It's your world.

A PROPOSAL FOR

High Performance Engine Machining

beginning fall of 2013

LAKE AREA
TECHNICAL INSTITUTE

www.lakeareatech.edu

LAKE AREA TECHNICAL INSTITUTE (LATI)

High Performance Engine Machinist

Executive Summary

Lake Area Technical Institute requests approval to add a High Performance Engine Machinist (HPEM) program plus additional options for our current Precision Machining, Auto Technology, and Diesel Technology Programs. This program will be 2 years in length, resulting in an AAS degree. The options will be 9 months in length. Graduates will be responsible for the machining of engine blocks, heads, and other components on internal combustion engines. These skills may also be applied to the machining of original equipment engines and their components.

LATI is an excellent fit for this new program/option(s) as we already have very strong Diesel Technology, Automotive Technology, and Precision Machining programs, which could share some of their equipment. All of these programs have resources which could be utilized by HPEM, thus lowering program and option expenses.

IDENTIFICATION AND DESCRIPTION OF THE PROGRAM

The HPEM program/option is designed for students interested in a career in the high performance aspects of engine machining and building, with opportunities in the automotive, diesel, and precision machining industry. This program/option will prepare individuals to apply technical knowledge and skills to the field of engine machining and building. Students will be trained in the areas of machining, precision measuring and grinding, blueprint reading, turning and milling, lathe and mill operations, Computer Numerical Control operations, engine analysis, engine performance, and engine repair. Students must also learn the various types of metals used in engines and gain an understanding of how those metals react to heat and pressure. All students will receive their ASC certification in HPEM.

OBJECTIVES AND PURPOSE OF THE PROGRAM

The primary objective of the HPEM program/option(s) would be to graduate students with the necessary skills to be employed in the Automotive, Diesel, and Machining industries.

The program/option will articulate appropriate high school credits, whenever possible, however high school articulation will be limited due to the specialized nature and detail of the HPEM curriculum. LATI will explore possible articulation agreements with the Board of Regents once the program/option(s) is started.

Objectives will include the following: A graduate of this program/option should be able to:

- use approved safety procedures in various work situations.
- correctly and safely use hand tools, specialty tools and test equipment.
- identify and explain the operation of various engines, power trains, electrical and hydraulic components that are utilized in the automotive and diesel industries.
- safely operate selected machines representing the high performance engine machining industry.
- correctly read and use blueprints involving engine machining.
- Provide students with the knowledge, skills, and attitude to advance in the career paths.
- Instill safe, ethical, and legal industry practice techniques.
- Analyze engine construction, operation, and failure.
- Demonstrate professionalism and related soft skills, including communicating with peers, supervisors, and customers.
- Perform engine machining procedures to industry standards.
- Analyze and demonstrate quality control in machining operations.
- Demonstrate computer utilization skills and interpret service information.

METHODS OF ATTAINING THE OBJECTIVES OF THE PROGRAM/OPTIONS

The program/option will include classroom instruction and lab experiences, along with industry field trips, guest speakers, and capstone projects. The curriculum will incorporate a variety of instructional methods including use of LATI's Innovation Center to enhance instructional materials with virtual instruction, streaming video, etc.

The HPEM program/option(s) will work closely with industry and an advisory board composed of representatives from potential employers. The Advisory Board will approve the curriculum, discuss and recommend equipment purchases and assist in forming partnerships to assist LATI with innovative curriculum and cost-sharing.

DESCRIPTION OF THE NEEDS BASED ON LABOR MARKET DEMANDS IN THE UNITED STATES AND SOUTH DAKOTA

See Appendix B

POPULATION TO BE SERVED BY THE PROGRAM/OPTIONS

The program/options will be available to all interested individuals who successfully meet the LATI admission criteria established. The program/options will be full-time. All applicants must be high school graduates and take an admission test to establish reading and math abilities. No restriction will be made regarding race, creed, gender or age. The program/options will draw students from South Dakota primarily. The opportunities for employment will be primarily in northeastern South Dakota.

PROJECTED THREE YEAR BUDGET

The program will be located on the LATI campus, sharing lab space with our Precision Machining Program. Extensive cooperation and synergism is anticipated between the High Performance Engine Machining Program and Precision Machining, Auto Technology, and Diesel Tech. LATI has some of the equipment needed for this program. Additional equipment purchases will be needed. The program can accommodate 15 students per class, with the program enrollment growing to over 30 after two years.

