

LETTER OF INTENT

Welding Technology Emphasis within an existing
Manufacturing Engineering Technology Bachelor of Science Degree
at Weber State University
(March 15, 2004)

EXECUTIVE SUMMARY

Weber State University (WSU) seeks approval to add a welding technology emphasis to its existing Manufacturing Engineering Technology (MfET) degree program. Currently, there are no emphasis options within the B.S. in MfET degree. The MfET program is one of four degree granting programs housed within the Manufacturing and Mechanical Engineering Technology Department (MMET) within the College of Applied Science and Technology (COAST).

We have intentionally added this welding technology emphasis to our existing MfET degree, versus creating a stand-alone welding technology degree, for two important reasons. First, this degree configuration will increase job opportunities for our students because it will produce graduates with both welding technology expertise and manufacturing knowledge and skills. Second, it will enable us to accredit the welding technology emphasis through the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET) as our MfET program is currently accredited by TAC of ABET. Designing and implementing an emphasis within a nationally accredited degree program will help us maintain program quality.

This proposed welding technology emphasis meets, to varying degrees, four criteria for exceptions to the moratorium:

1. Cost Savings or Efficiencies - To support this welding technology emphasis, we propose to hire one faculty member, using funds attached to a position vacated by a faculty retirement. The new faculty member will be paid approximately \$55,000 and the faculty member who retired was paid \$62,525 (both salaries exclude benefits). The balance of unspent salary dollars (\$7,525 plus benefits) will be redirected to support high demand growth areas within COAST, thereby increasing our salary dollars efficiency.
2. Accreditation - Although this new emphasis within the MfET program is not needed to meet accreditation requirements, embedding welding technology within a nationally accredited MfET degree program is a cost-effective way to extend this accreditation status to the proposed welding technology emphasis.
3. Compelling Need - This addition to our curriculum is in tandem with a Utah State University (USU) decision to suspend enrollment in its Welding Engineering Technology degree, effective Fall 2003. There is a compelling need to provide a program completion option for existing USU students, as well as to meet current and future industry employment needs as noted later in this document.
4. Transfer or Restructure of Existing Programs - On a fundamental level, this curriculum change could be viewed as a transfer of a program from one USHE institution to another,

although no funds are being transferred. This curriculum change is a restructuring of our MfET program and provides students with two degree options: the existing B.S. in MfET, and the B.S. in MfET with a Welding Technology emphasis.

PROGRAM DESCRIPTION

Currently, the B.S. in MfET requires a total of 125 credits, including 45 credits of required MfET courses. The proposed B.S. in MfET with a Welding Technology emphasis would require students to substitute 25 of the required 45 course credits with 26 credits of courses in welding technology and electrical circuits (see following table), for a degree total of 126 credits. The proposed welding technology courses have been approved by the WSU Faculty Senate, and we believe they cover the same content as the USU courses.

EXISTING AND NEW COURSES IN THE MfET WELDING TECHNOLOGY EMPHASIS PROGRAM			
Existing MfET Courses	Cr Hrs	New Welding Technology Courses	Cr Hrs
MfET 1150 Preprofessional Seminar	1	MfET 2670 Gas Metal Arc, Flux Core Arc, & Gas Tungsten Arc Welding	3
MfET 2440/L CNC in Manufacturing	3	MfET 3060 Codes, Welding Inspection, & Quality Assurance	3
MfET 3010 Tool Design	3	MfET 3630 Fusion Joining & Brazing	3
MfET 3310/L Material Selection and Heat Treatment	3	MfET 3750/L Welding Metallurgy I	3
MfET 3320 Machine Design	2	MfET 3760/L Welding Metallurgy II	3
MfET 3340/L Applied Fluid Power	3	MfET 3820 Nondestructive Testing	3
MfET 3350/L Plastic and Composite Manufacturing	4	MfET 4090 Power Sources	2
MfET 3610/L Machining Principles II	3	MfET 4310 Corrosion	2
MfET 3710/L Computer-Aided Manufacturing and Rapid Prototyping	3	CEET 1140 AC and DC circuits	4
TOTAL	25	TOTAL	26

The four-year suggested schedule of courses for the B.S. in MfET with a Welding Technology emphasis is found in the table on the following page.

