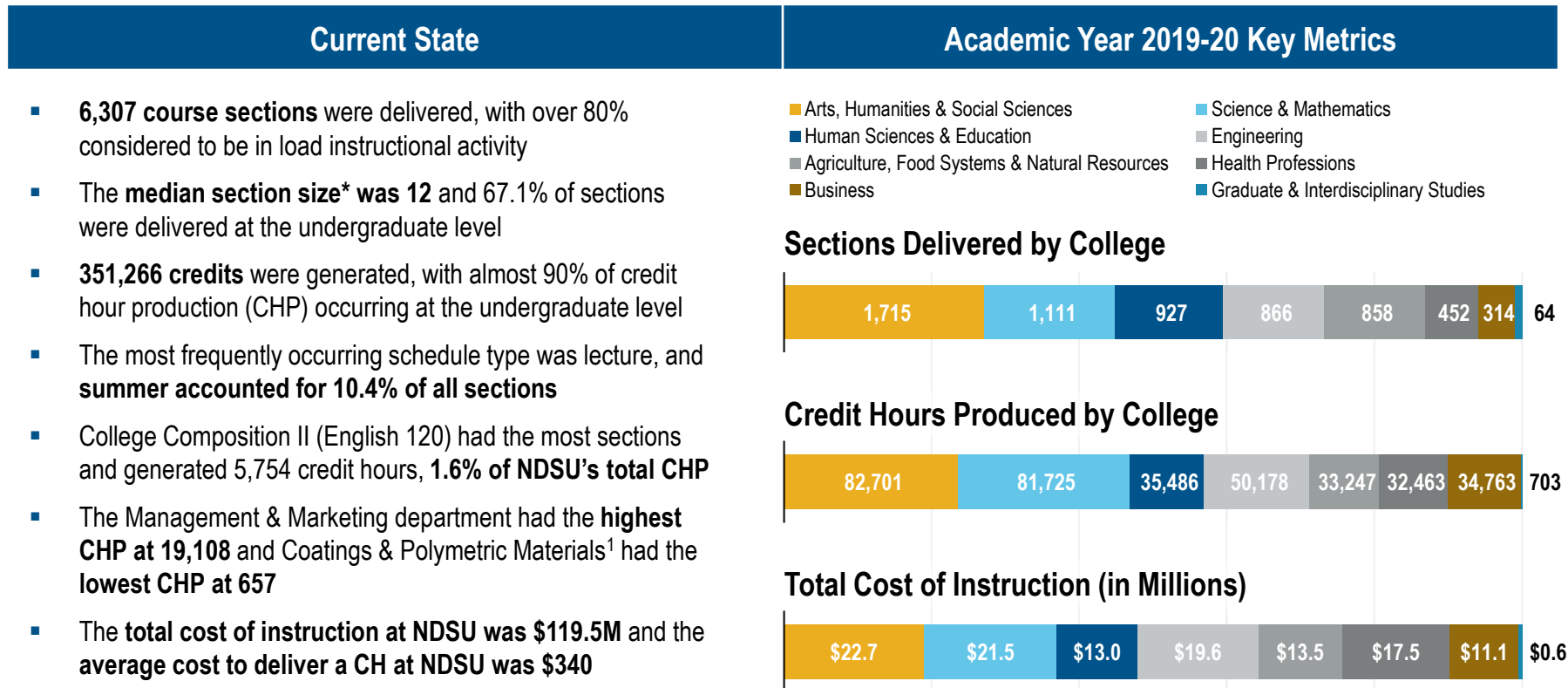


COURSE ECONOMICS

Course Economics

Introduction

Courses are the foundation of the programs that students pay for at a university and have a direct impact on an institution's cost to deliver the university curriculum, making them a key element to improving student outcomes and efficiencies.



Analyzing course economics allows each academic unit to identify the factors driving their costs and the levers that, if adjusted, may improve their efficiency and free up operational funds for strategic initiatives.

Note: ¹Excluding Aerospace Studies, Military Science, and Dean's offices

Source: Cost-to-Educate Model

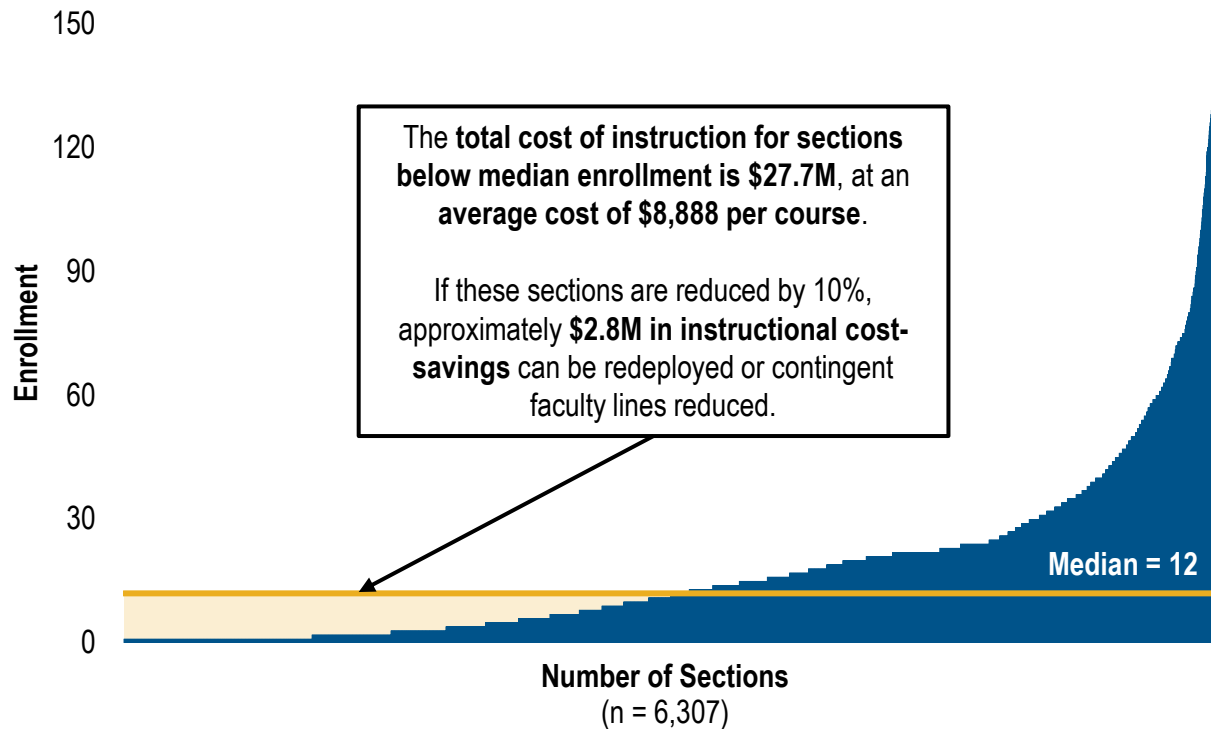
*Median section sizes include single-student entries, such as dissertations. Flagging these types of courses for removal would likely raise this figure.

Course Economics

Section Enrollments

During the 2019-20 academic year, the median enrollment for all NDSU sections was 12*, presenting an opportunity to increase efficiency and reduce cost by further examining the 3,121 sections falling below median enrollment.

Enrollment per Section



Sections Below Median Enrollment

Course Level	Percent	Cost
100	5%	\$1.4M
200	5%	\$1.3M
300	10%	\$2.9M
400	22%	\$6.6M
UG Total	42%	\$12.3M
500 Total	0%	\$95.8K
600	10%	\$2.6M
700	32%	\$9.1M
800	15%	\$3.6M
Grad Total	58%	\$15.3M

Sections with suboptimal enrollment may be necessary on occasion, but it can be beneficial to have unique enrollment expectations for various units based on their pedagogical needs and institutional function.

Note: Figures in table may not foot due to rounding; 70 courses have enrollments of >150 students and exceed the parameters of the chart
Source: Cost-to-Educate Model

*Median section sizes include single-student entries, such as dissertations. Flagging these types of courses for removal would likely raise this figure.

Course Economics

Academic Unit Matrix

Key: Unit Name (2019 Cost per CHP)

		2019 Completions		
		2-13 (Bottom Quintile)	14-115 (Middle Quintiles)	116-273 (Top Quintile)
Credit Hours Produced	First Quartile	<ul style="list-style-type: none"> Geosciences (\$258) Emergency Management (\$272) Visual Arts (\$307) Modern Languages (\$361) Women & Gender Studies (\$393) Plant Pathology (\$601) Pharmaceutical Sciences (\$815) Coatings & Polymeric Materials (\$1,304) 	<ul style="list-style-type: none"> University Studies (\$179) Political Science & Public Policy (\$245) Agricultural & Biosystems Engineering (\$637) Public Health (\$1186) 	
	Second Quartile	<ul style="list-style-type: none"> Physics (\$244) Theatre Arts (\$292) 	<ul style="list-style-type: none"> Criminal Justice (\$251) Microbiological Sciences (\$337) Allied Sciences (\$340) Apparel, Design & Hospitality Management (\$378) Transportation, Logistics & Finance (\$386) School of Natural Resource Sciences (\$422) Industrial & Manufacturing Engineering (\$435) Animal Sciences (\$471) 	<ul style="list-style-type: none"> Plant Sciences (\$516)
	Third Quartile		<ul style="list-style-type: none"> Sociology & Anthropology (\$220) Statistics (\$230) History, Philosophy & Religious Studies (\$261) Music (\$302) Architecture & Landscape Architecture (\$348) Electrical & Computer Engineering (\$361) Pharmacy Practice (\$494) 	<ul style="list-style-type: none"> Accounting & Information Systems (\$307) Human Development & Family Science (\$328) Civil & Construction Engineering (\$402) School of Education (\$513)
	Fourth Quartile	<ul style="list-style-type: none"> Mathematics (\$253) 	<ul style="list-style-type: none"> Communication (\$244) Psychology (\$245) English (\$266) Chemistry & Biochemistry (\$293) Agribusiness & Applied Economics (\$318) Computer Science (\$471) 	<ul style="list-style-type: none"> Biological Sciences (\$246) Management & Marketing (\$312) Health, Nutrition & Exercise Sciences (\$314) Mechanical Engineering (\$319) Nursing (\$526)

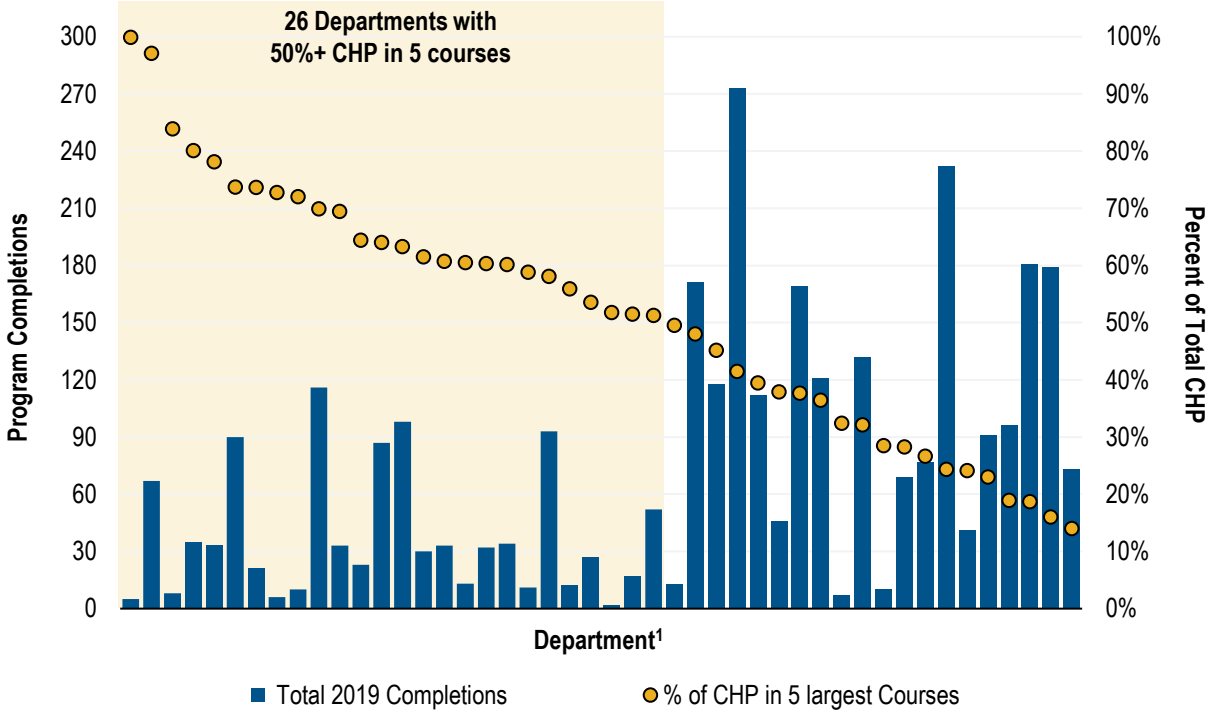
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Course Economics

Academic Unit Production

During the 2019-20 academic year, 26 departments generated more than half of their credit hours through only five courses, suggesting a distinction between units that produce high numbers of majors and units that teach students from those majors.

Completions and Credit Hour Production by Unit



Key Metrics	50%+	Other
Program Completions	988	2,211
Credit Hours Produced (CHP)	157,030	187,004
Average Cost per CHP	\$292	\$379
CHP per Degree Completion	159	85
CHP per TTL Faculty	858	842
Sections Offered at the 300/400 Level	1,201	1,277
Average Section Enrollment in 300/400 Courses	18	25

Units producing more degrees will require additional resources to support advising, upper division course offerings, and other items, while units with fewer of these responsibilities may be operated at greater efficiencies.

Note: Excludes Dean's Offices, Aerospace Studies, Military Science, and Graduate & interdisciplinary Studies
Sources: Cost-to-Educate Model; NDSU Program Completions

Course Economics

Summary

Course offerings make up the foundation of the academic portfolio which requires a careful balance between achieving pedagogical quality, faculty preferences, and effective cost management; as such, a variety of risks must be considered.

Key Questions

Short Term Considerations

- Is \$27M (23% of the total cost of instruction) the right amount for NDSU to spend on sections with fewer than 12 students?
- What units and levels present opportunities for quick wins by closing low-enrolled sections to redeploy that faculty effort elsewhere or reduce the need for PT faculty?
- Should faculty effort & overhead be evaluated in units whose CHP is driven by 5 courses?



Long Term Considerations

- Should units with consistently low credit hour production, high costs, and low section enrollments be transformed?
- Should “service” units offer major programs, given the associated costs and low margins?
- How do we ensure that mission-aligned and in-demand “major” units are getting the resources they need to thrive and grow?

Considerations

Opportunities

- Review low-enrolled, high-cost sections and consider closing sections or leveraging NDSU’s HyFlex capabilities to consolidate redundant sections
- Evaluate faculty effort expectations and need for low CHP courses in academic units that generate 50% of their credit hours through 5 or fewer courses

Risks

- Small sections may be necessary to accommodate student demand, faculty availability, and departmental schedules
- Complexities and unique traits across units could impede success if decisions do not actively involve all affected individuals

7b



FACULTY EFFORT & PAY

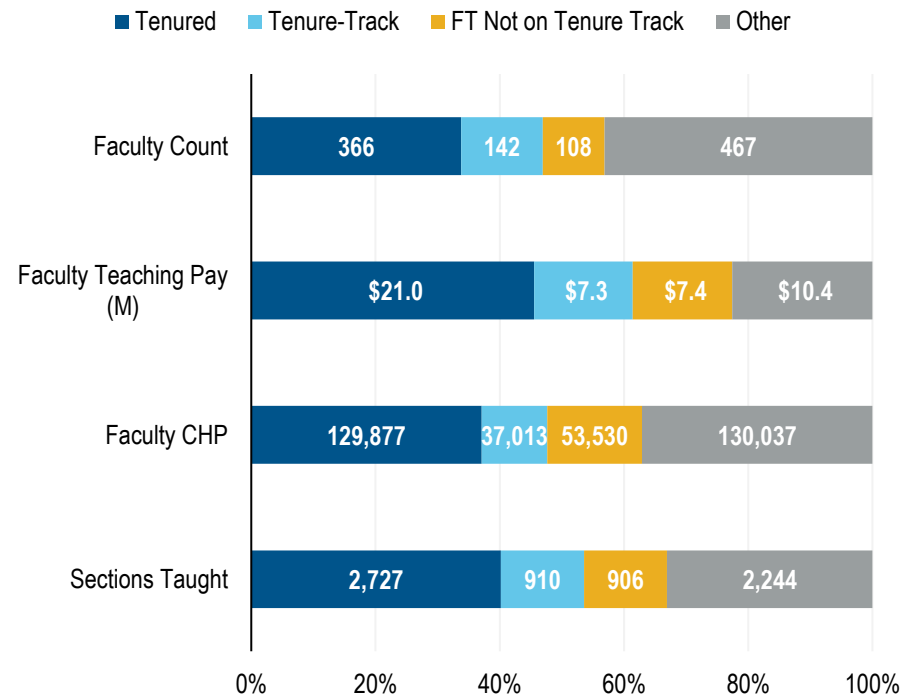
Faculty Effort & Pay

Introduction

A portion of faculty compensation serves as the direct cost of instruction for each course offered and has the most significant impact on the cost per credit hour of the institution. Effort translates to the value return of the investment in instructors.

Current State	Academic Year 2019-20 Key Metrics
---------------	-----------------------------------

- Full time faculty across NDSU **range in teaching expectations** from 40% of salary (Engineering) to 100% (Agriculture) and vary by department & faculty type
- More than **80% of the course sections offered in AY 2019-2020 were considered load-bearing** and contributed to workload expectations of full-time faculty
- Approximately **1,271 course sections (20.8%) were listed as being team-taught** with anywhere from 2 to 10 instructors assigned to the course
- Tenured faculty averaged 355 credit hours produced per faculty member, Tenure-Track averaged 261, FT Non-Tenure 496, and others 279 credit hours



Making resource allocation decisions in individual areas of faculty effort (e.g., increase CHP for TTL) and pay (overload) will inevitably influence other areas, due to the interconnected nature of influential variables.

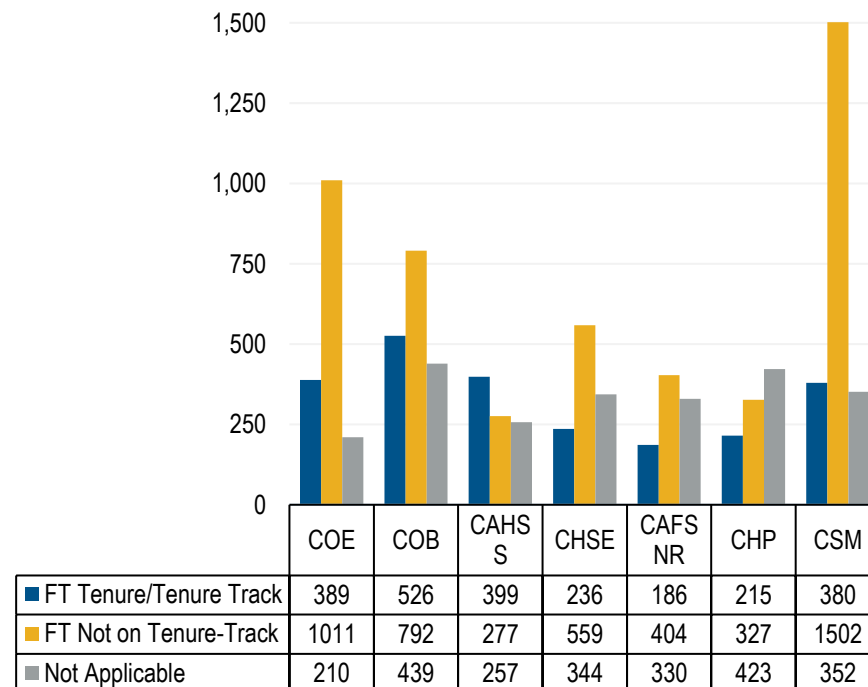
Faculty Effort & Pay

CHP of Tenure Line Faculty

An important metric used in academic assessments is Credit Hour Production (CHP) per faculty member, as this measure provides Deans and Chairs with information necessary to maximize pedagogical outcomes and assure financial viability.

- On a per-faculty member basis, **full time non-tenure track faculty teach nearly 40% more credit hours** than tenured faculty, and over 90% more than tenure track faculty
- Adjunct, part-time or administrative instructors amount to an additional 468 individuals teaching courses resulting** in an estimated total of approximately \$7.6M for their teaching efforts
- If every FT Faculty member teaching below the average CHP (358) were brought up to the average, NDSU would have the **capacity to offer more than 78,000 additional credit hours** by FT faculty without increasing expenses
- Given the average CHP of PT instructors (279) this move alone could **negate the need for about 280 PT instructors**, eliminating the compensation aligned with their teaching assignments (an estimated average of \$16,300 per person based on teaching portion of salary, or a total of \$4.6M)

Average Credit Production per Faculty Member
(Academic Year 2019-2020)



During AY 2019-2020, NDSU maintained a lower average CHP per TTL Faculty on average than that of FT non-tenure faculty, reducing the return on investment for teaching portions of tenure-line faculty salaries.

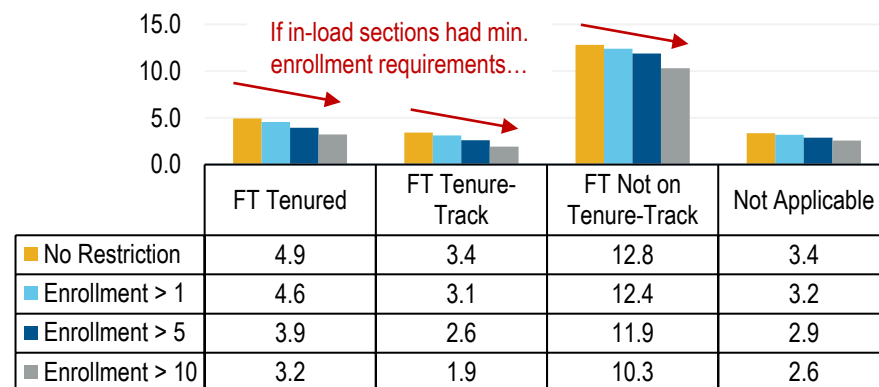
Faculty Effort & Pay

Faculty In-Load Instruction

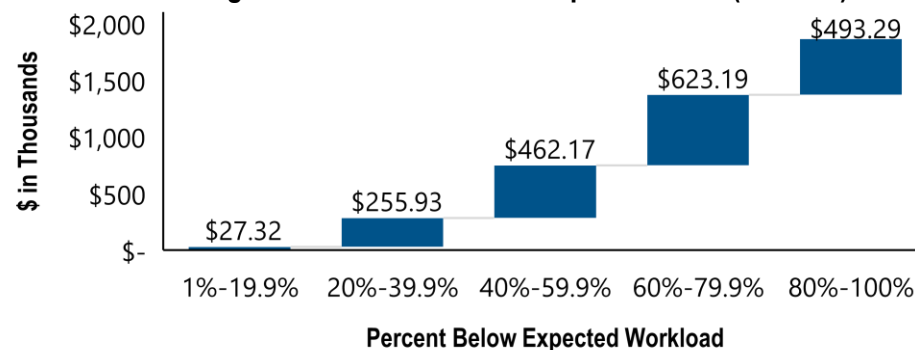
Full-time faculty taught over 3,400 in-load sections during academic year 2019-2020; however, when accounting for courses with 10 or fewer enrollments, this number decreases by approximately 81%.

- Excluding sections with 10 or fewer enrollments would cause tenured faculty to **decrease in-load sections taught from 72% to 55%**.
- By incorporating section enrollment thresholds into load calculations, up to **\$9.5M of planned instructional effort could be considered out-of-load**
- Nearly **20% of sections offered at NDSU were considered non-load bearing** and \$21.9 million was allocated to deliver these courses
- Load reassignments resulted in ~\$1.9M** of planned instructional resources being allocated to activities outside of formal instruction, requiring additional faculty to fill in gaps
- These **reassignments would show larger figures if load calculations considered enrollment**, revealing a substantial opportunity for increasing instructional productivity

Low Enrollment Impact on Load (AY 2020)



Reassignment Costs for Below-Expected Load (AY 2020)



Faculty load in terms of sections taught at NDSU is materially impacted by low enrollment sections resulting in small section sizes, reduced revenue margins, and deflated credit hours produced per full-time faculty member.

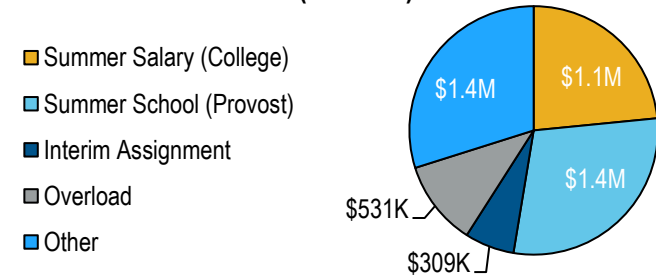
Faculty Effort & Pay

Supplemental Pay

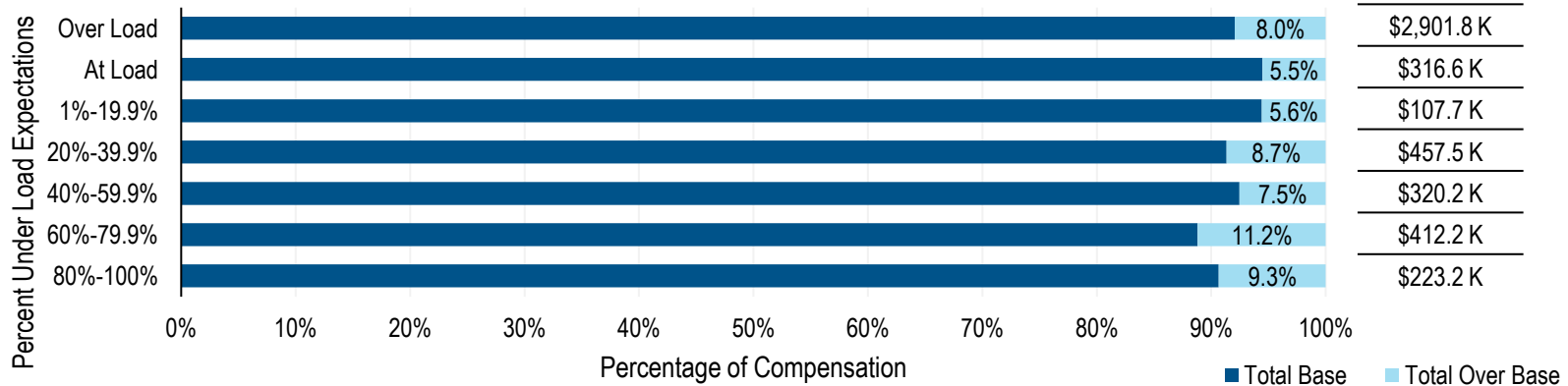
Payroll data indicates that a significant proportion of compensation (over \$4.8M) for instructors is above their base compensation and include activities such as summer salary, overload, and interim assignments, among others.

- Over 480 instructors received pay above base in FY 2020, averaging ~\$9,900 per person. Of these, 329 were FT faculty, with approximately one-third of FT faculty at each level receiving supplemental pay
- 141 FT instructors earned over base compensation despite not meeting workload expectations
- The colleges distribute supplemental pay at a rate of 7.9% of total pay on average, with college-specific rates ranging from 3.3% to 12.1%

FT Faculty Over Base Pay by Category (FY 2020)



Supplemental Pay Rates by Load Deficit¹ (FY 2020)



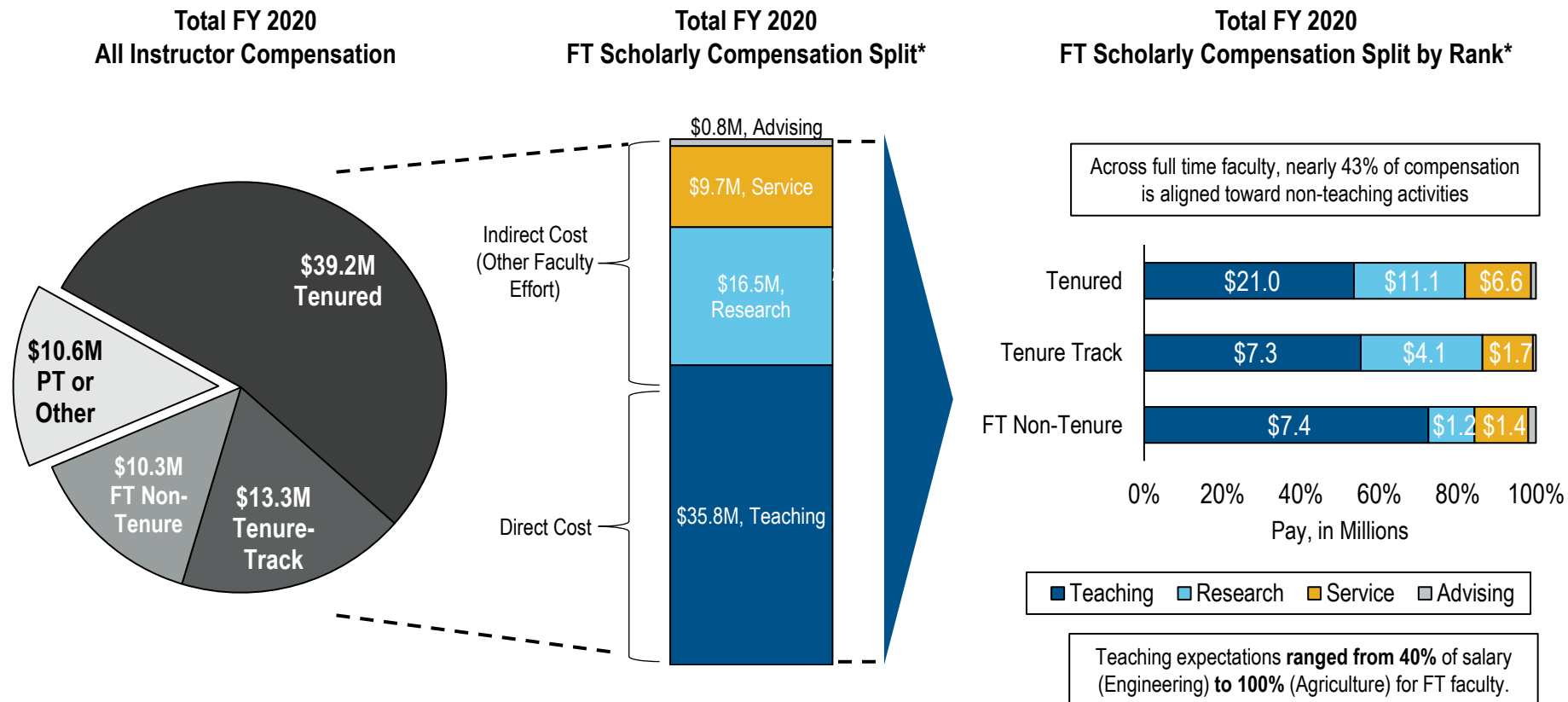
An assessment of supplemental pay, particularly as it relates to faculty with a load deficit, may identify various arenas for adjustments within both faculty workload and compensation.

Note: ¹Includes only instructors assigned to AY 2020 courses who report to a college
Source: Cost-to-Educate Model

Faculty Effort & Pay

Compensation by Activity

NDSU invests \$73.3M in total teaching faculty compensation including benefits. The review of faculty effort focuses on the approximate \$35.8M allocated to teaching, which composes 57% of total FT faculty compensation.



Base compensation of full-time instructors serves as the basis for determining NDSU's initial expected investment in the four academic workload realms (Teaching, Research, Service, and Advising).

Faculty Effort & Pay

Other Faculty Effort

The second largest component of the cost per credit hour, other faculty effort, must be considered in conjunction with the university's mission and overall financial needs in order to achieve sustainable performance.

Increasing the teaching split by just 5% would give FT faculty an additional \$1.7M capacity for credit hour production, equal to approximately 100 PT instructors based on average pay



Increase in teaching expectations leads to higher CHP for FT faculty and a reduced need for adjunct/part time instructors to fill in gaps

This also means a reduction in time spent towards non-teaching activities to free up time devoted to students in the classroom

- 275 full time faculty out of 616 (45%) **have research expectations exceeding 40% of their contracted salary**, amounting to \$13.5M of compensation
- Approximately 270 full time faculty have **service expectations over 20%**, amounting to a total of \$8.1M
- This non-instructional activity is compared against an **average of 45%* allocated toward direct instruction**
- Redirecting further efforts toward instruction may result in **reduced need for contingent faculty** to fill the gaps in teaching obligations

To find the appropriate balance of how and where faculty spend their working time, NDSU's academic units have the opportunity to determine which of its scholarly activities take priority in times of transformation.

Faculty Effort & Pay

Summary

When looking to implement changes in faculty effort and compensation, there are several important factors to consider to better understand how resource allocation decisions may affect the overall outcome of such endeavors.

Key Questions

Short Term Considerations

- Can supplemental pay be limited to instructors who have reached load expectations?
- What is the appropriate balance of in-load and out-of-load coursework to be assigned to full time faculty and part time instructors?



Long Term Considerations

- Can more time be allocated toward instruction for full time faculty?
- What is the right expectation for non-instructional effort? Where within the University should that effort be focused?
- Can full-time faculty increase their credit hour production to minimize contingent faculty expenses?

Considerations

Opportunities

- Consider whether adjustments should be made to redirect more of full time and tenure-line faculty's workload toward teaching to be able to reduce the need for additional hires to fill in gaps
- Review supplemental pay policies to ensure that extra compensation is limited to those who have fulfilled their load expectations

Risks

- These opportunities are integrated and interdependent, such that adjustments in one area will affect the others
- Balancing mission and goals between teaching and research means setting priorities over what is most impactful and realistic in times of transformation
- Resistance to change and limitations on demand may pose challenges for which each department must plan and prepare

7c



ACADEMIC OVERHEAD

Academic Overhead

Introduction

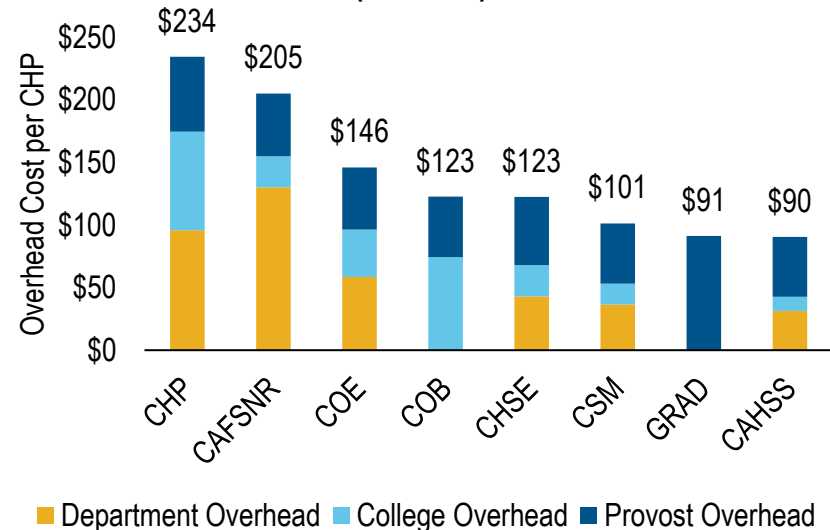
Outside of instructor compensation, academic overhead accounts for the remaining costs to deliver the curriculum, and includes costs related to support staff, services, supplies, and other uses at the department, college, and provost level.

Current State

- Academic overhead includes unrestricted expenditures for activities related to **instruction and academic support**, which **account for \$117.5M and 83.9% of total unrestricted expenditures** across the colleges and Provost's office
- Across NDSU, **academic overhead accounts for 38.6% of total costs** in the cost-to-educate model, including department (14.6%), college (9.3%), and provost overhead (14.8%)
- Academic overhead costs for departments* vary widely** across NDSU, **ranging from \$65 per CHP** for History, Philosophy, and Religious Studies **to \$968 per CHP** for Coatings and Polymeric Materials
- Non-instructional salaries and wages (e.g., staff) account for the largest proportion** of academic overhead costs, totaling 73.4%

Academic Year 2019-20 Key Metrics

Total Academic Overhead per CHP by College (AY 2020)



Assessing academic overhead costs in conjunction with instructor compensation costs provides a holistic understanding of the many avenues by which NDSU can pursue greater financial sustainability.

Note: *Excludes Dean Offices, Aerospace Studies, Military Science, University Studies, and 1 department with insufficient data
Source: Cost-to-Educate Model

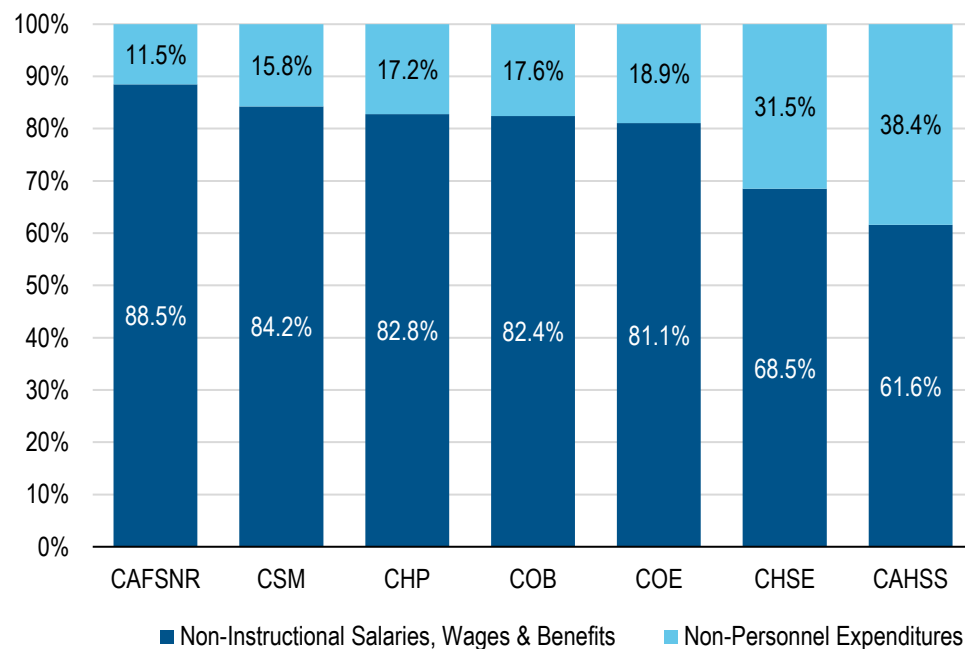
Academic Overhead

Department and College Overhead

The expenditure composition of college activities related to instruction and academic support is composed primarily of salaries, wages, and benefits, reducing the potential for non-personnel related cost savings across most colleges.

- Department and college overhead includes the **salaries, wages, and benefits** of individuals who did not teach a course in AY 2020, including administrators, faculty, staff, and grad students. **Non-personnel expenditures** includes travel, supplies, materials, equipment, leases, and other costs.
- Non-instructional salaries, wages, and benefits** account for the largest portion of department and college overhead costs, with each college **investing between \$1.7M and \$4.7M**
- The salaries, wages, and benefits accounted for in department and college overhead total \$24.4M and exclude \$72.7M **allocated to delivering coursework as instructor compensation** in the cost-to-educate model

Department and College Overhead by College¹, Type (AY 2020)



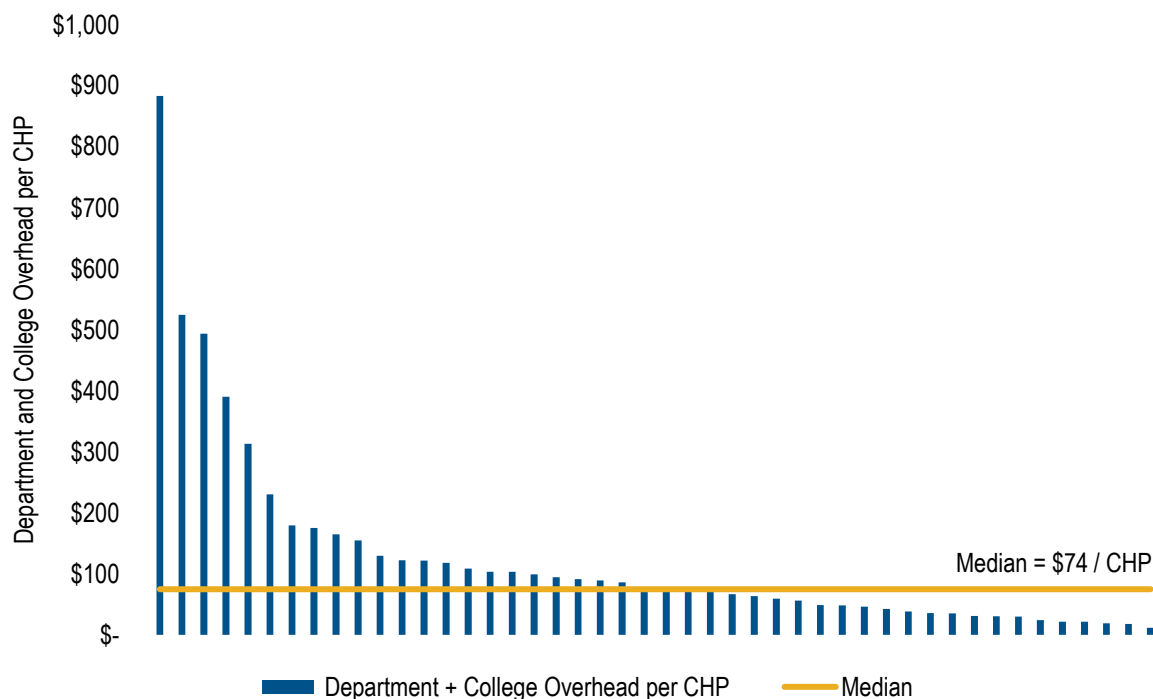
Efforts to reduce non-personnel expenditures across NDSU's colleges will result in proportionally minimal cost savings, given the weight of personnel expenditures within college expenditures.

Academic Overhead

Department and College Overhead per CHP

Department and college overhead accounts for 23.9% of NDSU's total instructional costs. Assessing where the rate of overhead to department credit hour production varies may identify opportunities for further cost savings across the university.

NDSU Department & College Overhead per CHP, by Department¹
(AY 2020)



- Total department and college overhead per credit hour varies widely across NDSU departments, ranging from **\$11 to \$883 per CHP**
- **22 departments** have department and college overhead per credit in excess of the median; if these departments reduced their ratio to the median, **NDSU could save ~\$8.5M**
- A **reduction of even 10%** across units with overhead above the institutional median per CHP **could save NDSU ~\$1.8M**

To determine the appropriate ratio of departmental overhead to CHP, NDSU must integrate and assess differences in academic disciplines, college support service structures, and approaches to historical budget cuts.

Academic Overhead

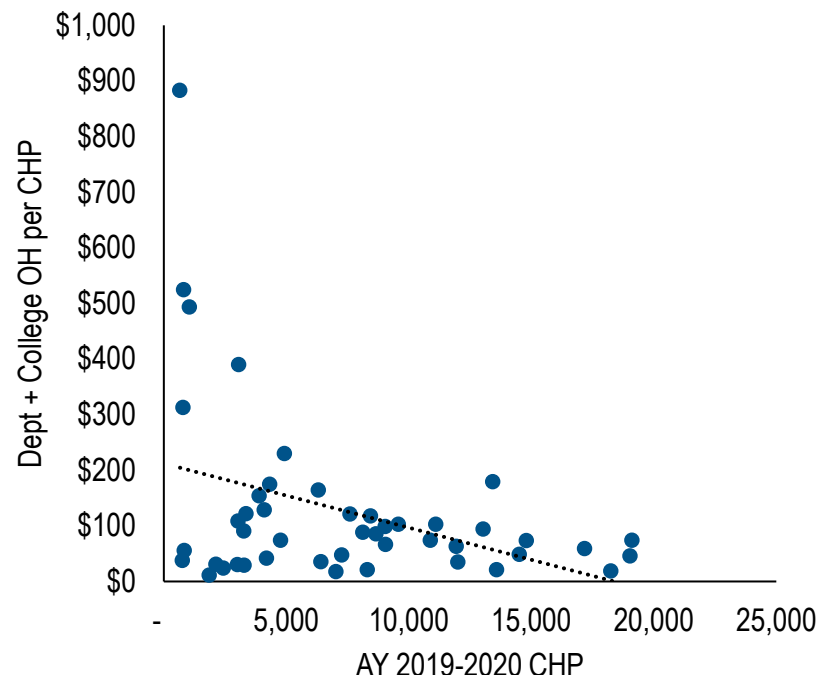
Department and College Overhead Trends

An alternative approach to addressing department and college overhead considers the entire departmental structure as it relates to overhead costs, utilizing alternative metrics to identify department adjustments and realize overhead savings.

- On average, departments with greater credit hour production have **lower average department and college overhead costs** per credit
- Reducing the number of departments can **streamline processes, encourage collaboration, and reduce administrative costs** by:
 - Reducing duplicative academic support staff by taking advantage of scale
 - Reducing costs associated with leadership titles (e.g., chairs and directors)

Department + College Overhead Reduction Scenarios	
Reduce By	Cost Savings
10%	\$3.1M
15%	\$4.6M
20%	\$6.1M

Department + College Overhead and CHP, by Department (AY 2020)



Assessing opportunities for scale and reduced duplication within NDSU's departments may identify additional cost savings at the department, college, and institutional level.

Academic Overhead

Summary

Academic Overhead is a key component supporting the education and service of students and faculty alike. Adjustments to financial investment in academic overhead must be considered in conjunction with institutional service levels.

Key Questions

Short Term Considerations

- Where have prior efforts to consolidate department overhead succeeded in reducing costs while maintaining overall service levels?
- What are appropriate metrics for measuring and moderating overhead costs in the current state, given pedagogical differences?



Long Term Considerations

- If the number of academic departments were reduced, would there be opportunity for savings in redistributed support services within colleges? Across colleges?
- Which approaches should NDSU consider, if any, to setup support service structures which can accommodate future variability in enrollment?

Considerations

Opportunities

- Consolidate departments with significant overhead costs per CHP, leveraging economies of scale to maximize existing infrastructure and support services
- Apply cost-reduction strategies, that departments with overhead costs below the median found effective in prior budget cuts, to high-cost departments

Risks

- Reductions to department and college non-personnel overhead, which only constitute 13% of total overhead, may have limited potential for cost savings
- Given NDSU historical budget cuts heavily impacted overhead, future approaches to cost savings should consider strategies which align with other academic metrics

7d



GRADUATE EDUCATION

Graduate Education

Introduction

Graduate level coursework (numbered 600+) at NDSU typically have fewer enrollments and credit hours produced, resulting in an average cost per credit hour that is 145% higher than the undergraduate average.

