Appendix DD

Self Study Sample

Program: Description:	2012-2013: Diesel Technology, BS (B05)

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1	**Centrality**

How does the program support the mission, core themes, and vision of MSU-Northern

1 Advancement of MSUN's vision, mission, and core themes.

How well does the program support this area?

MSU-N's
Diesel Program is one of a limited number of university colleges offering a
4-year degree in Diesel Technology in the World. The Diesel Technology programs offer a
unique, hands-on technology education recognized by industry leaders as one of
the nation's leading Diesel Programs. Specialized technicians (employees) bringing a formal education, excellent work ethic, life-long learning skills, and the ability to adapt to change are in short supply. Industry leaders continue to report that these are the necessary skills for the 21st century. The Diesel Technology Program's goal is to develop a source of professionally educated, highly skilled, and motivated employees for industry. At MSU-Northern, these are the qualities that we strive to instill in our graduates in the Diesel Program. Administration and faculty look forward to working with industry leaders, discussing ideas and implementing initiatives for meeting this standard and how together we can create programs that ensures Northern graduates and North American industries will be in demand well into the future.MSU-Northern values individualized attention to its students, experientially-based learning, and creating a culturally rich and intellectually stimulating environment. From its North Central Montana High Plains main campus, the University serves as a regional cultural center and maintains strong partnerships with communities, education, business and industry.
Montana State University – Northern's Diesel program has four purposes:
1. To prepare students for careers in the Diesel and Diesel-related industries.
2. Provide industry with highly qualified and skilled entry level technicians and to prepare the future leaders of the Diesel industry such as business owners, corporate level managers and master technicians.
3. Strengthen the Diesel workforce by providing employees who possess a strong work ethic, critical thinking skills and the ability to communicate effectively.
4. Expose students to a variety of employment opportunities through employer presentations and cooperative education/internship experiences that lead to excellent career opportunities.

The Diesel program's aim complements the university's mission statement by incorporating current and emerging technologies within the Diesel curriculum.

It is very evident that the Diesel technology program plays a key role in what defines MSU-Northern. Core values identified so far (as per MSU-Northern Master Plan) are:

1. All MSU-Northern students be competent in their fields of specialization of a program of study
2. MSU-Northern graduates must be prepared to participate in a global society, an increasingly fast-paced, interconnected and complex society. To live and work in such a society, students must acquire sophisticated communication and problem solving skills, a readiness to continue to learn, the ability to empathize with those whose values differ from their own, and an understanding of community and a responsibility to that community.

The Diesel technology program meets each of the objectives of these core values.

Core value 1 is evidenced by our placement and success rates of our highly qualified graduates. This core value is also met with student participation in the MSU-Northern SkillsUSA chapter, and state and national SkillsUSA competitions.

Core value 2 is met with the requirements that our students will study history, social sciences and the humanities, and is also met by the fact that the Diesel industry is constantly changing, thus our graduates become life-long learners by virtue of participating in this industry.

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		Thus, both of the established core values of MSU-Northern are met by the Diesel technology program.
	2	Necessity of program based on statute, government regulation or other internal or external mandates
		We are not aware of any state or federal statutes requiring a Diesel program. Due to the societies' dependence on transportation industry, there is an overwhelming need for educated technicians, and it is important to provide these technicians to private businesses and governmental agencies. Our graduates from the Bachelor degree program often become leaders and managers in the transportation industry for both private businesses and governmental agencies. It is not uncommon for past B.S. graduates to visit MSUN in management positions to interview and hire potential employees. The program has been charged to conduct specialized training in light and heavy duty diesel and Diesel electrical/electronic applications by the Montana Department of Transportation (MDT). This program has been delivered over the last decade to MDT administration and technicians who represent locations across the entire state of Montana. In a recent meeting they expressed how satisfied they are with the training and will continue with this training well into the future.
	3	Number of other programs of the same or similar kinds in Montana or in the bordering states This is for Major Programs only.
		MSUN has the only B.S. program in the state of Montana. The closest B.S. programs are at Pittsburgh State in Kansas, and Ferris State University in Michigan. None of the other B.S. programs are bordering states. None of these other programs are mirror images of MSUN's. The other programs do not incorporate hands on laboratory coursework in their upper division courses and are referred to as inverted degrees.
	4	Potential impact on other MSUN programs
		The Diesel, Automotive, Ag-mechanics and AOT programs all have core courses required by all programs. The following are impacts on MSUN programs. 1. All faculty in the ATDI group teach these different core courses which impacts over 260 students within these programs. 2. The second substantial impact on MSUN is the B.S. requires 33 general education credits which none are taught by the Diesel program. This impacts the entire universities FTE. 3. The third substantial impact is the evidence of increased enrollment over the past three years and the internship and career opportunities for our students and graduates. In conclusion, the program has an overall substantial direct and indirect positive impact on the university.
2	**Productivity**	
	Productivity numbers are to be based on the 2010-2011 and 2011-2012 academic years combined or averaged as indicated in the section areas.	
	1	Credit hours taught Total Past 2 years.
		The ATDI faculty have worked together for multiple years on core initiatives including recruiting, equipment, facility management, budgeting and shared governance which positively impact each of the individual programs. Currently there are six core ATDI instructors who teach technical courses for the