B.S. in MfET - Welding Technology Emphasis
Total credits = 126

COURSE	NAME	HRS	COURSE	NAME	HRS
MfET 1210/L	Machining Principles I	3	CEET 1110	Basic Electronics	2
CDGT 1250	Computer Aided Drafting	3	CDGT 1260	Advanced Computer Aided Design	3
*	Computer and Information Literacy exams/courses	2/4	ENGL EN 2010	Intermediate Writing	3
ENGL EN1010	Introduction to Writing	3	MATH SI 1210	Calculus	4
MATH QL1080	Pre-calculus	5	CHEM PS/SI 1110	Elementary Chemistry	5
FALL FRESHMAN SEMESTER		Total 16	SPRING FRESHMAN SEMESTER		Total 17
MfET 2150/L	Metal Forming, Casting and Welding	4	MfET SI 2300	Statics and Strength of Materials	5
CDGT 2450	Geometric Dimensioning & Tolerancing	2	MfET SI 2410	Quality Concepts and Statistical Applications	3
COMM HU1050	Intro to Interpersonal Communication	3	CEET 1140	AC and DC Circuits	4
ECON SS1010	Economics as a Social Science	3	HU	Creative Arts or Humanities Elective	3
PHSX PS/SI 2010 or 2210	General Physics	5			
FALL SOPHOMORE SEMESTER		Total 17	SPRING SOPHOMORE SEMESTER		Total 15
MfET 2670	Gas Metal Arc, Flux Core Arc, & Gas Tungsten Arc Welding	3	MfET 3630/L	Fusion Joining & Brazing	3
MfET 3060	Codes, Weld Inspection & Quality Assurance	3	MfET 3910	Six Sigma Methods and Tools in Manufacturing	5
MfET 3750/L	Welding Metallurgy I	3	MfET 3820	Nondestructive Testing	3
MfET 3810	Statistical Process Control and Reliability	3	MfET 3550	Manufacturing Supervision	3
MfET Elective	Technical Elective	3	MfET 3760/L	Welding Metallurgy II	3
FALL JUNIOR SEMESTER		Total 15	SPRING JUNIOR SEMESTER		Total 17

MfET 4580/L	Process Automation	3	MfET 4620L	Senior Project Lab	2
MfET 4610	Senior Project Production Planning and Estimating	5	MfET 4090	Power Sources	2
MfET 4610L	Senior Project Lab	2	MfET 4310	Corrosion	2
HIST 1700	American Institutions	3	DV	Diversity Elective	3
LS	Life Science Elective (Suggested - Botany 1400)	3	CA/HU	Creative Arts or Humanities Elective	3
			MfET 4595	Certified Manufacturing Technologist (CmfgT) Exam Review	1
FALL SENIOR SEMESTER		Total	SPRING SENIOR SEMESTER		Total 13
		16			

* Computer and Information Literacy may be satisfied with exams or specific courses.

Faculty Preparedness

There are currently six full-time faculty teaching in the WSU MfET program. Two of these faculty have significant welding background and they will teach some of the welding courses. To fully implement this proposed emphasis, we will hire one additional faculty member with welding expertise. For a tenure track appointment, this person must have a minimum of a masters degree and five years of relevant work experience. These three faculty are sufficient to teach the 26 credits of welding courses because WSU faculty are required to teach 24 credits per year.

MARKET AND STUDENT DEMAND

Utah Employer Demand

We have information from Utah industries that this type of degree is strongly needed. The WSU MfET Industrial Advisory Committee members, including representatives from Autoliv, Barnes Aerospace, and Williams International, feel very strongly that there is solid market demand for such a program and have fully endorsed it. Welding is a fundamental manufacturing process used within their companies. A significant advantage in having a welding emphasis as part of manufacturing degree program is that students not only learn about the various types and kinds of welding processes and procedures, they learn about it in the larger context of manufacturing as a whole. It should also be noted that this program will produce graduates with expertise in the technologies needed by Hill Air Force Base, and this could be a positive factor in any future BRAC evaluations. We are also aware that USU's welding graduates have been hired by other Utah companies, including Varian, Vulcraft, Hercules, Icon/Proform, Nucor, ATC Thiokol, and Boeing.

National Employer Demand

There is also a national market demand for welding graduates. With the decision of USU to suspend enrollment in their welding technology program, only three ongoing four-year welding programs exist: Ferris State University in Michigan, Ohio State University, and LeTourneau University in Texas. It is estimated that only 30% of the national demand for welding engineers is currently being met. This may be one reason why there has been a 100% placement of USU graduates in recent years in the Utah companies listed earlier, as well as with Caterpillar, Raytheon, General Dynamics, and Martin Marietta.

Student Demand

Because of local and national market demand for welding technology graduates, we believe there will be ongoing and consistent student demand for a program of this nature. We are told that USU is suspending enrollment in this program, not because of lack of student interest, but because there is a lack of program fit with their institutional mission and it is correspondingly underfunded (see USU letter).

We are aware of 30 USU welding students who are interested in transferring to WSU, pending Board of Regents' approval of this emphasis. We believe by including a welding emphasis within an accredited MfET degree and by implementing a strong recruitment program, WSU student enrollments will equal or exceed the recent USU five-year enrollment history as noted in the following table.

USU Welding Engineering Technology Majors				
1999	2000	2001	2002	2003
40	37	44	50	35

BUDGET

Personnel

As noted earlier we will hire one faculty member, in addition to the two current faculty who have significant welding background, to teach the 26 credits of welding technology MfET courses. This is comparable to USU's welding program that is supported by two faculty. Overall, we anticipate we will have an approximate faculty:student ratio of 1:16 for MMET courses, including within this proposed welding technology emphasis. The budget for this new position is approximately \$55,000, excluding benefits. Funding will be redirected from an unfilled Mechanical Engineering Technology faculty position, budgeted at \$62,525, that arose from a June 2003 retirement. This unfilled position is one of three that supports Mechanical Engineering Technology. It will be redirected to support the Welding Technology emphasis because of declining student enrollments within Mechanical Engineering Technology.