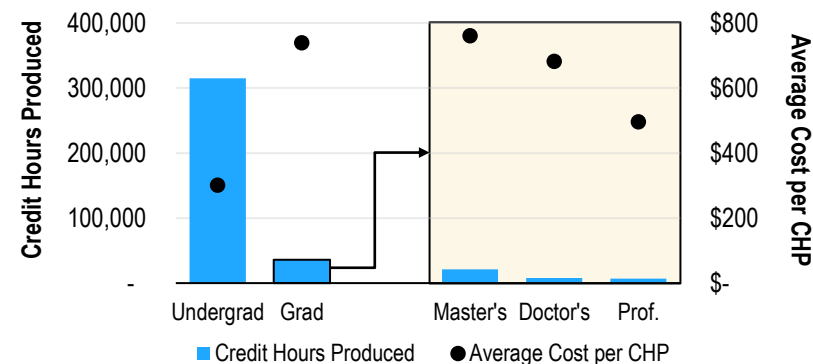
Current State

- NDSU produces graduate credits for **85 Master's programs** and **47 Doctor's programs**
- Graduate coursework **brings in substantially less net tuition revenue, while simultaneously costing 2.5x** as much per credit hour as undergraduate coursework
- Low enrollment in graduate courses leads to low credit hour production, resulting in a **higher cost per credit hour** for each course and program, lowering overall margins
- Graduate education is disproportionately expensive, producing **8.3% of NDSU's total credit hour production**, yet accounting for **31.0% of instructor compensation** and **18.3% of total instructional costs**
- This is largely due to the **fact that smaller sections are inherently more expensive to teach** given instructional compensation is spread across fewer CHs.

Academic Year 2019-20 Key Metrics

Credit Hour Production and Cost by Level

(Academic Year 2019-20)



	UG	Grad*	Total	Grad (%)
Sections Offered	4,233	2,031	6,264	32.2%
Instructor Compensation	\$27.4M	\$12.7M	\$40.1M	31.0%
Total Instructional Costs	\$94.9M	\$21.6M	\$116.5M	18.3%
Credit Hours Produced	315,031	29,279	344,310	8.3%
Cost per CHP	\$301	\$739	\$338	—

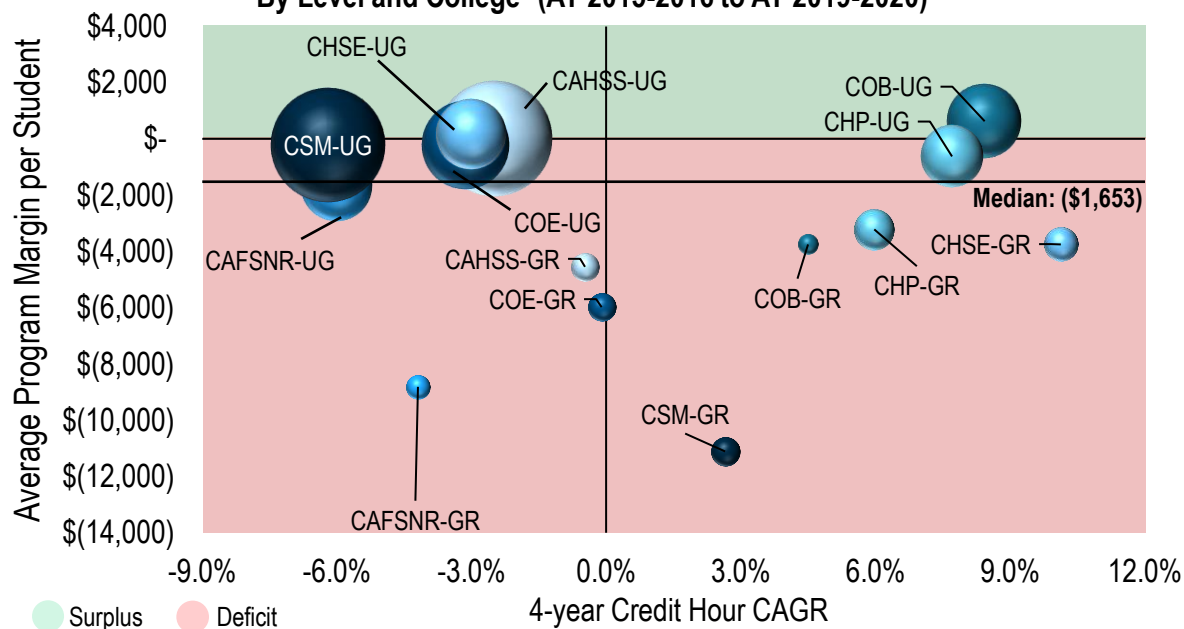
Graduate programs at NDSU typically cost significantly more money to operate and bring in less revenue than undergraduate programs suggesting a high need for subsidization by more profitable undergraduate programs.

Graduate Education

Program Economics

Graduate level courses at NDSU have smaller sections sizes, resulting in higher costs and lower revenues than their undergraduate counterparts; this results in a lower likelihood that graduate programs have positive margins.

Credit Hour Volume, Growth, and Per Student Program Margin
By Level and College* (AY 2015-2016 to AY 2019-2020)



Graduate Level Coursework	AY16	AY20	CAGR
Median Course Enrollment	14	14	0%
Average Course Enrollment	5	5	0%
Median Course CHP	26	26	0%
Average Course CHP	14	14	0%
Course Sections Offered	1,946	2,063	1.2%

Growth Metrics

Enrollment and credits of graduate-level courses across all academic units have not grown by more than 0.4% since AY 2016, though the amount of sections offered have grown by three times this amount, increasing the costs associated with each section.

Breakouts

Doctoral-only level courses make up almost 28% of all graduate coursework in AY 2020, and average approximately \$670 per credit hour, whereas masters-level coursework averages \$750 per credit hour produced.

Graduate Education

Total Margin by Program

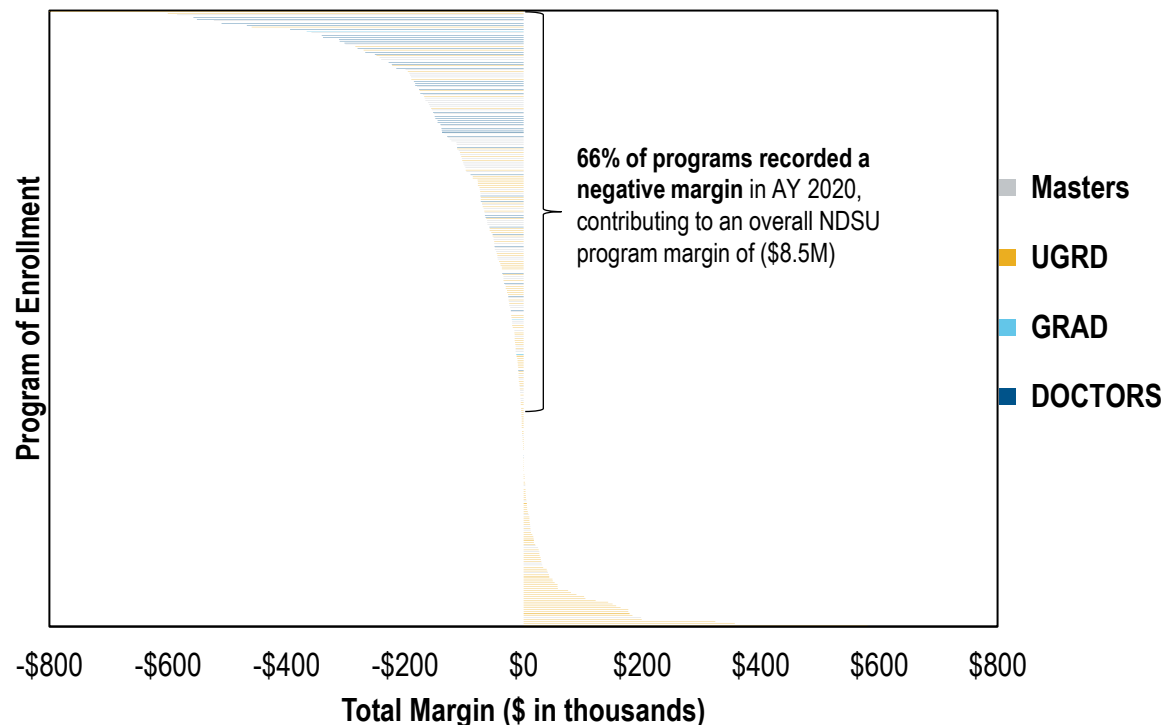
At NDSU, most programs with a positive margin are undergraduate, with graduate programs largely trailing the rest of the portfolio and often requiring significant fiscal support.

Margins are calculated using program costs by student course enrollment and net tuition by student program enrollment (tuition accrued less waivers). Waived tuition dramatically impacted graduate-level revenues.

Level	Average Waiver
Doctoral	79.2%
Masters	51.2%
Other Graduate	30.4%
Undergraduate	8.9%

Graduate-level waivers totaled \$10.2M in AY19-20, across about 3,600 students

Total Margin by Program¹
AY 2019-2020



While a University's academic portfolio will typically consist of net losses and gains, NDSU's current portfolio is weighed more heavily on the negative margin side due to a heavy investment in graduate programs.

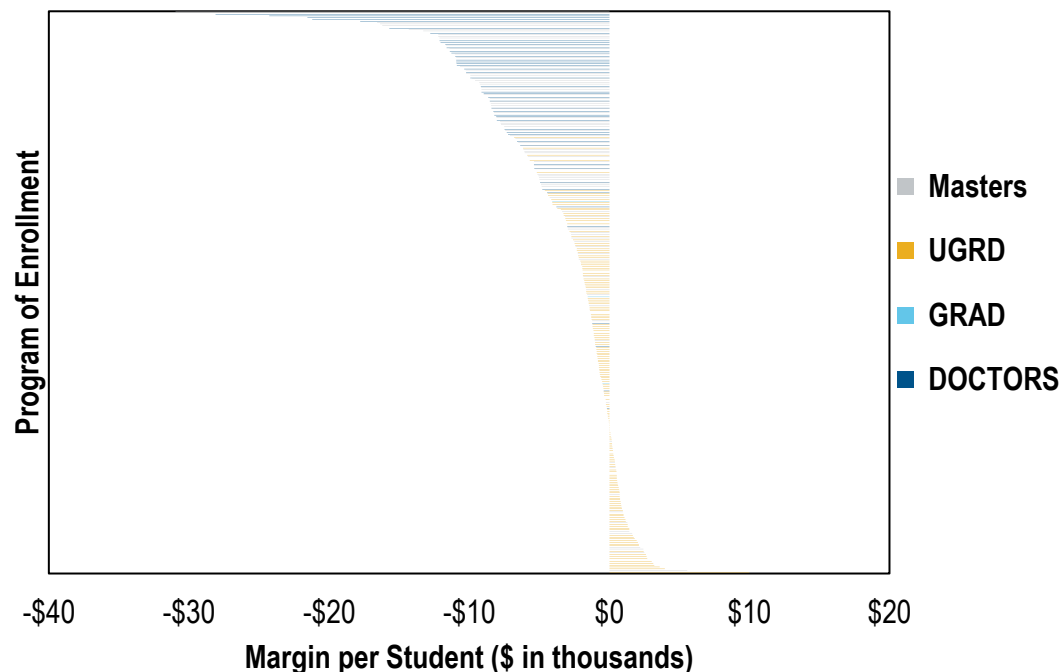
Graduate Education

Margin per Student by Program

When looking at margin-per-student, graduate level programming has little to no surplus (with no positive margins for doctoral programs) and have a substantial number of instances of low program enrollment.

Margin per Student by Program¹
AY 2019-2020

# Students in Plan-Program ²	# UG Plan-Programs	Avg. Margin per Student Undergrad	# Grad Plan-Programs	Avg. Margin per Student Grad
1-4	44	(\$391)	26	(\$5,751)
5-9	11	(\$1,076)	23	(\$9,491)
10-24	22	(\$1,386)	50	(\$8,371)
25-49	33	(\$933)	24	(\$6,289)
50-99	27	(\$332)	7	(\$4,145)
100-199	15	\$36	3	(\$2,318)
200+	20	\$112	2	(\$864)
Total	172	(\$561)	135	(\$7,222)



Current per-student investments exceed those of undergraduate programs while also serving far fewer students overall. Undergraduate programs alone cannot balance the deficit created by graduate programs.

Note: ¹Excludes certificate programs; ²A Plan-Program includes pre-program enrollees, as well as all program subcomponents at the appropriate level (e.g., BA/BFA/BS, MA/MED/MS)

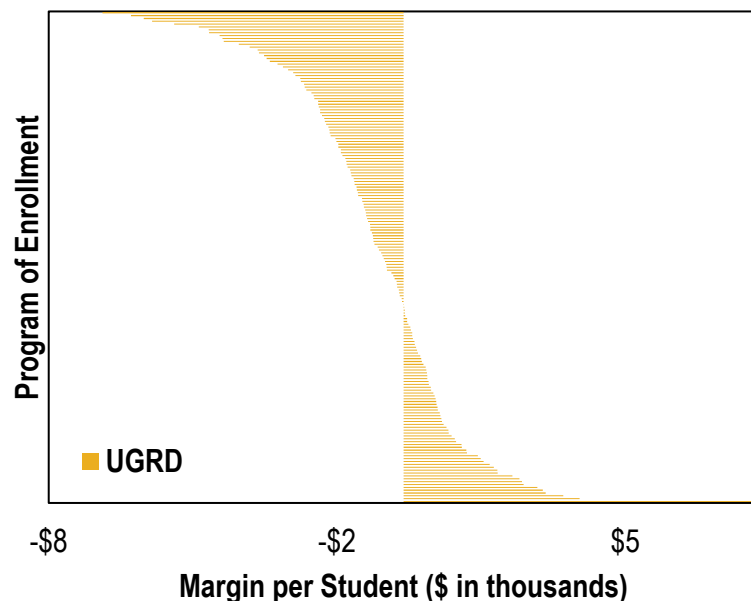
Source: Cost-to-Educate Model

Graduate Education

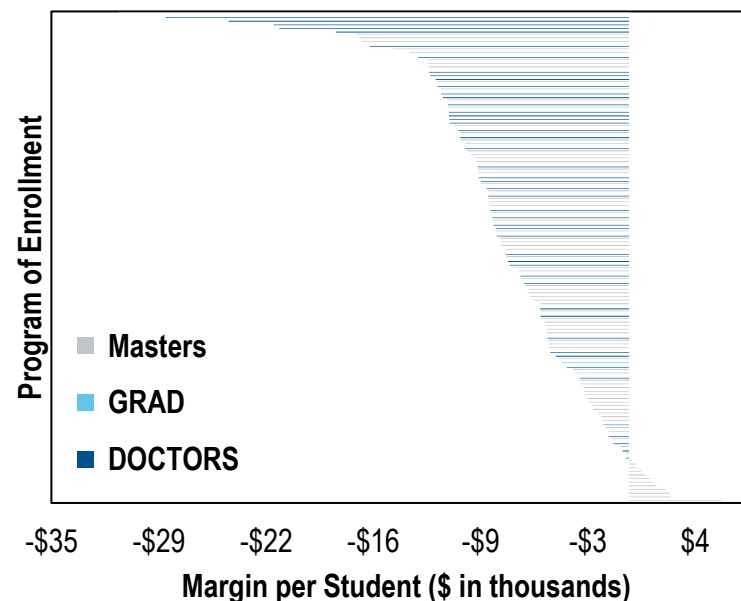
Margin per Student by Program

Separating the previous view into undergraduate and graduate lenses shows a stark difference in the level of sustainability across them. Undergraduate losses may be balanced by its own gains, but graduate losses overwhelm any upside.

Margin per Student by UG Program¹
AY 2019-2020



Margin per Student by Grad Program¹
AY 2019-2020

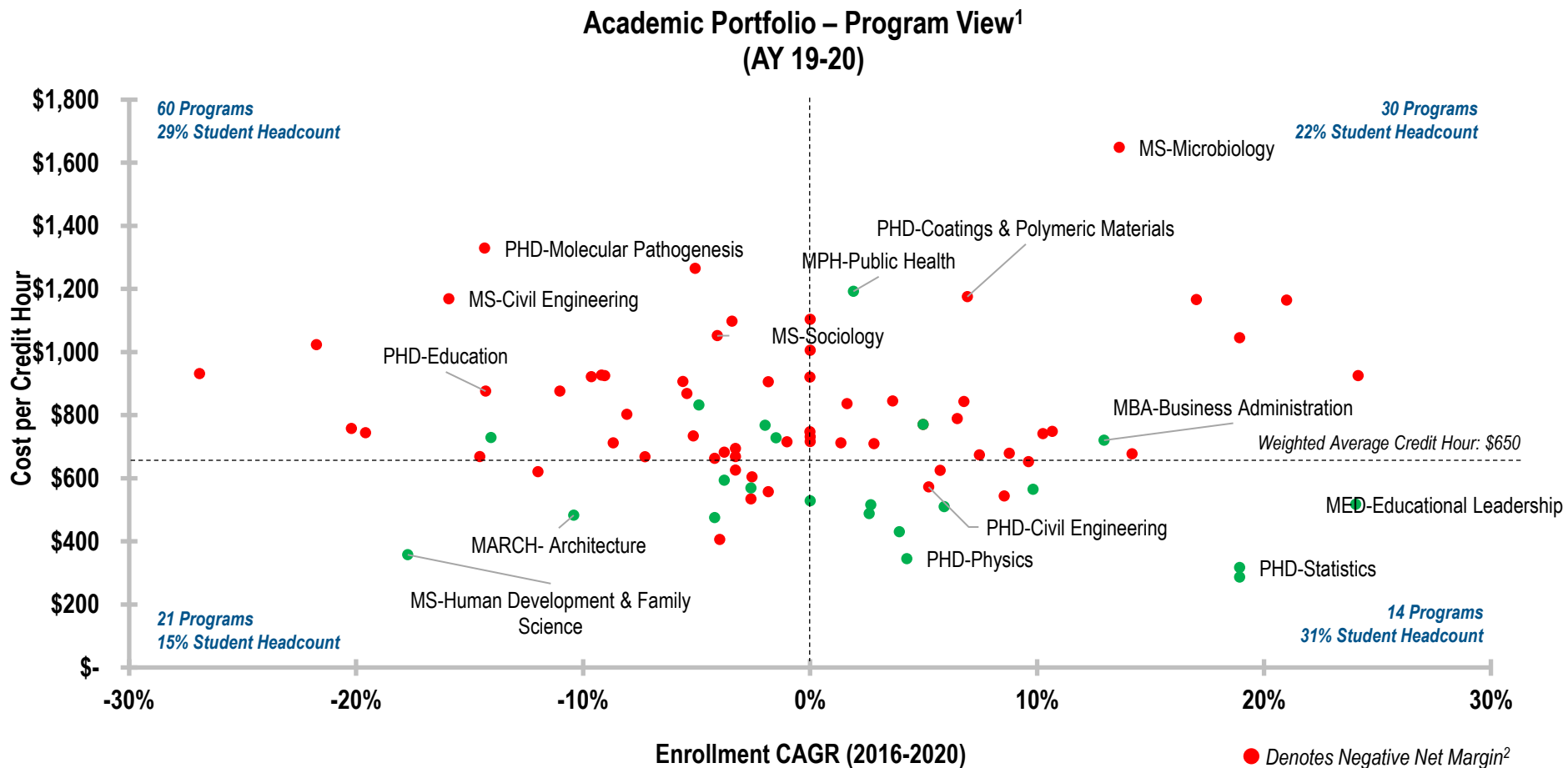


With only a handful of Masters programs bringing in small profits, it is clear that graduate programming at NDSU must be re-evaluated in light of the University's goals.

Graduate Education

Program Portfolio

In AY19-20, just under 50% of students were enrolled in one of the 81 programs that experienced declining enrollment during the review period; notably, 75% (99 of 135) graduate-level programs had a negative net margin after tuition and appropriations.



1. Programs with five or fewer students in AY2020 (41, 2%) are not visualized on the graph and programs without enrolled students in AY2016 (10, 3% of HC) are excluded from both the graph and the summaries.

2. Full program-level data is available within the cost-to-educate model.

Graduate Education

Summary

The financial impact of negative margin graduate level programming across NDSU calls for greater scrutiny of the factors contributing to losses, as well as the overall institutional value of certain programs.

Key Questions

Short Term Considerations

- Can increasing section sizes and reducing the number of sections offered at the graduate level yield meaningful savings on expensive programming?
- Could targeted reductions in waivers increase the margins for poor-performing programs?
- Could more graduate courses be paired as dual-listed offerings with cheaper undergraduate levels?



Long Term Considerations

- Is the current balance of graduate and undergraduate programming appropriate for NDSU's current or future state?
- Will decreasing demand naturally phase out declining graduate programs as student and employment needs change?

Considerations

Opportunities

- Evaluate the current graduate programming portfolio to determine the appropriate programs to continue to support with undergraduate returns (i.e. growing demand/enrollments, mission-aligned, etc.)

Risks

- Reductions or additions in graduate-level programming may present a challenge in maintaining current and ongoing levels of research throughout the University
- Changes in programming of any level may take years to complete, if honoring current students' graduation expectations, thus delaying the realization of savings

7e



MARKET POSITIONING

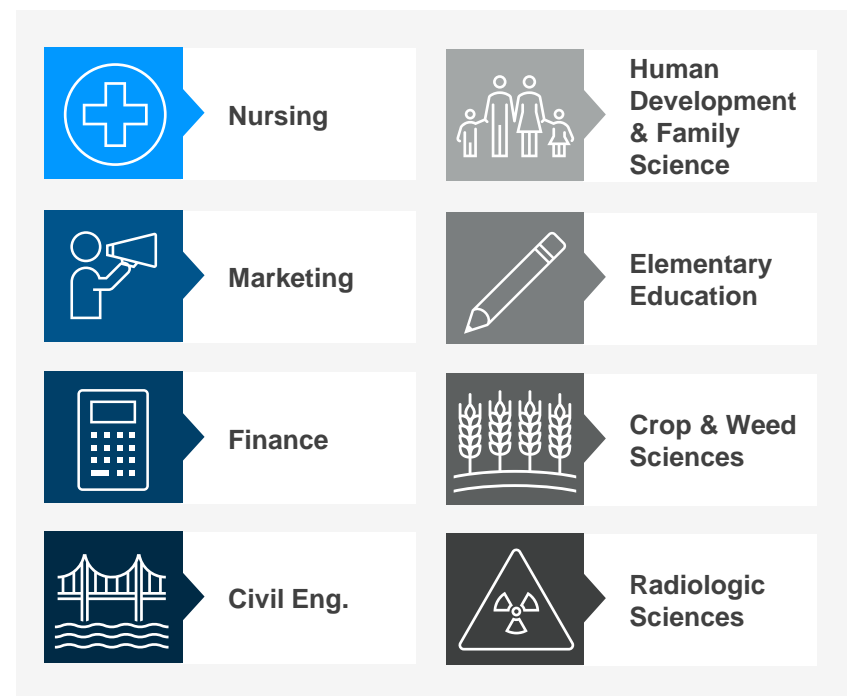
Program Growth Opportunities

Introduction

Strategically investing in programs that are aligned with the state’s workforce needs and present revenue-generating potential will strengthen NDSU’s academic portfolio.

Current State	Areas of Focus
---------------	----------------

- NDSU programs were evaluated according to the following factors:
 - **Student Demand:** AY 2015-19 change by volume and rate of NDSU program completions at each level
 - **Workforce Needs:** 2015-19 change by volume and rate of jobs corresponding with each program type and level
 - **Market Share:** NDSU program completions as a portion of all completions within NDSU’s competitive landscape¹
 - **Program Cost:** Average cost per credit of each NDSU program according to the Cost-to-Educate model
- This analysis identified program growth opportunities, which were further **refined through conversations with NDSU leadership** to select the areas of focus listed to the right



Preparing for continued declines in enrollment involves realigning academic resources with cost-efficient programs that have strong demand, competitive advantages, and a clear connection to the region’s workforce needs.

Notes: ¹Competitive landscape includes NDSU, UM Twin Cities, ISU, UND, MSU Mankato, SDSU, UM Duluth, MSU Moorhead, and Concordia College at Moorhead

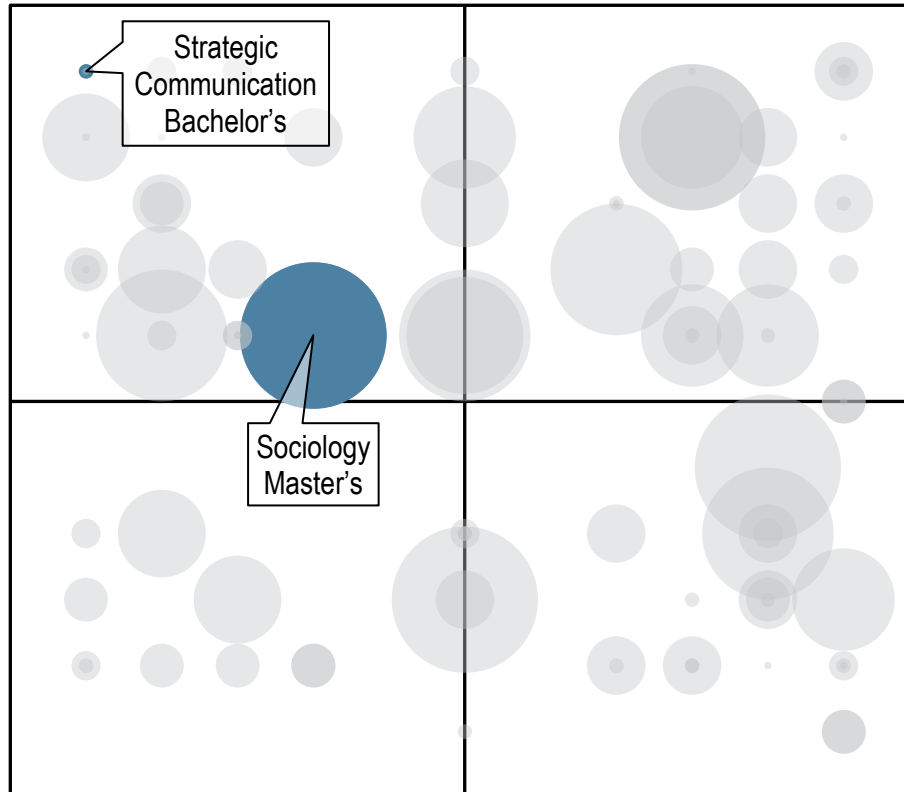
Program Growth Opportunities

Positioning Matrix

The matrix below organizes NDSU programs¹ according to the change in completions and corresponding occupations² in ND and MN between 2015 and 2019, with size representing the cost of each program.

More Occupations Fewer Completions

- 28 programs
- 479 completions
- Average program cost per CHP of \$430



More Occupations More Completions

- 26 programs
- 1,166 completions
- Average program cost per CHP of \$450

- 16 programs
- 203 completions
- Average program cost per CHP of \$398

Fewer Occupations Fewer Completions

- 21 programs
- 434 completions
- Average program cost per CHP of \$407

Fewer Occupations More Completions

Huron recommends that program prioritization incorporates internal metrics such as cost and mission-alignment, as well as external metrics including student demand, workforce need, and market share.

Notes: ¹Excludes programs with insufficient data in any of these variables;
²Using the NCES' CIP to Standard Occupational Classification (SOC) Crosswalk
 Sources: Emsi Program and Occupation Tables; Cost-to-Educate Model

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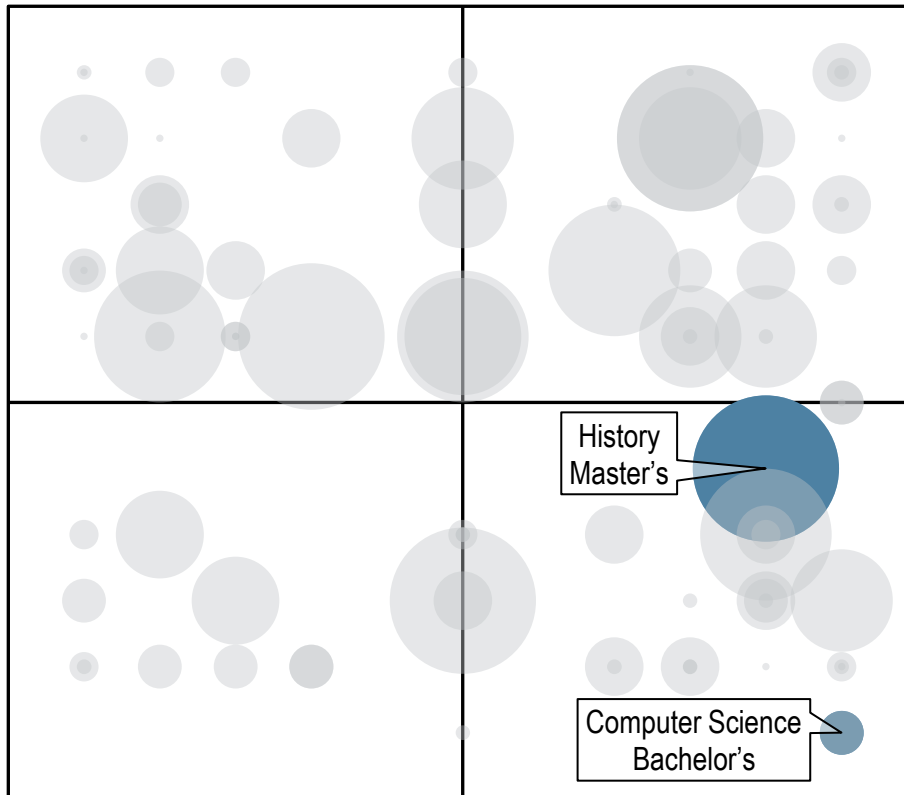
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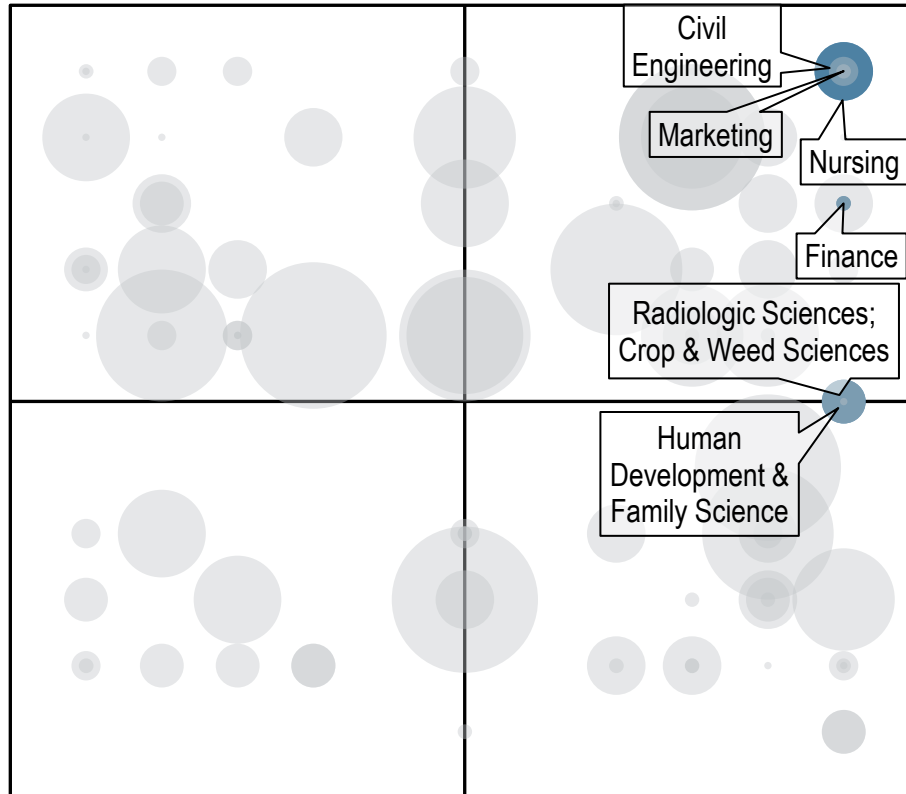
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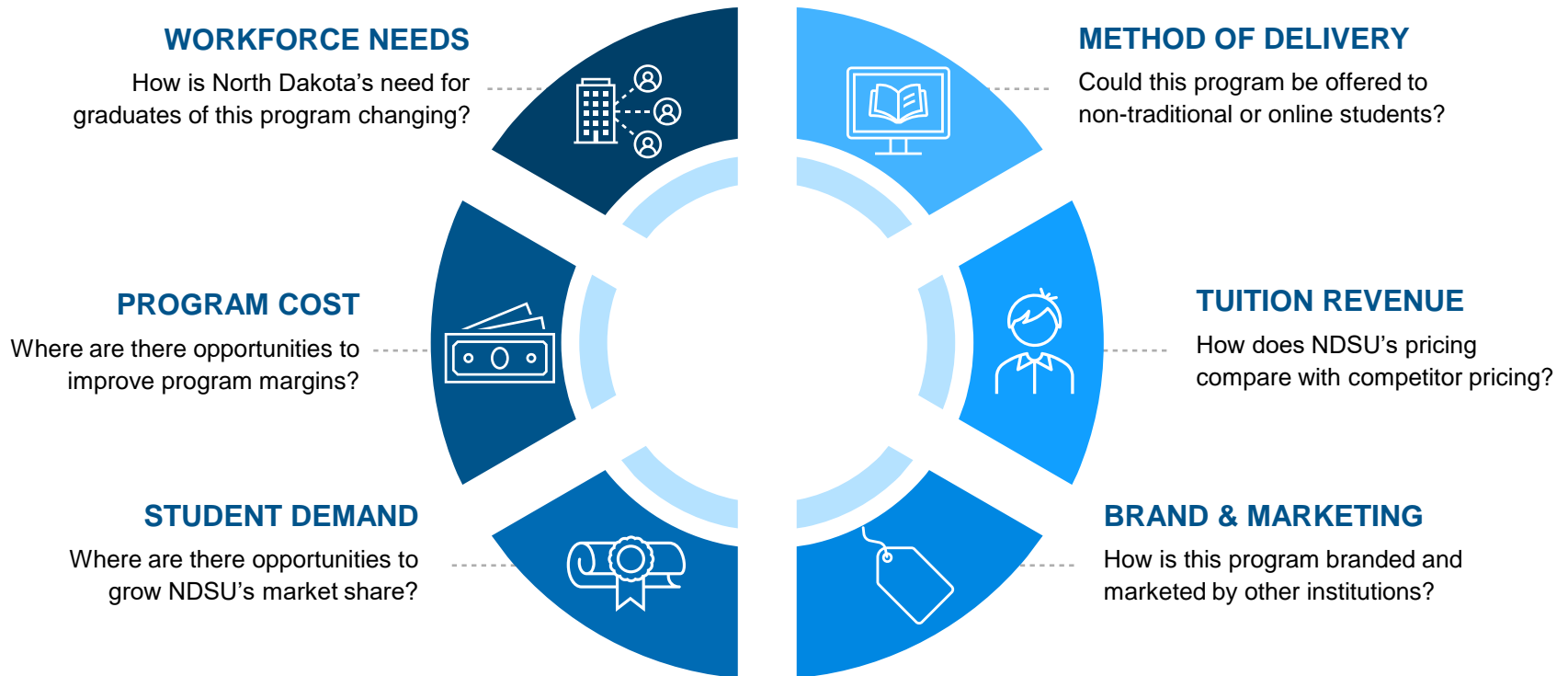
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 Sources: Emsi Program and Occupation Tables; Cost-to-Educate Model

Program Growth Opportunities

Analytical Dimensions

The eight programs selected by NDSU will be analyzed according to the following dimensions to develop actionable recommendations for the Deans.



Each program presents unique opportunities for NDSU to further its mission, improve financial sustainability, and meet the needs of current and prospective students and the state of North Dakota.

Program Growth Opportunities

Summary

The quantity of programs offered by NDSU relative to its size and budget call for increased investments in efficient programs aligned to student demand and workforce need, and divestment from programs that are less efficient and less aligned.

Key Questions

Short Term Considerations

- How do the program metrics presented here align with NDSU’s vision and mission?
- Does it make sense for any existing programs to stop admitting new students?
- Do any low-priority programs present opportunities for immediate cost-savings, driven by the elimination of vacant faculty lines or reduced administrative support?



Long Term Considerations

- What is the right number of programs for NDSU in a future state with lower enrollment and less revenue?
- Does NDSU’s portfolio of academic programs reflect its identity as a Land Grant institution?
- What programs should be offered and prioritized by the leading Land Grant institution of tomorrow?

Considerations

Opportunities

- Divest from specific programs and reinvest in those with the greatest growth potential and missional alignment to improve margins and increase enrollment
- Leverage NDSU’s HyFlex capabilities to begin capturing market share for high-demand, online programs

Risks

- NDSU faces intense competition for some of its fastest growing programs, so continuous innovation will be needed to maintain or grow its position
- Some occupations and the programs that feed into them are more easily affected by new technology or policy, presenting the potential for unexpected shifts in need

8



COLLEGE OPPORTUNITIES

College Opportunities

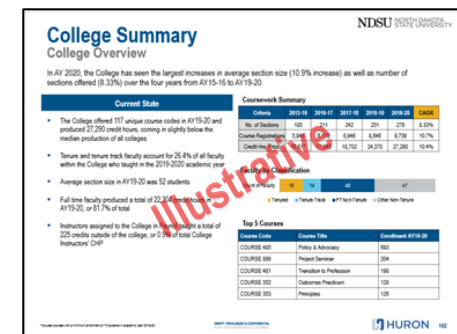
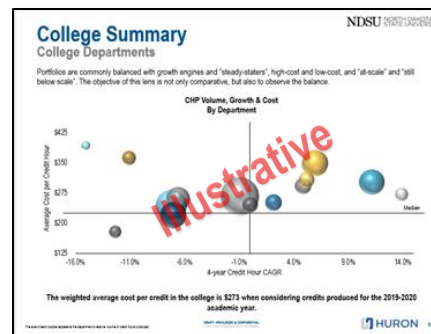
Dean Summaries

Utilizing the institutional fact base created by the cost to educate model, Huron identified and discussed college-level opportunities with each NDSU Dean.

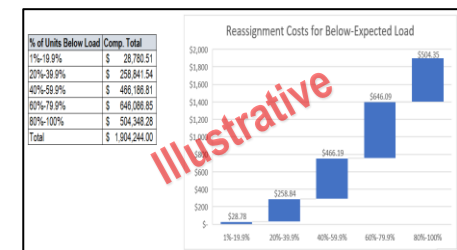
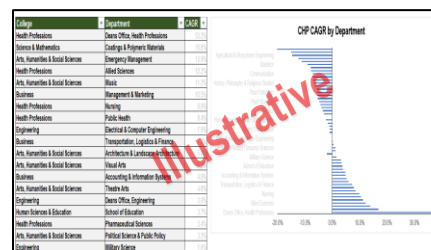
Huron met with each Dean and the Provost in the final week of the engagement to:

- Review summary metrics from the cost-to-educate model
- Evaluate department-level CHP costs and trends
- Assess recommendations on how the college can improve efficiency and effectiveness in:
 - Course Economics
 - Faculty Effort + Pay
 - Overhead
 - Graduate Programming
 - Other areas, as identified
- Provide summaries of program growth opportunities identified by trends in the market and model
- Discuss where opportunity realization at the institutional level may impact college-specific opportunities

Recommendations: College-specific Opportunity Assessments



Supporting Data: Cost-to-Educate Model and Market Data



College Opportunities

Dean Summaries

The below matrix reflects the areas of opportunity for each academic unit based on the levers available to them according to the findings of their current states. Each college will realize varying degrees of impact from implementing these initiatives.

College	Faculty Effort	Section Size	Academic Organization	Tuition Waivers	Program Opportunity
CAFSNR	●	●	●	●	●
CAHSS			●	●	
COB	●			●	●
COE	●	●		●	●
CHP				●	●
CHSE	●	●	●	●	●
CSM			●	●	

Cost management opportunities exist in each of the five curricular delivery components as listed above with tuition waiver expenditures a priority in each college followed by program opportunity and academic organization.

COLLEGE OF AGRICULTURE, FOOD SYSTEMS, & NATURAL RESOURCES

NDSU Academic Program Prioritization Dean Meeting
April 8th, 2021

NORTH DAKOTA
STATE UNIVERSITY



College of Agriculture

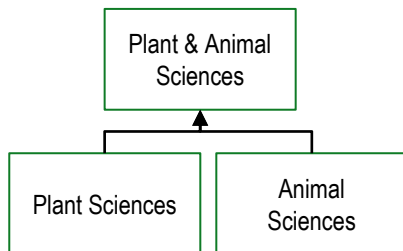
College Opportunities & Considerations

Based on the current state analysis of the College of Agriculture, Food Systems & Natural Resources, the below considerations may present opportunities for cost savings and increased efficiency to open up capacity.

1

Evaluate
Taxonomy
Opportunities

Could related disciplines find enough overlap to consolidate shared services? Departments with high overhead and declining growth rates may benefit from reduced costs



2

Increase Faculty
Teaching

Could more faculty time be allocated towards teaching activity to increase output and reduce need for additional instructors?

Reassignment costs for load deficits in CAFSNR were the highest of any college, totaling over \$950k. This amount is the equivalent of nearly 25 part time/adjunct instructors, based on average teaching compensation

3

Increase section
size and capacity

How can courses be delivered more efficiently while still maintaining instructional quality?

The University spent \$815 per credit hour on graduate-level coursework offered in CAFSNR which, on average, was under-enrolled by about 51%, based on capacity

Increasing section enrollments would alleviate section proliferation and increase capacity of faculty

4

Consider more
targeted tuition
waivers

How can the College offset its higher costs through organic revenue growth?

Graduate programs in CAFSNR have an average waiver rate of 84.9%, leaving little tuition revenue to cover the costs of delivering those programs

Reducing or more intentionally targeting program waivers could help the College to realize more of its earnings

As the focal point of the University's Land Grant identity, it is imperative that the College of Agriculture, Food Systems & Natural Resources operate at a sustainable level to continue to support the mission.

College of Agriculture

College Overview

In AY 2020, the College of Agriculture, Food Systems & Natural Resources produced 33,247 credit hours from the effort of 48 instructors across 7 departments (plus the Dean's suite) and averaging \$407 per credit hour produced.

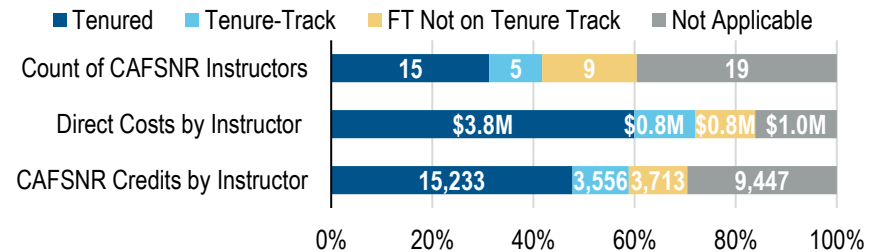
Current State

- Of the 782 course sections delivered, **100% were considered in load**. The median section size* was 8 and 62.6% of sections were delivered at the undergraduate level
- 88.7% of credit hour production (CHP)** occurred at the undergraduate level and 11.3% at the graduate level
- “Introductory Microbiology Lab” (MICR 202L) had the most sections and **generated 452 credit hours**, 1.4% of college’s total CHP
- The Agribusiness & Applied Economics department had the **highest CHP at 11,111** and Plant Pathology had the lowest CHP at 788
- During AY 2019, the College of Agriculture **granted 402 completions**, 81.8% at the undergraduate level. Bachelors degrees in the Plant Sciences department accounted for 24.9% of total completions
- The **average department operating margin** is (\$606K) without state appropriations and \$191K with state support

Coursework Summary

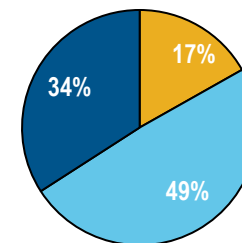
Criteria	2015-16	2016-17	2017-18	2018-19	2019-20	CAGR
No. of Sections	844	916	880	817	782	-1.9%
Course Enrollment	17,312	17,524	16,948	14,912	13,422	-6.2%
Credit Hrs. Prod.	42,271	43,366	42,355	37,402	33,247	-5.8%

Faculty Summary for Coursework Delivery



Course Enrollments by Student Primary Program

Same College Same Department Other College



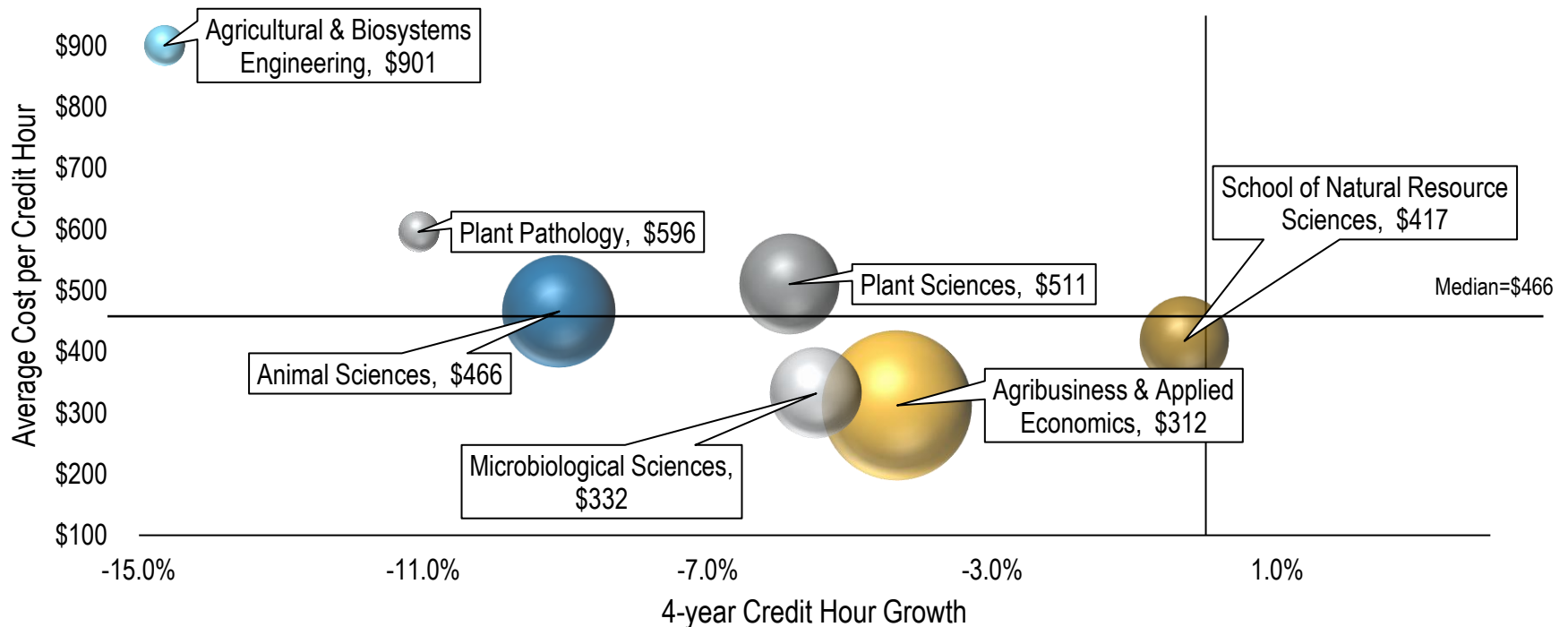
*Median section sizes include single-student entries, such as dissertations. Flagging these types of courses for removal would likely raise this figure.