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	Ag-Mechanics, Diesel and Diesel Programs. A blended approach has been incorporated which allows single instructors to teach courses required in multiple programs. The Ag-Mechanics, Diesel and Diesel Technology programs are interrelated and in many cases have faculty who teach in multiple disciplines. From a faculty viewpoint, all three programs are very intertwined and interrelated. The three full time Diesel faculty teaching loads in the 2011-12 school year consisted of 3 credits of Ag-Mechanics, 32 credits in Diesel, and 44 credits in ATDI which these prefixes are required by Auto, Diesel and Ag-Mechanics programs. 47 credits consisted of Ag-Mechanics and ATDI credits which are required in multiple programs. As the numbers indicate it is clear the Diesel program yields a high productivity critical to the success of Ag-Mechanics, Diesel, Diesel, AOT and MSU-Northern.
2	Degrees granted Average Past 2 years.
	2011: 18 2012: 19
3	Student retention Freshman fall to spring Freshman to Sophomore Looking at Past 2 years.
4	Time-to-degree Past 2 years.
5	Number of Majors/Minors Calculated per Faculty FTE Average Past 2 years.
	91 105 Avg: 98 FFTE: ??
6	Number of enrollments SFTE per Faculty FTE for courses taught by faculty in the program. Past 2 years.
7	Credits taught by full time vs. part time instructors.
	Almost all courses are taught by full-time faculty. Some adjunct have been employed to cover specific courses on a short time basis due to the difficulty in filling full-time positions.
8	Other factors influencing productivity
3	**Demand - external**
	Present and future demand of the program.
1	Present and future demand for program output as measured by market demand for graduates, economic/scientific/social trends Some resources: Montana Department of Labor Information Bureau of Labor Statistics Occupational Outlook Handbook Economic News Release for the Department of Labor

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1. Because of the increasing job opportunities and aging workforces in high technology industries in the region and nationally, skilled employees are in dire need.
2. The students are offered multiple jobs.
3. Undergraduate students are offered multiple cooperative education opportunities which lends to increased student retention.

Specialized technicians (employees) bringing a formal education, excellent work ethic, life-long learning skills, and the ability to adapt to change are in short supply. Industry leaders continue to report that these are the necessary skills for the 21st century. The Ag-Mechanics, Automotive and Diesel Technology Program's goal is to develop a source of professionally educated, highly skilled, and motivated employees for industry. At MSU-Northern, these are the qualities that we strive to instill in our graduates. Administration and faculty look forward to working with industry leaders, discussing ideas and implementing initiatives for meeting this standard and how together we can create programs that ensures Northern graduates and North American industries will be in demand well into the future.

2 Partnerships with external stakeholders

The Diesel Program utilizes a formal Cooperative Education program which collaborates with industry partners to prepare students and strengthen graduates, to excel in the fields of Diesel technology. As a result, the Diesel Program receives industry support and critical feedback.

While this has helped to improve our program, the need for long term stable budgets is necessary to keep our program current with industry needs. We have worked with industry to receive several donations, which reduce the demand on our operating budgets. However, these donations are not necessarily on a regular basis, and in some cases they add to the budget demands by requiring the purchase of specialized tooling and equipment to support donated equipment. The Diesel technology program has worked with other sources on campus such as the library that purchases on-line technical service manuals for students to utilize throughout the curriculum.