	FY 14	FY 15	FY 16
Instructor Salary/Benefits	$52,500	$105,000	$109,200
Equipment	$50,000	$25,000	$15,000
Supplies	$7,500	$10,000	$10,000
Travel	$2,000	$2,500	$2,500
Contracted Services	$2,000	$2,000	$2,000
Totals	$114,000	$144,500	$138,700

PROGRAM/OPTION COMPETENCIES AND ENTRY AND EXIT POINTS OF SUBOCCUPATIONS

Entry Points: Fall-2013

Exit Point: After completion of all coursework.

Job Titles: See Appendix B

Statement of Non-duplication

This program/option is not available at any college or Technical Institute in South Dakota.

Curriculum Design

See Appendix A for Curriculum Outlines.

Survey/Wage Factor

See Appendix B

SUGGESTED CIP CODE

47.0615 **Engine Machinist. (NEW)** A program that prepares individuals to apply technical knowledge and skills to the building and reconstruction of automotive and commercial vehicle engines. Includes instruction in cylinder head and block, crack repair, crankshaft inspection and repair, connecting rods and pistons, balancing, block preparation, disassembly and repair, **engine** assembly, gas and diesel technology, and inspection and machining.

APPENDIX

A. Curriculum outlines.
B. Job titles and survey/wage factors.
C. Letters of Support.

Appendix A

High Performance Engine Machinist

LAKE AREA TECHNICAL INSTITUTE
It's your world.

Semester Outline

2013 – 2014 Revised: 5/12

18 Months ■ Credits Required for Graduation: 75 ■ Associate of Applied Science (A.A.S.) Degree

First Year – Fall Semester 2013

Course Number	Course Title	Clock Hours	Credits
PM 101	Machine Tool Theory I	28	1
PM 106	Blueprint Reading	28	1
PM 110	Precision Measuring	28	1
PM 118	Turning/Milling Theory	28	1
PM 129	Lathe and Mill Operations	126	5.5
PM 134	Machine Tool Lab	28	1
PM 167	Introduction to Computer Numerical Control (CNC)	28	1
AT 119	Alignment, Suspension, Steering, Axle Theory	56	2
AT 122	Alignment, Suspension, Steering, Axle Lab	84	3
• Selected Mathematics Course MATH 100 – Applied General Math MATH 101 – Intermediate Algebra MATH 102 – College Algebra *		48	3
	Total	482	19.5

First Year – Spring Semester 2014

Course Number	Course Title	Clock Hours	Credits
AT 155	Electrical/Electronic Systems Theory	98	3.5
AT 156	Electrical/Electronic Systems Lab	168	6
DT 179	Diesel Engines I	84	3
PM 168	Precision Grinding	56	2
PM 185	Miltronics Computer Numerical Control (CNC) Operations	84	3
AED 100	Automated External Defibrillator	14	.5
HAZ 100	Hazardous Materials Safety	14	.5
	Total	518	18.5

Appendix A (continued)

High Performance Engine Machinist

Second Year – Fall Semester 2014

Course Number	Course Title	Clock Hours	Credits
HPEM 100	Introduction to High Performance Engine Machining	84	3
HPEM 105	Cylinder Head Machining/Reconditioning	84	3
HPEM 110	High Performance Machining Lab	14	.5
HPEM 115	High Performance Engines Lab	140	5
CIS 102	Windows Applications for Technicians	48	3
CSS 100	Career Search Strategies	14	.5
• Selected Social Science Course ECON 105 – Leadership in the Global Workplace ECON 201 – Principles of Microeconomics I * ECON 202 – Principles of Macroeconomics II * SOC 100 – Introduction to Sociology *		48	3
	Total	432	18

Second Year – Spring Semester 2015

Course Number	Course Title	Clock Hours	Credits
HPEM 120	Automotive Engine Analysis	84	3
HPEM 125	Loader Engine Machining/Reconditioning	84	3
HPEM 130	Advanced High Performance Engine Machining	70	2.5
HPEM 135	Advanced High Performance Engine Lab	126	4.5
• Selected Behavioral Science Course PSYC 100 – Psychology of Human Relations PSYC 101 – General Psychology *		48	3
• Selected Communications Course COMM 101 – Contemporary Communication ENGL 101 – Composition * SPCM 101 – Fundamentals of Speech *		48	3
	Total	460	19

• Students will select a course in each of the areas listed to meet general education requirements.