College of Agriculture

Department Economics

Portfolios are commonly balanced with growth engines and “steady-staters”, high-cost and low-cost, and “at-scale” and “still below scale”. The objective of this lens is not only comparative, but also to observe the balance.

CHP Volume, Growth & Cost
By Department: Agriculture, Food Systems & Natural Resources



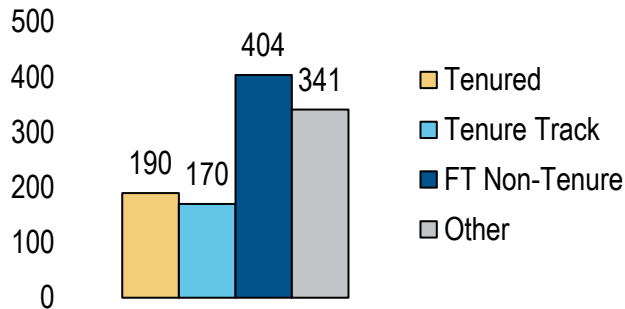
The weighted average cost per credit in the College of Agriculture, Food Systems & Natural Resources is \$407 when considering credits produced for the 2019-2020 academic year.

College of Agriculture

College Opportunities

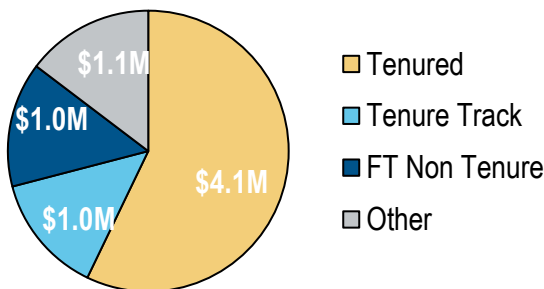
The College of Agriculture, Food Systems & Natural Resources operates under a unique model that relates directly to the Land Grant mission of the University, providing research and services to the community while delivering its curriculum.

Average CHP per Instructor by Type



The College of Agriculture is unique in that 100% of unrestricted salaries for instructors goes towards teaching activities, with other faculty effort being supported by restricted funds

Instructional Pay by Type



Because of this, all \$7.2M of instructional compensation & benefits is allocated toward the 33,247 credit hours, contributing about \$202 (nearly 50%) to the overall cost per credit hour of \$407, the highest of any academic college

Tenured and tenure-track faculty may have capacity to increase their average credit hour production by meeting load expectations more consistently and through more frequent utilization on high-enrollment courses.

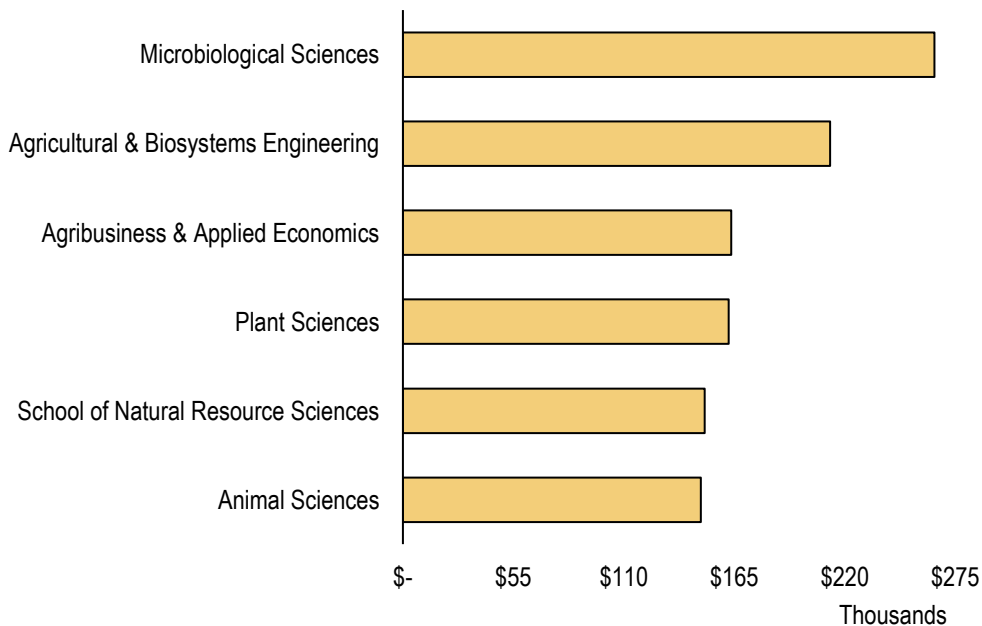
College of Agriculture

College Opportunities

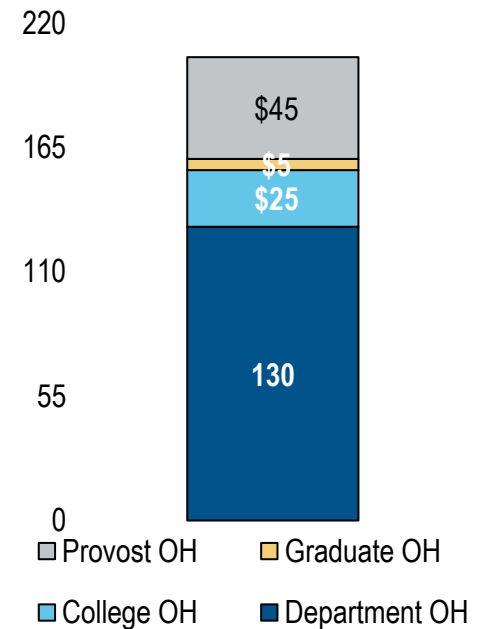
The programming and activities delivered through CAFSNR are fundamentally vital to the Land Grant mission of NDSU. While adequate support for these activities is imperative, equally necessary is the College's financial sustainability and efficiency.

CAFSNR has the highest unit-driven academic overhead (department and college overhead) per faculty member produced across colleges, and the second highest per credit hour produced

Unit OH per FT Faculty



Overhead Contributions to Cost per Credit Hour



Non-instructional salaries make up 88.5% of total unit-driven overhead

Departments in CAFSNR may have an opportunity to reduce their unit-driven overhead costs and bring the College average closer to the institutional median of \$95 per credit hour from CAFSNR's current \$155 per credit hour.

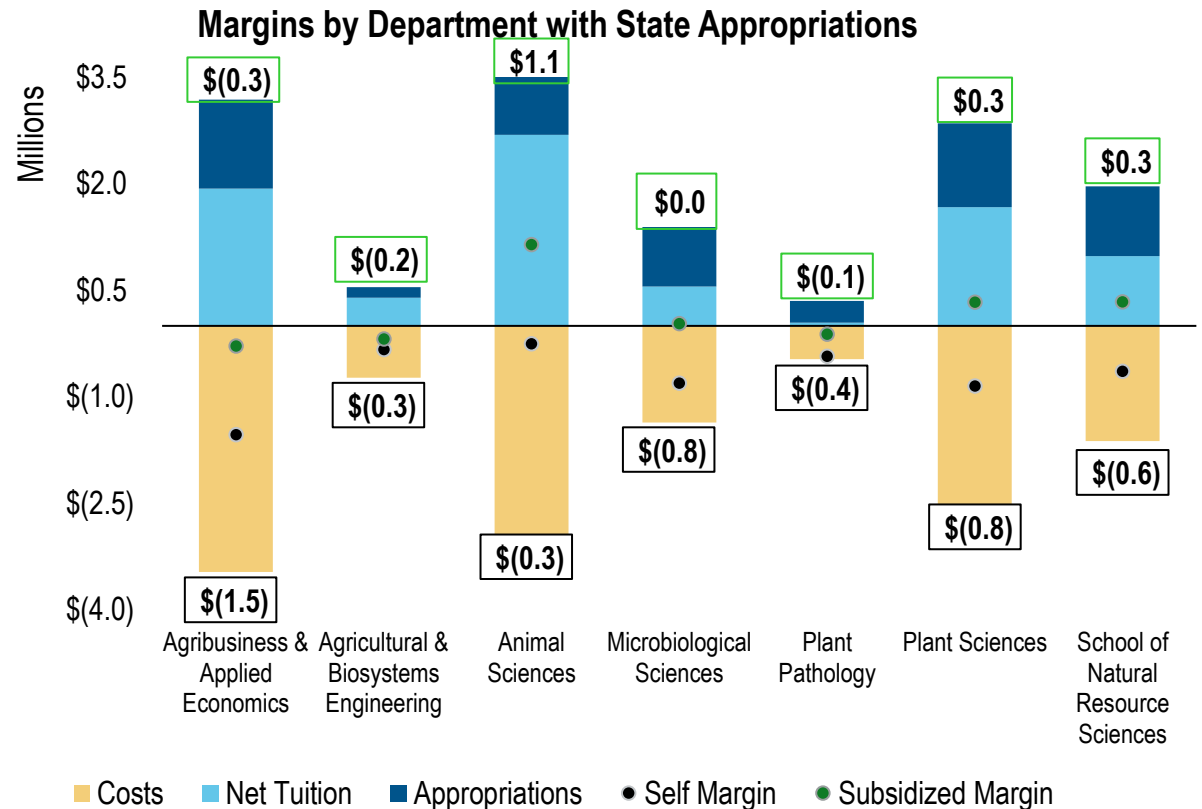
*Plant Pathology does not have any reporting faculty assigned coursework in AY19-20 and thus is excluding from the overhead per faculty analysis

College of Agriculture

College Opportunities

In AY19-20 students enrolled in 422 unique course codes offered through the College of Agriculture, Food Systems & Natural Resources. Approximately \$6.4M in state appropriations supported these departments and alleviated the college deficit.

- Without considering state appropriations, every department is operating at a deficit, averaging about (\$693k) per department
- When adding in the corresponding appropriations, 4 departments are brought into surplus and the College's overall margin comes to about \$1.5M
- The highest amount of appropriations went to Animal Sciences, totaling \$1.4M



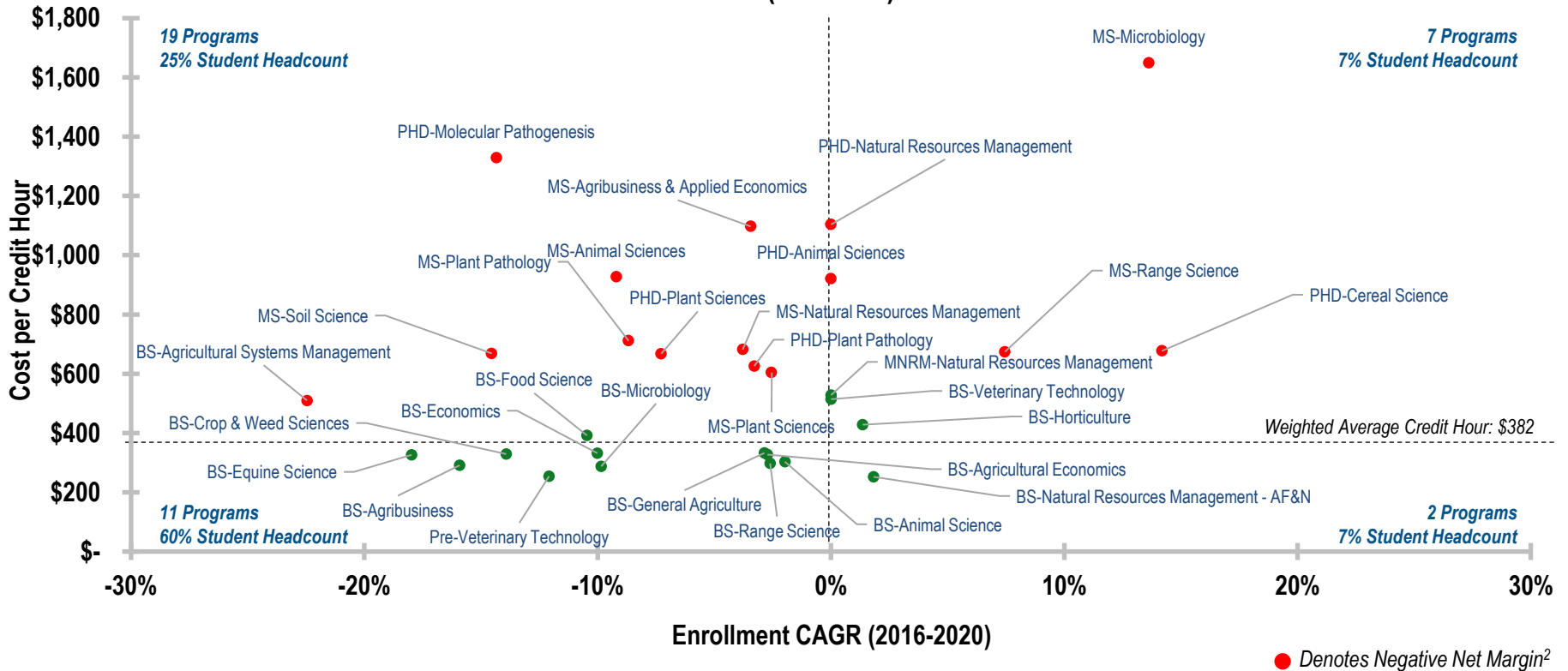
The College of Agriculture, Food Systems & Natural Resources is reliant on state appropriations for operational margins largely due to high costs and declining enrollment in programs.

College of Agriculture

Program Portfolio

In AY19-20, just 15% of students were enrolled in one of nine programs that experienced growth during the review period; notably, only one of the twenty-two graduate programs (MNRM) had a positive net margin after tuition and appropriations.

Academic Portfolio – Program View¹
(AY 19-20)



1. Programs with five or fewer students in AY2020 (9, 3%) are not visualized on the graph and programs without enrolled students in AY2016 (2, 1% of HC) are excluded from both the graph and the summaries.
2. Full program-level data is available within the cost-to-educate model.

College of Agriculture

Crop and Weed Sciences (BS) Program Overview

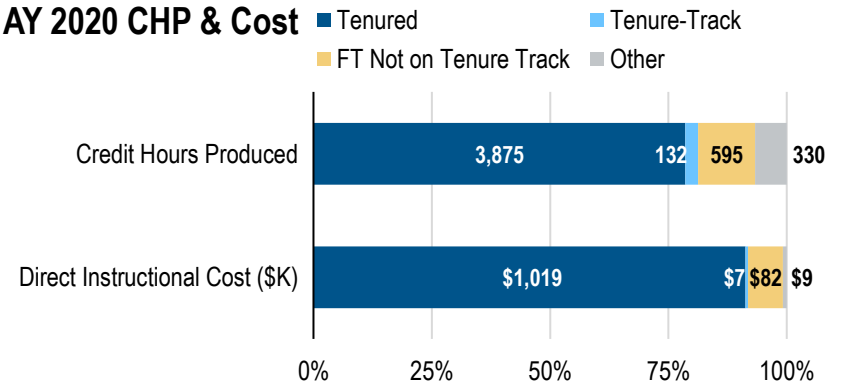
Based on the results of Huron’s market positioning study, informed by the Cost-to-Educate model, NDSU’s Crop and Weed Sciences BS program is an area of competitive advantage and high mission alignment.

Current State

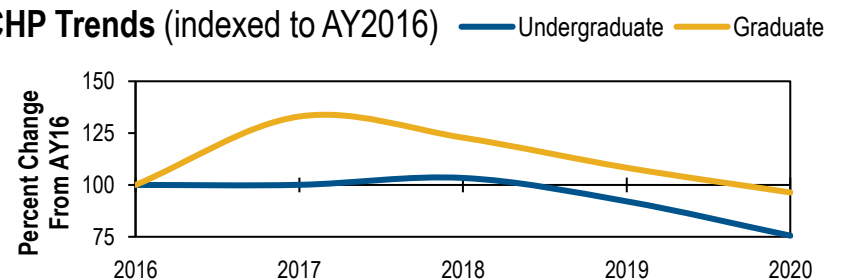
- Crops and their use as livestock feed is an **integral part of the North Dakota economy**, making the Plant Sciences department extremely well-aligned with NDSU’s identity as a land-grant institution
- During AY 2020, the Plant Sciences department **produced 15% of CAFSNR’s credit hours** through primarily tenured faculty at an **average cost-per credit of \$511**
- The Plant Sciences department produced **121 completions in academic year 2019 through 8 different degree programs**, with 65% of these completions occurring in the Crop and Weed Sciences BS program

Plant Sciences Department Key Metrics

AY 2020 CHP & Cost



CHP Trends (indexed to AY2016)



NDSU’s Plant Sciences department was steadily growing until recently, when credit hour production began falling at the graduate and undergraduate levels.

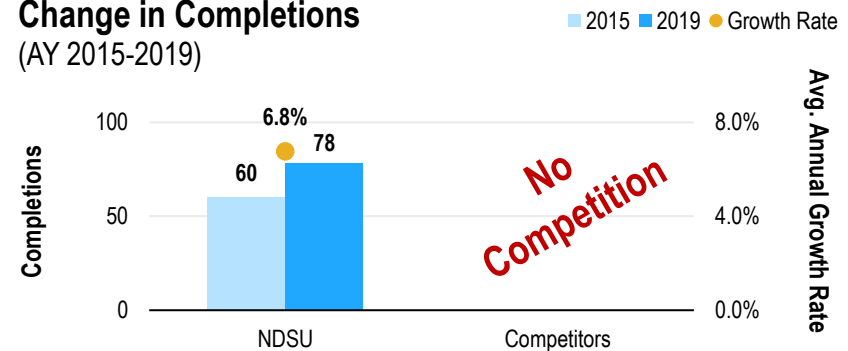
College of Agriculture

Crop and Weed Sciences (BS) Competitive Analysis

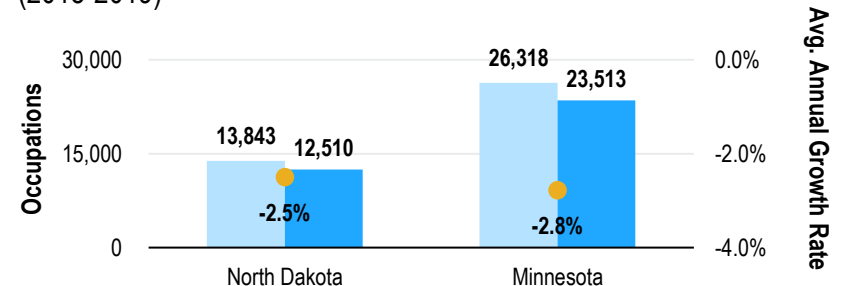
NDSU is the only institution in North Dakota and Minnesota that offers a Crop & Weed Sciences BS program, which plays a vital role in fulfilling North Dakota’s labor needs.

- Between 2015 and 2019, Crop & Weed Sciences BS program completions **grew at an average annual rate of 6.8%**, accounting for **18 new NDSU program completions at the Bachelor’s level**
- NDSU is the only institution in its competitive landscape that offers this program, and it is particularly **aligned to North Dakota’s identity as the leading producer of many crops**
- Based on the nature of Crop & Weed Sciences, it is difficult to track all occupations that may be relevant for program graduates, but in the North Dakota and Minnesota labor markets **4,138 Farmers, Ranchers, and Other Agricultural Manager jobs disappeared** between 2015 and 2019, **decreasing the total number of Management jobs available by 11.5%**

Change in Completions
(AY 2015-2019)



Change in Management Occupations
(2015-2019)



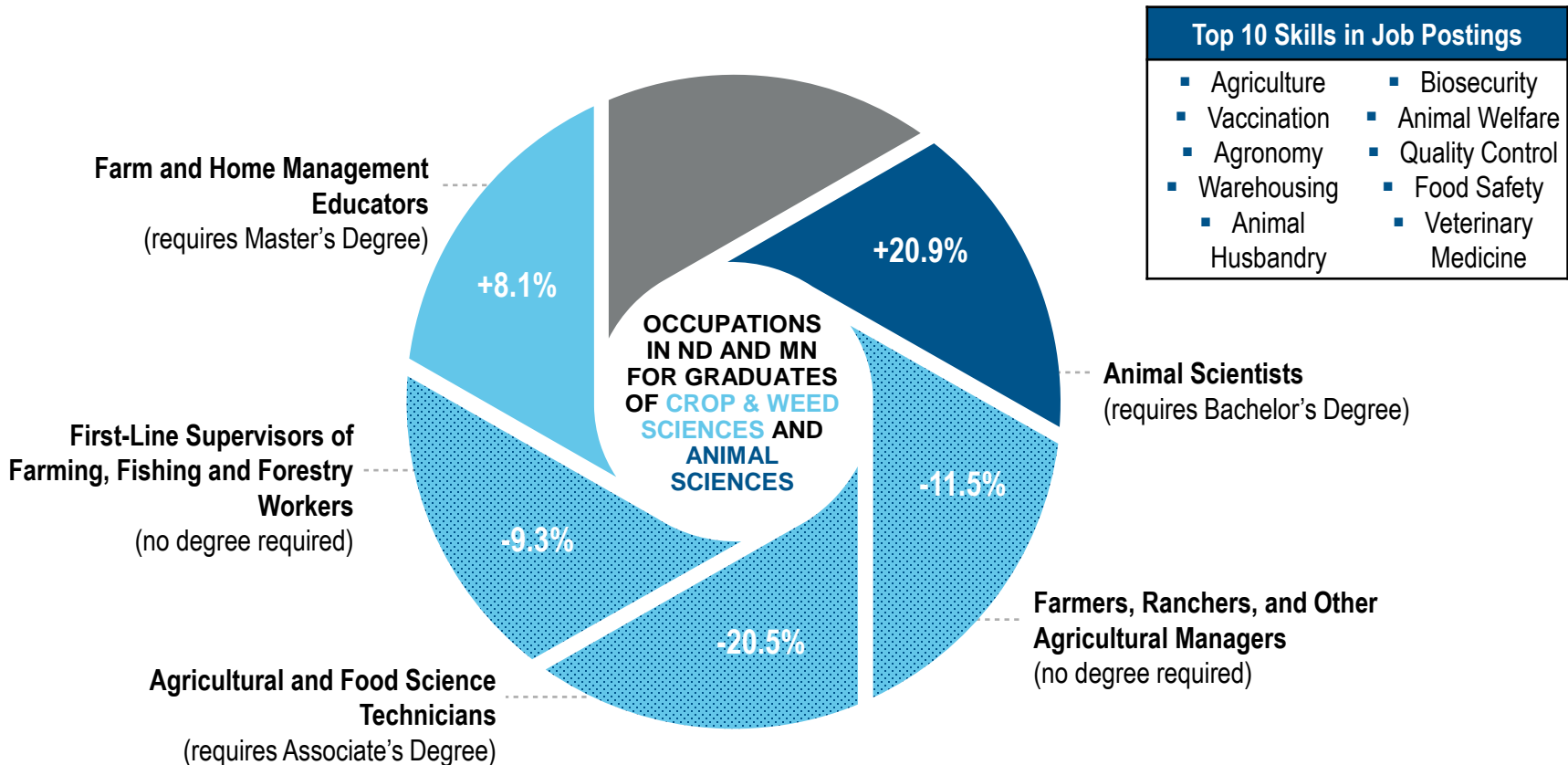
The Crop & Weed Sciences program faces little competition, but negative occupational trends present an opportunity to realign this program with what the workforce needs.

Notes: *Competitors include UM Twin Cities, ISU, UND, MSU Mankato, SDSU, UM Duluth, MSU Moorhead, and Concordia College at Moorhead
Sources: Emsi Program Table, Emsi Occupation Table

College of Agriculture

Crop and Weed Sciences (BS) Growth Opportunity

Given NDSU's land-grant mission, programs like Crop and Weed Sciences are essential, but there may be opportunities to reorganize the program curriculum in response changes in the region's labor needs.



Undergraduate CHP has declined by 9.2% and 6.8% in Animal Sciences and Plant Sciences, respectively, and some programs like these have substantial occupational overlap, presenting an opportunity to reevaluate curricula.

College of Agriculture

Crop and Weed Sciences (BS) Next Steps

Before making any changes to the Crop and Weed Sciences BS, additional stakeholders should be involved in the steps below to determine what implementing these changes could look like.



What are Crop and Weed Sciences alumni doing? Are there courses they would have benefited from taking?

Would a broader, more interdisciplinary major attract more students?

How can existing curricula be adjusted to expand the flexibility of this program and improve job prospects?

What programs must be separate due to the discipline? Is this aligned with the current financial state?

What upfront investments would be needed to reorganize program curricula and revise marketing?

What benefit would CAFSNR expect this to have in terms of growing enrollment and meeting the state's labor needs?

Relative to other opportunities, how does this one align with NDSU's strategic priorities?

Where would the resources needed to undertake this effort come from?

What are the milestones related to revising program curricula and structure?

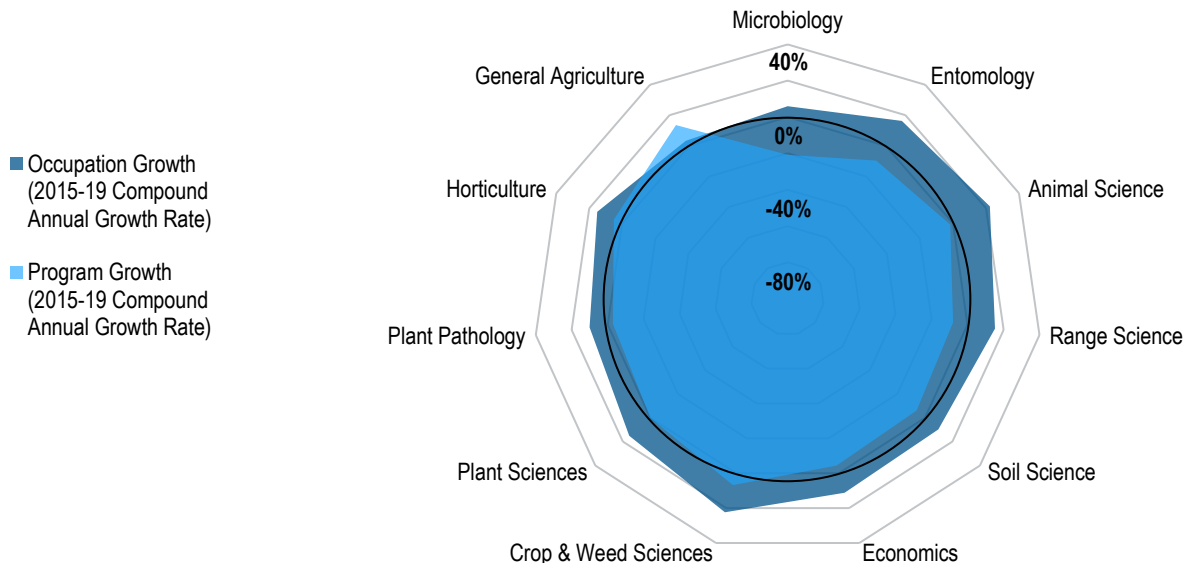
How will NDSU determine success and measure the return on its investment?

The Plant Sciences department could begin by assessing how current graduates are faring in the labor market, in order to consider long-term changes to program curricula and structures.

College of Agriculture Program Alignment

The chart below portrays the growth rate of programs and their corresponding occupations, visualizing areas of alignment (programs completions are growing at the same rate as occupations) and gaps.

Change in Program Completions and Corresponding Occupations (For occupations requiring a Bachelor's Degree or Higher in the Fargo MSA)



Observations

- **Alignment:** Between 2015 and 2019, **Crop & Weed Sciences** program completions grew at an average annual rate of 7% and the job market for graduates of this program grew by 22%
- **Gaps:** CAFSNR's **Microbiology** program produced 31 fewer graduates in 2019 than it did in 2015, while the job market for graduates of these programs grew at an average annual rate of 6%

The volume of change in program completions and corresponding occupations must also be considered to fully evaluate whether NDSU programs are aligned with the region's workforce needs.

Note: Excludes programs with insufficient completion / occupation data
Sources: Emsi Program Completions; Emsi Occupation Table for QCEW Employees, Non-QCEW Employees, and Self-Employed

COLLEGE OF ARTS, HUMANITIES, & SOCIAL SCIENCES

NDSU Academic Program Prioritization Dean Meeting

April 8th, 2021

NORTH DAKOTA
STATE UNIVERSITY



Arts, Humanities & Social Sciences

College Opportunities & Considerations

Based on the current state analysis of the College of Arts, Humanities & Social Sciences, the below considerations may present opportunities for cost savings and increased efficiency to open up capacity.

1

Evaluate
Taxonomy
Opportunities

Could related disciplines find enough overlap to consolidate shared services? Departments with declining growth rates may benefit from reduced costs

CAHSS had a \$43 contribution to the cost per credit hour just from unit-driven overhead and total costs outweighed tuition accrued

Reimagining academic infrastructure may help offset some of those costs and encourage interdisciplinary collaboration at NDSU

2

Increase Faculty
Teaching

Could more faculty time be allocated towards teaching activity to increase output and reduce need for additional instructors?

Decreasing research and service by an average of just 5% each for full time faculty members would free up over \$321K for teaching output, equal to more than 7 additional FT faculty, based on average instructional pay

3

Increase section
size and capacity

How can courses be delivered more efficiently while still maintaining instructional quality?

Business spent \$676 per credit hour on graduate-level coursework which, on average, was under-enrolled by about 57%, based on capacity

Increasing section enrollments would alleviate section proliferation and increase capacity of faculty

While CAHSS has lower costs than the University average, not enough of their costs are invested into their own program enrollments, leaving insufficient tuition revenue to close the margin gap.

Arts, Humanities & Social Sciences

College Overview

In AY 2020, the College of Arts, Humanities & Social Sciences produced 82,701 credit hours from the effort of 252 instructors across 14 departments (plus the Dean’s suite) and averaging \$274 per credit hour produced.

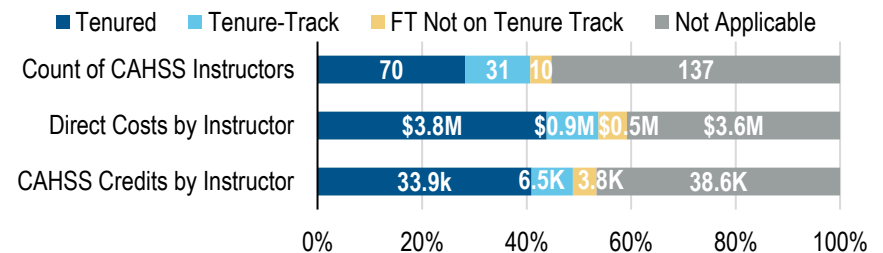
Current State

- Of the 292 course sections delivered, **90.0% were considered in load**. The median section size* was 33 and 71.0% of sections were delivered at the undergraduate level
- 93.6% of credit hour production (CHP)** occurred at the undergraduate level and 6.4% at the graduate level
- “College Composition II” (ENGL 120) had the most sections and **generated 5,754 credit hours**, 4.9% of college’s total CHP
- The English department had the **highest CHP at 18,249** and Women and Gender Studies had the lowest CHP at 838
- During AY 2019, CAHSS **granted 461 completions**, 82.4% at the undergraduate level. Bachelors degrees in Communication department accounted for 18.0% of total completions
- The **average department operating margin** is (\$642K) without state appropriations and (\$82K) with state support

Coursework Summary

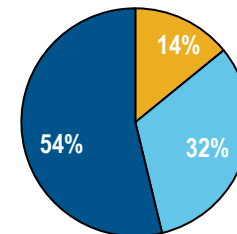
Criteria	2015-16	2016-17	2017-18	2018-19	2019-20	CAGR
No. of Sections	1,827	1,931	1,790	1,667	1,627	-2.9%
Course Enrollment	32,246	33,532	32,448	30,632	28,463	-3.1%
Credit Hrs. Prod.	91,054	93,827	92,845	89,167	82,701	-2.4%

Faculty Summary for Coursework Delivery



Course Enrollments by Student Primary Program

Same College Same Department Other College



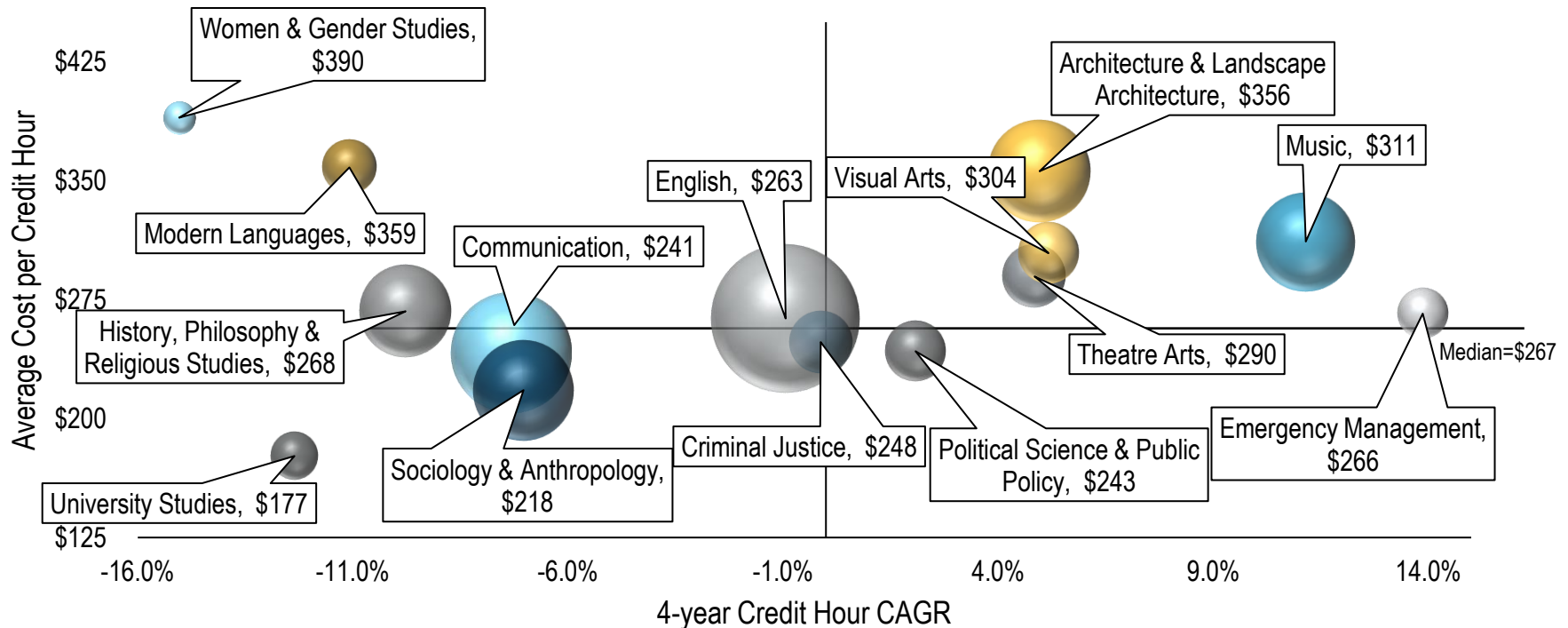
*Median section sizes include single-student entries, such as dissertations. Flagging these types of courses for removal would likely raise this figure.

Arts, Humanities & Social Sciences

Department Economics

Portfolios are commonly balanced with growth engines and “steady-staters”, high-cost and low-cost, and “at-scale” and “still below scale”. The objective of this lens is not only comparative, but also to observe the balance.

CHP Volume, Growth & Cost
By Department: Arts, Humanities & Social Sciences



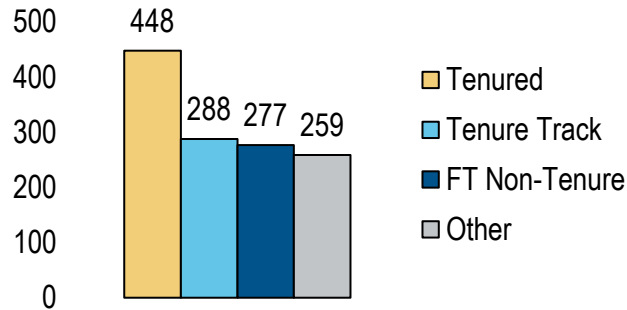
The weighted average cost per credit in the College of Arts, Humanities & Social Science is \$274 when considering credits produced for the 2019-2020 academic year.

Arts, Humanities & Social Sciences

College Opportunities

The College of Arts, Humanities & Social Sciences faculty produce a larger than average amount of credit hours than other colleges, but about 54% of their course enrollments are from students in programs outside of CAHSS.

Average CHP per Instructor by Type



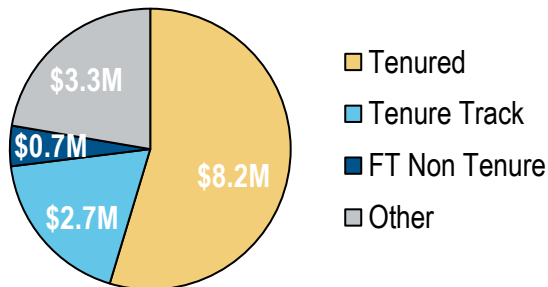
Teaching expectations averaged about 56% of all instructors' compensation



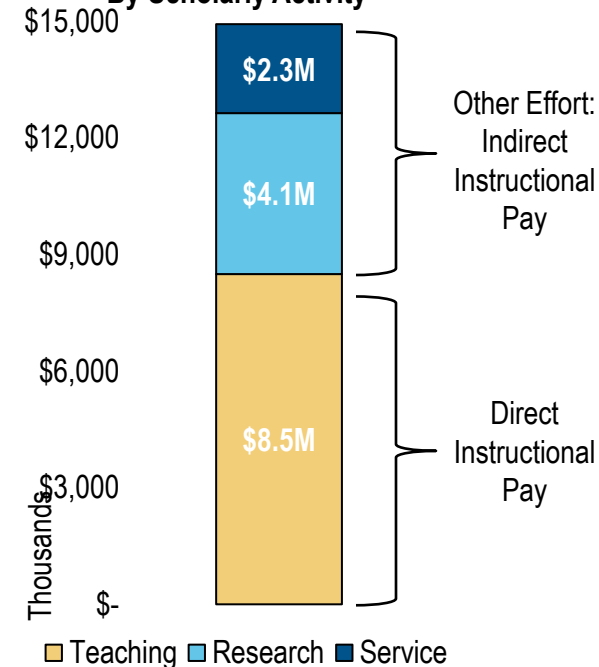
Direct instructional pay contributed \$106 of the \$274 per credit hour in Arts, Humanities & Social Sciences



Instructional Pay by Type



Instructional Pay Breakdown By Scholarly Activity



The College of Arts, Humanities & Social Sciences is the only academic unit whose average credit hour production per instructor rises with faculty rank, indicating efficient utilization of full time faculty.

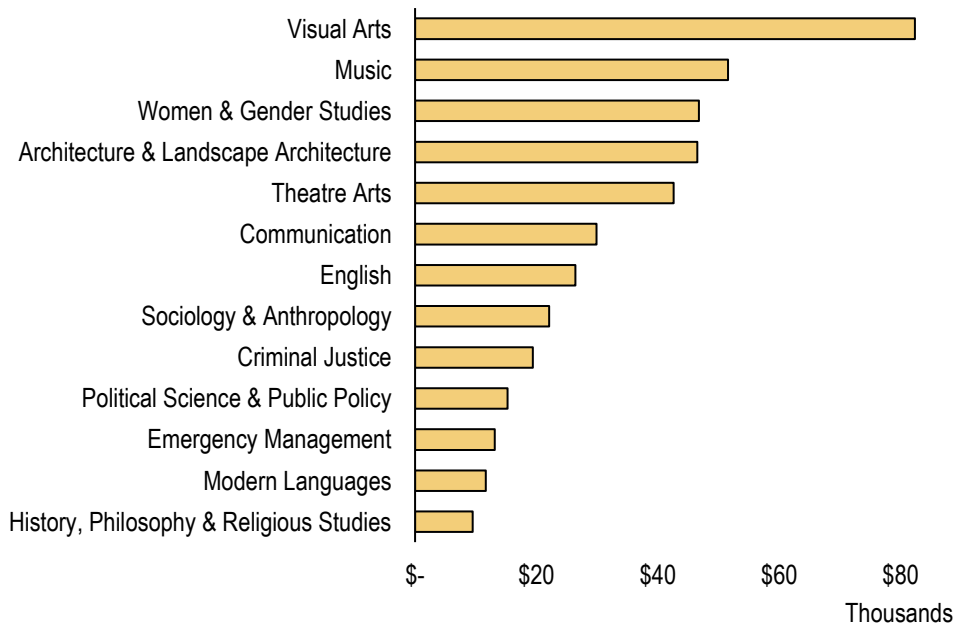
Arts, Humanities & Social Sciences

College Opportunities

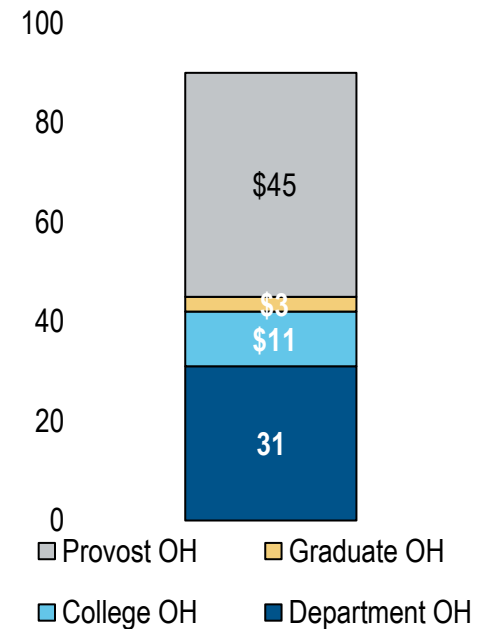
Despite the many departments in Arts, Humanities & Social Sciences, the College maintains the lowest proportion of overhead costs per credit throughout the institution, averaging at about \$90 out of the unit's \$274 per credit hour produced.

CAHSS has the lowest unit-driven academic overhead (department and college overhead) per credit hour and per faculty member produced across colleges

Unit OH per FT Faculty



Overhead Contributions to Cost per Credit Hour



Non-instructional salaries make up 61.6% of total unit-driven overhead

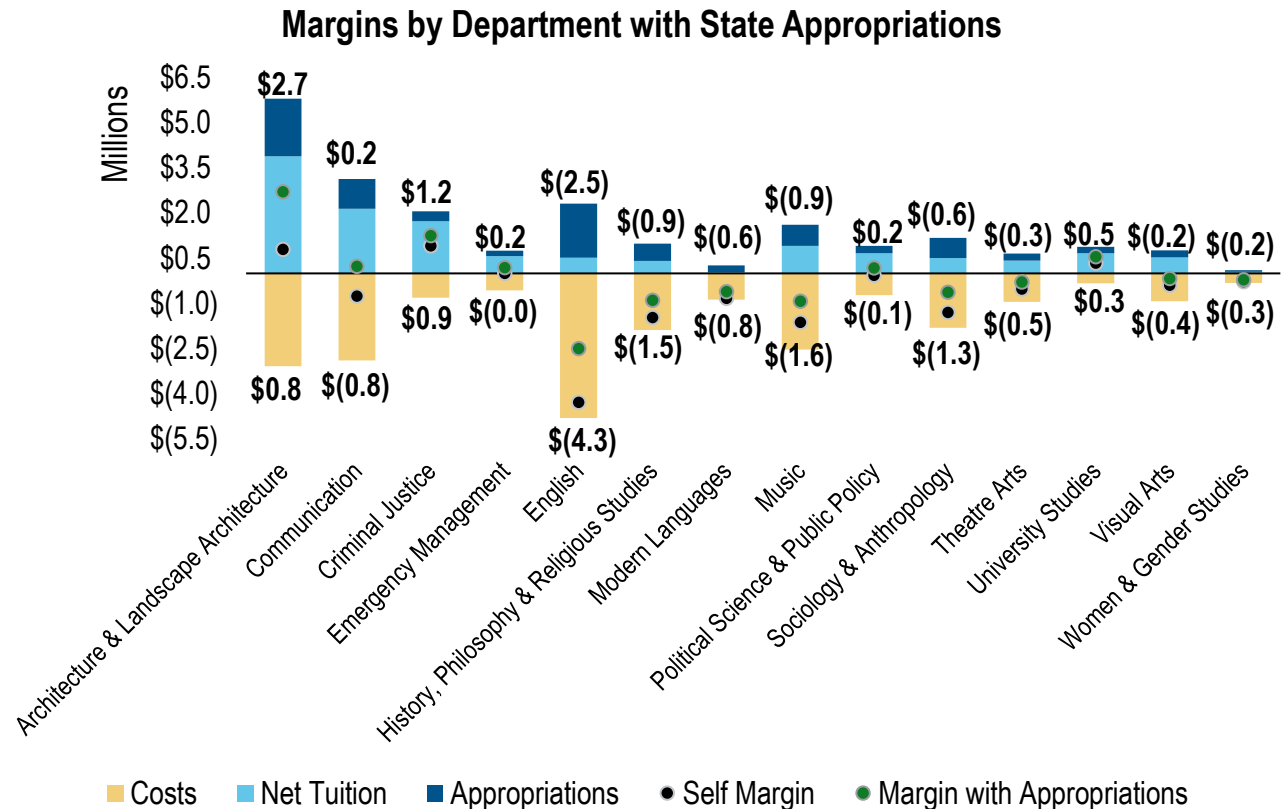
Given the large amount of credit hours produced by the College, the overhead incurred is widely distributed and, thus, efficiently managed throughout coursework delivery.

Arts, Humanities & Social Sciences

College Opportunities

In AY19-20 students enrolled in 690 unique course codes offered through the College of Arts, Humanities & Social Sciences. Approximately \$8.4M in state appropriations supported these departments and helped but did not eliminate the overall deficit.