MSU-Northern's Diesel program has several industry partnerships in place, including Case New Holland, Modern Machinery, Tractor and Equipment, RDO, General Electric, BNSF, Patrick Construction, Tilleman Motor, Moodie Implement, Torgerson's, AGCO and others. In addition the Diesel program has been charged to conduct specialized training in light and heavy duty diesel and Diesel electrical/electronic applications by the Montana Department of Transportation (MDT). This program has been delivered over the last decade to MDT administration and technicians who represent locations across the entire state of Montana. In a recent meeting they expressed how satisfied they are with the training and will continue with this training well into the future.

MSUN has worked with a variety of industry partners to secure donations and develop partnerships for placement of internships and full time graduates. Some of these partners include: Ford Motor Company, General Electric, Tilleman Motor Company, Kiewit Construction, Diesel Doctor, Sanjel, Schlumberger, Wartsilla, RDO, Tractor and Equipment, Triangle Telephone, Montana Department of Transportation, Precision Diesel, Modern Machinery, Helena Motors, Cummins Rocky Mountain, Cummins Inc., Mack/Volvo, BNSF, Butler CAT, and others.

In order to support the needs of new and current students and employers/partners there is a need for three additional staff members, to be located in the College of Technical Sciences. This will include an Educational Specialist, Recruiter/Industry Relations Specialist and a Lab Technician. The Educational Specialist duties will include working with students and recruiter through the admissions process, assign

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		and manage the best cohort sequence available, deal with pre-registration, check for required course conflicts, and scheduling of technical and general education courses. The Recruiter/Industry Relations Specialist duties will include target recruiting for the ATDI programs, managing follow up contacts with potential students, maintaining and developing new articulation agreements, maintaining contact with supporting industry and develop new contacts for student cooperative education, and manage ATDI student cooperative education objectives, reports and visits. The Lab Technician duties will include maintaining lab components, developing new lab training stations and maintain technical software.
	3	The uniqueness of the program
		MSUN has the only B.S. program in the state of Montana. The closest B.S. programs are at Pittsburgh State in Kansas, and Ferris State University in Michigan. None of the other B.S. programs are bordering states. None of these other programs are mirror images of MSUN's. The other programs do not incorporate hands on laboratory coursework in their upper division courses and are referred to as inverted degrees. Employers consistently comment on the exceptional technical competencies of the students. Teaching technical content in the third and fourth years of the program greatly enhance the technical skill sets of the program's students. Many students will take dual majors or minor in other programs including business, automotive, and ag-mechanics.
	4	Project percentage of on-line vs. on-the-ground enrollments FTE What is the current percentage and what future opportunities may be available?
		At the present time the Diesel program has offered one course utilizing online and hybrid delivery courses. However, the Diesel, ATDI and Automotive programs are planning on expanding distance delivery courses through the use of poly-cam interactive training as well as hybrid course delivery.
4	**Demand - internal**	
	Utilization of the program courses by other areas and programs.	
	1	Courses in the program that are in general education.
		None.
	2	Course offerings in the program required in other programs.
		ATDI are core courses used for the Diesel, Automotive, Ag-Mechanics and AOT degrees.
	3	Enrollment demand for program courses Student FTE credits of majors in courses offered Student FTE credits of non-majors in courses offered
		All ATDI courses fill to capacity or beyond each semester. The Diesel courses are consistently at capacity or overloaded which maintains consistent high productivity. FTE credits will be calculated by administration.
5	**Quality**	
	1	State, national and international reputation of the program
		MSUN's Diesel program industry partners employ full time graduates and Cooperative Education students locally and worldwide. The graduates who are employed by our industry partners have very successful, life-long careers. These partnerships are an example of why Northern's Diesel Technology