Courses marked with an asterisk can be transferred directly to the university system under the terms

Appendix B

South Dakota Employment Projections 2008 - 2018 and Wage Data for Select Machinist Occupations											
							Percentile Wages				
SOC* Code	Occupational Title	2008 Base Number of Jobs	2018 Projected Number of Jobs	Percent Change	Average Annual Demand for Workers	Average Wage	10th	25th	50th	75th	90th
17-2141	Mechanical Engineers	310	370	19.4%	14	$33.87	$22.67	$26.84	$32.67	$39.86	$46.14
17-3027	Mechanical Engineering Technicians	85	105	23.5%	4	$18.67	$14.88	$16.40	$18.33	$20.61	$23.45
51-2031	Engine and Other Machine Assemblers	580	670	15.5%	21	$13.69	$10.87	$12.12	$13.51	$14.96	$16.83
51-4034	Lathe and Turning Machine Tool Setters, Operators and	175	170	-2.9%	3	$14.83	$11.75	$12.84	$14.50	$16.68	$18.86
51-4041	Machinists	735	880	19.7%	24	$16.55	$12.69	$14.29	$16.54	$18.57	$20.95

**SOC - Standard Occupational Classification, 2000*

Click here for descriptions of SOC occupations by code (2000 version).

Projected Employment Notes:

Data is preliminary and subject to revision. Data for occupations with less than 20 jobs in 2008 not included. Number of jobs data for 2008 and 2018 rounded to neareast five.

Demand data is the summation of job openings estimated due to projected employment growth and job openings projected to be created due to replacement need of current workers. Replacement need is estimated by multiplying occupational employment estimates by national replacement rates supplied by the U.S. Bureau of Labor Statistics (BLS). These rates estimate the number of job openings, by occupation, which will be attributed to a worker permanently leaving an occupation (e.g. retirement, death, exits the workforce, etc.). Average annual demand data are calculated by dividing by ten, the number of years in the projection period. For more information, see http://dol.sd.gov/lmic/projections_methodology.aspx.

Wages Notes:

Wages include May 2010 SD Occupational Worker and Wage Estimates and do not include the value of benefits paid to workers.
Number of Workers: represents an estimate of the total wage and salary workers in an occupation across all industries. For certain occupations, the number of workers statistic may not be available because of disclosure concerns or reliability issues.

Average Wage: represents the arithmetic mean of the wage data collected, calculated by dividing the estimated total wages for an occupation by the number of workers in that occupation. Also referred to as the mean wage.

Median Wage: represents the positional central tendency of a dataset where 50 percent of the wages fall below this wage and 50 percent of the wages fall above this wage. This is also commonly referred to as the 50th percentile wage.

Percentile Wage: represents the percentage of an occupation's workers that earn less than or equal to that wage:

10th Percentile: 10% earn less than or equal to this amount; 90% earn more
25th Percentile: 25% earn less than or equal to this amount; 75% earn more
50th Percentile: 50% earn less than or equal to this amount; 50% earn more (median wage)
75th Percentile: 75% earn less than or equal to this amount; 25% earn more
90th Percentile: 90% earn less than or equal to this amount; 10% earn more

For more technical notes on wage data, please visit http://dol.sd.gov/lmic/technicalnotes_wages.aspx.

Source: Labor Market Information Center, South Dakota Department of Labor and Regulation, April 2012.

Appendix B (continued)

United States Employment Projections 2010 - 2020 and Wage Data for Select Machinist Occupations											
					Average Annual Demand for Workers		2010 Percentile Wages				
SOC* Code	Occupational Title	2010 Base Number of Jobs	2020 Projected Number of Jobs	Percent Change		2010 Average Wage	10th	25th	50th	75th	90th
17-2141	Mechanical Engineers	243,200	264,600	8.8%	99,600	$39.65	$24.30	$29.98	$37.58	$47.19	$57.44
17-3027	Mechanical Engineering Technicians	44,900	46,700	3.9%	10,400	$24.74	$15.36	$19.01	$24.09	$29.74	$35.57
51-2031	Engine and Other Machine Assemblers	33,700	35,500	5.3%	15,200	$18.75	$11.33	$13.58	$17.46	$23.22	$28.91
51-4034	Lathe and Turning Machine Tool Setters, Operators and Tenders, Metal and Plastic	41,900	39,900	-4.7%	8,300	$17.23	$10.83	$13.33	$16.66	$20.66	$24.78
51-4041	Machinists	370,400	401,900	8.5%	99,500	$19.13	$11.59	$14.73	$18.52	$22.90	$27.91

**SOC - Standard Occupational Classification, 2000*

Click here for descriptions of SOC occupations by code (2000 version).