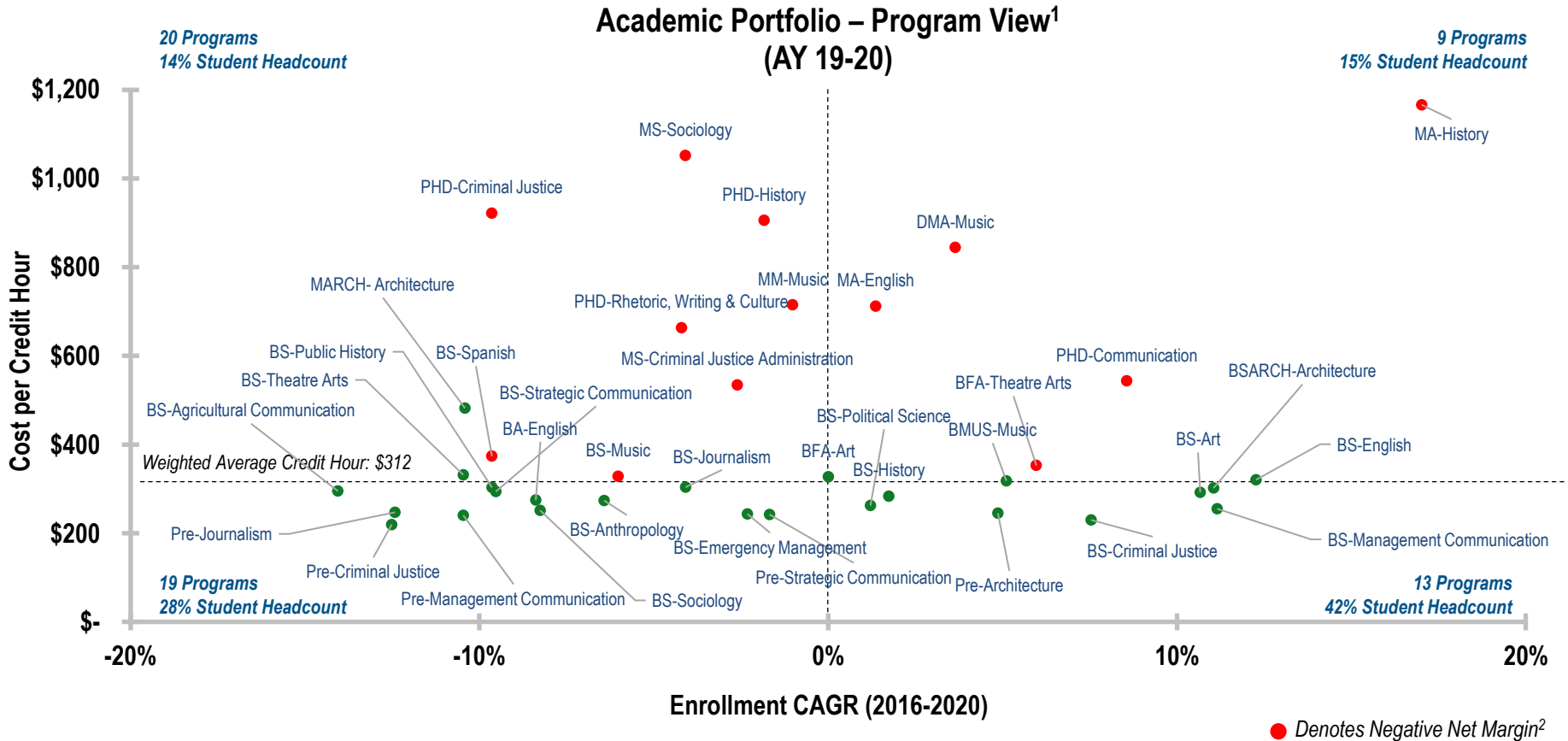
- Without considering state appropriations, nearly every department is operating at a slight deficit, averaging about (\$679k) per department
- When adding in the corresponding appropriations, 3 departments are brought into surplus and the College's overall margin comes to about (\$1.2M)
- The highest amount of appropriations went to Architecture & Landscape Architecture, totaling \$1.9M



While CAHSS operates at an efficient level for delivering coursework, the low program enrollments mean that not enough net tuition is accrued to cover the costs of curriculum delivery.

Arts, Humanities & Social Sciences Program Portfolio

In AY19-20, more than 67% of students were enrolled in one of twenty-two programs that experienced growth during the review period; notably, only two graduate-level programs (MLA, MArch) had positive net margins after tuition and appropriations.



1. Programs with five or fewer students in AY2020 (22, 4%) are not visualized on the graph and programs without enrolled students in AY2016 (5, 1% of HC) are excluded from both the graph and the summaries.
2. Full program-level data is available within the cost-to-educate model.

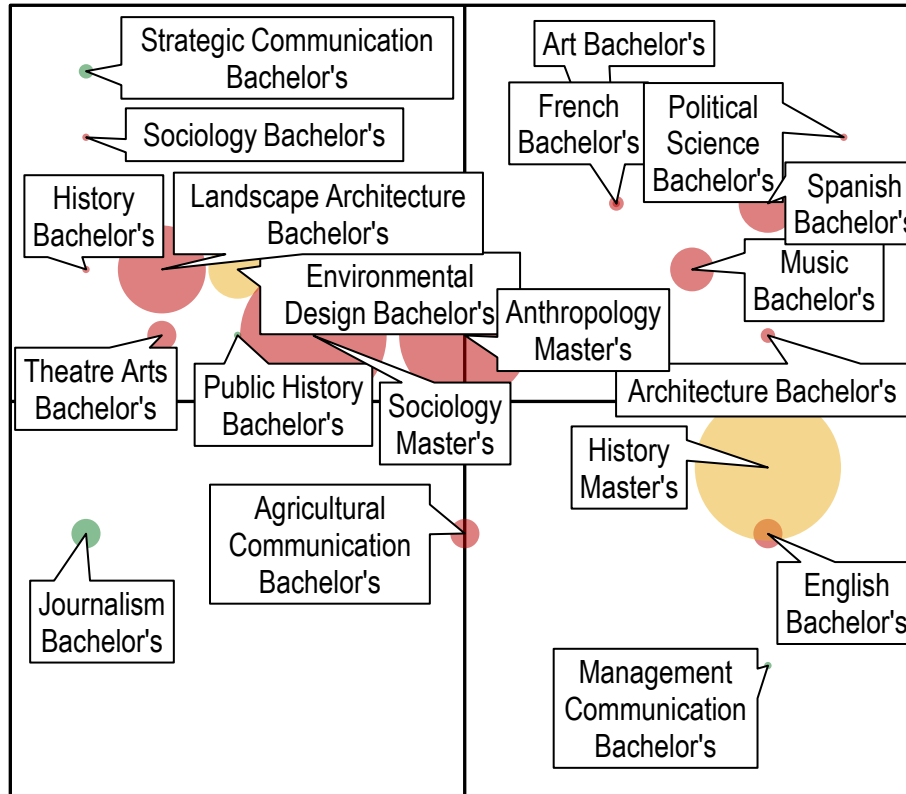
Arts, Humanities & Social Sciences

Program Market Positioning Matrix

The matrix below organizes AHSS programs¹ according to the change in completions and corresponding occupations² in ND and MN between 2015 and 2019, with size representing the average cost per CHP and color denoting program market share.

More Occupations Fewer Completions

- 9 programs
- 82 completions
- Average program cost per CHP of \$465



More Occupations More Completions

- 6 programs
- 116 completions
- Average program cost per CHP of \$302

- 2 programs
- 17 completions
- Average program cost per CHP of \$308

Fewer Occupations Fewer Completions

- 3 programs
- 48 completions
- Average program cost per CHP of \$540

Fewer Occupations More Completions

When evaluating opportunities to invest additional resources in program growth, it is important to consider how programs are positioned in NDSU's competitive landscape and the regional labor market.

Notes: ¹Excludes programs with insufficient data in any of these variables;
²Using the NCES' CIP to Standard Occupational Classification (SOC) Crosswalk
 Sources: Emsi Program and Occupation Tables; Cost-to-Educate Model

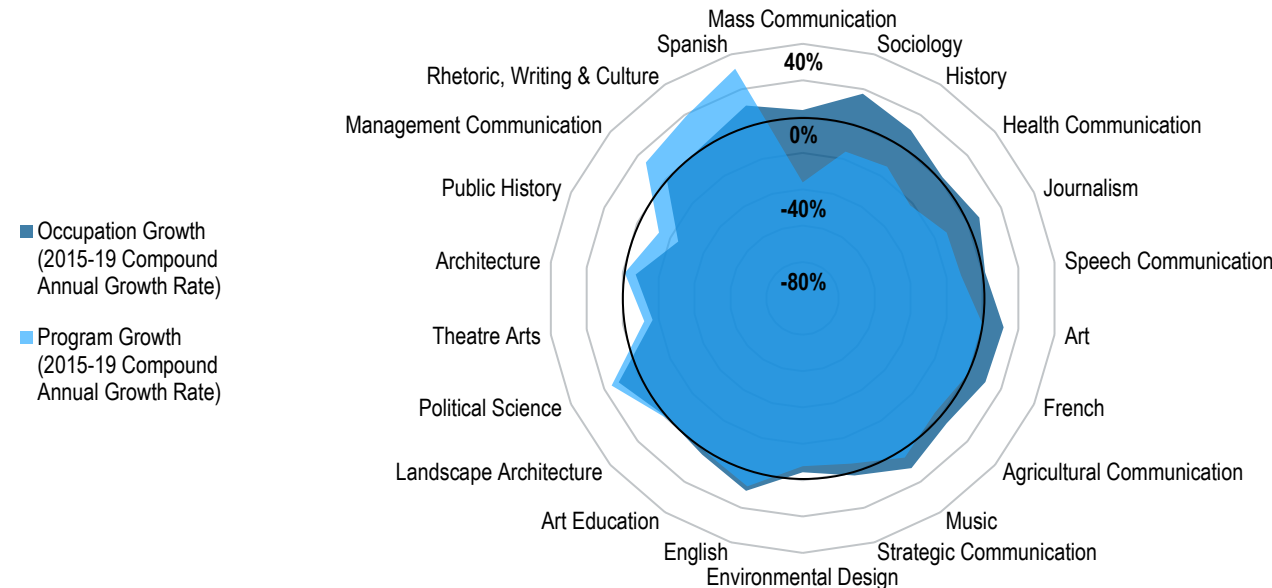
Arts, Humanities & Social Sciences

Program Alignment

The chart below portrays the growth rate of programs and their corresponding occupations, visualizing areas of alignment (programs completions are growing at the same rate as occupations) and gaps.

Change in Program Completions and Corresponding Occupations

(For occupations requiring a Bachelor's Degree or Higher in the Fargo MSA)



Observations

- **Alignment:** AHSS's **Landscape Architecture** program produced the same number of completions in 2015 and 2019 and the job market remained stable
- **Gaps:** AHSS's **Health Communication** and **Strategic Communication** programs produced less completions in 2019, while the job market for graduates of these programs grew by 1.6%

The volume of change in program completions and corresponding occupations must also be considered to fully evaluate whether NDSU programs are aligned with the region's workforce needs.

COLLEGE OF BUSINESS

NDSU Academic Program Prioritization Dean Meeting
April 7th, 2021

NORTH DAKOTA
STATE UNIVERSITY



College of Business

College Opportunities & Considerations

Based on the current state analysis of the College of Business, the below considerations may present opportunities for cost savings and increased efficiency to open up capacity for growing programs.

1

Increase Faculty Teaching

Could more faculty time be allocated towards teaching activity to increase output and reduce need for additional instructors?

Decreasing research and service by an average of just 5% each for full time faculty members would free up over \$147K for teaching output, equal to almost two additional faculty, based on average instructional pay

2

Increase section size and capacity

How can courses be delivered more efficiently while still maintaining instructional quality?

Business spent \$812 per credit hour on graduate-level coursework which, on average, was under-enrolled by about 45%, based on capacity

Increasing section enrollments would alleviate section proliferation and increase capacity of faculty

3

Review faculty workload and compensation

Are faculty outputs generating enough of a return on investment?

Faculty with dual appointments in the Upper Great Plains Transportation unit averaged \$1,352 per credit hour produced based on unrestricted teaching compensation

Increasing credit hour production of these faculty (27 average) to the median for the College (384) could add nearly 3,000 credit hours to their productivity

The College of Business operates in an efficient manner and has managed costs effectively by maximizing resources at the undergraduate level and minimizing high-cost graduate programs to create a balanced academic portfolio.

College of Business

College Overview

In AY 2020, the College of Business produced 34,763 credit hours from the effort of 53 instructors across three departments, averaging \$320 per credit hour produced.

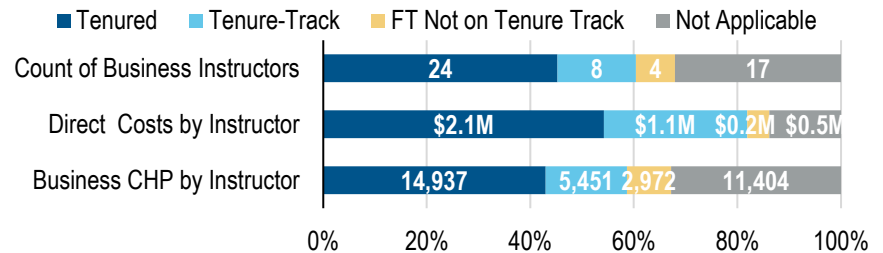
Current State

- Of the 292 course sections delivered, **90.0% were considered in load**. The median section size* was 33 and 71.0% of sections were delivered at the undergraduate level
- 93.6% of credit hour production (CHP)** occurred at the undergraduate level and 6.4% at the graduate level
- “Elements of Accounting I” (ACCT 200) had the most sections and **generated 1,716 credit hours**, 4.9% of college’s total CHP
- The Management & Marketing department had the **highest CHP at 19,108** and Transportation, Logistics & Finance had the lowest CHP at 4,767
- During AY 2019, the College of Business granted **479 completions**, 81.8% at the undergraduate level. Bachelors degrees in Management & Marketing department accounted for 43.6% of total completions
- The **average department operating margin** is \$874K without state appropriations and \$3.5M with state support

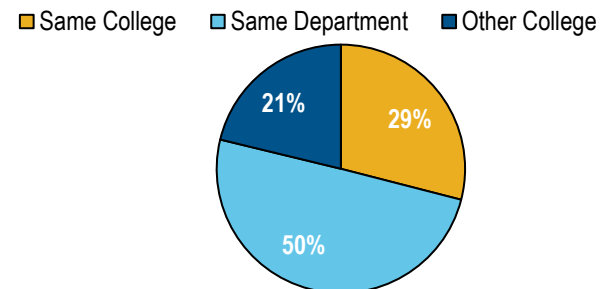
Coursework Summary

Criteria	2015-16	2016-17	2017-18	2018-19	2019-20	CAGR
No. of Sections	272	287	274	276	292	1.8%
Course Enrollment	8,520	9,691	10,683	11,565	11,751	8.4%
Credit Hrs. Prod.	25,406	28,190	32,367	34,360	34,763	8.2%

Course & Cost Summary by Instructor Type



Course Enrollments by Student Primary Program



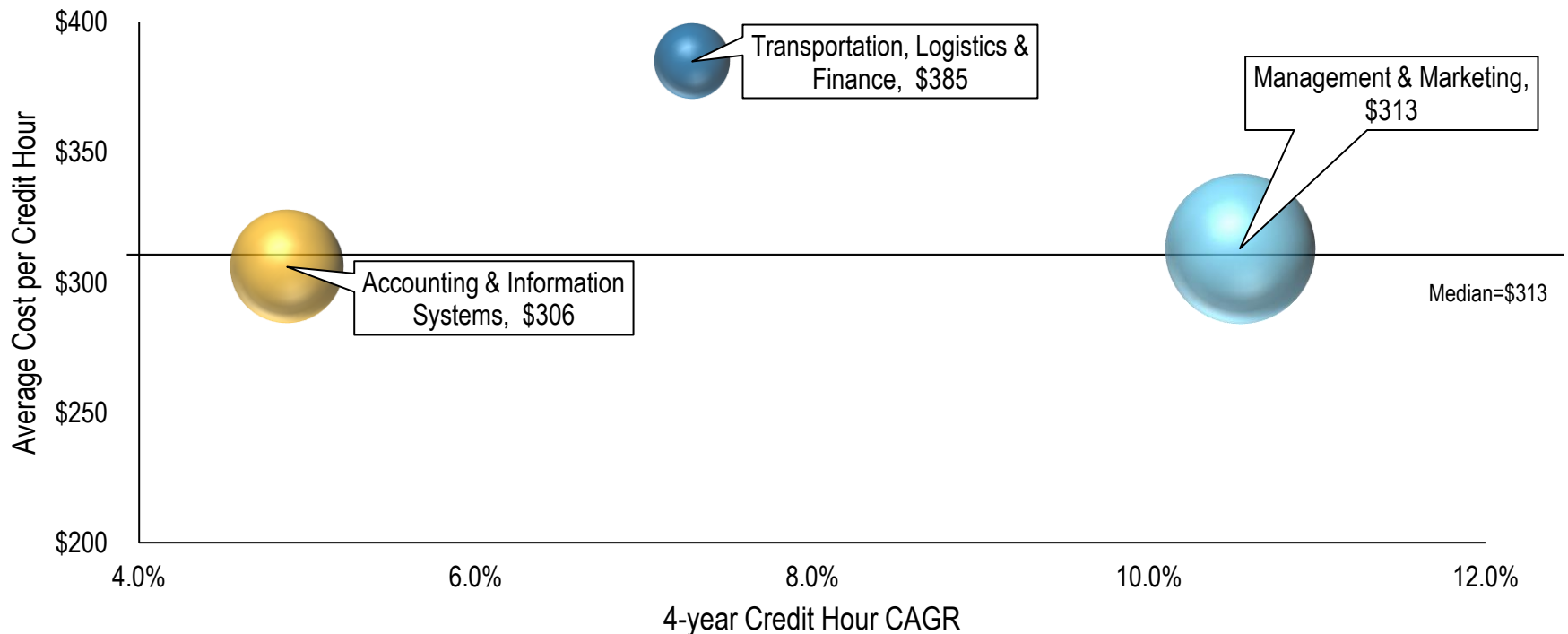
*Median section sizes include single-student entries, such as dissertations. Flagging these types of courses for removal would likely raise this figure.

College of Business

Program Economics

Portfolios are commonly balanced with growth engines and “steady-staters”, high-cost and low-cost, and “at-scale” and “still below scale”. The objective of this lens is not only comparative, but also to observe the balance.

**CHP Volume, Growth & Cost
By Department: Business**



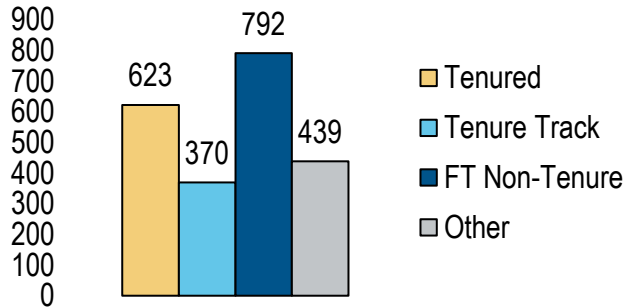
The weighted average cost per credit in the College of Business is \$320 when considering credits produced for the 2019-2020 academic year.

College of Business

College Opportunities

The College of Business operates more efficiently than the University average with more faculty time devoted to teaching and production of credit hours, and with high utilization of full-time faculty.

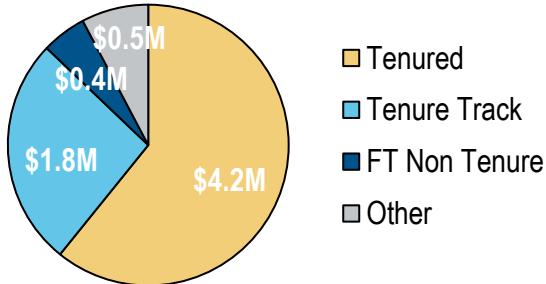
Average CHP per Instructor by Type



Teaching expectations averaged about 57% of all instructors' compensation



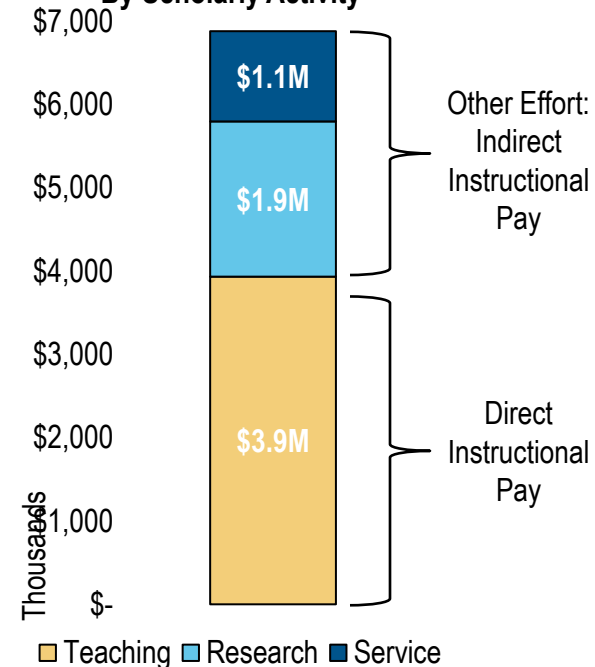
Instructional Pay by Type



Direct instructional pay contributed \$113 of the \$320 per credit hour in the College of Business



Instructional Pay Breakdown By Scholarly Activity



The College of Business is one of the few units whose tenured faculty teach more, on average, than part time or adjunct instructors, leading to low reassignment costs for load deficits for this category.

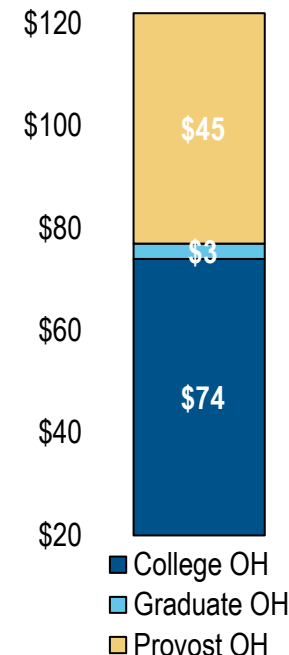
College of Business

College Opportunities

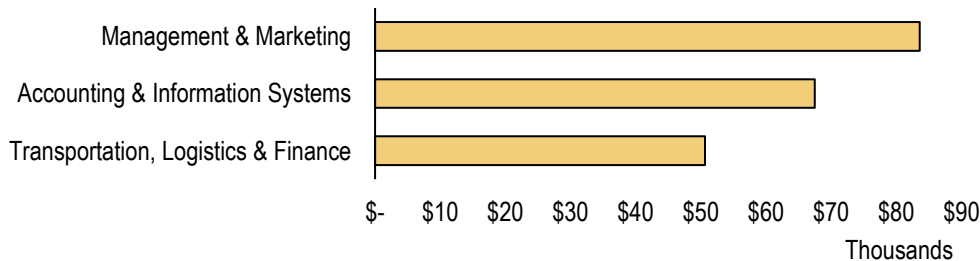
Overhead and infrastructure within the College of Business ranges from \$50,650 to \$83,598 and is directly correlated with credit hour production, given the lack of department overhead and proportional distribution of college overhead.

- The College of Business falls right at the median for unit-driven academic overhead (department and college overhead) per credit hour produced across colleges
- Non-instructional salaries make up 82.4% of total college overhead
- The College of Business comes just under the institutional average rate of unit-driven overhead contribution to cost per credit hour at 23.2%

Overhead Contributions to Cost per Credit Hour



Unit OH per FT Faculty



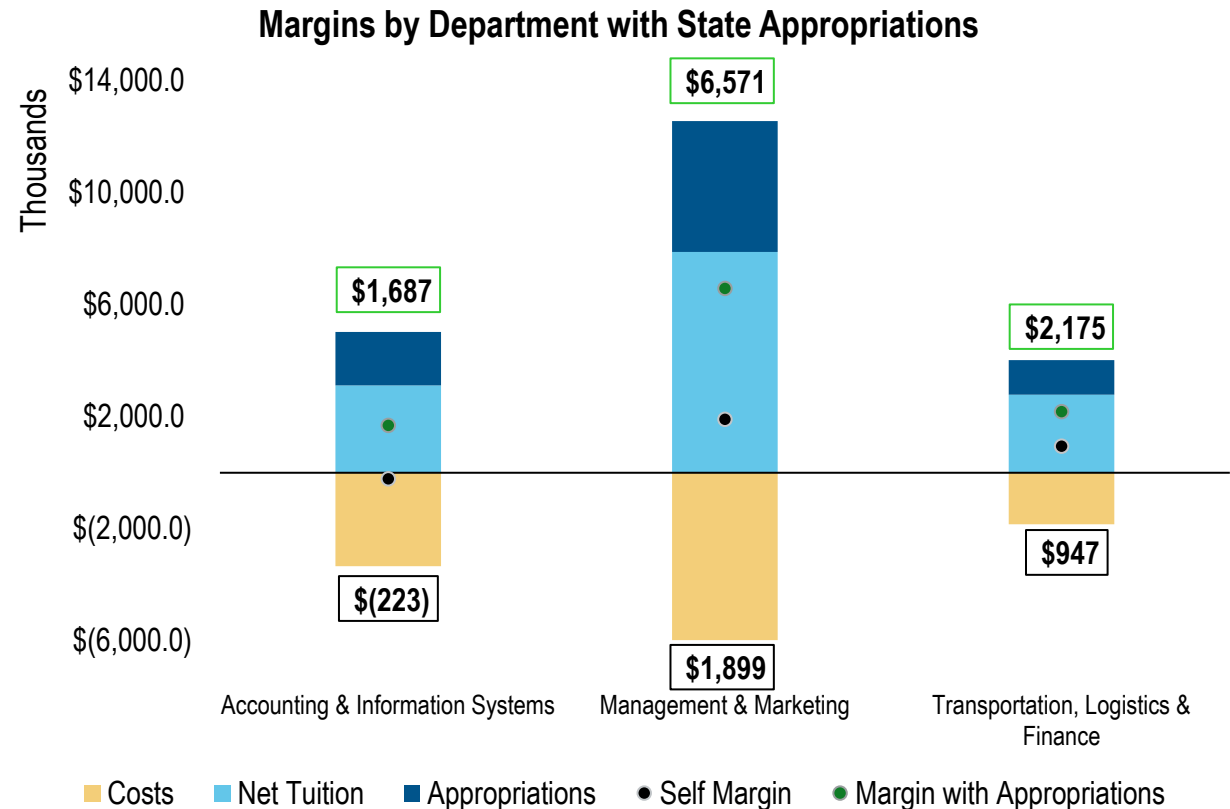
The College of Business has managed its expenditures efficiently and falls below the institutional average for overall cost per credit hour and likewise for each contributing component of cost per credit hour.

College of Business

College Opportunities

In AY19-20 students enrolled in 165 unique course codes offered through the College of Business. Approximately \$7.8M in state appropriations supported these departments and alleviated the existing deficit.

- Without considering state appropriations, Accounting & Information Systems is operating at a slight deficit averaging of about (\$223k)
- When adding in the corresponding appropriations, this department is brought into surplus and the College's overall margin comes to about \$10.4M
- The highest amount of appropriations went to Management & Marketing, totaling \$4.7M

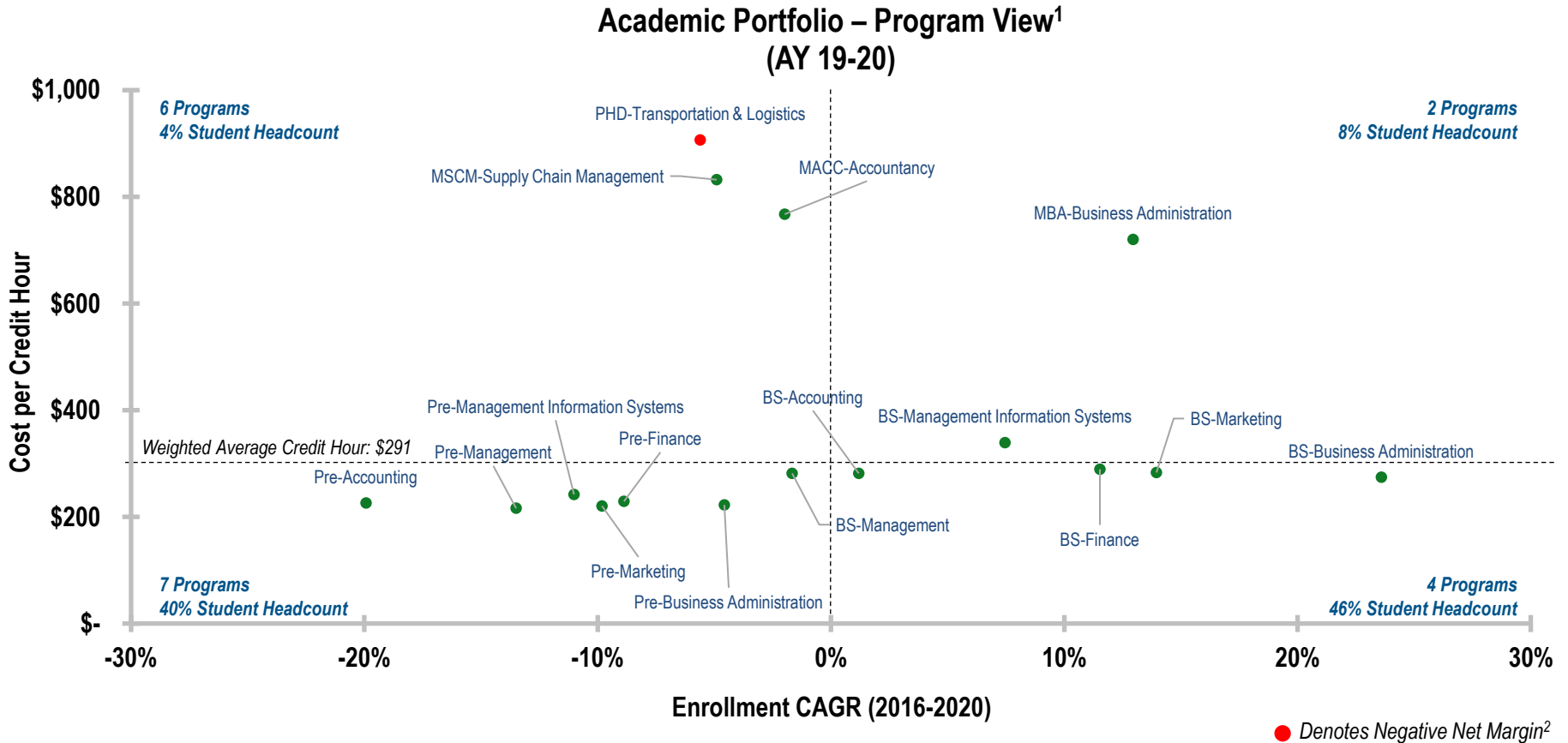


On a department and College level, the College of Business is operating below its means and producing a positive margin, likely owing to strong enrollment trends, efficient course delivery, and effective faculty deployment practices.

College of Business

Program Portfolio

In AY19-20, nearly 55% of students were enrolled in one of six programs that experienced growth during the review period; notably, all six programs (five not shown¹) with negative net margins after tuition and appropriations were graduate-level.



1. Programs with five or fewer students in AY2020 (3, <1%) are not visualized on the graph and programs without enrolled students in AY2016 (5, 1% of HC) are excluded from both the graph and the summaries.
2. Full program-level data is available within the cost-to-educate model.

College of Business

Marketing (BS) Program Overview

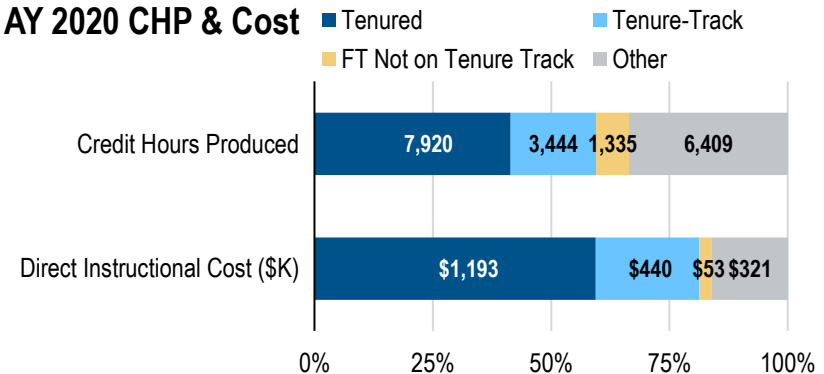
Based on the results of Huron’s market positioning study, informed by the Cost-to-Educate model, NDSU’s Marketing BS program highlights an opportunity to reinvest to ensure consistency in program quality and delivery.

Current State

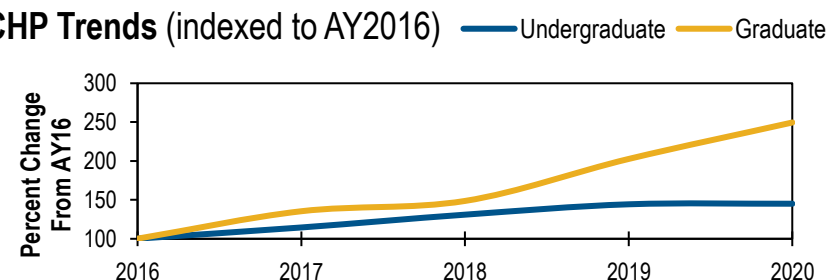
- The NDSU Department of Management and Marketing offers a **major in Marketing and graduate certificate in Digital Marketing**, among others
- The Management and Marketing department **produces 55.0% of the College of Business’ credit hours**, primarily through tenured faculty and other instructors,¹ at an average cost-per credit of \$313
- Department credit hour production has grown at both the graduate and undergraduate levels, which cost \$713 and \$285, respectively, per credit hour
- The Marketing BS is **NDSU’s 6th largest program**, accounting for **3.5% of all NDSU Bachelor’s completions in academic year 2019**

Management and Marketing Department Key Metrics

AY 2020 CHP & Cost



CHP Trends (indexed to AY2016)



Given that this department houses business disciplines core to all business majors (e.g., Management), Management and Marketing credit hour production should largely reflect enrollment trends.

Note: ¹Includes all instructors assigned to a class that are not full-time faculty
Source: Cost-to-Educate Model

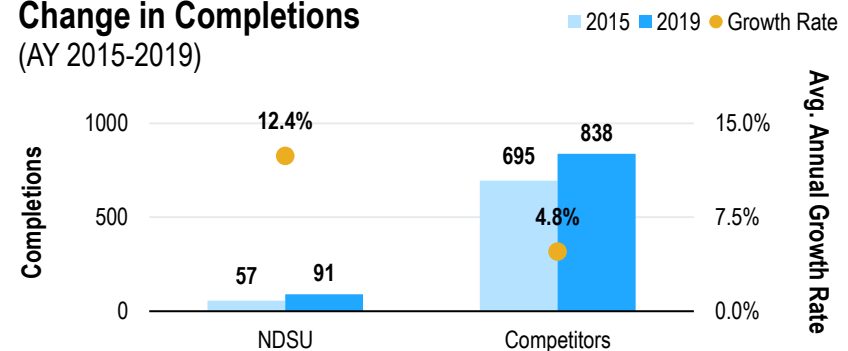
College of Business

Marketing (BS) Competitive Analysis

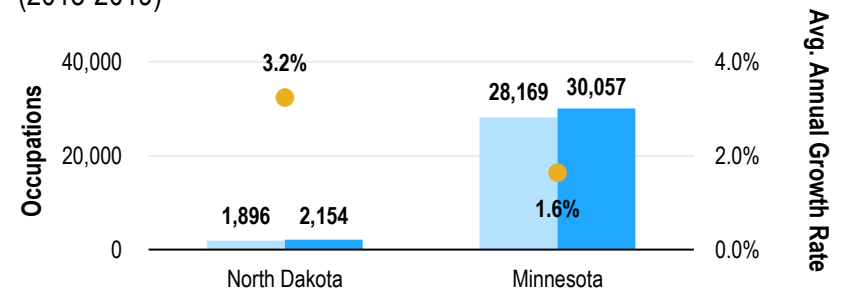
Focusing specifically on direct competitors¹, NDSU's Marketing BS program has grown faster than its competitors on average, and new jobs have been added for graduates of this program in North Dakota and Minnesota.²

- Between 2015 and 2019, Marketing BS program completions **grew at an average annual rate of 12.4% for NDSU** and **4.8% for its competitors**, altogether accounting for **177 new program completions at the Bachelor's level**
- Relative to its direct competitors, NDSU's **Marketing BS market share grew from 7.6% to 9.8%** during this period
- In the North Dakota and Minnesota labor markets, **2,146 new Marketing jobs were added** between 2015 and 2019, increasing the total number of jobs available by **6.7%**
- This occupational growth was skewed towards specific Marketing occupations

Change in Completions
(AY 2015-2019)



Change in Occupations
(2015-2019)



Given the overall growth in program completions and corresponding occupations, in addition to NDSU's increasing market share, the Marketing BS program is a strong candidate for growth.

Notes: ¹Competitors include UM Twin Cities, ISU, UND, MSU Mankato, SDSU, UM Duluth, MSU Moorhead, and Concordia College at Moorhead; ²Occupations include Advertising and Promotions Managers; Sales Managers; Fundraisers; Market Research Analysts and Marketing Specialists
Sources: Emsi Program Table, Emsi Occupation Table

College of Business

Marketing (BS) Growth Opportunity

Increased student demand for the Marketing BS has not been met with equivalent growth in course sections, leading to an increase in average section size that lowers costs but can also impact student perceptions of quality.

Management and Marketing (Undergrad <500)

	2015-16	2016-17	2017-18	2018-19	2019-20	CAGR
Course Enrollment	4,246	5,077	5,347	5,960	5,991	9.0%
Sections	108	112	100	101	120	2.7%
Avg. Enrollment / Section	39	45	53	59	50	6.2%



- **Avg. enrollment per UG section has increased** due to growing student demand that has exceeded the growth in sections offered
- There was a significant bump (20%) in sections offered between AY19 and AY20 **suggesting that the department has partially reacted to the increased student demand**
- Addressing this will **create the need for resource reallocation**; this can be addressed with short-term reallocation (e.g., part-time faculty) or long-term reallocation (i.e., changing departmental faculty mix)

The Marketing BS program appears to have momentum for continued growth, making it important to monitor pedagogical quality and make additional investments to decrease section sizes if warranted.

College of Business

Marketing (BS) Next Steps

Before investing additional resources to support the growth of the Marketing (BS) program, the institution should determine whether resources should be reallocated or whether new resources could be used.



What average section size is appropriate for this department and program?

Do we have the excess resources to support the section size and anticipated future growth?

If not, do we have departments with excess resources from declining demand?

How does this reallocation or new support change the faculty and discipline mix of the College?

What recurring costs and revenue would the Management and Marketing Department incur from this expansion?

Relative to other opportunities, how does this one align with the College's strategic priorities?

How should impacts from this reallocation be communicated to faculty and staff?

How will NDSU determine success and measure the return on its investment?

In the long term, the Marketing BS program may be a strong candidate to be added to the College of Business' growing portfolio of asynchronous, online program offerings.

College of Business

Finance (BS) Program Overview

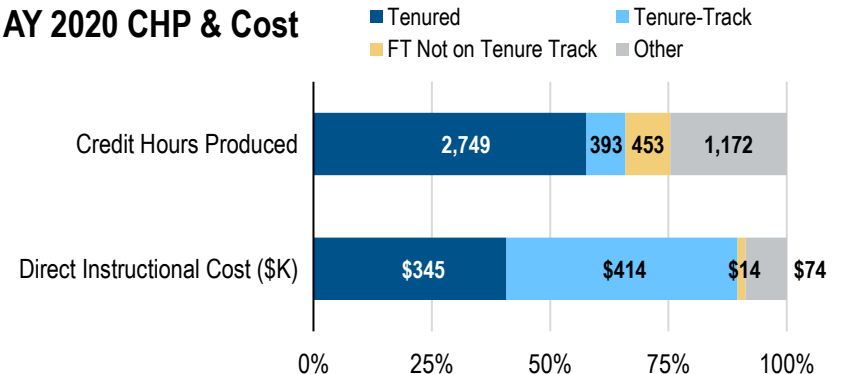
Based on the results of Huron’s market positioning study, informed by the Cost-to-Educate model, NDSU has an opportunity to bolster its Finance (BS) program and harness momentum to increase its graduate enrollment (in turn lowering cost per CH).

Current State

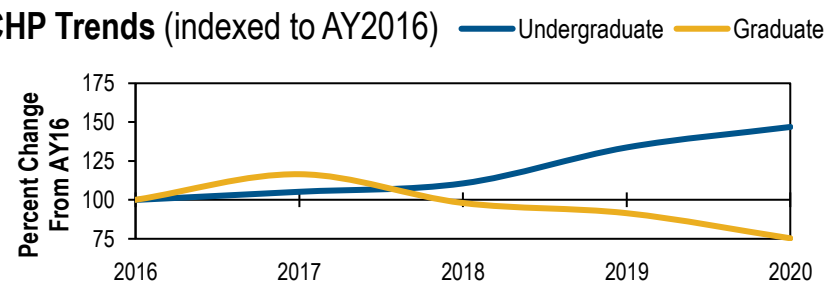
- The NDSU Transportation, Logistics, and Finance (TL&F) department offers **the undergraduate Finance Major**, among other programs
- The TL&F department **produces 13.7% of the College of Business’ credit hours**, primarily through tenured faculty, at an average cost-per credit of \$385
- TL&F graduate credit hour production has decreased while undergraduate credit hour production has grown, at an average cost per credit hour produced of \$1087 and \$295, respectively
- The Finance BS is **NDSU’s 8th largest program**, accounting for **3.1% of all NDSU Bachelor’s completions in academic year 2019**

TL&F Department Key Metrics

AY 2020 CHP & Cost



CHP Trends (indexed to AY2016)



TL&F is experiencing significant CH growth at the undergraduate level, in part due to the growing Finance BS program, but the College is experiencing a decline in CH production at the graduate level.

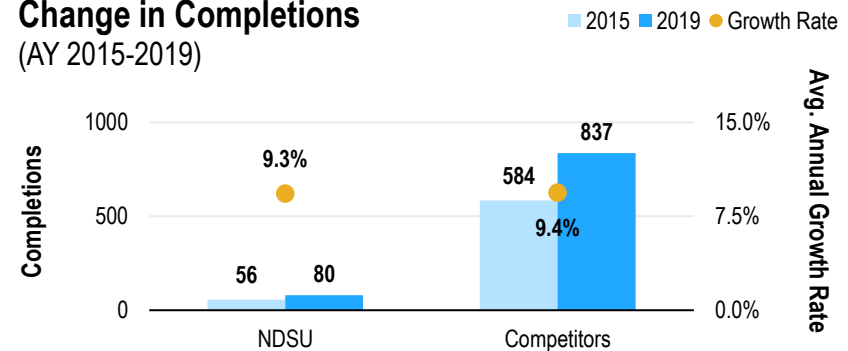
College of Business

Finance (BS) Competitive Analysis

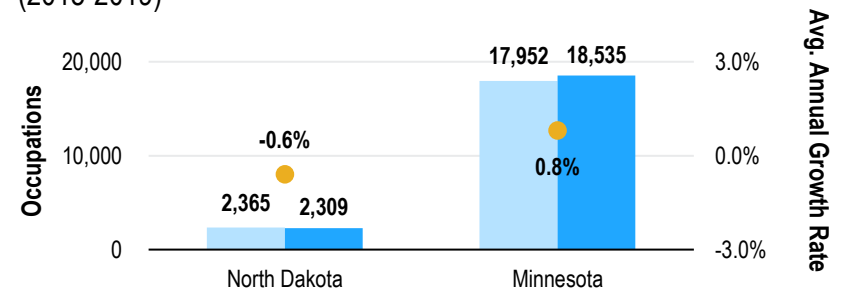
Focusing specifically on direct competitors¹, NDSU's Finance BS program has grown at the same rate as its competitors on average, and new jobs were added in Minnesota for graduates of this program.²

- Between 2015 and 2019, Finance BS program completions **grew at an average annual rate of 9.3% for NDSU and 9.4% for its competitors**, altogether accounting for **277 new program completions at the Bachelor's level**
- Relative to its direct competitors, **NDSU has maintained it's market share of 8.7%**
- In the North Dakota and Minnesota labor markets, **527 new Finance jobs were added between 2015 and 2019, increasing the total number of jobs available by 2.5%**
- This **occupational growth is concentrated in Minnesota**, with a slight decrease in the number of Finance jobs in North Dakota

Change in Completions
(AY 2015-2019)



Change in Occupations
(2015-2019)



Given strong regional demand for the Finance BS degree, maintaining market share will require ensuring that the program continues to build upon its reputation to assure graduates have strong job prospects.

Notes: ¹Competitors include UM Twin Cities, ISU, UND, MSU Mankato, SDSU, UM Duluth, MSU Moorhead, and Concordia College at Moorhead; ²Occupations include Compensation, Benefits, and Job Analysis Specialists; Budget Analysts; Credit Analysts; Personal Financial Advisors; Loan Officers
Sources: Emsi Program Table, Emsi Occupation Table

College of Business

Finance (BS) Growth Opportunity



In order to maintain market share, ensure the competitiveness of graduates, and address declining demand in TL&F graduate credit hour production, NDSU should evaluate the viability of an accelerated MBA program and/or relevant credential.