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	program is unique and graduates are highly sought after by many different types of industries. These partnerships are the result of high intentions, sincere effort, methodical planning and skillful execution of many individuals between industry partners and program faculty. Documentation of industry employers is on file at the Career Center.
2	Faculty recognition
	Two of the faculty have been recognized with Pure Gold awards, one has been recognized with a Golden N award, and one has been recognized with a Faculty Focus award. MSUN does not employ a formal faculty excellence/award procedure. However, faculty can achieve faculty rank and tenure through a formal collective bargaining procedure. Currently, all the faculty are in a tenure track position or are tenured and have faculty rank. The faculty are ASE certified in Diesel technology. The faculty maintain these requirements plus additional on campus training provided by industry and off campus training at industry training centers. Faculty are also engaged in professional development programs and seminars hosted by industry and other entities. In conclusion, it is critical for the well-being of the program to have full time faculty.
3	Student work experiences or other co-curricular learning experiences
	The Diesel Program utilizes a formal Cooperative Education program which collaborates with industry partners to prepare students and strengthen graduates, to excel in the fields of Diesel technology. As a result, the Diesel Program receives industry support and critical feedback. The program also employs work study students throughout the academic year. The students are actively involved as judges and organizers of the annual Montana State SkillsUSA competition.
4	Faculty achievements in teaching
	The reputation of faculty in the program is very good. Faculty have often received offers of employment by industry and by other institutions. Student evaluation of faculty are typically above average.
5	Success in establishing and meeting learning goals
	Given the fact the MSU-Northern Diesel program has a 100% placement rate, within industries throughout Montana and across the United States, students as well as graduates are heavily garnered by the employers which demonstrates an ongoing success of the program's learning goals. MSUN's Diesel program has undergone major curriculum changes in electrical/electronic systems and diesel fuel systems to maintain the proper standards to meet the current industry requirements. Upper division technical courses are based upon new technology continually introduced and implemented by industry. The program faculty are acutely aware of this new technology as a result of bi-annual industry advisory board meetings. Further evidence of success of the program is the ongoing demand from industry partners for internships and graduates.
6	Other factors Professional development Training Maintaining certifications ...

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MSUN Diesel faculty receive a minimum of 20 hours of industry sponsored update training each year. The faculty are ASE certified in Diesel technology. The faculty maintain these requirements plus additional on campus training provided by industry and off campus training at industry training centers. Faculty are also engaged in professional development programs and seminars hosted by industry and other entities.

6 Size

1 Critical mass of faculty, students, curricular offerings.

Facts:

1. We are experiencing increased traditional and transfer student enrollments
2. ATDI faculty are overloaded at an average of 28 credits per six faculty
3. Based on current staffing, our programs are roughly 40% above student capacity.
4. Timing exists for incredible growth potential in ATDI programs
    1. Unique and quality programs create an inward migration of students into our university that wouldn't come in the first place.
    2. Continued articulation agreements across North America.
    3. Development of unique Bachelor degrees for cohort course sequencing.
5. Placement
    1. Because of the increasing job opportunities and aging workforces in high technology industries in the region and nationally, skilled employees are in dire need.
    2. Our students are offered multiple jobs.
    3. Undergraduate students are offered multiple cooperative education opportunities which lends to increased student retention.
6. We have experienced a lack of support to sufficiently run programs
    1. We need two additional faculty
    2. We need a dedicated recruiter
    3. We need co-op to reside in the COTS
    4. We need a dedicated position to be an Industry liaison
    5. We need a full time equipment maintenance and preparation person
    6. We need more time and support for faculty and curriculum development

Conclusion:

If we don't change, our program's growth will not maintain and the program enrollment will significantly decrease. If this is allowed to happen, the repercussions will be long lasting and very difficult to recapture. The ATDI faculty are passionate and dedicated to our programs and student's success. The faculty's goal and vision is to develop and grow our programs well into the future, which leads to lifelong careers for our graduates.

2 Outline personnel and/or facilities issues attached to quality, growth, and expansion.

We have experienced a lack of support to sufficiently run programs

1. We need two additional faculty
2. We need a dedicated recruiter
3. We need co-op to reside in the COTS
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		The Diesel program and ATDI courses need the proposed Auto/Diesel Tech Center to handle the expanded growth and demand of current and prospective new students.
7	**Cost Effectiveness**	
	1	Faculty efficiency Individual faculty salary/ SFTE
		Admin
	2	Investment in facilities and equipment Estimate of cost to Grow, Maintain, Integrate, Reduce program.
		If the benchmarks of a successful technical education program are job placement rates and the wages graduates can expect to earn during their internship or upon graduation, then Montana State University-Northern's Diesel Technology program can rightfully claim to be one most successful technical education programs in the U.S. The program faculty, chair and Dean of the COTS and industry partners have developed this world class program. Industry partners for many years have consistently off set the high cost of this program with training equipment, tooling, faculty training, curriculum, recruiting, retention, employing students and graduates. The program has significantly grown in student numbers in the last 5 years. Addressing the first two topics listed; Grow, Maintain, will take a consistent significant financial infusion into the program supporting; New facilities, current facilities, tooling, additional faculty, program support staff, faculty development, recruiting, retention and program development. The program is already integrated in AG-Mechanics and ATDI. If there is no University/state increase in financial support, the program's growth will not maintain or increase and the program enrollment will significantly decrease. If this is all to happen, the repercussions will be long lasting and very difficult to recapture. The ATDI faculty are passionate and dedicated to the program and student's success. The faculty's goal and vision is to develop and grow the program into the future, which leads to lifelong careers for graduates.
	3	Investment in personnel Personnel costs to Grow, Maintain, Integrate, Reduce the program.
		For the program to maintain and keep the level of quality expected by the program industry partners, the following contingencies will have to be adopted; 1. The program needs two additional faculty 2. The program needs a dedicated recruiter 3. The program needs an Cooperative Education/Internship director to reside in the COTS 4. The program needs a dedicated position to be an Industry liaison 5. The program needs a full time equipment maintenance and preparation person 6. The program needs more time and support for faculty and curriculum development For the program to grow and keep the level of quality expected by the program industry partners, the following contingencies will have to be adopted; 1. The program needs additional faculty proportional to the increase in student enrollment 2. The program needs additional dedicated recruiters 3. The program needs an Cooperative Education/Internship staff to reside in the COTS 4. The program needs industry liaison staff 5. The program needs additional full time equipment maintenance and preparation people