Projected Employment Notes:

Data is preliminary and subject to revision. Data for occupations with less than 20 jobs in 2010 not included. Number of jobs data for 2010 and 2020 rounded to neareast five.

Demand data is the summation of job openings estimated due to projected employment growth and job openings projected to be created due to replacement need of current workers. Replacement need is estimated by multiplying occupational employment estimates by national replacement rates supplied by the U.S. Bureau of Labor Statistics (BLS). These rates estimate the number of job openings, by occupation, which will be attributed to a worker permanently leaving an occupation (e.g. retirement, death, exits the workforce, etc.). Average annual demand data are calculated by dividing by ten, the number of years in the projection period. For more information, see http://dol.sd.gov/lmic/projections_methodology.aspx.

Wages Notes:

Number of Workers: represents an estimate of the total wage and salary workers in an occupation across all industries. For certain occupations, the number of workers statistic may not be available because of disclosure concerns or reliability issues.

Average Wage: represents the arithmetic mean of the wage data collected, calculated by dividing the estimated total wages for an occupation by the number of workers in that occupation. Also referred to as the mean wage.

Median Wage: represents the positional central tendency of a dataset where 50 percent of the wages fall below this wage and 50 percent of the wages fall above this wage. This is also commonly referred to as the 50th percentile wage.

Percentile Wage: represents the percentage of an occupation's workers that earn less than or equal to that wage:

10th Percentile: 10% earn less than or equal to this amount; 90% earn more
25th Percentile: 25% earn less than or equal to this amount; 75% earn more
50th Percentile: 50% earn less than or equal to this amount; 50% earn more (median wage)
75th Percentile: 75% earn less than or equal to this amount; 25% earn more
90th Percentile: 90% earn less than or equal to this amount; 10% earn more

For more technical notes on wage data, please visit http://dol.sd.gov/lmic/technicalnotes_wages.aspx.

Source: Labor Market Information Center, South Dakota Department of Labor and Regulation, April 2012. United States Department of Labor, Bureau of Labor Statistics, April 2012

Hedahls Auto Plus

Office of Career and Technical Education
800 Governor's Drive
Pierre, SD

May 11, 2012

Re: LATI High Performance Engine Machining Program

Director Wilson,

Hedahl's Auto Plus whole-hearted supports Lake Area Technical Institute's application to start a High Performance Engine Machining diploma and degree program. Such a program is needed to supply the skilled craftsmen the Auto Engine Repair industry needs. Hedahl's has a long standing relationship with Lake Area Technical Institute and we feel LATI would do an excellent job with this program.

Considering the value of automotive and diesel engines, the skill level needed to customize and repair this equipment is increasing. There is a shortage of technicians with the skill to do this type of work. South Dakota does not currently have a program of this type.

Graduates from this proposed program are needed all across the state and will be a welcome addition to our workforce.

Rich O'Byrne
Machine Shop Manager
Hedahl's Auto Plus
Watertown, SD 57201

P4 Manufacturing
CNC Machining
Clark, SD 605-532-4121

5-15-12

Letter of support for a High Performance Engine Machining program

We support the addition of a high performance engine machining program at Lake Area Technical Institute. Adding this degree could result in multiple benefits.

The communication and collaboration between programs would increase. This program would encourage multiple programs to work together on projects and ideas. If the automotive department wanted to try a new design they could work with the engineering and drafting departments to draw the design so the engine machining department could manufacture the design to be tested.

Creativity would be stimulated. When people see that ideas, to improve performance of engines, are manufactured and tested: teachers, students, and others will come forward with ideas to be manufactured and tested.

There is a continual need for trained metal working professionals. LATI's precision machining program has been filling key positions for years, helping area manufacturers compete in our global economy. We need more trained individuals to help our area, state, and country thrive.

Paul Streff
CEO
P4 Manufacturing