Relevant Opportunities to Explore:



- **Accelerated Master’s and/or MBA** – NDSU offers accelerated Master’s programs but does not currently have an option for undergraduates in Finance or other business majors; since the College of Business Master’s programs already have flexible options, the University could explore an accelerated Master’s program that allows for either part-time or remote completion of the graduate program.
- **Credentials** – Credentials such as certificates offer students another “resume booster” which can make them more appealing to hiring professionals. The College of Business has a robust graduate certificate portfolio, but Huron has observed that more institutions are using undergraduate certificate programs to demonstrate their students' competencies and build interest in future graduate programming. Huron has seen these offerings developed in-house or delivered through partnerships with existing providers

Relevant Case Studies:

- **Accelerated Masters and/or MBA**

	<ul style="list-style-type: none"> ▪ 4 + 1 Integrated MBA
	<ul style="list-style-type: none"> ▪ Accelerated B.Acc/M.Acc

- **Credentials**

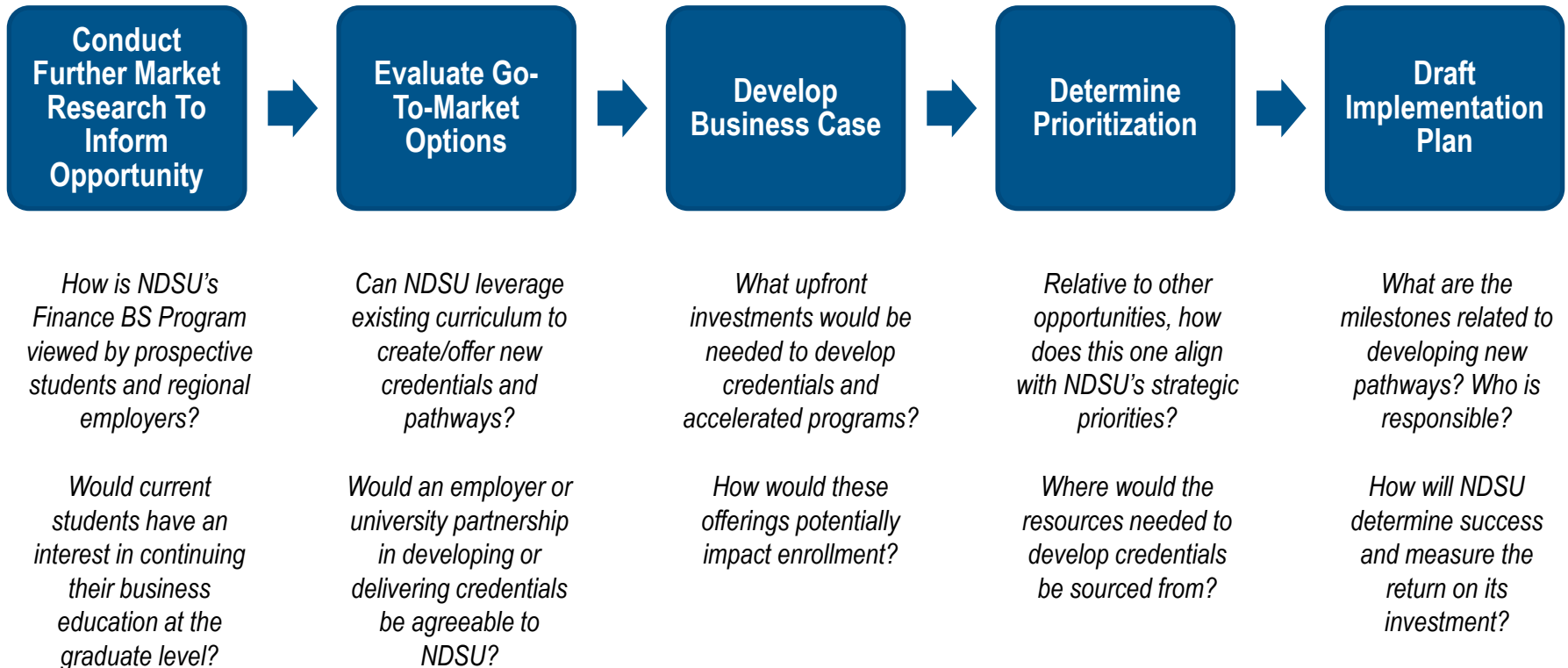
	<ul style="list-style-type: none"> ▪ Partnered with HBS Online to provide HBS Core as an UG Immersion
	<ul style="list-style-type: none"> ▪ Developed certificates specific to areas of finance (e.g., Capital Markets, Commercial Banking)

These opportunities are not unique to the Finance BS, and their benefits could affect students from throughout the college, strengthening student’s skills and spreading the success of undergraduate programming.

College of Business

Finance (BS) Next Steps

Before investing in any program expansion opportunities, internal stakeholders should consider the following questions to conduct due diligence, determine approach and timing, and develop an implementation plan.



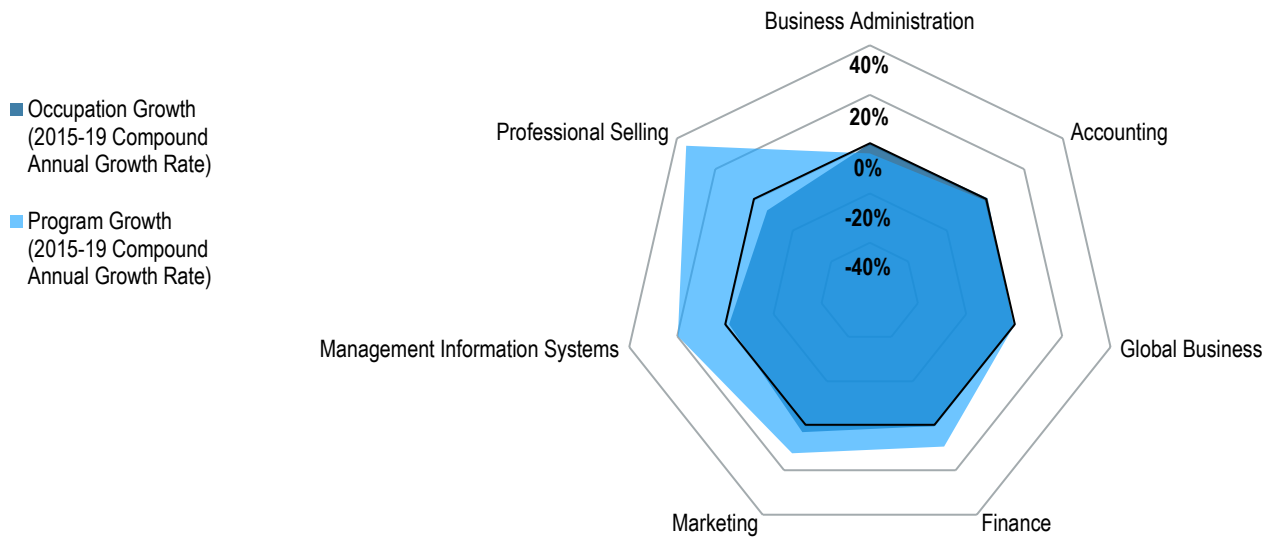
College of Business

Program Alignment

The chart below portrays the growth rate of programs and their corresponding occupations, visualizing areas of alignment (programs completions are growing at the same rate as occupations) and gaps.

Change in Program Completions and Corresponding Occupations

(For occupations requiring a Bachelor's Degree or Higher in the Fargo-Moorhead MSA)



Observations

- Gaps: Between 2015 and 2019, **Business Administration** program completions declined at an average annual rate of -4%, while 63 new jobs were added to this area
- Alignment: Between 2015 and 2019, **Accounting** program completions stayed consistent and the number of jobs available for graduates of this program grew slightly

The volume of change in program completions and corresponding occupations must also be considered to fully evaluate whether NDSU programs are aligned with the region's workforce needs.

COLLEGE OF ENGINEERING

NDSU Academic Program Prioritization Dean Meeting
April 9th, 2021

NORTH DAKOTA
STATE UNIVERSITY



College of Engineering

College Opportunities & Considerations

Based on the current state analysis of the College of Engineering, the below considerations may present opportunities for cost savings and increased efficiency to open up capacity.

1

Increase Faculty Teaching

Could more faculty time be allocated towards teaching activity to increase output and reduce need for additional instructors?

Decreasing research and service by an average of just 5% each for T/TL faculty would free up nearly \$230K for teaching output, equivalent to about four additional instructors, based on average teaching pay

2

Increase section size and capacity

How can courses be delivered more efficiently while still maintaining instructional quality?

The University spent \$828 per credit hour on graduate-level coursework offered in Engineering which, on average, was under-enrolled by about 51%, based on capacity

Increasing section enrollments would alleviate section proliferation and increase capacity of faculty

3

Consider more targeted tuition waivers

How can the College offset its higher costs through organic revenue growth?

Doctoral programs in Engineering have an average waiver rate of 79%, substantially reducing tuition revenue to cover the costs of delivering those programs

Reducing or more intentionally targeting program waivers could help the College to realize more of its earnings

While the departments within the College of Engineering have realized enough positive margins to bring the College into an overall surplus, there may be opportunities for increased efficiency through small adjustments.

College of Engineering

College Overview

In AY 2020, the College of Engineering produced 50,178 credit hours from the effort of 139 instructors across eight departments (plus the Dean's suite), averaging \$391 per credit hour produced.

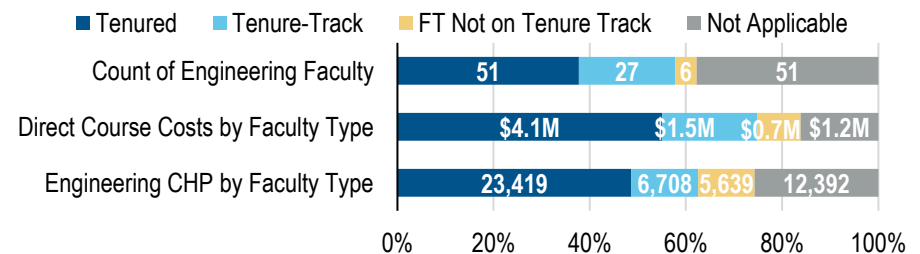
Current State

- Of the 806 course sections delivered, **77.3% were considered in load**. The median section size* was 15 and 66.7% of sections were delivered at the undergraduate level
- 91.0% of credit hour production (CHP)** occurred at the undergraduate level and 9.0% at the graduate level
- “Doctoral Dissertation” (ECE 899) had the most sections and **generated 286 credit hours**, 0.6% of college’s total CHP
- The Mechanical Engineering department had the **highest CHP at 13,045** and Aerospace Studies had the lowest CHP at 81
- During AY 2019, the College of Engineering **granted 571 completions**, 86.2% at the undergraduate level. Bachelors degrees in Mechanical Engineering department accounted for 27.7% of total completions
- The **average department operational margin** is \$287k without state appropriations and \$1.6M with state support

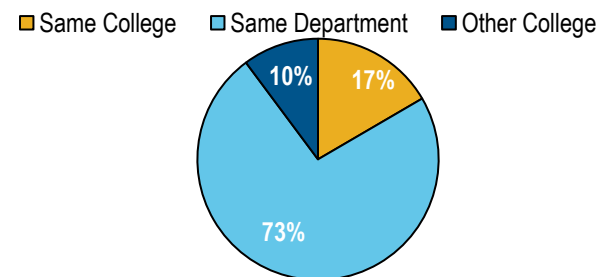
Coursework Summary

Criteria	2015-16	2016-17	2017-18	2018-19	2019-20	CAGR
No. of Sections	868	936	898	882	806	-1.8
Course Enrollment	19,320	20,340	19,949	19,995	17,552	-2.4%
Credit Hrs. Prod.	56,391	59,606	58,305	58,555	50,178	-2.9%

Faculty Summary for Coursework Delivery



Course Enrollments by Student Primary Program



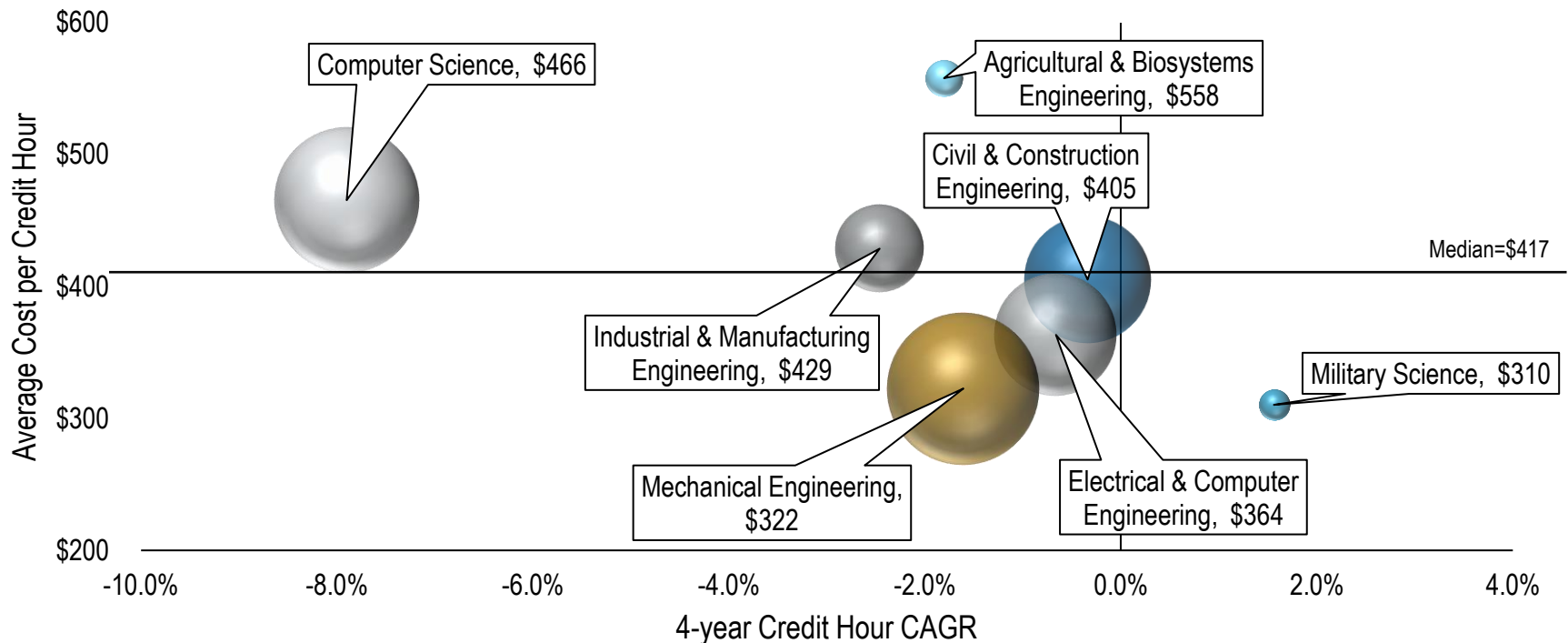
*Median section sizes include single-student entries, such as dissertations. Flagging these types of courses for removal would likely raise this figure.

College of Engineering

Department Economics

Portfolios are commonly balanced with growth engines and “steady-staters”, high-cost and low-cost, and “at-scale” and “still below scale”. The objective of this lens is not only comparative, but also to observe the balance.

**CHP Volume, Growth & Cost
By Department: Engineering***



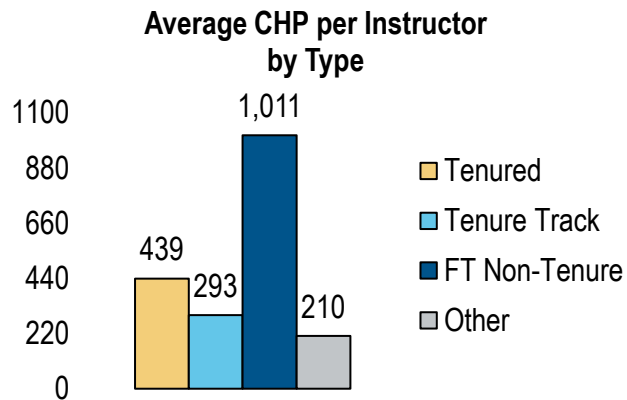
The weighted average cost per credit in the College of Engineering is \$391 when considering credits produced for the 2019-2020 academic year.

*The department of Aerospace Studies appears outside of the parameters of this chart as an outlier at \$1,072 per credit hour produced.
The size of each bubble represents that department's relative volume of credit hours produced.

College of Engineering

College Opportunities

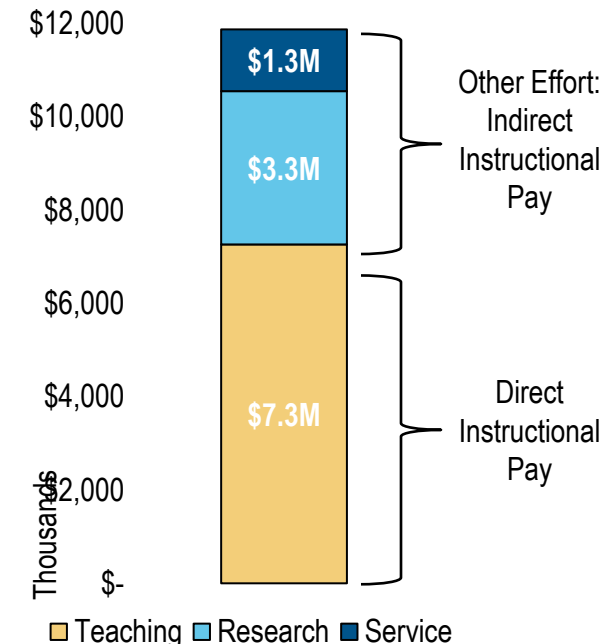
The College of Engineering departments range in scholarly activity expectations from 40% teaching to 80% teaching for tenure line faculty, who together average \$182 per credit hour of direct instructional compensation.



Within scholarly activities, teaching averaged about 61% of all instructors' compensation



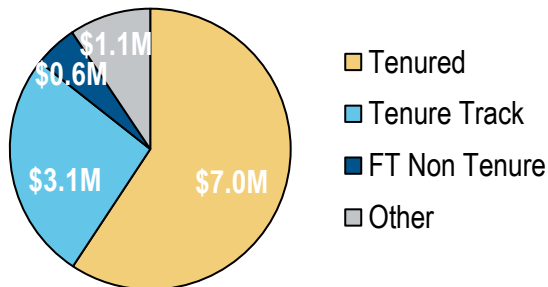
Instructional Pay Breakdown By Scholarly Activity



Direct instructional pay contributed \$153 of the \$391 per credit hour in the College of Engineering



Instructional Pay by Type



Full time, non-tenure faculty produced nearly 2.5x more credit hours per instructor than tenured faculty. These instructors include professors of practice, who typically have little other faculty effort expectations.

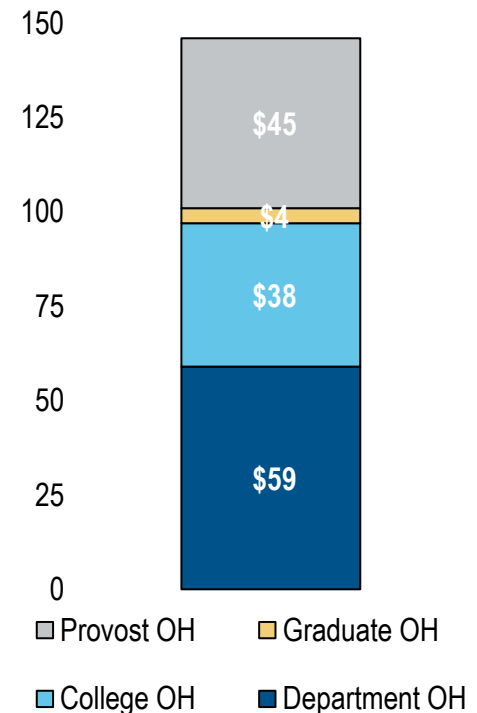
College of Engineering

College Opportunities

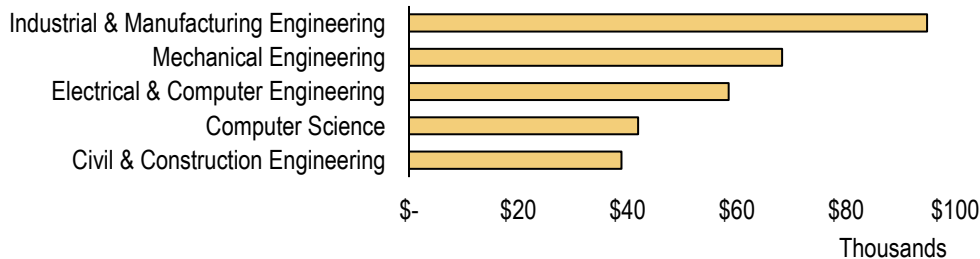
About 25% of the College of Engineering’s cost per credit hour comes from unit-driven overhead accrued at the department and college/Dean suite level. This aligns with both the average and median rates across academic units.

- The College of Engineering falls 29.7% above the median for unit-driven academic overhead (department and college overhead) per credit hour produced across colleges
- Non-instructional salaries make up 81.1% of total college overhead
- The College of Engineering sets the median for unit-driven overhead per full time faculty member at just under \$57k

Overhead Contributions to Cost per Credit Hour



Unit OH per FT Faculty*



Industrial & Manufacturing Engineering had a disproportionately high department overhead per credit hour produced, as compared to other departments (about 72% higher than the next highest unit).

*The departments of Agricultural & Biosystems Engineering, Military Science and Aerospace Studies do not appear because of the nature of their faculty employment

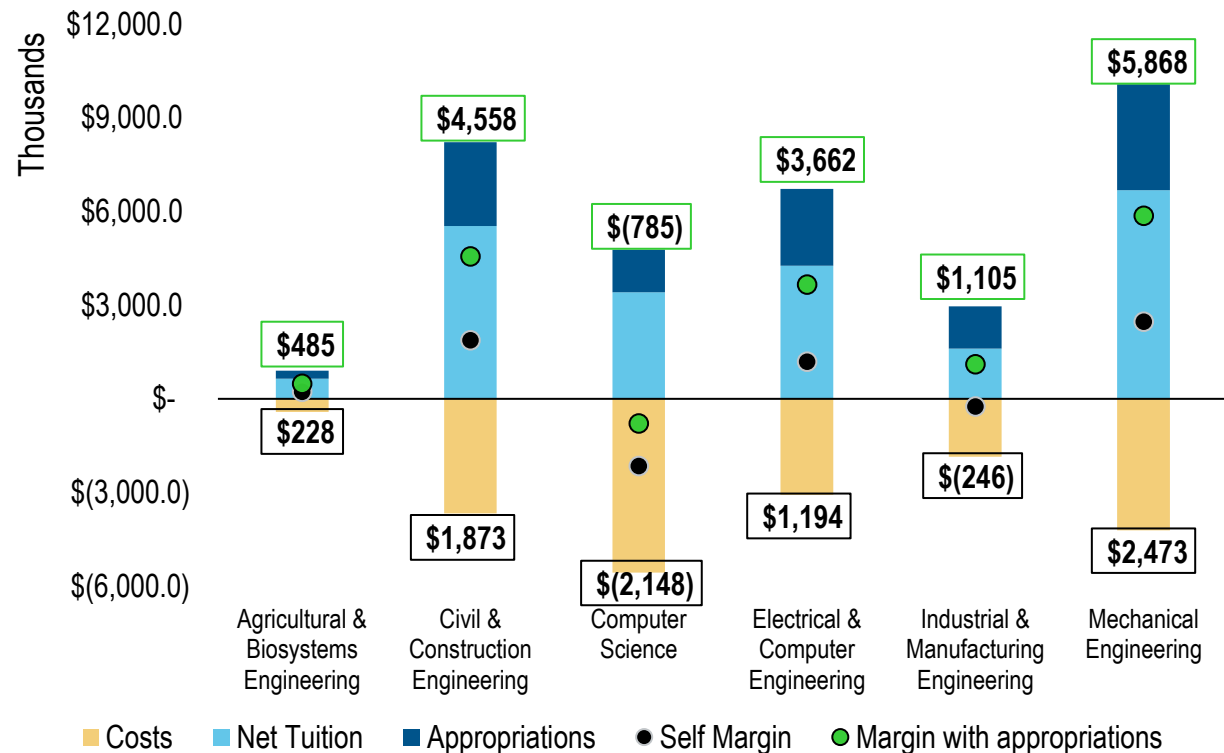
College of Engineering

College Opportunities

In AY19-20 students enrolled in 395 unique course codes offered through the College of Engineering. Approximately \$12.2M in state appropriations supported these departments and increased the overall College operating surplus.

- Without considering state appropriations, Computer Science and Industrial & Manufacturing are operating at a deficit – (\$2.1M) and (\$246k), respectively
- When adding in the corresponding appropriations, Industrial & Manufacturing is brought into surplus and the College’s overall operating margin comes to about \$14.8M
- The highest amount of appropriations went to Mechanical, totaling \$3.4M

Margins by Department with State Appropriations



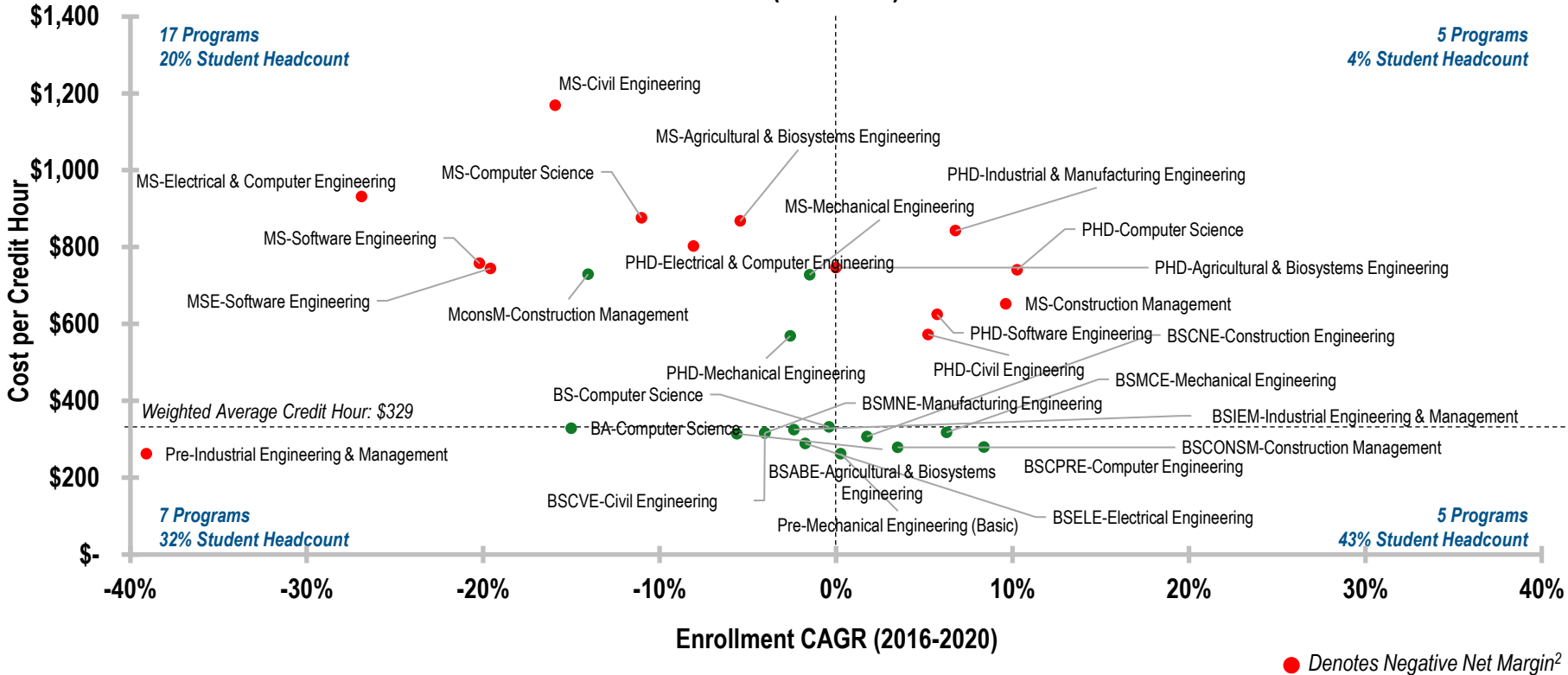
Despite hefty state appropriations totaling close to \$1.4M, the department of Computer Science remains at a deficit for operating margin, in part due to its higher costs to enrollments ratio.

College of Engineering

Program Portfolio

In AY19-20, just under 50% of students were enrolled in one of 10 programs that experienced growth during the review period; notably, less than half (17 of 37) programs had a positive net margin after tuition and appropriations.

Academic Portfolio – Program View¹
(AY 19-20)



1. Programs with five or fewer students in AY2020 (5, <1%) are not visualized on the graph and programs without enrolled students in AY2016 (3, <1% of HC) are excluded from both the graph and the summaries.
2. Full program-level data is available within the cost-to-educate model.

Engineering

Civil Engineering (BS) Program Overview

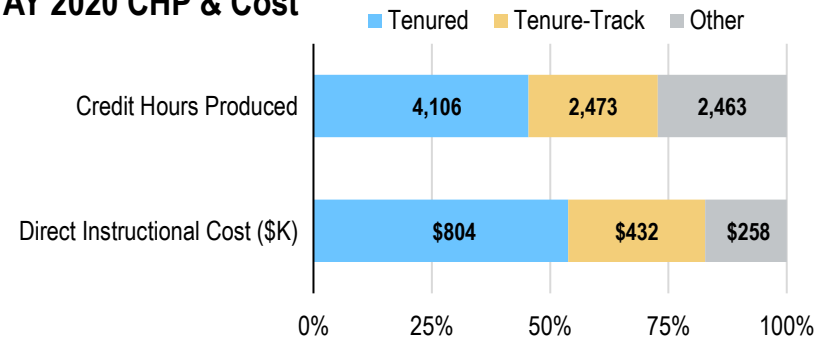
Based on the results of Huron’s market positioning study, informed by the Cost-to-Educate model, it is important to consider creative opportunities to grow enrollment in the Civil Engineering BS program.

Current State

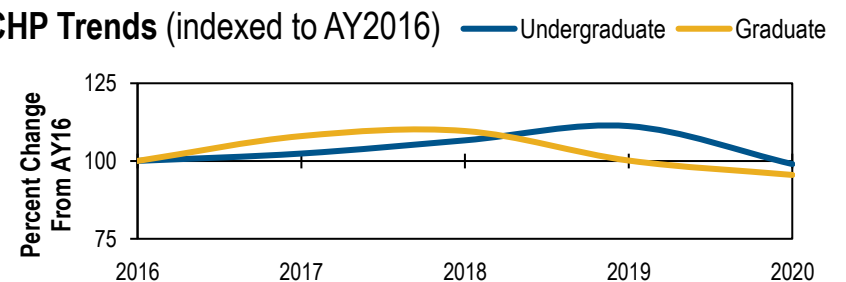
- The NDSU department of Civil and Environmental Engineering (CEE) offers **undergraduate and graduate programs in Civil Engineering**
- The CEE department (now including Construction)* **produces 18.1% of the College of Engineering’s credit hours**, primarily through full-time tenured and tenure-track faculty, at an average cost-per credit of \$405
- CEE* **credit hour production has declined recently at both the graduate and undergraduate levels**, which cost \$767 and \$369, respectively, per credit hour
- The Civil Engineering BS is **NDSU’s fifth largest Bachelor’s program**, accounting for **3.7% of all NDSU Bachelor’s completions in academic year 2019**

CEE Department Key Metrics

AY 2020 CHP & Cost



CHP Trends (indexed to AY2016)



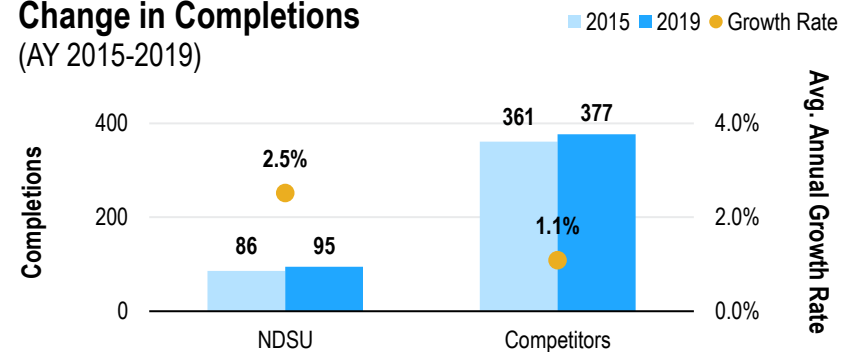
Engineering

Civil Engineering (BS) Competitive Analysis

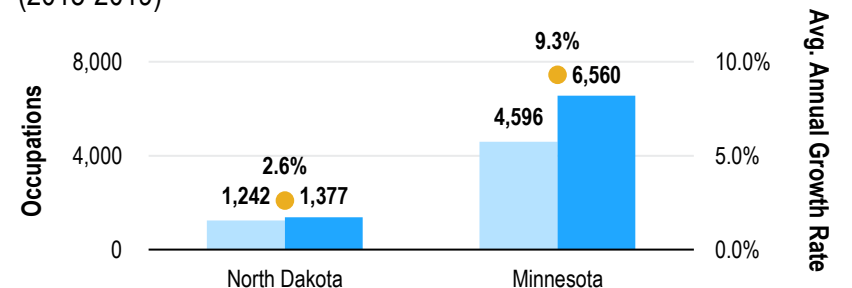
Focusing specifically on direct competitors¹, NDSU's Civil Engineering BS program had previously grown faster than its competitors on average, while the number of jobs for graduates of this program in North Dakota and Minnesota has also grown by 26.5%.

- Between 2015 and 2019, Civil Engineering BS program completions **grew at an average annual rate of 2.5% for NDSU and 1.1% for its competitors**, altogether accounting for **25 new program completions at the Bachelor's level**
- Relative to its direct competitors, NDSU's **Civil Engineering BS market share grew from 19.2% to 20.1%** during this period; but credit hour production suggests that NDSU completions will decline in future years.
- In the North Dakota and Minnesota labor markets, **2,099 new Civil Engineering jobs were added between 2015 and 2019, increasing the total number of jobs available by 26.5%**

Change in Completions
(AY 2015-2019)



Change in Occupations
(2015-2019)



Given the substantial growth in Civil Engineering occupations, in addition to NDSU's strong market share, the Civil Engineering BS program is a strong candidate for continued investment.

Notes: ¹Competitors include UM Twin Cities, ISU, UND, MSU Mankato, SDSU, UM Duluth, MSU Moorhead, and Concordia College at Moorhead
Sources: Emsi Program Table, Emsi Occupation Table

Engineering

Civil Engineering (BS) Growth Opportunity



The Civil Engineering BS was not immune to the broader enrollment declines at NDSU, as CEE's credit hour production fell by 10% in AY2020, but new program pathways and packages could spark additional interest and/or increase graduate enrollment.

Relevant Program Pathways and Packages to Explore:



- Accelerated Masters** – NDSU offers accelerated programs in engineering but does not currently have an option for undergraduates in Civil Engineering; since NDSU reports 100% placement for its Civil Engineering BS program, the University could explore an accelerated master program that allows for either part-time or remote completion of the graduate program; immediately after graduating or within 30 months of earning a BS degree.
- Stackable Certificates** – Huron has observed that institutions are using certificate programs to drive interest in their traditional degree programs. For example, NDSU could package either Civil Engineering or related curriculum (e.g., Robotics) as a certificate and allow degree-seeking students to apply the credits earned toward a graduate program in the future.

Relevant Case Studies:

- Accelerated Masters**

 AUBURN UNIVERSITY	<ul style="list-style-type: none"> <i>Civil Engineering Accelerated Bachelor's / Master's Program</i>
 ILLINOIS TECH	<ul style="list-style-type: none"> <i>Civil Engineering (B.S.) / Env. Engineering (M.ENG.)</i>

- Stackable Certificates**

 PennState College of Engineering	<ul style="list-style-type: none"> <i>Online Engineering Leadership and Innovation Management Certificate</i>
 Tufts University School of Engineering	<ul style="list-style-type: none"> <i>Certificate in Civil and Environmental Engineering</i>

Creating new program pathways through curricular repackaging can help NDSU provide additional value to enrolled students and potentially attract new students who are looking for specific pathways or credentials.

Engineering

Civil Engineering (BS) Next Steps

Before investing in the Civil Engineering BS program opportunities, internal stakeholders should consider the following questions to conduct due diligence, determine approach and timing, and develop an implementation plan.



How is NDSU's Graduate Program viewed by prospective students and regional employers?

Can NDSU leverage existing curriculum to create/offer new credentials and pathways?

What upfront investments would be needed to develop credentials and packaged pathways?

Relative to other opportunities, how does this one align with NDSU's strategic priorities?

What are the milestones related to developing new pathways? Who is responsible?

How do recent alumni rate their workforce readiness and/or interest in continuing their education?

Would regional employers be open to partnering to curate a relevant certificate?

How would these offerings potentially impact enrollment?

Where would the resources needed to develop pathways come from?

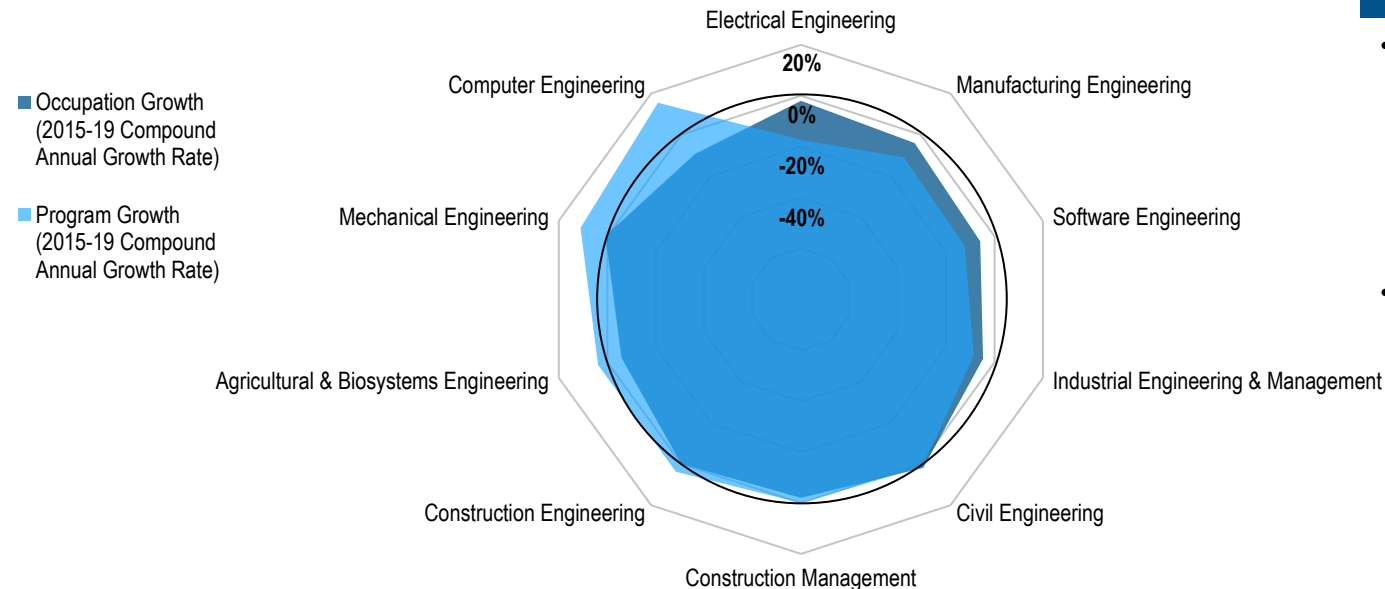
How will NDSU determine success and measure the return on its investment?

Engineering Program Alignment

The chart below portrays the growth rate of programs and their corresponding occupations, visualizing areas of alignment (programs completions are growing at the same rate as occupations) and gaps.

Change in Program Completions and Corresponding Occupations

(For occupations requiring a Bachelor's Degree or Higher in the Fargo MSA)



Observations

- **Alignment:** Between 2015 and 2019, **Civil Engineering** program completions grew at an average annual rate of 1% and the job market for graduates of this program grew by 2%
- **Gaps:** The overall number of jobs for Engineering graduates in the Fargo MSA has been declining

The volume of change in program completions and corresponding occupations must also be considered to fully evaluate whether NDSU programs are aligned with the region's workforce needs.

Note: Excludes programs with insufficient completion / occupation data
 Sources: Emsi Program Completions; Emsi Occupation Table for QCEW Employees, Non-QCEW Employees, and Self-Employed

COLLEGE OF HEALTH PROFESSIONS

NDSU Academic Program Prioritization Dean Meeting
April 6th, 2021

NORTH DAKOTA
STATE UNIVERSITY



Health Professions

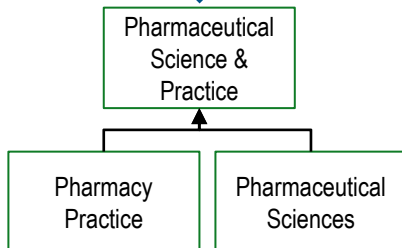
College Opportunities & Considerations

Based on the current state analysis of the College of Health Professions, the below considerations may present opportunities for cost savings and increased efficiency to open up capacity for growing programs within the College.

1

Explore
Taxonomy
Opportunities

Could related disciplines find departmental overlap and consolidate shared services?



2

Increase Faculty
Teaching

Could more faculty time be allocated towards teaching activity to increase output and reduce need for additional instructors?

Decreasing research and service by an average of just 5% each for full time faculty member would free up over \$173K for teaching output, equal to more than two additional faculty, based on average instructional pay.

3

Increase section
size and capacity

How can courses be delivered more efficiently while still maintaining instructional quality?

Health Professions spent \$993 per credit hour on graduate-level coursework which, on average, was under-enrolled by about 40%, based on capacity.

Increasing section enrollments would alleviate section proliferation and increase faculty credit hour production.

4

Reduce Tuition
Waivers for
Graduates

To increase margins in under-performing programs, Health Professions might consider reducing tuition waivers for graduate students.

The PhD in Pharmaceutical Sciences waived 99.6% of tuition accrued for enrolled students, leaving no substantial revenues to offset the costs incurred by the programs.

The College of Health Professions has maintained its growth on limited resources, but there may be some opportunities for maximizing efficiency of those resources by adjusting course delivery levers.

Health Professions

College Overview

In AY 2020, the College of Health Professions produced 32,463 credit hours from the effort of 102 instructors across 5 departments, averaging \$538 per credit hour produced.

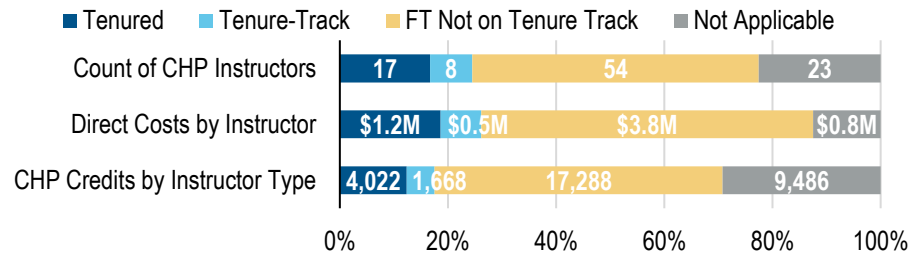
Current State

- Of the 446 course sections delivered, **96% were considered in load**. The median section size* was 16 and 74.6% of sections were delivered at the undergraduate level
- 70.7% of credit hour production (CHP) occurred at the undergraduate level**, 8.1% at the graduate level and 21.3% through 'professional' (500-level) coursework
- "Field Experience" (RS 496) had the most sections and generated 2,155 credit hours, **6.6% of college's total CHP**
- The Nursing department had the **highest CHP at 13,427** and Public Health had the lowest CHP at 1,051
- During AY 2019, the College of Health Professions granted **392 completions**, 73% at the undergraduate level. The Nursing BSN program accounted for 55% of total completions
- The **average department margin** is \$293K without state appropriations and \$2.5M with state support

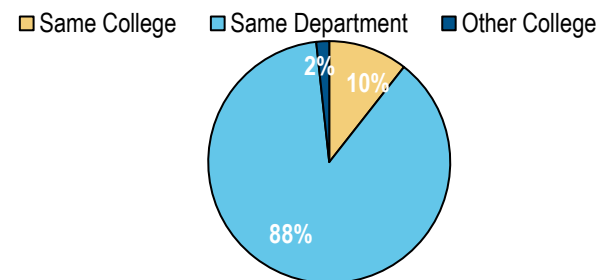
Coursework Summary

Criteria	2015-16	2016-17	2017-18	2018-19	2019-20	CAGR
No. of Sections	282	334	426	486	446	12.1%
Course Enrollment	7,862	9,045	10,334	11,200	10,778	8.2%
Credit Hrs. Prod.	26,280	29,236	32,806	33,049	32,463	5.4%

Course & Cost Summary



Course Enrollments by Student Primary Program



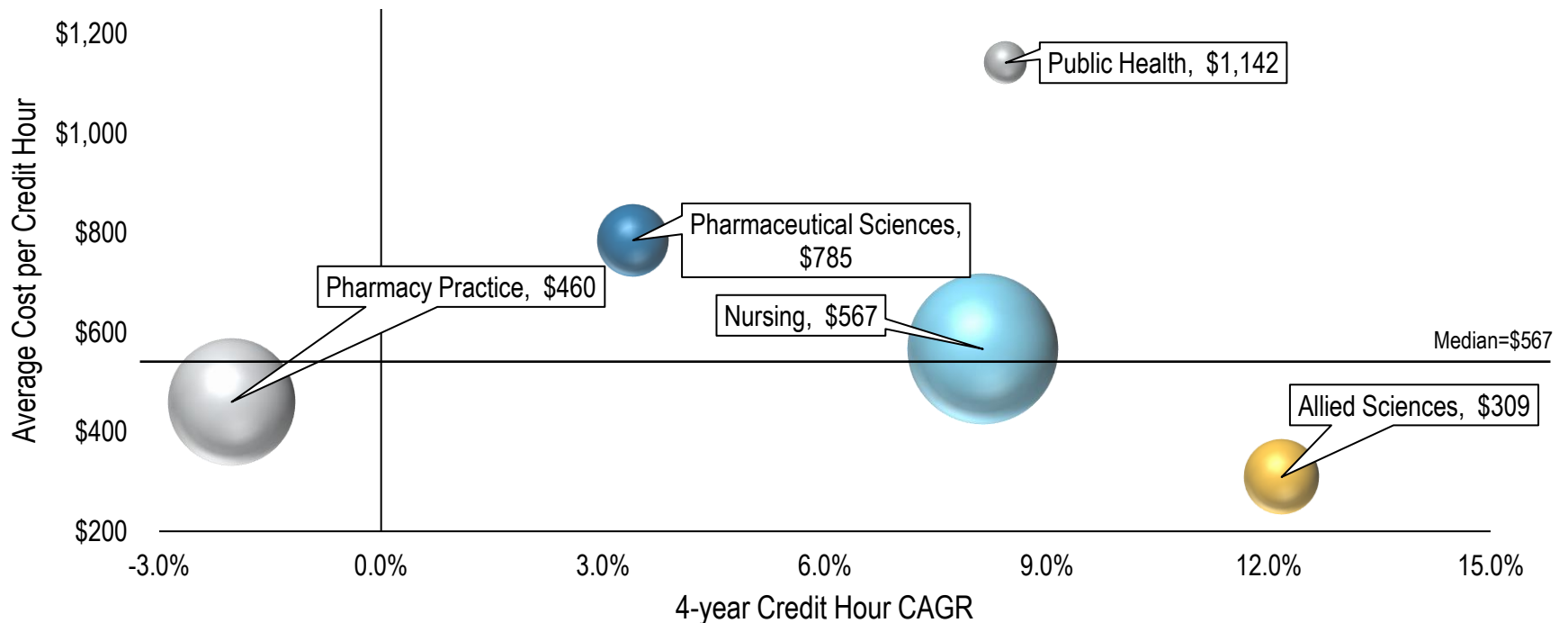
*Median section sizes include single-student entries, such as dissertations. Flagging these types of courses for removal would likely raise this figure.

Health Professions

Department Economics

Portfolios are commonly balanced with growth engines and “steady-staters”, high-cost and low-cost, and “at-scale” and “still below scale”. The objective of this lens is not only comparative, but also to observe the balance.