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	6. The program needs additional facilities, tooling, equipment, training, and program support infrastructure to accommodate the increased student enrollment.
4	Revenue generating activity Grants, donations, others...
	The program has cultivated over two decades worth of relationships with industry partners to offset the high cost of equipment, tooling, faculty development and student scholarships. These relationships are not just about donations. They are about a long lasting relationship between industry partners and MSUN. These donations have exceeded millions of dollars over the decades and helped to successfully carry a high quality reputation for the program well into the future. With the support of these industry partnerships and dedicated faculty and staff, enrollment in the program has substantially increased and is generating significant additional FTE for the university. Therefore, it is a well-known fact the program is a substantial revenue generator. In conclusion, these current relationships are consistent and new relationships are also forth coming. However, to expect these industry partnerships to fully fund and financially support the program is not reasonable.

Faculty Recommendations

The program faculty believe if significant positive changes do not happen, the program will not be able to maintain or grow enrollment. It is clear to the faculty the program enrollment will significantly decrease. If this is allowed to happen, the repercussions will be long lasting and very difficult to recapture. The program faculty are passionate and dedicated to the program and student's success. The faculty's goal and vision is to develop and grow the program well into the future, which leads to lifelong careers for the graduates.

Option 1 - Remain status quo

Costs:

Projected loss of 54 FTE

Reduction of current students in program

Stop recruiting

No growth potential in the program

Faculty burn out

Student scheduling issues

Reduction of quality and shortened life of lab equipment

Current technical curriculum content will not be updated

Decline in program quality

Option 2 - Right size program capacity to current enrollment

Actions:

Fill current faculty position

Reduce current faculty loads to 24-26 credits

Cap program enrollments

Costs:

Projected loss of 54 FTE

No growth potential in THE program

Stop recruiting

Reduction of current students in program

Current technical curriculum content will not be updated

Reduced availability for new students to enroll in technical program

Immediate reduction in FTE at Junior and Senior level

Overall reduction in FTE Freshman to Senior

Loss of industry and coop support because of lack of students.

Decline in program quality

Option 3 – Grow the program

Actions:

The program needs additional faculty proportional to the increase in student enrollment

The program needs dedicated recruiters

The program needs Cooperative Education/Internship staff to reside in the COTS

The program needs a dedicated position to be an Industry liaison.

The program needs additional full time equipment maintenance and preparation people

The program needs additional facilities, tooling, equipment, training, and program support infrastructure to accommodate the increased student enrollment.

Results:

If additional faculty are hired, the program capacity has the potential for a 25% growth in enrollment.

Industry will cover costs for travel to recruit

Increase follow up with industry contacts resulting in additional coop opportunities

Senate Recommendations

Diesel Technology Bachelor of Science (B05)

It is our recommendation that the program be maintained at its current level until the new facility is built. In addition, a serious review needs to be made of the major and minors in the automotive field. It seems at this time that faculty are adequate to meet the needs of the program. Courses are utilized in a number of the technology areas which makes it challenging to fully review the programs individually. It seems the number of majors is very good however, the graduate rate seems to be a bit low for the number of majors. Do we know why?

Academic Council Recommendation

Grow

: There is incredible regional potential to increase the enrollment and number of graduates in the program. Job potential is present to employ all graduates of the program.

Provost Recommendation

Grow

Grow—be aware of the facility needs.

Faculty Comments