**CHP Volume, Growth & Cost
By Department: Health Professions**



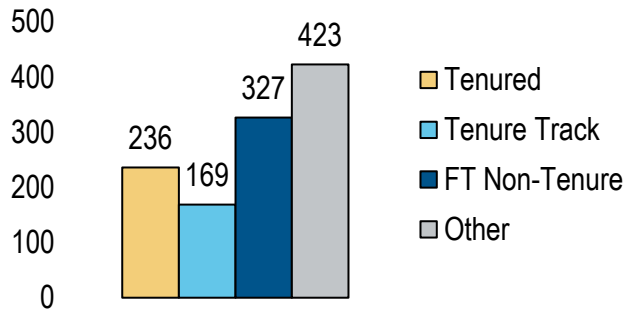
The weighted average cost per credit in the College of Health Professions is \$538 when considering credits produced for the 2019-2020 academic year.

Health Professions

College Opportunities

The College of Health Professions has experienced growth since 2015 that has outpaced the growth of much of the University, driven primarily by Allied Sciences, Nursing and Public Health course deliveries.

Average CHP per Faculty by Type



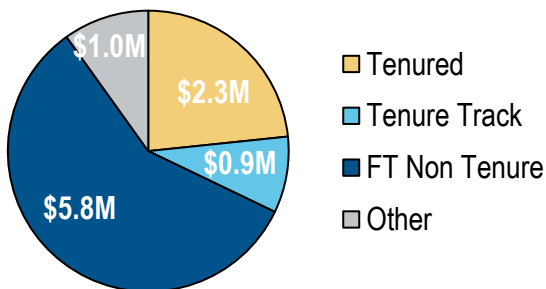
Teaching expectations averaged about 64% of all instructors' compensation



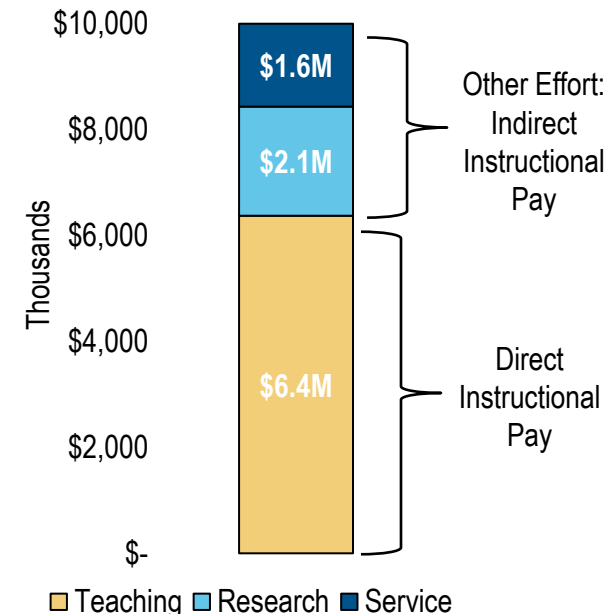
Instructional pay contributed \$192 of the \$538 per credit hour in the College of Health Professions



Instructional Pay by Type



Instructional Pay Breakdown By Scholarly Activity



The College of Health Professions leverages part-time/adjunct and FT non-tenure faculty to produce the majority of their credit hours, allowing flexibility for program and course delivery modifications.

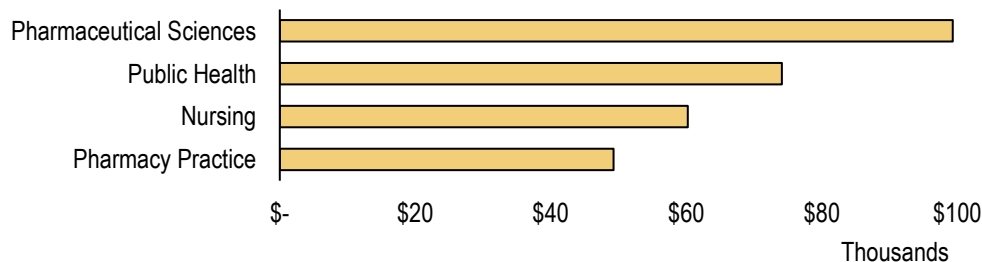
Health Professions

College Opportunities

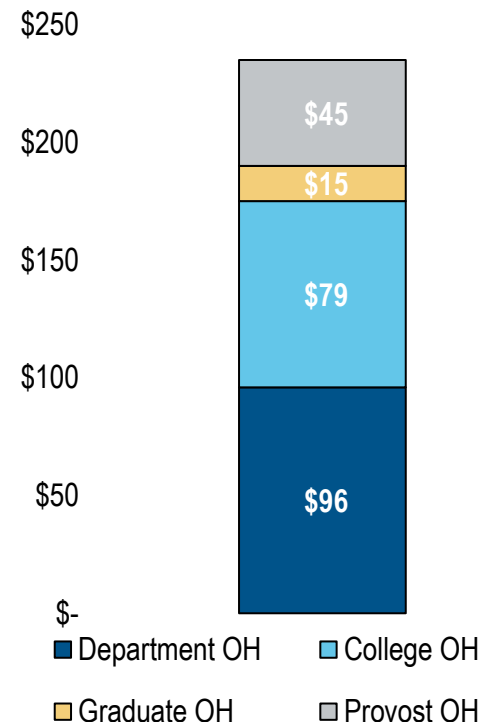
Unit-level overhead (department and college) within the College of Health Professions is primarily made up of non-instructional support salaries when considering unrestricted funds.

- The College of Health Professions has the highest academic overhead per credit hour produced in the University, with the second highest department contribution
- Non-instructional salaries make up 82.8% of total department & college overhead
- College and department overhead for Health Professions totals \$71.8k per full time faculty member assigned a course in AY19-20, which is just below the University median

Unit OH per FT Faculty*



Overhead Contributions to Cost per Credit Hour



While Allied Sciences does produce substantial program completions and credit hours, about 97% of credits are produced by just five courses and are supported by \$122 of unit overhead per credit.

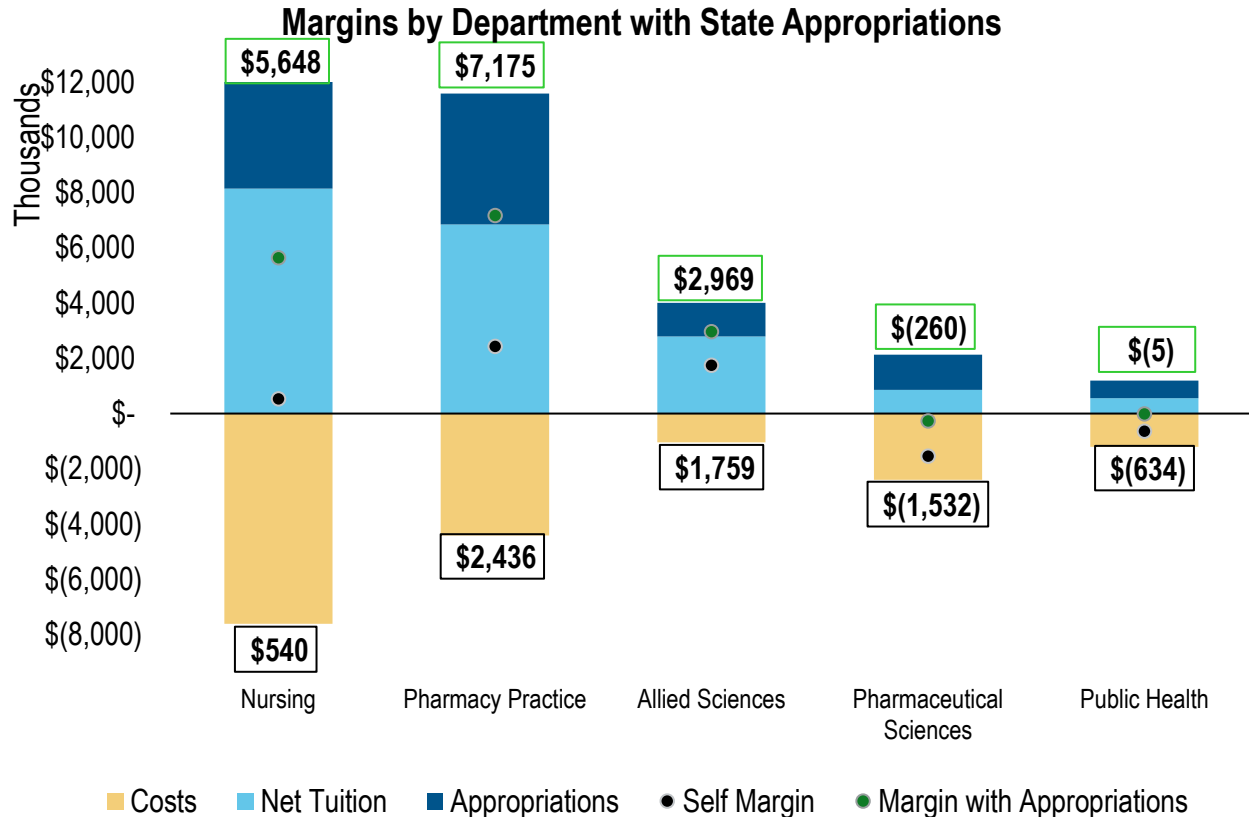
*Allied Sciences had no FT faculty members reporting to them, according to the FY20 payroll file and therefore does not have an outcome for this metric

Health Professions

Department Economics

In AY19-20 students enrolled in 180 unique course codes offered through the College of Health Professions. Approximately \$13.5M in state appropriations supported these departments but did not cover all costs to operate the unit.

- Without considering state appropriations, 3 of the 6 departments (inclusive of Dean's Suite) are operating at a deficit averaging at about (\$993k) per department
- When adding in the corresponding appropriations, these deficits are lessened, but not eliminated
- The highest amount of appropriations went to the Nursing department, totaling \$5.1M

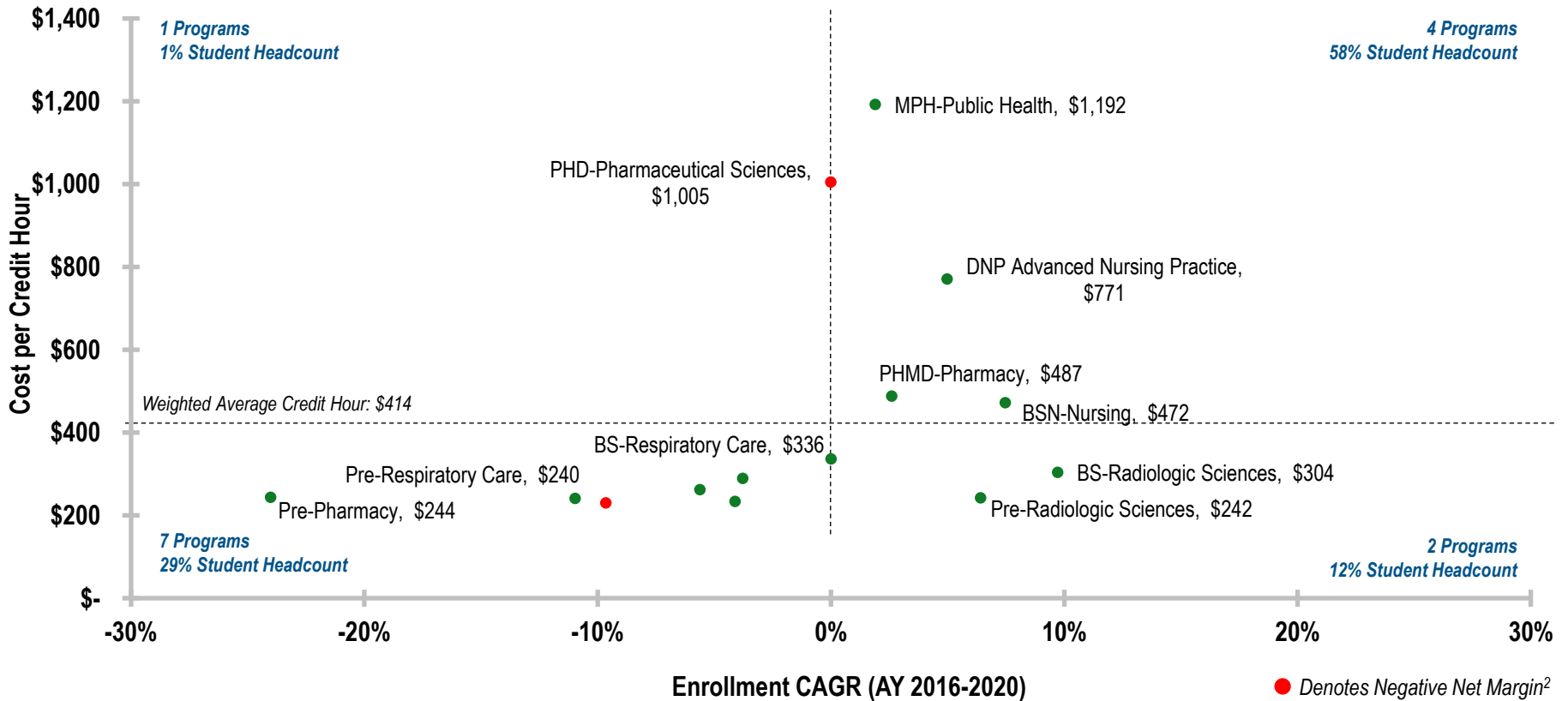


State appropriations alleviated most deficits, but Pharmaceutical Sciences and Public Health maintained a loss despite the state support, with costs up to 9x the amount of tuition revenue accrued.

Health Professions Program Portfolio

In AY19-20, nearly 70% of students were enrolled in one of six programs that experienced growth during the review period; notably, two programs (PhD Pharm. Sciences, BS Pharm. Sciences) had a negative net margin after tuition and appropriations.

Academic Portfolio – Program View¹
(AY 19-20)



1. Programs (1, <1% of HC) without enrolled students in AY2016 are excluded from both the graph and the summaries.
2. Full program-level data is available within the cost-to-educate model.

Health Professions

Nursing (BSN) Program Overview

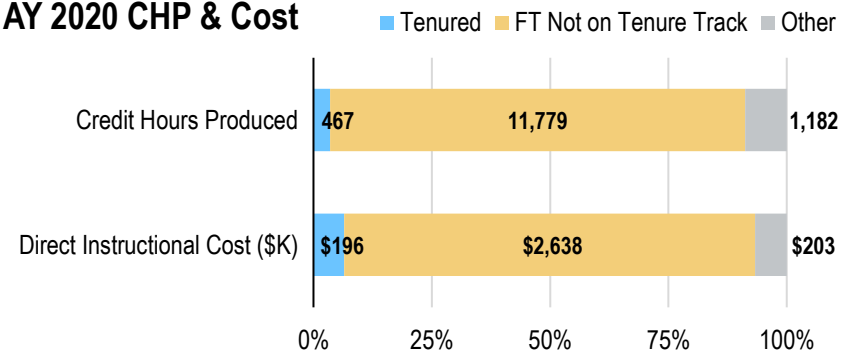
Based on the results of Huron’s market positioning study, informed by the Cost-to-Educate model, NDSU’s Nursing BSN program presents an opportunity to increase enrollment and efficiency by growing existing online program tracks.

Current State

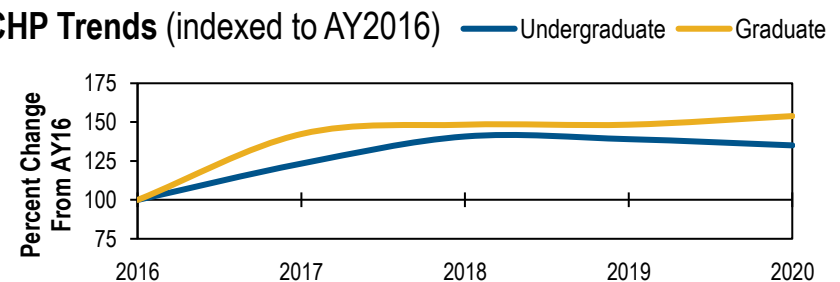
- The NDSU School of Nursing offers **nationally ranked programs at the undergraduate and graduate level**
- The Nursing department **produces 41% of the College of Health Profession’s credit hours**, primarily through full-time, non-TTL faculty, at an average cost-per credit of \$567
- The Nursing BSN is **NDSU’s largest program**, accounting for **8% of all NDSU Bachelor’s completions in academic year 2019**
- Nursing credit hour production has grown at both the graduate and undergraduate levels, which cost \$692 and \$507, respectively, per each credit hour produced

Nursing Department Key Metrics

AY 2020 CHP & Cost



CHP Trends (indexed to AY2016)



NDSU’s Nursing department produces a substantial number of credit hours and programs, but also has the highest total cost of instruction, largely due to the discipline.

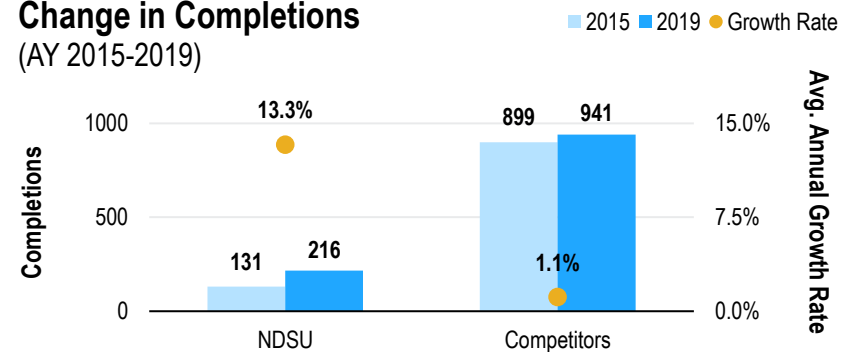
Health Professions

Nursing (BSN) Competitive Analysis

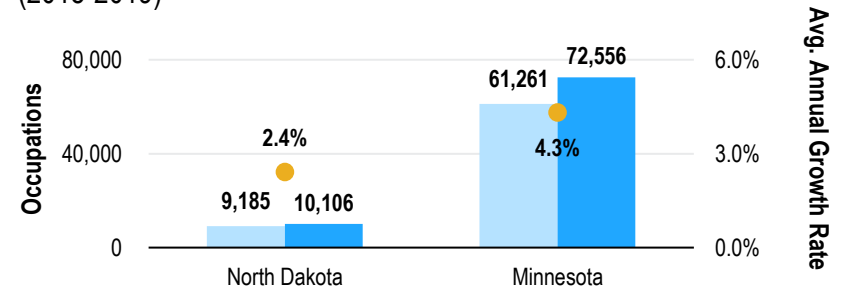
Focusing specifically on direct competitors¹, NDSU's Nursing BSN program has grown much faster than its competitors on average, and 12,217 new jobs have been added for graduates of this program in North Dakota and Minnesota.

- Between 2015 and 2019, Nursing BSN program completions **grew at an average annual rate of 13.3% for NDSU** and **1.1% for its competitors**, altogether accounting for **127 new program completions at the Bachelor's level**
- Relative to its direct competitors, NDSU's **Nursing BSN market share grew from 12.7% to 18.7%** during this period
- In the North Dakota and Minnesota labor markets, **12,217 new Registered Nursing jobs were added** between 2015 and 2019, **increasing the total number of jobs available by 14.8%**

Change in Completions
(AY 2015-2019)



Change in Occupations
(2015-2019)



Given the overall growth in program completions and corresponding occupations, in addition to NDSU's increasing market share, the Nursing BSN program is a strong candidate for continued growth.

Notes: ¹Competitors include UM Twin Cities, ISU, UND, MSU Mankato, SDSU, UM Duluth, MSU Moorhead, and Concordia College at Moorhead
Source: Emsi Program Table, Emsi Occupation Table

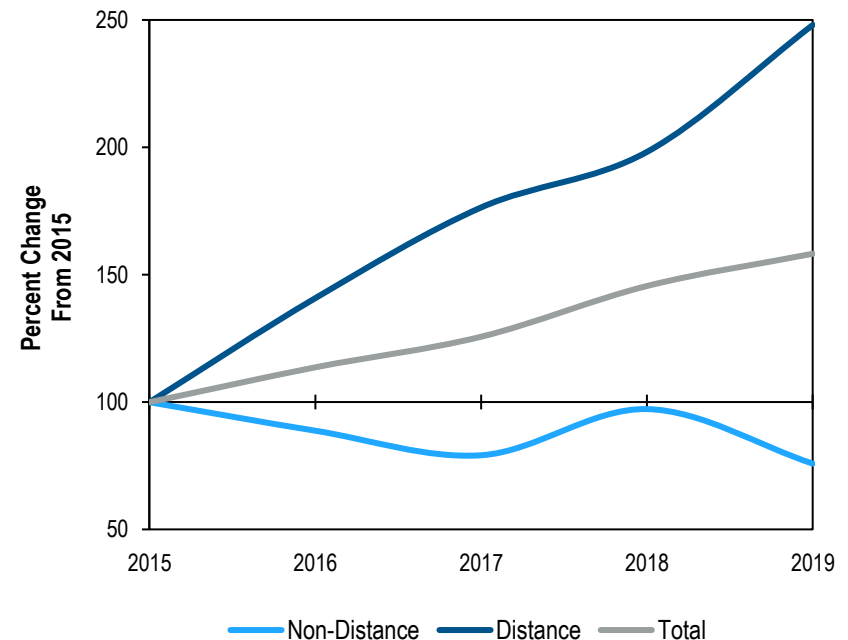
Health Professions

Nursing (BSN) Growth Opportunity

Nursing BSN programs are increasingly delivered online, presenting an opportunity for NDSU to grow enrollment in its online LPN and RN to BSN program tracks, which require less resources than the pre-licensure BSN program.

- The **greatest limitation to growing the Nursing program is resources**, in terms of the cost to educate and the availability of clinical instructors necessary for the pre-licensure BSN and LPN to BSN program tracks
- Throughout North Dakota and Minnesota, **distance completions for Nursing BSN programs grew by 148% between AY 2015 and 2019**, presenting an opportunity to grow program enrollments at a lower cost by leveraging the blended LPN to BSN track, and fully online RN to BSN track, which require less clinical involvement
- The **Nursing Department operates more efficiently than the institutional average**, with approximately 19% unused section capacity (versus the NDSU average of 37%) and under \$25,000 in reassignment costs due to faculty load deficits (out of \$1.8M across NDSU), which suggests **little capacity for growth in its current state**

Change in Nursing BSN Completions
(North Dakota and Minnesota, indexed to 2015)



NDSU's Nursing BSN will need additional resources to grow its enrollment and leveraging the online LPN and RN to BSN tracks can maximize the return on this investment.

Health Professions

Nursing (BSN) Next Steps

Before investing additional resources in the Nursing BSN, internal stakeholders should be involved in the steps below, building on this foundation to determine how the program aligns with NDSU's strategic plan and drafting a plan for implementation.



How is NDSU's Nursing Program viewed by prospective students and regional employers?

How would NDSU increase the capacity of its online Nursing BSN tracks while maintaining quality?

What upfront investments would be needed to increase the capacity of online Nursing BSN tracks?

Relative to other opportunities, how does this one align with NDSU's strategic priorities?

What are the milestones related to growing the online Nursing BSN tracks? Who is responsible?

What are NDSU's online Nursing BSN competitors doing well?

How could NDSU market its online Nursing BSN tracks more broadly?

What recurring costs and revenue would the Nursing Department incur from this expansion?

Where would the resources needed to grow NDSU's Nursing BSN program come from?

How will NDSU determine success and measure the return on its investment?

Huron recommends approaching online Nursing BSN tracks in terms of a dual transformation by improving efficiencies today to prepare for longer-term online expansion.

Health Professions

Radiologic Sciences (BS) Program Overview

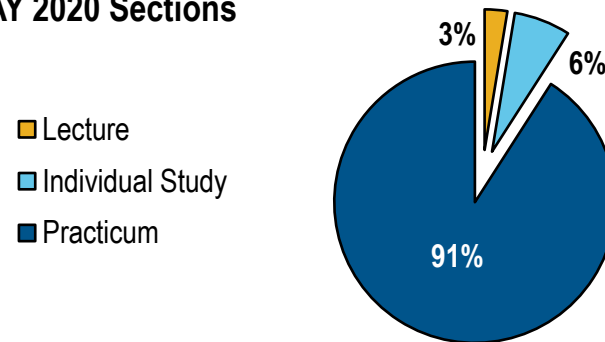
Based on the results of Huron’s market positioning study, informed by the Cost-to-Educate model, the Radiologic Sciences BS is an area of competitive advantage for NDSU.

Current State

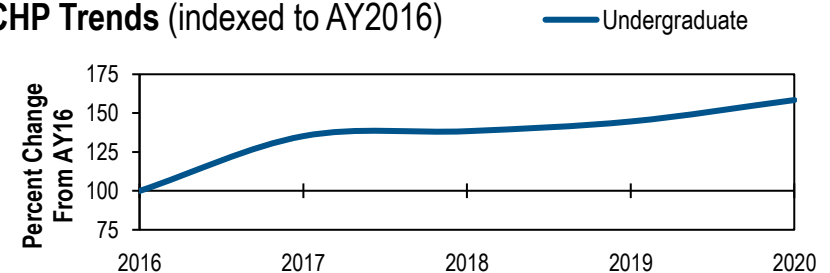
- The NDSU Allied Sciences department offers **three programs**, all at the undergraduate level
- Given the nature of these programs, a substantial amount of instruction occurs in the field during an **internship with one of NDSU’s affiliated hospitals**
- The **Radiologic Sciences BS accounts for 69% of the degrees conferred by the Allied Sciences department**, with 46 degrees conferred during the 2019 academic year
- The Allied Sciences department’s **credit hour production grew faster than all but one of NDSU’s departments at the undergraduate level**

Allied Sciences Department Key Metrics

AY 2020 Sections



CHP Trends (indexed to AY2016)



NDSU’s Allied Sciences department is highly unique, delivering a largely experiential curriculum that continues to grow in popularity.

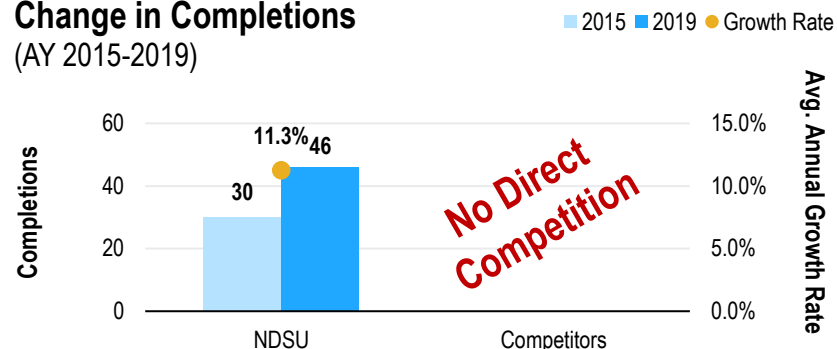
Health Professions

Radiologic Sciences (BS) Competitive Analysis

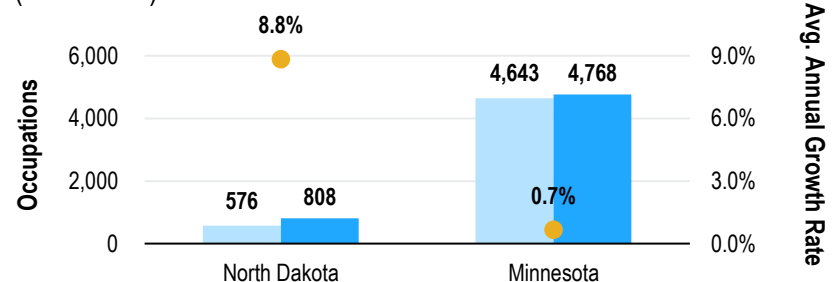
Focusing specifically on direct competitors¹, NDSU is the only institution that offers the Radiologic Sciences BS program and 357 new jobs have been added for graduates of this program in North Dakota and Minnesota.

- Between 2015 and 2019, Radiologic Sciences BS program completions **grew at an average annual rate of 11.3% for NDSU**, which is the only institution in its competitive landscape that offers this degree
- There are **additional competitors throughout North Dakota and Minnesota that offer this program at the Associate's Degree level**
- In the North Dakota and Minnesota labor markets, **357 new Radiologic Technologist and Technician positions were added** between 2015 and 2019, but a **Bachelor's Degree is not required for many of these roles**
- Most of this growth occurred in North Dakota**, aligning this program with NDSU's land-grant mission

Change in Completions
(AY 2015-2019)



Change in Occupations
(2015-2019)



NDSU may face increasing competition for prospective Radiologic Sciences students, given the degree level offered by NDSU and required for jobs connected to this program.

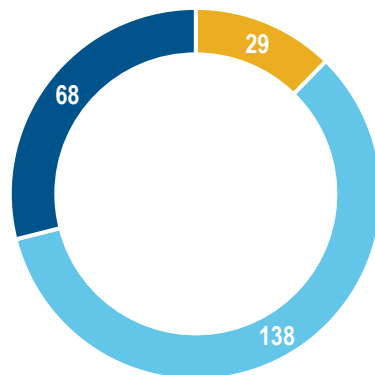
Notes: ¹Competitors include UM Twin Cities, ISU, UND, MSU Mankato, SDSU, UM Duluth, MSU Moorhead, and Concordia College at Moorhead
Source: Emsi Program Table, Emsi Occupation Table

Health Professions

Radiologic Sciences (BS) Growth Opportunity

Given NDSU's success with the Radiologic Sciences BS, it may be worth considering an Associate's Degree in this program, which is already offered by a handful of less prestigious schools throughout North Dakota and Minnesota.

- Throughout North Dakota and Minnesota, **Bachelor's Degrees in this program account for just over a quarter of all 2019 completions:**



- Award of at least 1 but less than 2 academic years
- Associate's Degree
- Bachelor's Degree

- Only **one other school in the NDUS**, Minot State University, offers this program (at the same level as NDSU), and **none of the institutions offering this program produced completions at more than one level**

Institution ¹	UG Cert	Associate's	Bachelor's
NDSU			45
Century College		43	
Mayo Clinic College of Medicine and Science	29		
Lake Superior College		18	
University of Mary			16
MN State Community and Technical College		14	
Rasmussen College-MN		14	
Riverland Community College		13	
Northland Community and Technical College		13	
MN West Community and Technical College		13	
MN State College Southeast		10	
Minot State University			5

NDSU's Radiologic Sciences BS has been very successful and occupational growth throughout the region suggests that there is additional capacity for expansion, potentially through offering this program as an Associate's Degree.

Note: ¹Table excludes St. Mary's University of MN, which produced 2 2019 completions at the Bachelor's level
Source: Emsi Program Development Report

Health Professions

Radiologic Sciences (BS) Next Steps

Before investing additional resources in Radiologic Sciences, additional stakeholders should be involved in the steps below to determine how the program aligns with NDSU's strategic plan and what implementing these changes could look like.



Is there capacity for additional Radiologic Sciences students at NDSU's affiliated hospitals?

What would an Associate's level Radiologic Sciences curriculum include and require?

What upfront investments would be needed to launch a Radiologic Sciences Associate's Degree?

Relative to other opportunities, how does this one align with NDSU's strategic priorities?

What are the milestones related to launching a Radiologic Sciences Associate's Degree?

What factors do students consider when deciding which Radiologic Sciences degree to pursue?

How many additional faculty and staff would be needed for various Associate's Degree enrollment scenarios?

What recurring costs and revenue would the Allied Sciences Department incur from this program?

Where would the resources needed to launch a new Radiologic Sciences degree come from?

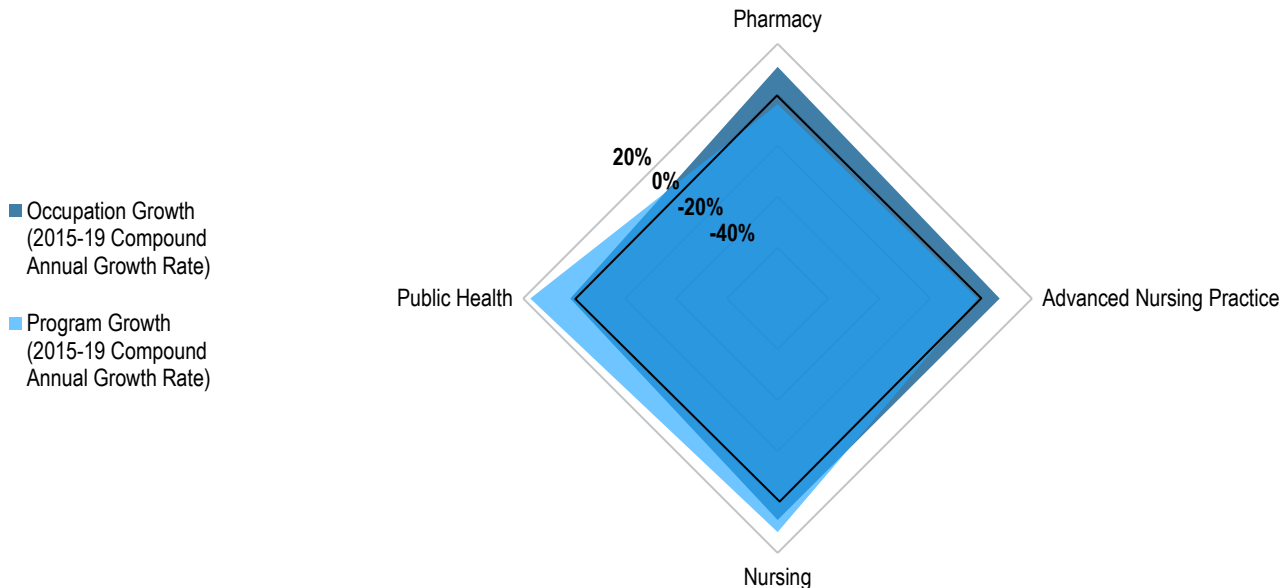
How will NDSU determine success and measure the return on its investment?

Viewed through the dual transformation framework, there may be opportunities to optimize Radiologic Sciences program marketing today, while also evaluating the potential for program expansion in the future.

Health Professions Program Alignment

The chart below portrays the growth rate of programs and their corresponding occupations, visualizing areas of alignment (programs completions are growing at the same rate as occupations) and gaps.

Change in Program Completions and Corresponding Occupations (For occupations requiring a Bachelor's Degree or Higher in the Fargo MSA)



Observations

- Most CHP graduates stay in North Dakota
- In the Fargo MSA, as in most of the country, **demand for graduates of all CHP programs has increased**
- Gaps: There is substantial room for program growth

The volume of change in program completions and corresponding occupations must also be considered to fully evaluate whether NDSU programs are aligned with the region's workforce needs.

Note: Excludes programs with insufficient completion / occupation data
Sources: Emsi Program Completions; Emsi Occupation Table for QCEW Employees, Non-QCEW Employees, and Self-Employed

COLLEGE OF HUMAN SCIENCES & EDUCATION

NDSU Academic Program Prioritization Dean Meeting
April 6th, 2021

NORTH DAKOTA
STATE UNIVERSITY

Human Sciences & Education

College Opportunities & Considerations

Based on the current state analysis of the College of Human Sciences & Education, the below considerations may present opportunities for cost savings and increased efficiency particularly for departments with declining credit hour production.

1

Explore
Taxonomy
Opportunities

Could related disciplines find enough overlap to consolidate shared services? Departments with declining growth rates may benefit from reduced costs

The Dean's Suite in CHSE adds over \$887K in shared costs (or \$25 per credit hour produced) to the College's operations, primarily driven by non-instructional salaries

Reimagining the academic infrastructure may help to offset some of those additional costs and further encourage the interdisciplinary collaboration within the University

2

Increase Faculty
Teaching

Could more faculty time be allocated towards teaching activity to increase output and reduce need for additional instructors?

Decreasing research and service by an average of just 5% each for full time faculty members would free up over \$130K for teaching output, equal to more than two additional faculty, based on average instructional pay

3

Increase section
size and capacity

How can courses be delivered more efficiently while still maintaining instructional quality?

CHSE spent \$627 per credit hour on graduate-level coursework which, on average, was under-enrolled by about 52%, based on capacity.

Increasing section enrollments would alleviate section proliferation and increase capacity of faculty

Human Sciences & Education may have an opportunity to realize program cost reductions by capitalizing on cross-college relationships and combining shared services while further aligning with the Land Grant mission.

Human Sciences & Education

College Overview

In AY 2020, the College of Human Science & Education produced 35,486 credit hours from the effort of 112 instructors across 4 departments (plus the Dean's suite), averaging \$366 per credit hour produced.

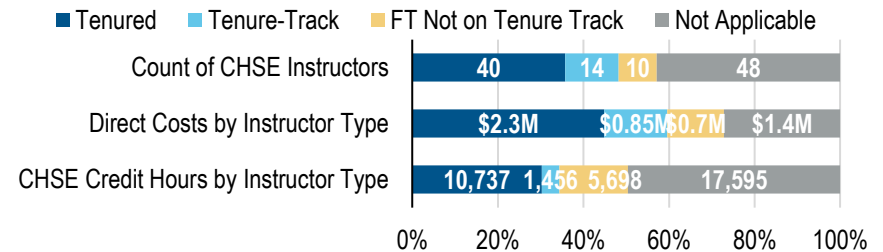
Current State

- Of the 892 course sections delivered, **74% were considered in load**. The median section size* was 6 and 43.9% of sections were delivered at the undergraduate level
- 80.6% of credit hour production (CHP)** occurred at the undergraduate level and 19.4% at the graduate level
- “Individual Study/Tutorial” (HDFS 893) had the most sections and **generated 66 credit hours**, 0.2% of college’s total CHP
- Health, Nutrition & Exercise Sciences department had the **highest CHP at 14,516** and Apparel, Design & Hospitality Management had the lowest CHP at 4,191
- During AY 2019, the College of Human Science & Education granted **539 completions**, 71.2% at the undergraduate level. The Bachelors in HDFS accounted for 30.2% of total completions
- The **average department margin (\$64k)** without appropriations and \$1.6M with state support

Coursework Summary

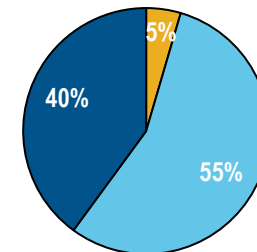
Criteria	2015-16	2016-17	2017-18	2018-19	2019-20	CAGR
No. of Sections	836	998	935	843	892	1.6%
Course Enrollment	15,241	16,731	15,595	14,579	13,645	-2.7%
Credit Hrs. Prod.	37,190	41,696	40,100	37,759	35,486	-1.2%

Course & Cost Summary



Course Enrollments by Student Primary Program

Same College Same Department Other College



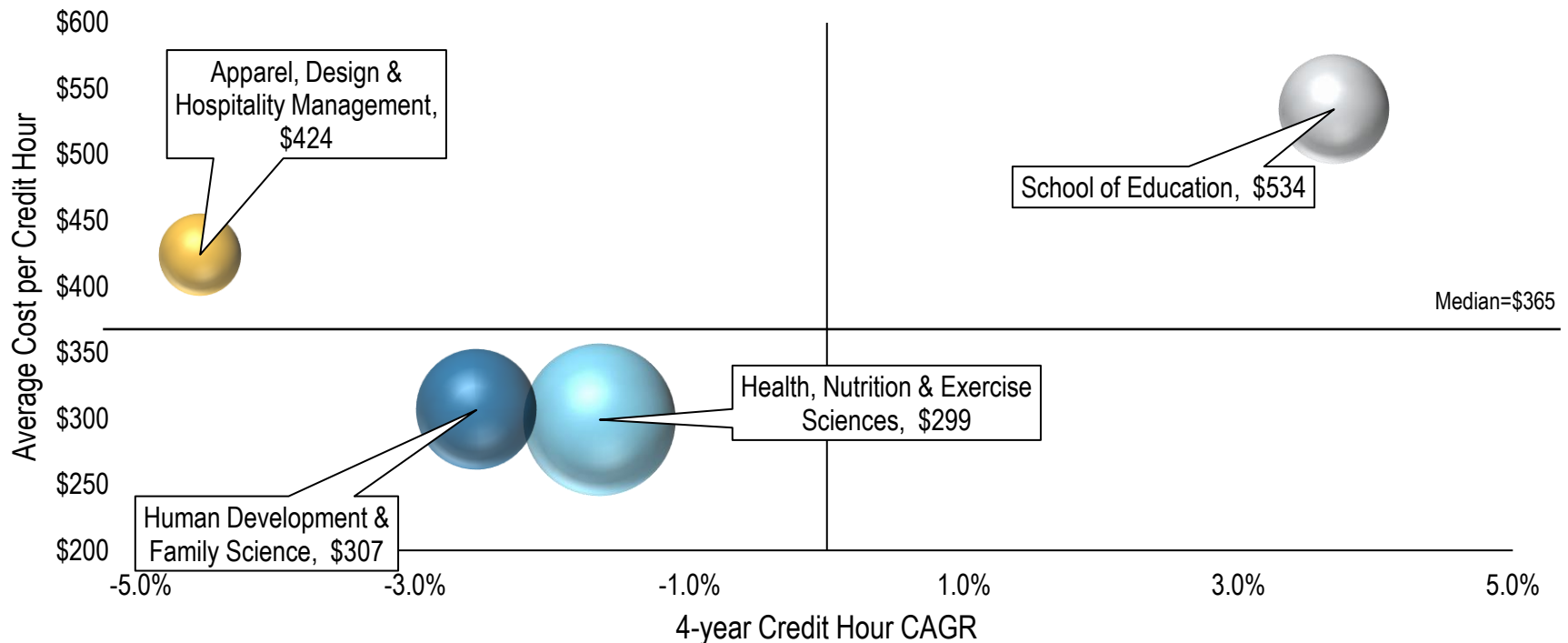
*Median section sizes include single-student entries, such as dissertations. Flagging these types of courses for removal would likely raise this figure.

Human Sciences & Education

Department Economics

Portfolios are commonly balanced with growth engines and “steady-staters”, high-cost and low-cost, and “at-scale” and “still below scale”. The objective of this lens is not only comparative, but also to observe the balance.

CHP Volume, Growth & Cost
By Department: Human Sciences & Education

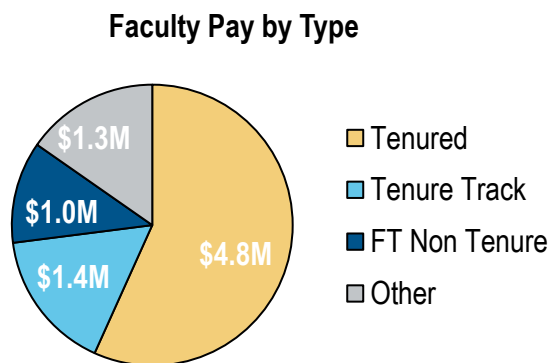
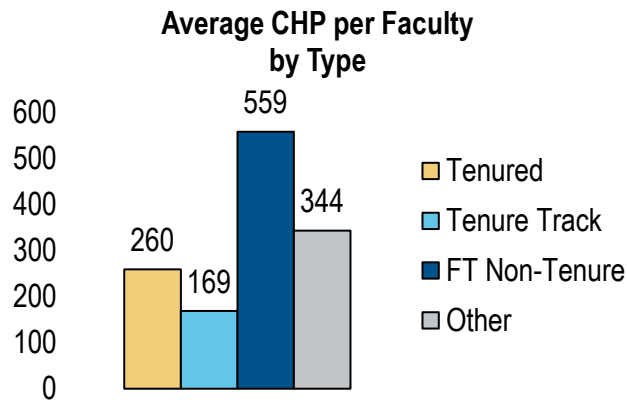


The weighted average cost per credit in the College of Human Sciences & Education is \$366 when considering credits produced for the 2019-2020 academic year.

Human Sciences & Education

College Opportunities

Due to the lower average credit hour production of tenured faculty, coupled with their higher compensation, the current cost per credit hour of tenured faculty is more than 54% higher than that of full time, non-tenured faculty.



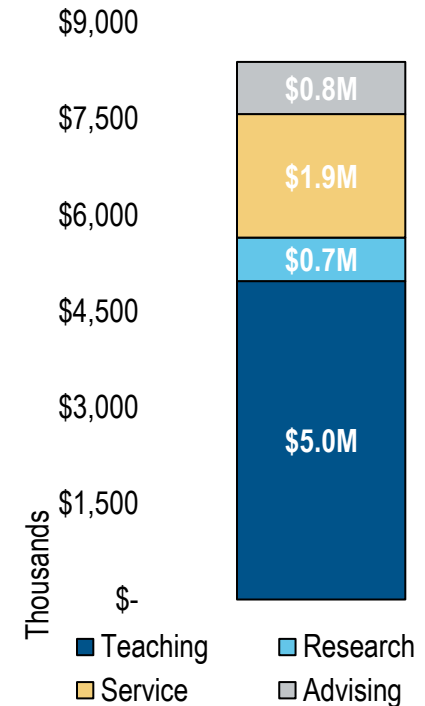
Teaching activities averaged about 59% of all faculty's compensation



Faculty pay contributed \$146 of the \$366 per credit hour in the College of Human Sciences & Education



Faculty Pay Breakdown By Scholarly Activity



FT Non-Tenure faculty produced close to 5,600 credits as compared to Tenured faculty who produced 10,400 credits. This means that Tenured averaged \$185 per CHP whereas FT Non-Tenure averaged \$120 per CHP.

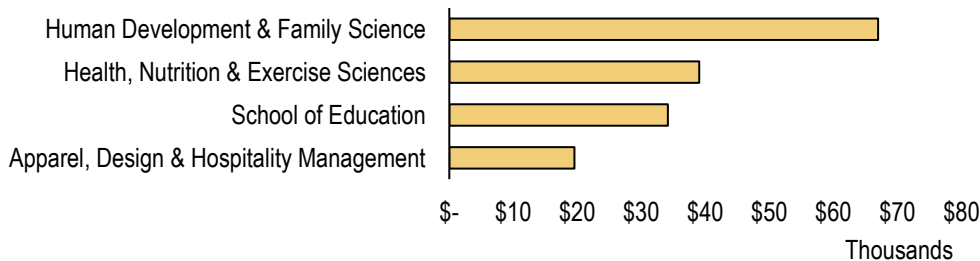
Human Sciences & Education

College Opportunities

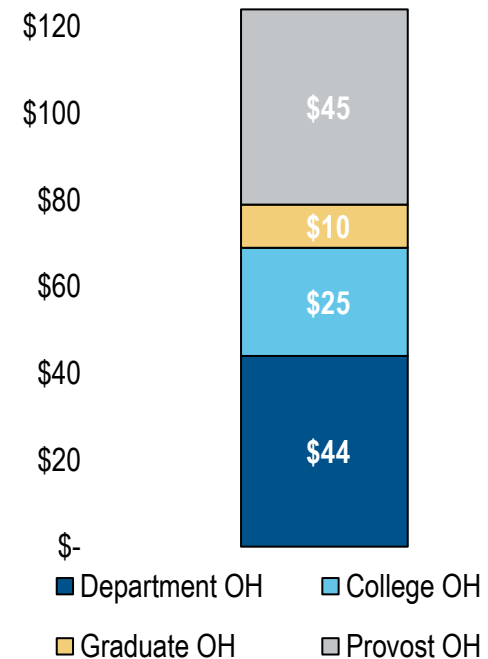
Overhead and infrastructure within the College of Human Science & Education appears to have few immediate opportunities for transformation, given the level of efficiency within most departments.

- The College of Human Science & Education falls below the institutional median academic overhead per credit hour produced across colleges
- Non-instructional salaries make up about 69% of total department & college overhead
- School of Education has nearly twice as much department overhead as the next highest department (47% of all department OH), but only makes up 21.4% of the College's credit hours

Unit OH per FT Faculty



Overhead Contributions to Cost per Credit Hour



The School of Education may be able to rethink its departmental overhead and the amount of support needed to produce its current level of credit hours in a sustainable manner and align more closely with its peer departments.

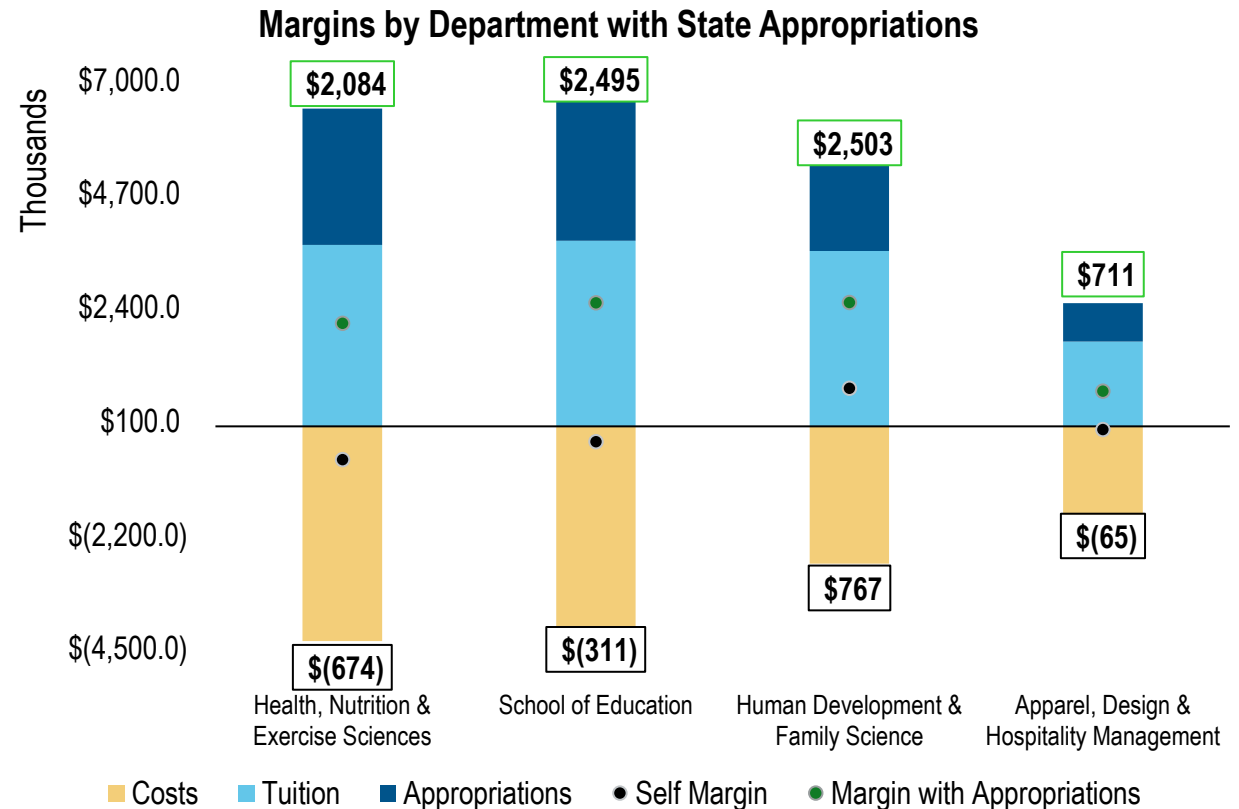
*Currently the Office of Teaching and Learning is distributed across colleges as a shared service. If applied to Human Sciences & Education, it would contribute an additional \$28 per credit hour.

Human Sciences & Education

College Opportunities

In AY19-20 students enrolled in 413 unique course codes offered through Human Science & Education. Approximately \$8.1M in state appropriations supported these courses and alleviated departmental deficits.

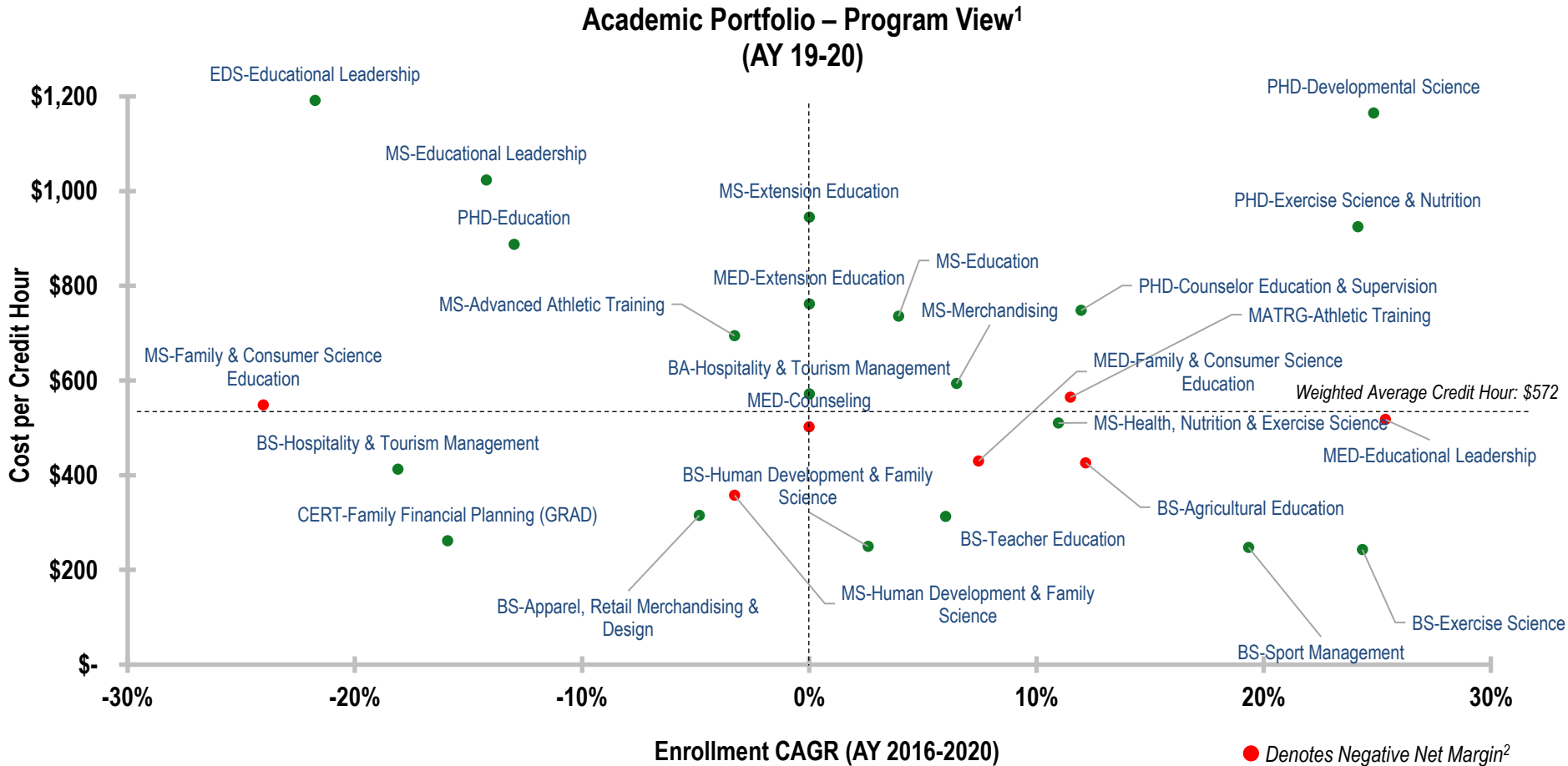
- Without considering state appropriations, 3 of the 4 departments are operating at a deficit averaging at about (\$350k) per department
- When adding in the corresponding appropriations, all of these departments are brought into surplus and the College's overall margin comes to about \$7.8M
- The highest amount of appropriations went to the School of Education, totaling \$2.8M



State appropriations help to alleviate the deficits across all departments of Human Sciences & Education, allowing the college's departments to offset their highest costs.

Human Sciences & Education Program Portfolio

In AY19-20, the majority of programs offered through the College of Human Sciences & Education operated at a positive net margin, despite higher costs and some enrollment declines.



1. Programs with five or fewer students in AY2020 (21, 2%) are not visualized on the graph and programs without enrolled students in AY2016 (1, <1% of HC) are excluded from both the graph and the summaries.
 2. Full program-level data is available within the cost-to-educate model.

Human Sciences & Education

Human Development and Family Science Program Overview

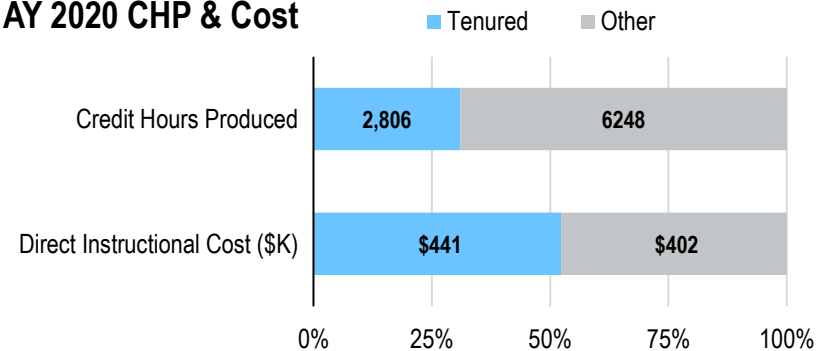
Based on the results of Huron’s market positioning study, informed by the Cost-to-Educate model, NDSU’s Human Development and Family Science program is an area of competitive advantage.

Current State

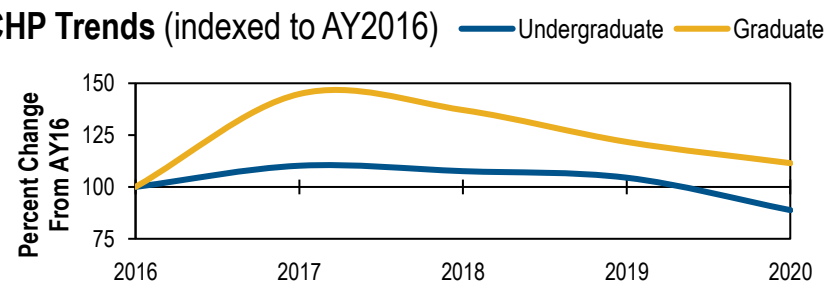
- The Human Development and Family Science department at NDSU **offers an award-winning undergraduate program and multiple graduate degrees and certificates**
- During AY 2020, the HDFS department **produced 26% of HSE’s credit hours** through a mix of tenured faculty and other instructors¹ at an **average cost-per credit of \$307**
- The Human Development and Family Science BA/BS is **NDSU’s third largest program**, accounting for 30% of HSE’s completions and **6.3% of all NDSU Bachelor’s completions in academic year 2019**

HDFS Department Key Metrics

AY 2020 CHP & Cost



CHP Trends (indexed to AY2016)



NDSU’s HDFS program was steadily growing until recently, when credit hour production began falling at the graduate and undergraduate levels.

Note: ¹Includes all instructors assigned to a class that are not full-time faculty
Source: Cost-to-Educate Model

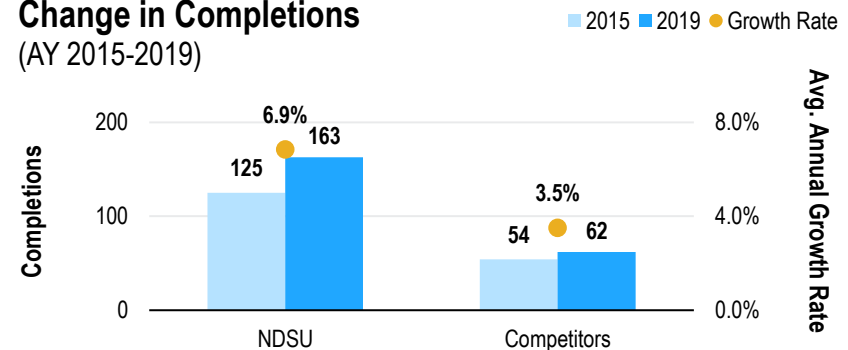
Human Sciences & Education

Human Development and Family Science Competitive Analysis

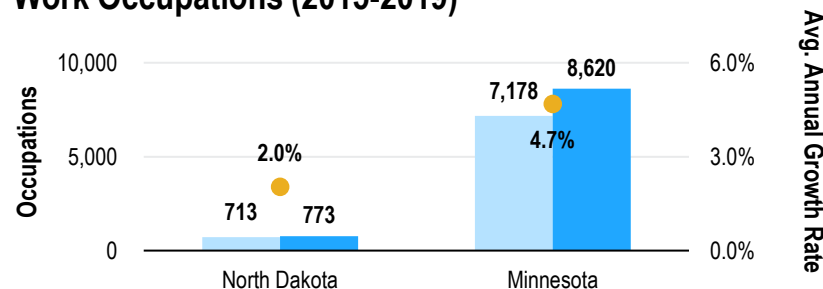
Focusing specifically on direct competitors¹, NDSU's Human Development and Family Science Bachelor's program has grown faster than its competitors on average, capturing more than two thirds of the market for this program.

- Between 2015 and 2019, HDFS program completions grew at an average annual rate of 6.9% for NDSU and 3.5% for its competitors, altogether accounting for 46 new Bachelor's program completions
- Relative to its direct competitors, NDSU's HDFS Bachelor's Degree market share grew from 69.8% to 72.4% during this period

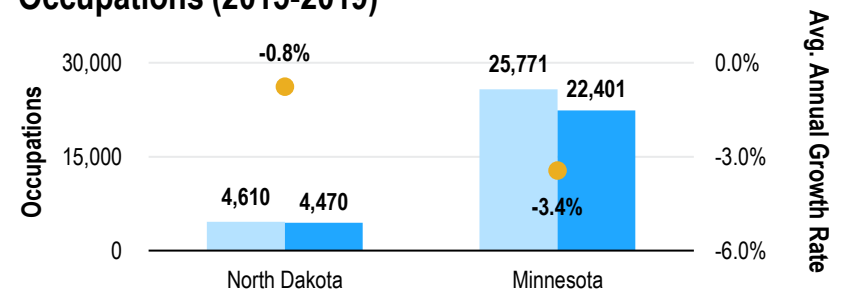
Change in Completions
(AY 2015-2019)



Change in Child, Family, & School Social Work Occupations (2015-2019)



Change in Elementary Education Occupations (2015-2019)



NDSU has a very strong brand in the HDFS area, so there may be opportunities to creatively realign this program with what students want and the labor market needs.

Notes: ¹Competitors include UM Twin Cities, ISU, UND, MSU Mankato, SDSU, UM Duluth, MSU Moorhead, and Concordia College at Moorhead
Source: Emsi Program Table, Emsi Occupation Table

Human Sciences & Education

Human Development and Family Science Growth Opportunity



Given NDSU's success growing the HDFS Bachelor's program through five-degree options, including two dual-degree partnerships, there may be additional opportunities to leverage existing infrastructure and offer additional in-demand options.

Opportunities to Explore:

- **Family Financial Planning Option** – NDSU already offers a graduate certificate and Master's Degree in Family Financial Planning, which is only offered by two other institutions in North Dakota and Minnesota. UM Duluth's produced its first completions in 2016 and has since more than tripled its program size. Although NDSU already offers Family Financial Planning as an accelerated Master's program, there may be additional opportunities to offer this option at the UG level.
- **Online Certificates and Degree** – Credentials such as certificates make students more appealing to prospective employers and build interest in additional programming. When offered online, they make programs more widely accessible to adult learners, rural students, and students who are simply unable to attend classes in person. Online offerings are a great way to leverage an existing program's brand and faculty to create a recurring, low-cost source of revenue.

Relevant Case Studies:


- **Financial Planning Bachelor's**

	<ul style="list-style-type: none"> ▪ <i>Financial Planning B.B.A.</i> <ul style="list-style-type: none"> ▪ 93% placement rate
	<ul style="list-style-type: none"> ▪ <i>Online Financial Planning Bach.</i> <ul style="list-style-type: none"> ▪ 99% placement rate

- **Undergraduate Certificates**

	<ul style="list-style-type: none"> ▪ <i>Online Special Education and Autism Spectrum Disorder Certificates</i>
-------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------

- **Fully Online Degrees**

	<ul style="list-style-type: none"> ▪ <i>Bachelor's in Human Development and Family Science</i>
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NDSU's HDFS degree is highly interdisciplinary, lending itself well to a diversity of partnerships and non-traditional program offerings.

Human Sciences & Education

Human Development and Family Science Next Steps

Before investing additional resources in HDFS, additional stakeholders should be involved in the steps below to determine how the program aligns with NDSU's strategic plan and what implementing these changes could look like.



Where are HDFS alumni working? What courses did they find to be the most beneficial?

Is there a market for online, undergraduate HDFS certificates or degrees in North Dakota or Minnesota?

How can HDFS adapt existing certificates like family financial planning for new levels?

Are there curricular modules or program options that could easily be taken online?

What upfront investments would be needed to launch additional online certificates or program options?

What recurring costs and revenue would the HDFS Department incur from these offerings?

Relative to other opportunities, how does this one align with NDSU's strategic priorities?

Where would the resources needed to launch or expand program offerings come from?

What are the milestones related to launching or expanding program offerings?

How will NDSU determine success and measure the return on its investment?

Considering the dual transformation framework, HDFS should begin by considering which program options could be most easily offered online or in the form of a certificate, gradually building a more robust online offering overtime.

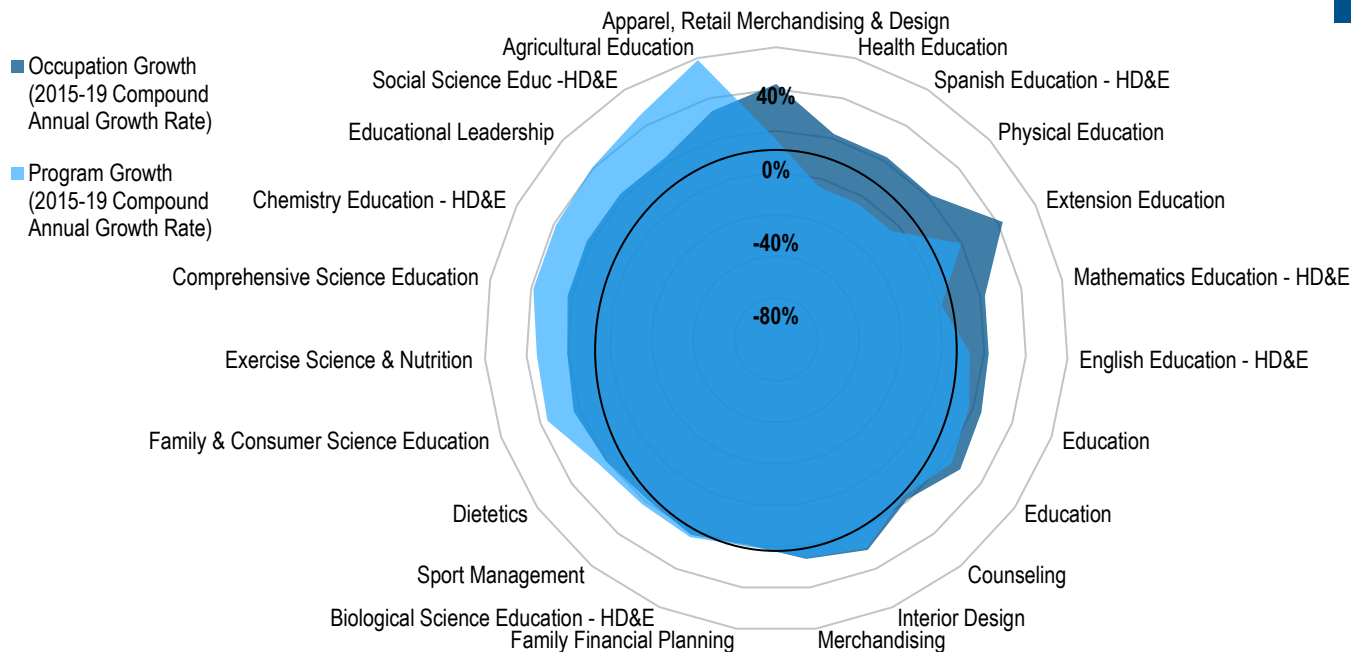
Human Sciences & Education

Program Alignment

The chart below portrays the growth rate of programs and their corresponding occupations, visualizing areas of alignment (programs completions are growing at the same rate as occupations) and gaps.

Change in Program Completions and Corresponding Occupations

(For occupations requiring a Bachelor's Degree or Higher in the Fargo MSA)



Observations

- **Alignment:** Interior Design program completions grew at an average annual rate of 9% and the job market for people with this degree grew by 10% each year
- **Gaps:** HSE's Spanish Education program produced fewer graduates in 2019 than it did in 2015, while the job market for graduates of these programs grew at an average annual rate of 2%

The volume of change in program completions and corresponding occupations must also be considered to fully evaluate whether NDSU programs are aligned with the region's workforce needs.

Note: Excludes programs with insufficient completion / occupation data
Sources: Emsi Program Completions; Emsi Occupation Table for QCEW Employees, Non-QCEW Employees, and Self-Employed

COLLEGE OF SCIENCE & MATHEMATICS

NDSU Academic Program Prioritization Dean Meeting

April 9th, 2021

NORTH DAKOTA
STATE UNIVERSITY



Science & Mathematics

College Opportunities & Considerations

Based on the current state analysis of the College of Science & Mathematics, the below considerations may present opportunities for cost savings and increased efficiency to open up capacity.

1

Evaluate
Taxonomy
Opportunities

Could related disciplines find enough overlap to consolidate shared services? Departments with high overhead and/or declining growth rates may benefit from reduced costs

College overhead in CSM amounted to over \$1.3M and departments collectively added nearly \$3M to the University's operating budget

Highly service-oriented units may benefit from cross-college relationships and combining academic resources, reducing University overhead costs

2

Increase Faculty
Teaching

Could more faculty time be allocated towards teaching activity to increase output and reduce need for additional instructors?

Reassignment costs for load deficits totaled nearly \$248k. This amount is the equivalent of nearly 12 part time/adjunct instructors, based on average teaching compensation

3

Increase section
size and capacity

How can courses be delivered more efficiently while still maintaining instructional quality?

The University spent \$654 per credit hour on graduate-level coursework offered in CSM which, on average, was under-enrolled by about 35%, based on capacity

Increasing section enrollments would alleviate section proliferation and increase capacity of faculty

4

Consider more
targeted tuition
waivers

How can the College offset its higher costs through organic revenue growth?

Graduate programs in CSM have an average waiver rate of 76.2%, leaving less tuition revenue to cover the costs of delivering those programs

Reducing or more intentionally targeting program waivers could help the College to realize more of its earnings

The College of Science & Mathematics serves students from across the University in coursework delivery, but does not enroll enough of its own students to capture a strong enough revenue stream to offset costs of delivery.

Science & Mathematics

College Overview

In AY 2020, the College of Science & Mathematics produced 81,725 credit hours from the effort of 191 instructors across eight departments, averaging \$263 per credit hour produced.

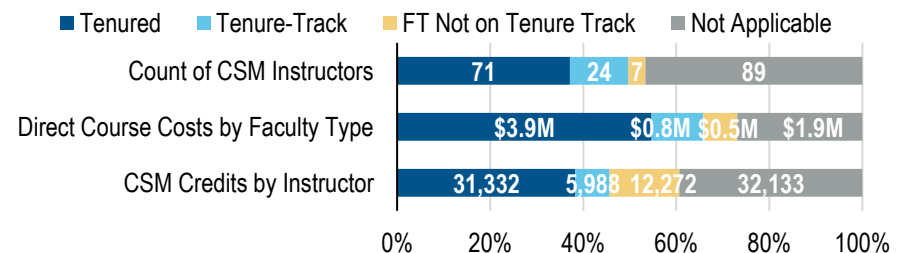
Current State

- Of the course sections delivered, **76.4% were considered in load**. The median section size* was 20 and 76.8% of sections were delivered at the undergraduate level
- 94.1% of credit hour production (CHP)** occurred at the undergraduate level and 5.9% at the graduate level
- “General Chemistry I Lab” (CEM 121L) had the most sections and **generated 895 credit hours**, 1.1% of college’s total CHP
- The Mathematics department had the **highest CHP at 19,036** and Coatings & Polymerics Materials had the lowest CHP at 657
- During AY 2019, the College of Science & Mathematics **granted 326 completions**, 84.4% at the undergraduate level. Bachelors degrees in the Biological Sciences department accounted for 39.6% of total completions
- The **average department operational margin** is (\$1.6M) without state appropriations and (\$345k) with state support

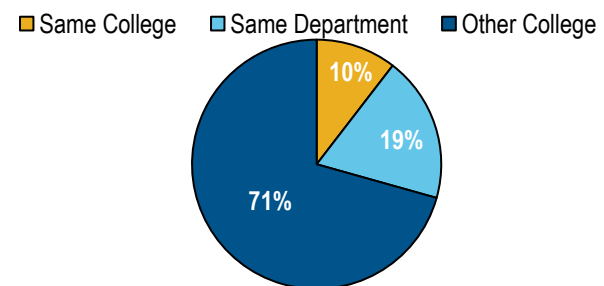
Coursework Summary

Criteria	2015-16	2016-17	2017-18	2018-19	2019-20	CAGR
No. of Sections	1,268	1,381	1,239	1,129	1,030	-5.1%
Course Enrollment	38,033	39,072	37,918	34,095	30,434	-5.4%
Credit Hrs. Prod.	103,695	106,988	104,321	93,656	81,725	-5.8%

Faculty Summary for Coursework Delivery



Course Enrollments by Student Primary Program



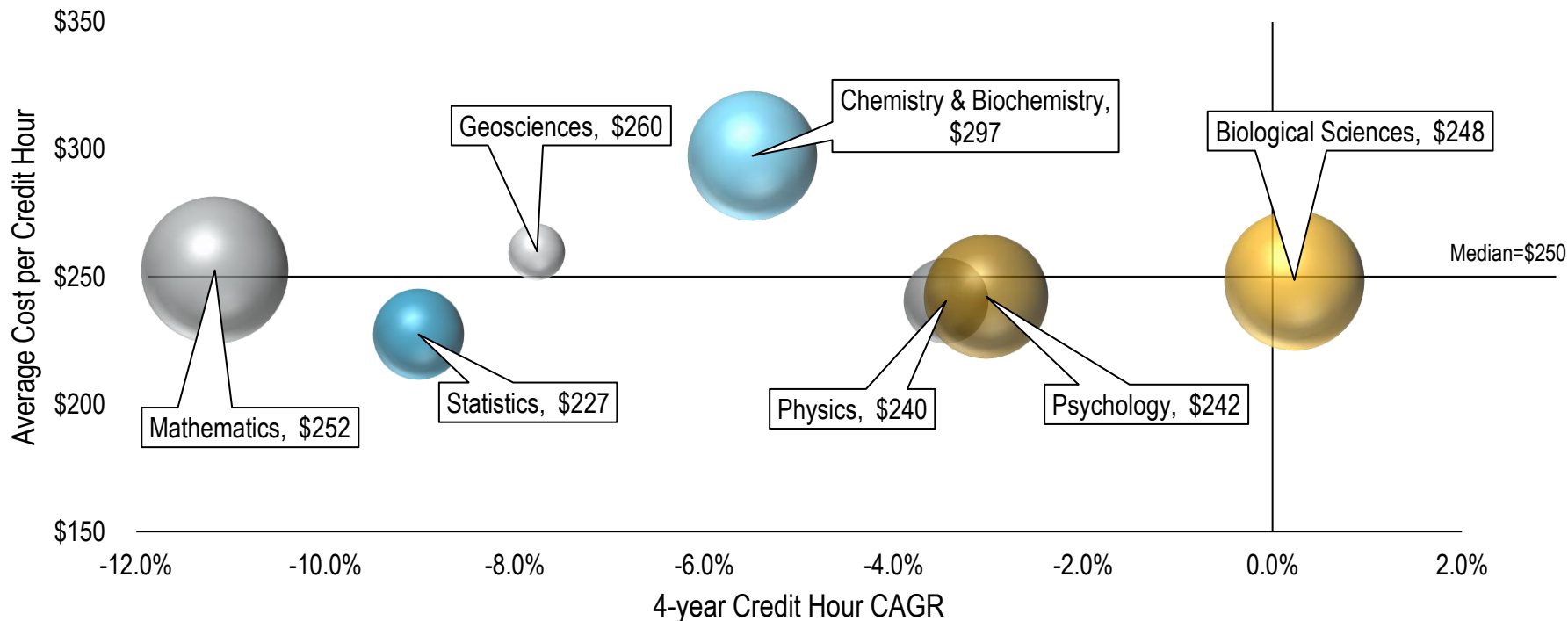
*Median section sizes include single-student entries, such as dissertations. Flagging these types of courses for removal would likely raise this figure.

Science & Mathematics

Department Economics

Portfolios are commonly balanced with growth engines and “steady-staters”, high-cost and low-cost, and “at-scale” and “still below scale”. The objective of this lens is not only comparative, but also to observe the balance.

**CHP Volume, Growth & Cost
By Department: Science & Mathematics**



The weighted average cost per credit in the College of Science & Mathematics is \$263 when considering credits produced for the 2019-2020 academic year.

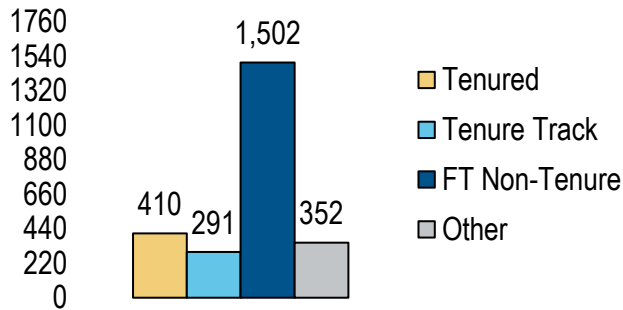
The size of each bubble represents the department's relative volume of credit hours produced
Coatings and Polymeric Materials falls outside of the parameters of the chart at \$1,295 per credit hour

Science & Mathematics

College Opportunities

The College of Science & Mathematics has the highest number of tenured faculty reporting to their departments of any academic college, as well as teaching compensation as compared to other colleges.

Average CHP per Instructor by Type



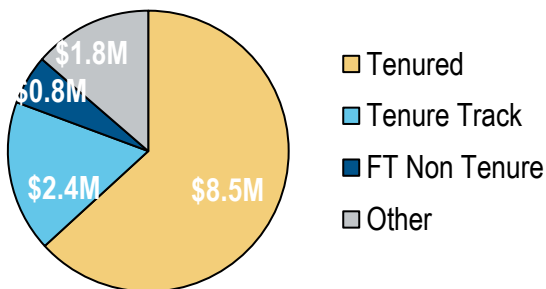
Within scholarly activities, teaching averaged about 55% of all instructors' compensation



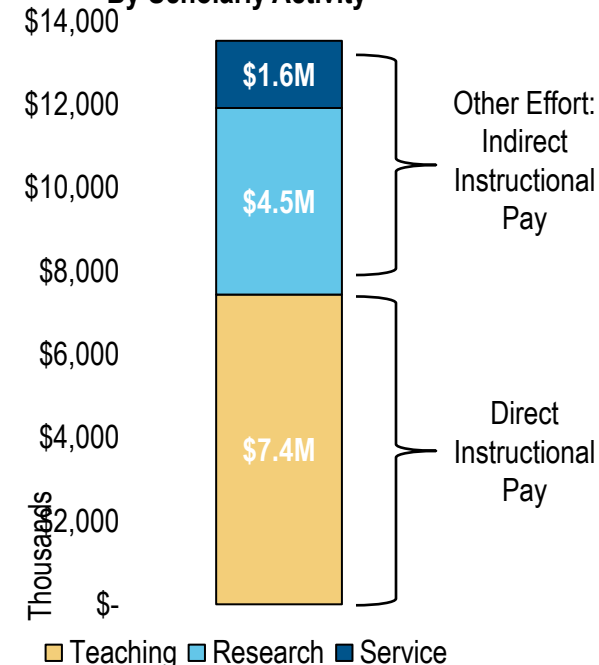
Direct instructional pay contributed \$88 of the \$263 per credit hour in the College of Science & Mathematics



Instructional Pay by Type



Instructional Pay Breakdown By Scholarly Activity



Full time, non-tenure faculty produced a disproportionately high average credit hour per instructor as compared to other groups. Five of the eight faculty in this category were assigned to very high-enrolled course sections.

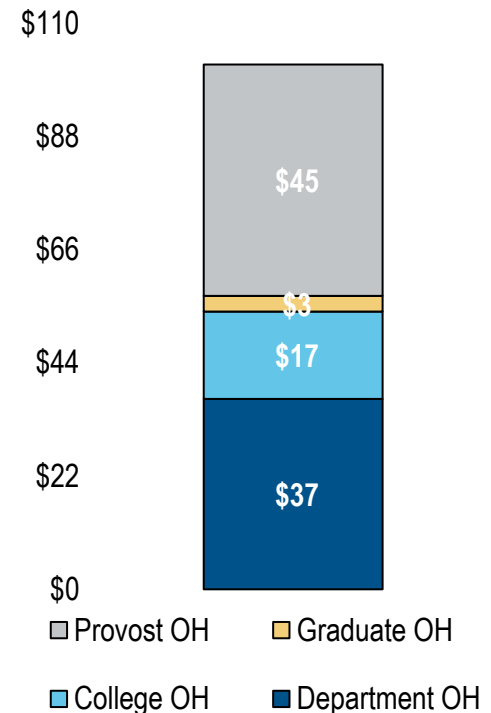
Science & Mathematics

College Opportunities

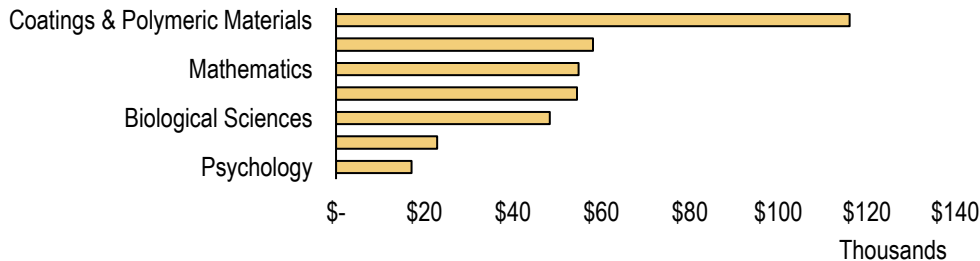
About 20.2% of the College of Science & Mathematics' cost per credit hour comes from unit-driven overhead accrued at the department and college/Dean suite level. This falls slightly below both the average and median rates across academic units.

- The College of Science & Mathematics falls 28.6% below the median for unit-driven academic overhead (department and college overhead) per credit hour produced across colleges
- Non-instructional salaries make up 84.2% of total college overhead
- The College also falls 25.3% below the University median for unit-driven overhead per full time faculty member (just under \$57k across colleges)

Overhead Contributions to Cost per Credit Hour



Unit OH per FT Faculty*



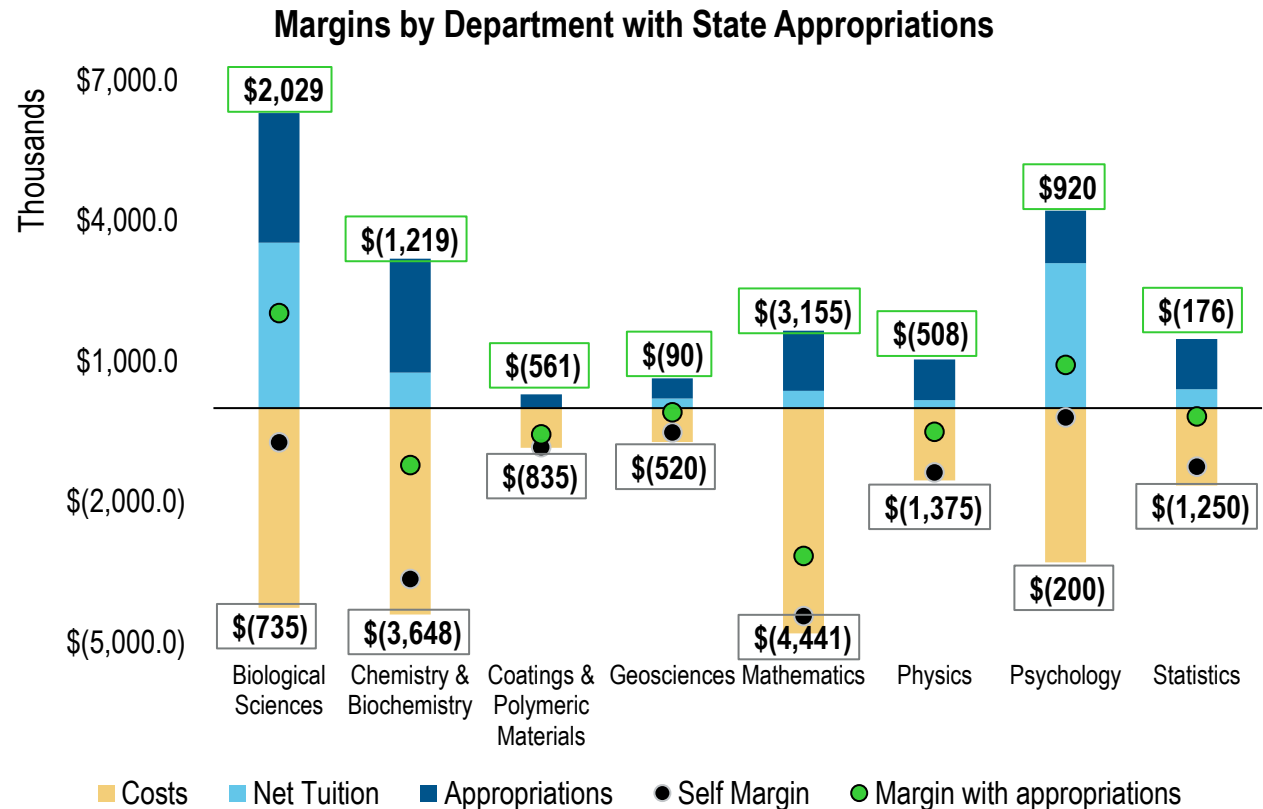
Coatings & Polymeric Materials had consistently disproportionate costs per credit hour produced and faculty member supported based on low productivity and employment.

Science & Mathematics

College Opportunities

In AY19-20 students enrolled in 366 unique course codes offered through the College of Science & Mathematics. Approximately \$10.2M in state appropriations supported these departments but did not eradicate the College's deficits.

- Without considering state appropriations, all departments are operating at a deficit, averaging (\$1.6M) per department
- When adding in the corresponding appropriations, Psychology is brought into surplus and the College's overall operating margin comes to about (\$2.8M)
- The highest amount of appropriations went to Biological Sciences, totaling \$2.8M

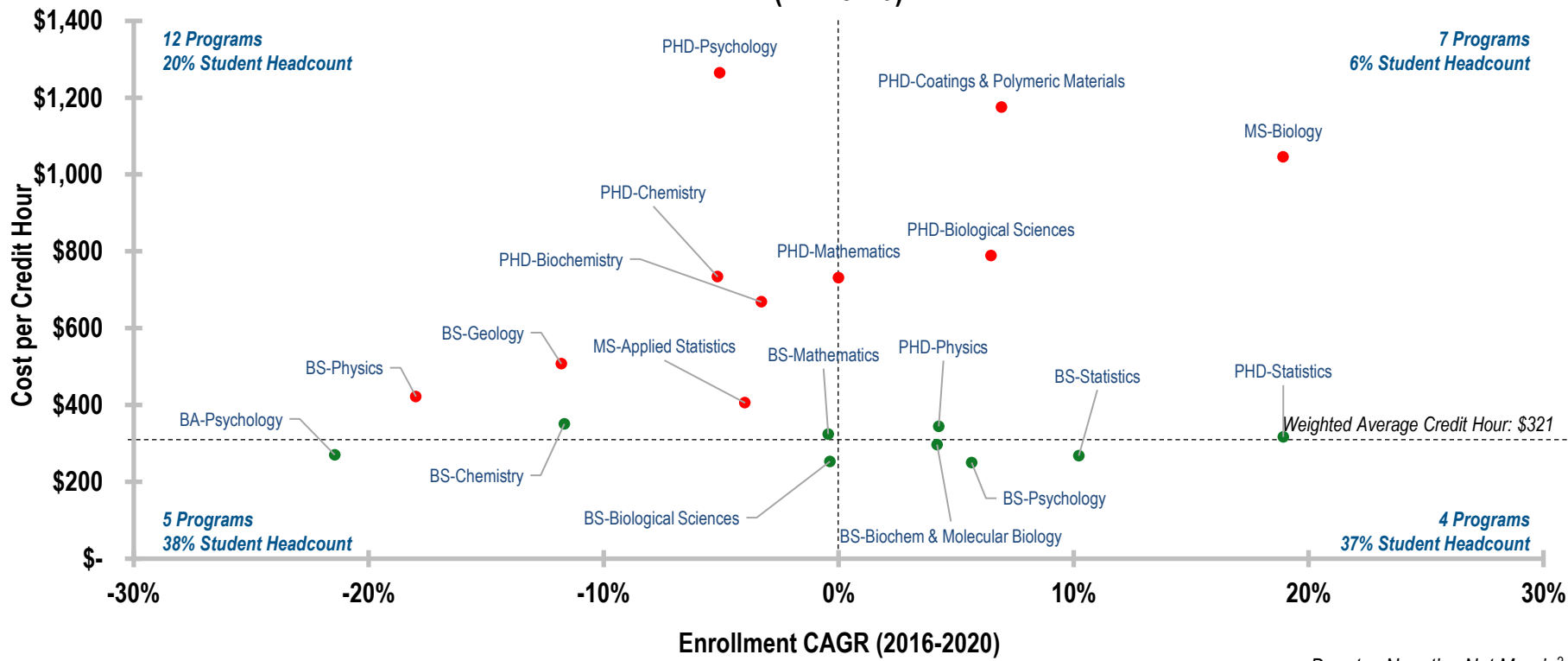


Despite hefty state appropriations totaling over \$10.2M, the College of Science & Mathematics remains at a deficit for operating margin, primarily due to their serving students enrolled in external programming.

Science & Mathematics Program Portfolio

In AY19-20, more than 58% of students were enrolled in one of 17 programs that experienced enrollment decline during the review period; notably, less than half (14 of 29) programs had a positive net margin after tuition and appropriations.

Academic Portfolio – Program View¹
(AY 19-20)



● Denotes Negative Net Margin²

1. Programs with five or fewer students in AY2020 (9, <2%) are not visualized on the graph and programs without enrolled students in AY2016 (1, <1% of HC) are excluded from both the graph and the summaries.
2. Full program-level data is available within the cost-to-educate model.

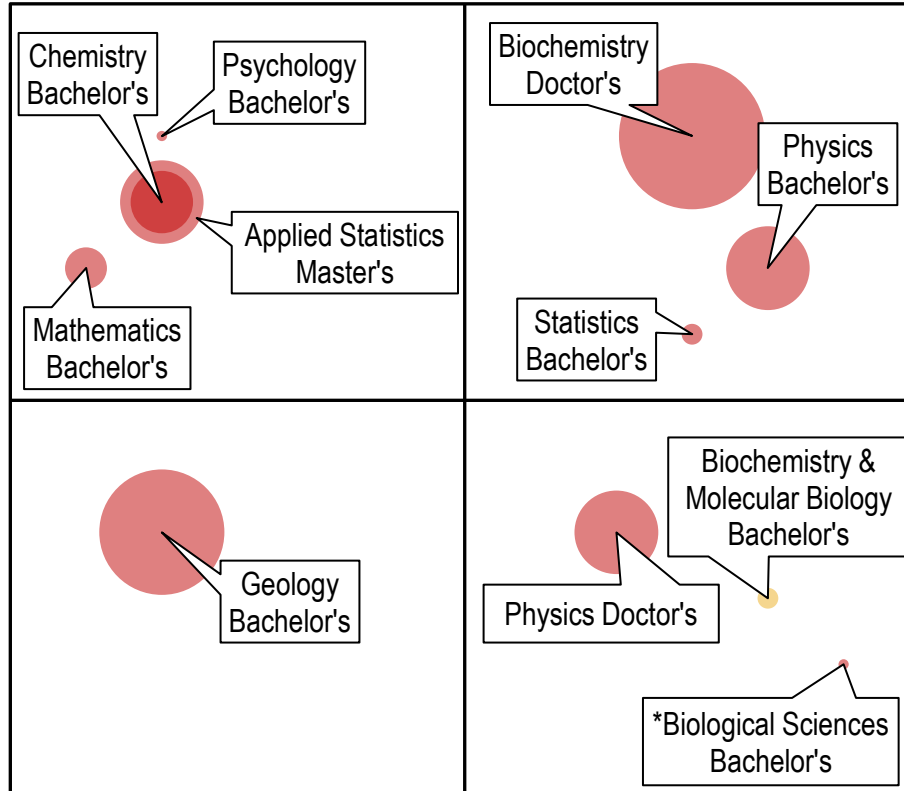
Science & Mathematics

Program Market Positioning Matrix

The matrix below organizes CSM programs¹ according to the change in completions and corresponding occupations² in ND and MN between 2015 and 2019, with size representing the average cost per CHP and color denoting program market share.

More Occupations Fewer Completions

- 4 programs
- 108 completions
- Average program cost per CHP of \$341



More Occupations More Completions

- 3 programs
- 23 completions
- Average program cost per CHP of \$459

- 1 program
- 10 completions
- Average program cost per CHP of \$511

Fewer Occupations Fewer Completions

- 3 programs
- 113 completions
- Average program cost per CHP of \$302

Fewer Occupations More Completions

When evaluating opportunities to invest additional resources in program growth, it is important to consider how programs are positioned in NDSU's competitive landscape and the regional labor market.

Notes: ¹Excludes programs with insufficient data in any of these variables;
²Using the NCES' CIP to Standard Occupational Classification (SOC) Crosswalk
 Sources: Emsi Program and Occupation Tables; Cost-to-Educate Model

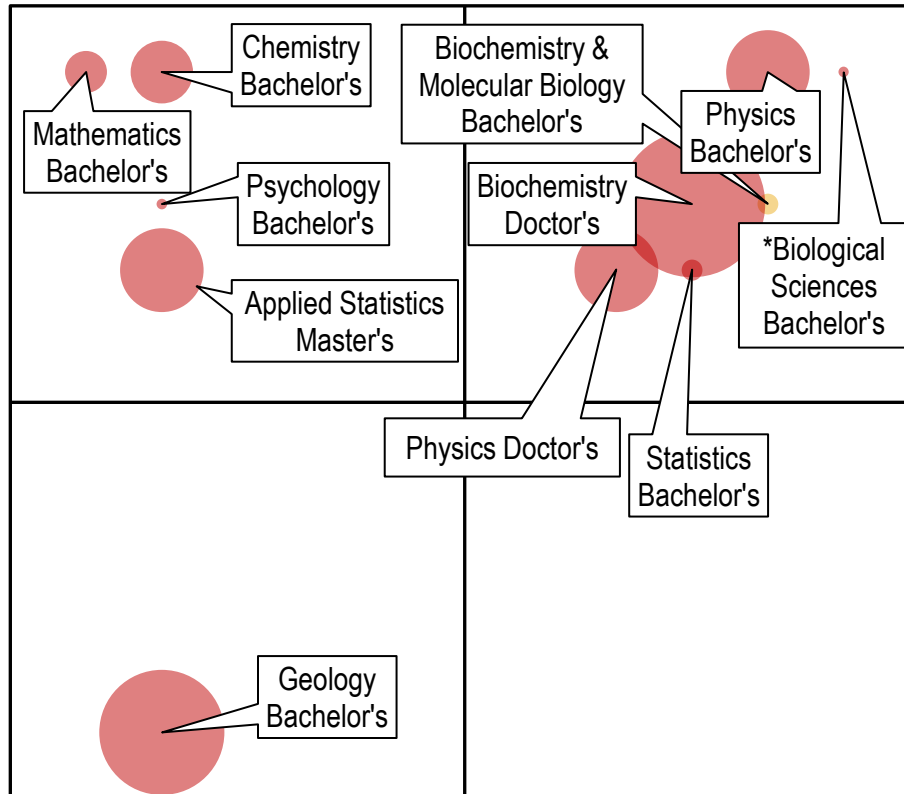
Science & Mathematics

Program Market Positioning Matrix

The matrix below organizes CSM programs¹ according to the change in completions and corresponding occupations² in the United States between 2015 and 2019, with size representing the average cost per CHP and color denoting market share.

More Occupations Fewer Completions

- 4 programs
- 108 completions
- Average program cost per CHP of \$341



More Occupations More Completions

- 6 programs
- 136 completions
- Average program cost per CHP of \$381

- 1 program
- 10 completions
- Average program cost per CHP of \$511

Fewer Occupations Fewer Completions

Fewer Occupations More Completions

When evaluating opportunities to invest additional resources in program growth, it is important to consider how programs are positioned in NDSU's competitive landscape and the regional labor market.

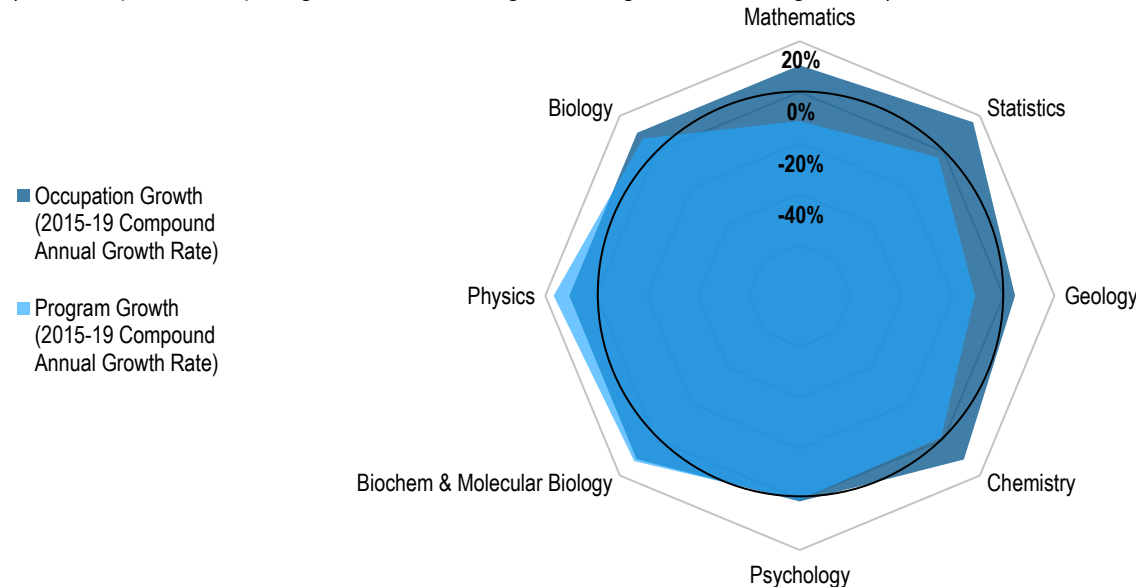
Notes: ¹Excludes programs with insufficient data in any of these variables;
²Using the NCES' CIP to Standard Occupational Classification (SOC) Crosswalk
 Sources: Emsi Program and Occupation Tables; Cost-to-Educate Model

Science & Mathematics

Program Alignment

The chart below portrays the growth rate of programs and their corresponding occupations, visualizing areas of alignment (programs completions are growing at the same rate as occupations) and gaps.

Change in Program Completions and Corresponding Occupations (For occupations requiring a Bachelor's Degree or Higher in the Fargo MSA)



Observations

- Alignment: Between 2015 and 2019, **Psychology** program completions grew at an average annual rate of 0.3% and the job market for graduates of this program grew by 0.9%
- Gaps: The overall number of jobs for CSM graduates in the Fargo MSA has been growing

The volume of change in program completions and corresponding occupations must also be considered to fully evaluate whether NDSU programs are aligned with the region's workforce needs.

GRADUATE & INTERDISCIPLINARY STUDIES

NDSU Academic Program Prioritization Dean Meeting
April 8th, 2021

NORTH DAKOTA
STATE UNIVERSITY

Graduate & Interdisciplinary Studies

Opportunities & Considerations

Based on the current state analysis of graduate-level programming at NDSU, the below considerations may present opportunities for cost savings and increased efficiency to open up capacity.

1

Evaluate Program Opportunities

Could underperforming programs be candidates for transformation based on mission/identity alignment with the University?

Shrinking and high-cost programs at the graduate level do not have the same type of financial support generated by other graduate programs that undergraduate programs seem to have, so it is imperative to focus on efficiency and value proposition

2

Increase section size and capacity

How can courses be delivered more efficiently while still maintaining instructional quality?

The University spent \$741 per credit hour on graduate-level coursework which, on average, was under-enrolled by about 53.4%, based on capacity

Increasing section enrollments would alleviate section proliferation and increase capacity of faculty

3

Consider more targeted tuition waivers

How can the University offset its higher costs through organic revenue growth?

Graduate programs at NDSU have an average waiver rate of 62.3%, with doctoral programs alone averaging 79.2%, leaving little tuition revenue to cover the costs of delivering those programs

Reducing or more intentionally targeting program waivers could help NDSU to realize more of its earnings

As part of the University's research-heavy mission, it is imperative that graduate programs offered operate at a more sustainable level to not jeopardize the financial wellbeing of other academic areas.

Graduate & Interdisciplinary Studies

Coursework Overview

In AY 2020, Graduate coursework produced 29,279 credit hours, averaging \$741 per credit hour and with only 2.2% of these credits generated through courses offered by the College of Graduate & Interdisciplinary Studies.

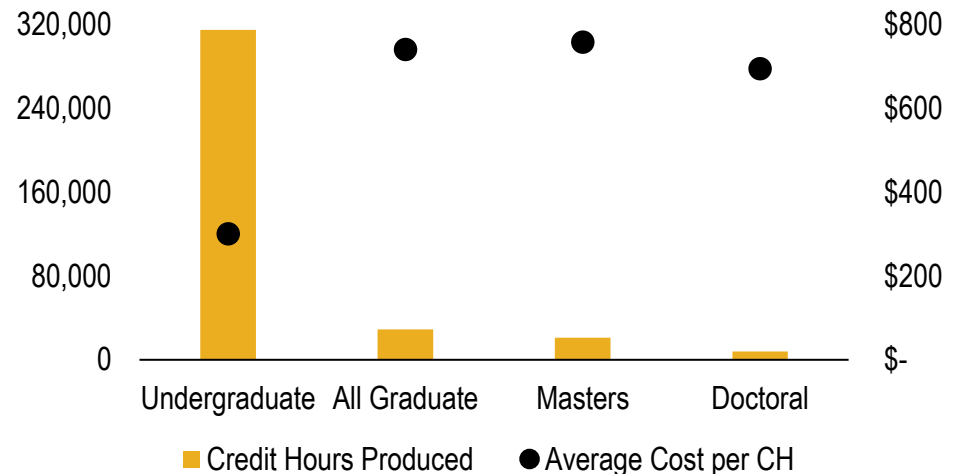
Current State

- Of the 1,825 course sections delivered, **71.0% were considered in load**. The median section size* was 2 and 74.1% of sections were delivered by tenured faculty
- “Doctoral Dissertation” (ECE 899) had the most sections and **generated 286 credit hours**, 1.0% of University’s total graduate CHP
- The School of Education had the **highest graduate CHP at 4,597** and Theatre Arts had the lowest CHP at 6
- During AY 2019, the University **granted 612 graduate completions**. Master’s degrees in the School of Education accounted for 14.4% of total completions
- Graduate coursework cost the University nearly \$21.7M over the academic year, with **62.6% of this made up of instructor compensation** (29.4% of the University total)

Coursework Summary

Criteria	2015-16	2016-17	2017-18	2018-19	2019-20	CAGR
No. of Sections	1,755	2,134	2,012	1,819	1,825	1.0%
Course Enrollment	9,477	11,001	10,297	10,256	10,414	1.4%
Credit Hrs. Prod.	26,351	31,282	29,669	29,570	29,279	2.7%

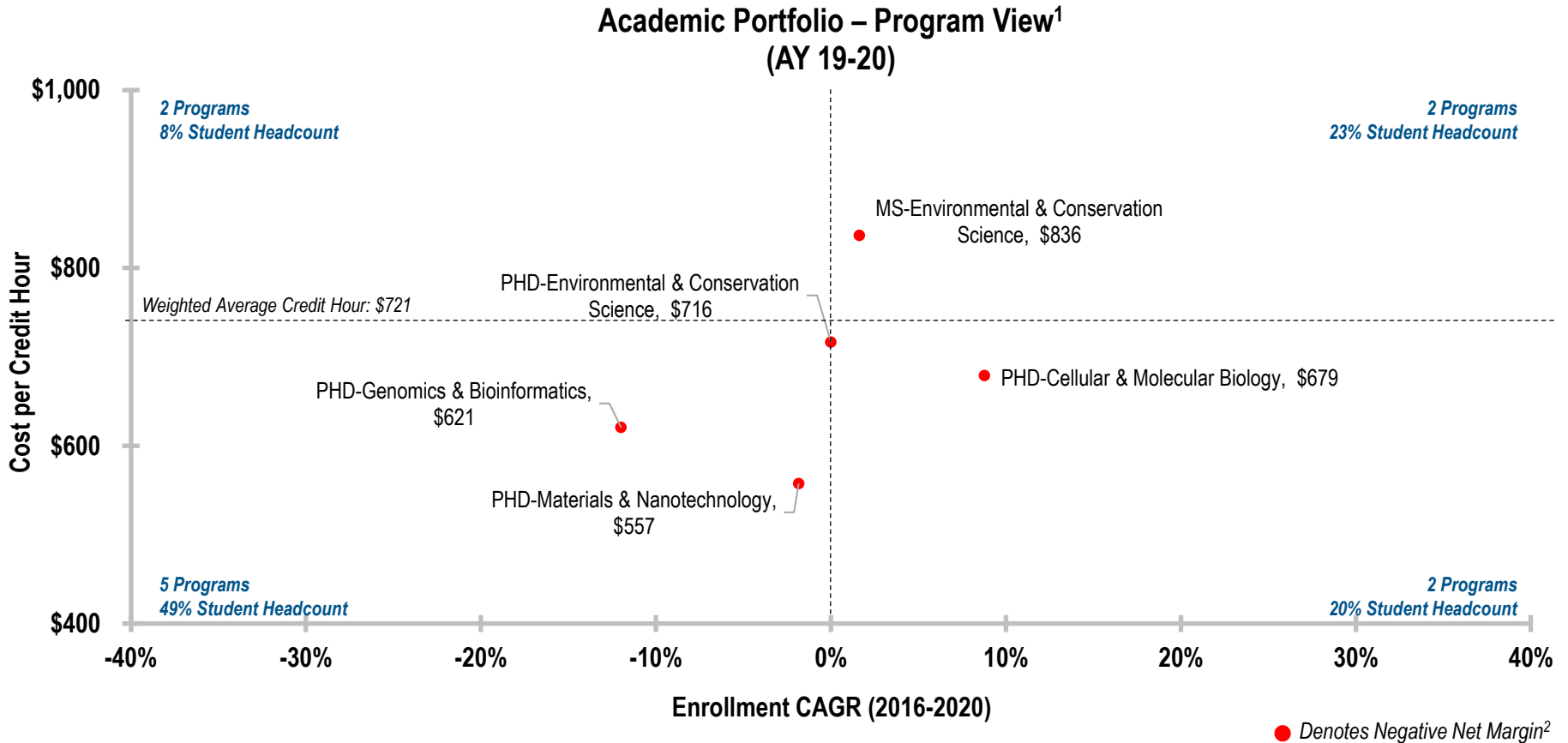
Volume and Cost of Credit Hours by Type



*Median section sizes include single-student entries, such as dissertations. Flagging these types of courses for removal would likely raise this figure.

Graduate & Interdisciplinary Studies Program Portfolio

In AY19-20, nearly 70% of students were enrolled in one of 9 programs that experienced enrollment declines during the review period; notably, less than half (5 of 13) programs had a positive net margin after tuition and appropriations.



1. Programs with five or fewer students in AY2020 (7, 17%) are not visualized on the graph.
2. Full program-level data is available within the cost-to-educate model.

LIBRARIES

NDSU Academic Program Prioritization Dean Meeting

April 9th, 2021

NORTH DAKOTA
STATE UNIVERSITY

Library Assessment Overview

The NDSU Libraries support the educational and research activities of students, faculty, and staff by providing access to more than 2.2 million physical and electronic items across multiple locations.

- Physical locations include the Main Library supplemented by
 - Sanford Health Library
 - NDSU West
 - Downtown

- NDSU maintains several prominent academic library collections to include:
 - Business Learning Center,
 - Klai Juba Wald Architectural Studies,
 - P.N. Haakenson Health Sciences
 - Digital Fabrication Lab
 - Germans from Russian Heritage Collection
 - University Archives

- In 2019-20, NDSU Libraries served nearly 200,000 visitors and received more than 2 million Website views



The Main Library at NDSU Library encompasses nearly 60,000 **square feet** over four levels.

NDSU Libraries is guided by an internal strategic plan (2019-2023) focused on student service, partnership development, academic and research enhancement, collections utilization, and increased campus engagement.

Library Assessment

Benchmark Approach

Huron leveraged data from the National Center for Education Statistics to isolate all Land Grant universities in the US and organized them into two groups with Land Grant 1s operating without a hospital and Land Grant 2s operating with a hospital.

Current State	Land Grant Benchmarks			
<ul style="list-style-type: none"> Land Grant 1 institutions were established by identifying institutions with similar enrollment and research activity while at the same time excluding those institutions with hospitals or awarding medical degrees NDSU reported lower enrollments and full-time faculty members than Land Grant 1 institutions but research expenditures were nearly identical Library spend at NDSU from an aggregate perspective is significantly lower when compared to the two benchmark groups when considering compensation, materials, and operations 	Measure	NDSU	Land Grant 1	Land Grant 2
	Student HC	14,503	17,820	39,362
	FT Faculty FTE	553	743	1,706
	Research	\$107.4M	\$108.0M	\$317.6M
	Selected metrics suggests NDSU is similar in size and scope to the Land Grant 1 benchmark group			
	Category	NDSU	Land Grant 1	Land Grant 2
	Library Spend	\$6.6M	\$10.3M	\$26.4M
	<i>Compensation</i>	\$2.8M	\$3.5M	\$11.7M
	<i>Materials</i>	\$3.4M	\$4.4M	\$11.8M
	<i>Operations and other</i>	\$0.4M	\$2.4M	\$2.9M
NDSUs spend in compensation, materials, and operations is significantly less when compared to both benchmark groups				

NDSU Library spend in aggregate or by category, is significantly less than Land Grant institutions with total spend at 64% of Land Grant 1 universities (without hospitals) and 25% of Land Grant 2 universities (with hospitals).

Library Assessment

User Metrics

Using the Land Grant benchmarking methodology, Huron developed several key user metrics to compare library service delivery based on populations typically associated with academic library utilization.

Current State	Key User Metrics			
<ul style="list-style-type: none"> Multiple measures of library spend suggest NDSU allocates significantly fewer resources per key user metric NDSU spend in 2018-19 was \$457 per student FTE compared to \$576 for Land Grant 1s and \$670 for Land Grant 2s When considering full-time faculty, NDSU spent \$11,990 per faculty member compared to \$13,823 for Land Grant 1s and \$15,453 for Land Grant 2s To achieve resource parity with the Land Grant 1 benchmark group, NDSU would need to allocate an additional \$119 per student and \$1,833 per full-time faculty member 	Library Expenditures Ratios per Key User Metric by Benchmark			
	Expenditure Per:	NDSU	Land Grant 1	Land Grant 2
	Students	\$457	\$576	\$670
	Faculty	\$11,990	\$13,823	\$15,453
	Total Underspend per Key User Metric Compared to Land Grant 1			
Metric	Per Observation	Total		
Students	\$119	(\$1.7M)		
Faculty	\$1,833	(\$1.0M)		

This information should be leveraged to inform strategic priorities of the university when considering the role of undergraduate research activity, graduate student research support, and sponsored grant activity.

Library Assessment

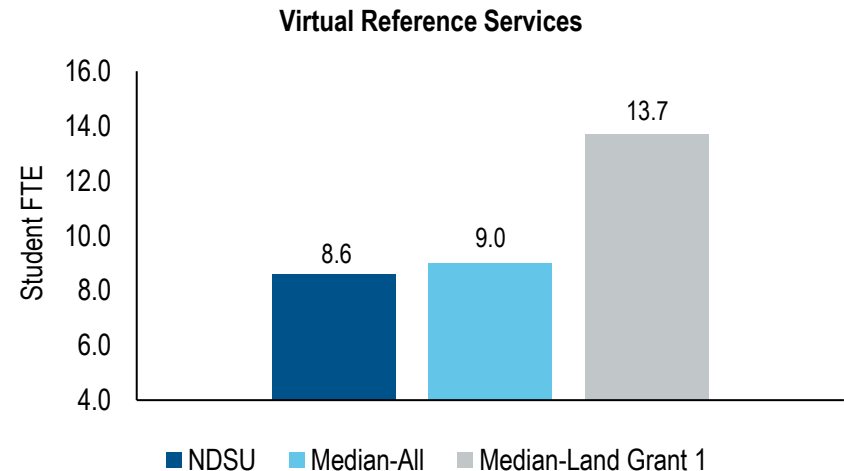
Service Metrics

Each year, the Association of College and Research Libraries (ACRL) administers a survey to more than 3,000 universities and colleges enabling Library personnel and researchers to make comparisons in areas such as expenditures, services, etc.

Current State	NDSU Engagement Comparisons	
---------------	-----------------------------	--

- In 2019, 374 doctoral institutions responded to the ACRL survey providing a robust set of metrics helpful in assessing areas such as service
- Library transactions per FTE student is approximately half of the number of transactions found at Land Grant 1 institutions participating in the ACRL survey
- A similar pattern occurs when considering FTE students per library consultation with NDSU reporting 60.5 per FTE compared to 27.8 for the ACRL group
- Virtual reference services are also less frequent at NDSU when compared to Land Grant 1 institutions; however, they report similar numbers when compared to all doctoral institutions in the ACRL inventory

Comparison by Activity	NDSU	LG1
FTE students per transaction	3.0	1.6
FTE students per consultation	60.5	27.8



ACRL service volume metrics tend to be lower when compared to the Land Grant 1 institutions participating in the ACRL, which should be expected given the comparatively lower resources available in areas such as compensation.

Library Assessment

Next Steps and Risk Management

Library resource allocation decisions should be made in conjunction with the institution’s strategic priorities toward student learning outcomes, faculty research expectations, and community engagement activities.

Key Questions

Short Term Considerations

- How do the resource allocation metrics presented here align with NDSU’s vision and mission?
- Where should the Library focus their resources to best support the undergraduate research expectations of the university?
- Do resource allocation trends impact NDSU’s ability to educate students or conduct research?



Long Term Considerations

- What levels of service are other Land Grant institutions able to provide when they have access to more resources?
- How will NDSU know if the Library is meeting the needs of the evolving research mission of the university?

Considerations

Opportunities

- Leverage technology to assure access to materials and services necessary to support a Land Grant institution
- Assess engagement levels and material utilization rates with the NDSU community to assure limited resources are aligned to priority areas

Risks

- Decreased enrollments over the past several years has impacted all areas of the campus making additional investments in the Library a challenging proposition
- Minimal service levels and material spend may limit student and faculty research productivity and negatively impact student outcomes and faculty productivity

NORTH DAKOTA STATE UNIVERSITY

Research Slides

NORTH DAKOTA
STATE UNIVERSITY

Research Enterprise

Research Growth

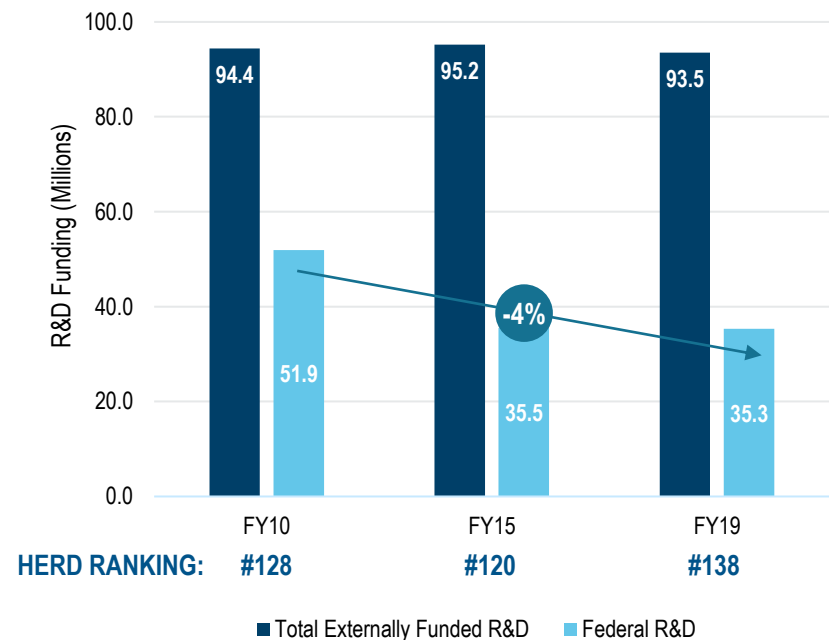
NDSU's externally-funded sponsored program annual revenue has decreased over the last 10 years, with a significant decrease in federal funding.

Current State

- NDSU's external R&D expenditures have decreased over the 10-year period from 2010-2019
- Federal R&D decreased by **\$16.6M** or an average **4%** annual decrease during this time
- Federal funding is one standard measure that is used to determine an institution's academic reputation
- NDSU's HERD ranking has dropped during the 10-year period, where without the increase in NDSU's institutionally funded research, the ranking would have likely dropped further
- Federally funded awards typically receive the full negotiated Organized Research F&A rate, therefore there has likely been a significant reduction in F&A revenue due to this decline

Academic Year 2019-20 Key Metrics

NDSU External R&D FY10- FY19



Research Enterprise

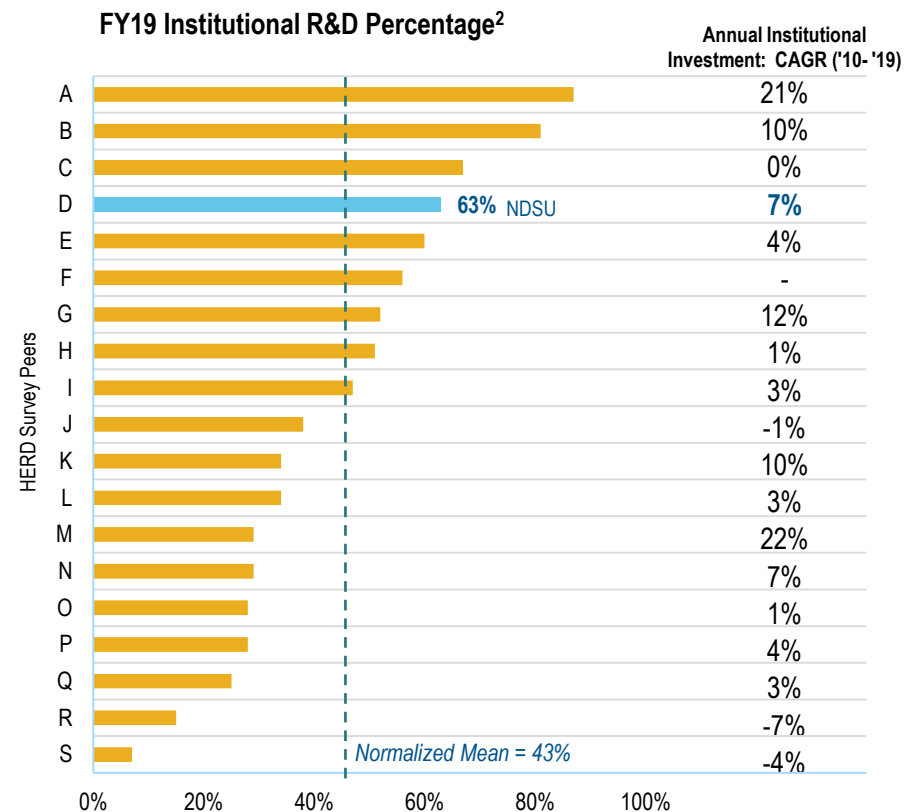
Institutionally-Funded Research and Development

NDSU internally funds research at a higher-level than many of its peers.

Current State

- Per the FY19 HERD survey¹, NDSU reported:
 - Externally funded R&D expense of **\$93M**
 - Institutionally supported R&D expense of **\$59M**
 - Total R&D of **\$152M**
- NDSU was compared to a peer group of 18 institutions of similar R&D funding (ranking 100- 298 on the HERD survey)
- As compared to this peer group, NDSU's Institutionally-funded R&D percentage of **63%** was higher than the peer groups mean average of **43%**
- Additionally, NDSU has experienced average annual Institutional Investment growth of **7%** over a 10-year period, which was larger than many of its peers

Academic Year 2019-20 Key Metrics



1. See Appendix A, slide 202, for FY19 HERD Survey results for peer group

2. See Appendix B, slide 203, for the Institutional R&D percentage for peer group

*The University of Maryland was excluded from this benchmark

Research Enterprise

Facilities and Administrative Rates

NDSU's Facilities and Administrative Cost Rate is in-line with its regional peers.

Current State

- NDSU most recently submitted their Facilities and Administrative Cost Rate proposal based on fiscal year ending June 30, 2017
- NDSU negotiated an Organized Research rate of 45%, which is in place for FY18-23.
- The negotiated Organized Research rate is in-line with other regional, state institutions, *as seen by the table on the right*
- Every 1% point of the Organized Research F&A rate results in estimated \$100K of F&A revenue

Academic Year 2019-20 Key Metrics

Organization	HERD FY19 R&D (Millions)	Organized Research F&A Rate
University of South Dakota	N/A	47
North Dakota State University	\$152	45
University of Idaho	113	47.5
University of North Dakota	111	41
University of Montana	105	47
University of Wyoming	80	44.5
South Dakota State University	67	46

*University of South Dakota did not report HERD Survey R&D results

Research Enterprise

Facilities and Administrative (F&A) Revenue

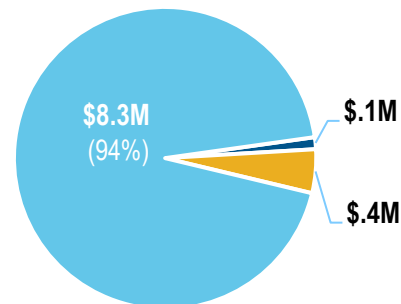
But NDSU under-recovers approximately **\$8.8M** of F&A revenue due to accepting sponsored programs at less than the negotiated F&A rate.

Current State

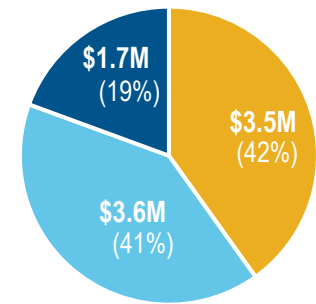
- In FY19, NDSU experienced **\$8.8M** in F&A under-recovery due to the following:
 - Government regulations limiting recovery (i.e., Administrative Cap)
 - Rate negotiations with the Federal government resulting in a lower rate
 - NDSU accepting sponsored program awards at less than their negotiated rate, understanding that many state agencies and other sponsors have standard F&A rates which cannot be negotiated
- 94% of the unrecovered F&A revenue are due to indirect recovery less than the negotiated rate.
- On a sponsor basis, state and federal awards equally comprise 80% of unrecovered indirect costs, while industry, nonprofit, and other sponsors account for the remaining 20%.

Academic Year 2019-20 Key Metrics

Unrecovered F&A Expenditures by Key Driver



Unrecovered F&A Expenditures by Sponsor



- Unrecovered F&A Due to Admin Cap
- Unrecovered F&A Due to Negotiation
- Unrecovered F&A Due to Award Rate

- FED
- STATE
- OTHER

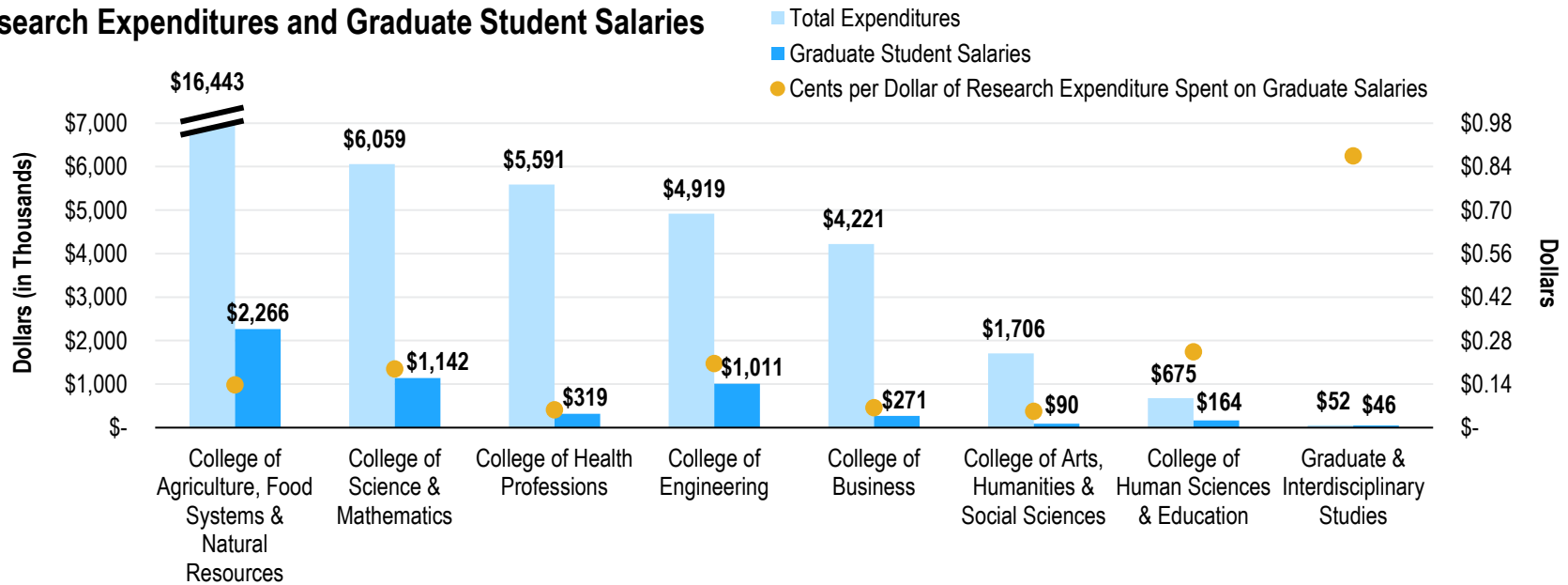
Note: Unrecovered F&A due to Award Rate are calculated using a Total Direct Cost base since excluded expenses are included with allowable operating expenses

Research Enterprise

Graduate Student Spending

Graduate salaries accounted for 12% of 2020 sponsored research expenditures, ranging from 5% in Arts, Humanities & Social Sciences to 87% in Graduate & Interdisciplinary Studies.

Research Expenditures and Graduate Student Salaries



Graduate HC	308	225	513	411	198	295	485	96
Waivers (\$K)	\$1,684	\$1,667	\$1,026	\$2,394	\$597	\$1,041	\$924	\$616
% Waived	85%	85%	12%	80%	42%	42%	37%	85%

There may be an opportunity to improve academic margins by charging graduate tuition and salaries to grants, when possible, and targeting tuition waivers towards strategically aligned areas of the research portfolio.

Appendix

A: HERD Survey Peet Group FY19 R&D

Institution	Rank	All R&D expenditures	Source of funds					
			Federal government	State and local government	Institution funds	Business	Nonprofit organizations	All other sources
Total	-	2,437,089	1,215,755	263,161	681,668	98,937	103,855	73,713
U. California, Santa Barbara	100	243,778	118,517	4,592	49,052	19,264	32,192	20,161
U. Massachusetts, Amherst	109	223,177	117,359	12,409	70,889	10,026	8,986	3,508
Clemson U.	110	218,760	81,080	24,259	87,791	18,812	6,643	175
U. Delaware	113	206,270	133,020	12,379	45,490	5,944	4,556	4,881
U. Arkansas, Fayetteville	127	180,225	50,875	53,643	61,913	7,274	6,123	397
Montana State U., Bozeman	135	154,811	88,955	17,738	39,627	1,974	4,251	2,266
North Dakota State U.	138	152,381	35,322	48,566	58,902	2,166	1,444	5,981
U. New Hampshire	141	148,980	90,241	4,648	38,163	8,680	6,422	826
U. Alaska, Fairbanks	142	144,457	92,964	2,874	39,572	3,333	1,753	3,961
U. California, Santa Cruz	144	142,958	74,669	6,280	31,144	5,452	14,838	10,575
U. Maine	146	129,913	51,049	19,299	48,644	4,334	4,452	2,135
U. Rhode Island	151	115,160	73,080	10,878	25,849	4,268	427	658
New Mexico State U.	160	101,457	58,022	20,496	12,922	1,022	3,569	5,426
U. Wyoming	171	80,353	52,082	4,594	17,939	3,619	1,599	520
South Dakota State U.	182	66,794	29,683	15,663	4,511	1,955	4,442	10,540
U. California, Merced	208	44,890	16,850	3,137	20,887	474	1,937	1,605
North Carolina Agricultural and Technical State U.	228	37,339	23,863	347	12,615	208	208	98
Delaware State U.	265	23,017	12,179	498	10,315	25	0	0
Tennessee State U.	298	15,236	8,962	752	5,443	66	13	0
U. Maryland, Eastern Shore	370	7,133	6,983	109	0	41	0	0
Normalized Mean		121,854	60,788	13,158	37,620	4,947	5,193	3,686

Appendix

B: Institutionally Funded R&D

REF	Institution	Rank	Institution R&D Funds	External R&D Funds	Institution R&D Percentage
A	U. California, Merced	208	20,887	24,003	87%
B	Delaware State U.	265	10,315	12,702	81%
C	Clemson U.	110	87,791	130,969	67%
D	North Dakota State U.	138	58,902	93,479	63%
E	U. Maine	146	48,644	81,269	60%
F	Tennessee State U.	298	5,443	9,793	56%
G	U. Arkansas, Fayetteville	127	61,913	118,312	52%
H	North Carolina Agricultural and Technical State U.	228	12,615	24,724	51%
I	U. Massachusetts, Amherst	109	70,889	152,288	47%
J	U. Alaska, Fairbanks	142	39,572	104,885	38%
K	U. New Hampshire	141	38,163	110,817	34%
L	Montana State U., Bozeman	135	39,627	115,184	34%
N	U. Rhode Island	151	25,849	89,311	29%
M	U. Wyoming	171	17,939	62,414	29%
P	U. Delaware	113	45,490	160,780	28%
O	U. California, Santa Cruz	144	31,144	111,814	28%
Q	U. California, Santa Barbara	100	49,052	194,726	25%
R	New Mexico State U.	160	12,922	88,535	15%
S	South Dakota State U.	182	4,511	62,283	7%
	Normalized Mean*		36,194	87,771	43%

*The normalized mean excludes outliers: U. California, Merced

Appendix

C: Unrecovered F&A

FA Rate %	TDC	TDC Distribution	Recovered IDC	Recovered Expenses	Unrecovered IDC
0.00%	15,813,262	42%	28,375	15,841,636	6,621,508
5.00%	1,091,486	3%	54,573	1,146,058	436,596
8.00%	16,703	0%	1,336	18,039	6,180
8.50%	148,821	0%	12,650	161,470	54,320
9.00%	404,006	1%	35,640	439,646	146,163
10.00%	2,229,497	6%	223,350	2,452,847	761,219
10.50%	32,716	0%	3,435	36,151	5,071
11.10%	4,491	0%	499	4,989	1,522
11.11%	259,585	1%	28,839	288,425	57,520
12.00%	10,947	0%	1,314	12,261	3,613
15.00%	91,443	0%	13,717	105,160	27,433
17.50%	213,373	1%	37,159	250,532	40,889
17.64%	48,089	0%	8,483	56,571	13,157
17.65%	24,529	0%	4,329	28,858	6,710
20.00%	7,196	0%	1,439	8,635	1,799
25.00%	14,394	0%	3,599	17,993	2,879
26.00%	1,054,455	3%	271,081	1,325,536	41,658
28.20%	159,830	0%	45,216	205,046	26,708
28.21%	239,377	1%	67,528	306,905	40,192
30.81%	131,263	0%	39,031	170,294	20,037
42.85%	10,896	0%	3,519	14,415	-
42.86%	86,725	2%	294,191	980,916	-
43.00%	19,452	0%	8,364	27,816	-
43.20%	2,612	0%	499	3,111	-
43.50%	13,483	0%	-	13,483	-
44.50%	-	0%	(1)	(1)	-
45.00%	14,909,110	40%	4,512,114	19,421,224	-
46.20%	64,423	0%	29,763	94,186	-

Total	37,702,163		5,730,039	43,432,201	8,315,172
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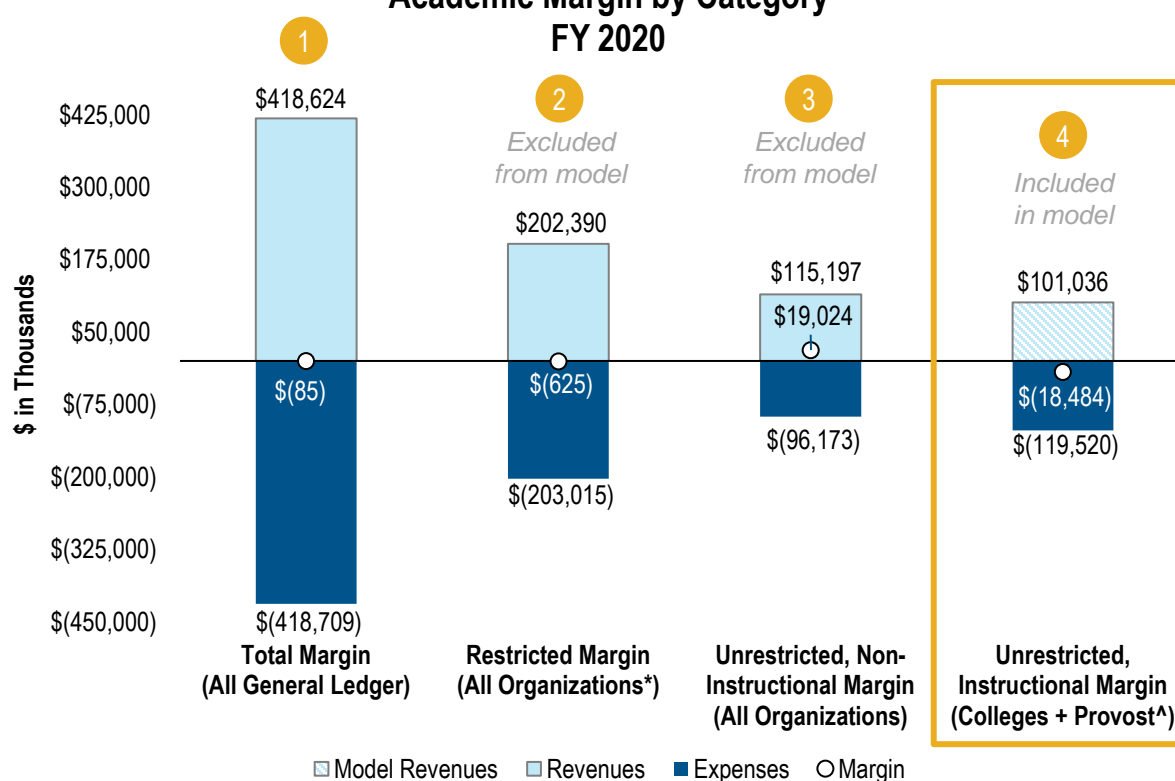
Note: ¹ Awards with MTDC Rate >40% have been excluded from results because of overstated unrecovery due to lack of distinction between Total Direct Cost (TDC) and Modified Total Direct Cost (MTDC)

Appendix

Marginal Analysis

The analysis began with an exclusion of state appropriations from the revenues included within the model, as depicted below. Further exploration with academic leadership led to the decision to include the funding formula within academic margins.

**Academic Margin by Category
FY 2020**



- 1 Total Margin** represents the **change in net assets** from activities found within the FY 2020 Statement of Revenues, Expenses, and Other Changes in Net Position.
- 2 Restricted Margin** represents operating revenues and expenses **on restricted funds**, including research, auxiliaries, gifts, capital, and others. These funds are excluded from the cost-to-educate model.
- 3 Unrestricted, Non-Instructional Margin** represents operating revenues and expenses for **activities not considered instruction or academic support** (e.g., research, auxiliaries, student services), and thus are excluded from the cost-to-educate model.
- 4 Unrestricted, Instructional Margin** represents the **net tuition[†]** from the FY 2020 tuition file **less instructional expenses included in the model** such as direct (instructor cost) and indirect (departmental support, materials and supplies, provost overhead, etc.)

Comparing net tuition and fee revenue to the direct and indirect costs of instruction provides an initial snapshot of NDSU's instructional margin at an institutional level.

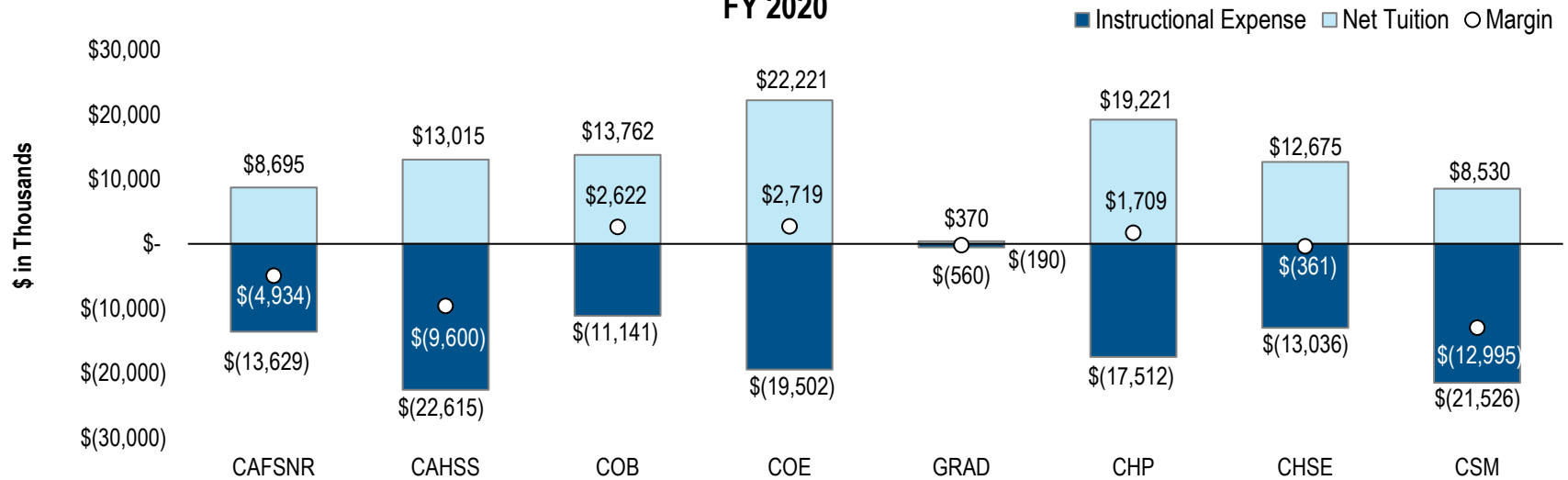
* Excludes instructional grant and student fee funds treated as unrestricted components in analyses
 ^ Includes all units reporting to the Provost except Research & Creative Activities and the Family Healthcare Pharmacy
 † Model net tuition includes tuition less waivers, and is exclusive of student fees and financial aid
 Sources: FY20 General Ledger & Cost to Educate Model

Appendix

Marginal Analysis

The chart below is the initial surplus and deficit view of the model, wherein net tuition revenue (tuition less waivers) is attributed to each unit according to students' most recent, primary program of study (not inclusive of state appropriations).

**Net Academic Margin by School
FY 2020**



	CAFSNR	CAHSS	COB	COE	GRAD	CHP	CHSE	CSM
Credit Hours Produced	33,247	82,701	34,763	50,178	703	32,463	35,486	81,725
Net Tuition/CH	\$262	\$157	\$396	\$443	\$526	\$592	\$357	\$104
Cost/CH	\$410	\$273	\$320	\$389	\$797	\$539	\$367	\$263
Margin/CH	\$(148)	\$(116)	\$75	\$54	\$(271)	\$53	\$(10)	\$(159)

Figures may differ from externally reported figures by <1% due to minor variances in classifications
Source: Tuition figures derived from AIR tuition database; Costs derived from Cost-to-Educate model. Non-degree and undeclared programs were not counted within any academic units for revenue; Excludes student fees