The MMET Department currently has one full-time technician and 1.5 FTE clerical support staff. This is adequate to support this new emphasis area and additional staff will not be needed.

Current Expense

Currently the MMET Department has an operating budget of \$60,000 per year to support the needs of 14 full-time and 11 part-time faculty and nearly 700 majors across four programs. This operating budget is adequate to support the addition of one faculty member and 30 to 60 welding technology emphasis students.

Equipment and Facilities

We will not require any equipment budget to implement the welding technology emphasis. Miller Electric, a major manufacturer of welding equipment, has relocated their Training Center for the Intermountain West from USU to WSU as of September, 2003 (see letter of support). As a result, we have access to the latest welding equipment including four Metal Inert Gas welders, four Tungsten Inert Gas welders, three arc welders, five plasma cutters, and two engine driven welders, all of which can be used with this emphasis. The estimated dollar amount of this equipment is \$250,000.

Additionally, USU has indicated they are willing to send us surplus equipment that was used solely for their Welding Engineering Technology program, pending approval of our welding technology emphasis. This equipment is also being sought after by BYU Idaho, College of Southern Idaho, Salt Lake Community College, Ogden-Weber Applied Technology Center, and Bridgerland Applied Technology Center. We hope this equipment will come to WSU to further support our welding technology emphasis.

Currently, we have eight classrooms, three computer labs and 11 other laboratories for the MMET Department (a combined 30,041 square feet). This is adequate to support the proposed 26-credit welding technology emphasis courses.

The following table summarizes the five-year budget increase needed for our welding technology emphasis. By reallocating salary dollars from an unfilled position, we will be able to adequately support this proposed emphasis.

	2004-05	2005-06	2006-07	2007-08	2008-09
Total Students	35	45	55	60	60
New Faculty	1	0	0	0	0
Redirected position	\$55,000 *	\$56,100	\$57,222	\$58,366	\$59,534

* Note: Salary figures include a 2% increase each year and do NOT include benefits.

MISSION FIT

The proposed emphasis in welding technology in our MfET program supports WSU's institutional mission that states, "The mission of the university is to meet the educational needs of Utah through roles assigned by the State Board of Regents in the liberal arts and sciences and

a variety of vocations and professions.” Additionally the mission indicates, “Instructional programs are designed to prepare students for immediate employment or further study, at the same time equipping them through liberal education for lifelong learning in a changing world.” The COAST mission is to serve the citizens of Utah by preparing students for employment upon graduation and ensuring that they are productive, accountable, and responsible individuals able to function effectively in today’s workplace. The proposed B.S. in MfET with a welding technology emphasis fits very well with both the university and college mission.

SIMILAR PROGRAMS ALREADY OFFERED IN THE USHE

Several of the UCAT campuses offer certificates in welding and several of the community colleges have welding programs. The main thrust of both of these types of programs is to produce welders, rather than welding technologists. A welder is one who physically does the welding, either in the shop or in the field. The welding technologist is someone who determines what kind of welding process should be used, often in an assembly line setting within manufacturing. With the enrollment suspension of the USU welding program, there is no four-year welding emphasis or major program within USHE.

We believe that UCAT faculty and administrators are discussing a possible AAT in Welding. Our proposed MfET baccalaureate degree with a welding emphasis will complement a future UCAT AAT in Welding and provide an advanced degree path for those AAT graduates.

INSTITUTIONAL PRIORITY

The funding, facilities, equipment and courses are already in place for this proposed emphasis which we will incorporate within an existing nationally-accredited manufacturing program. There is documented local, state and national industry need for graduates with welding technology expertise. A welding technology emphasis within our existing MfET degree program is a cost-effective way to provide a nationally-accredited program option for students. Welding technology is consistent with our institutional and college missions. For all of these reasons, this proposed welding technology emphasis program is a high priority for WSU.

INSTITUTIONAL READINESS

We are well prepared to implement this welding technology emphasis within our existing B.S. in MfET degree program. We have reallocated funds sufficient to hire the one additional faculty member needed to teach the welding technology emphasis courses that have been approved by our Faculty Senate. We have the support staff, space, operating budget, and equipment needed for this program. We have demonstrated employer demand for a welding technology emphasis. Our faculty have traveled to USU to talk to their students and faculty to facilitate the transfer of USU students to WSU. USU faculty have visited WSU to talk to our faculty and tour our facilities. We are prepared to provide a seamless transfer of USU students to our emphasis

program when it is approved. We are ready to implement a high-quality, nationally-accredited welding technology emphasis within an existing degree program, and we request Board of Regents' approval to do so.

INSTITUTIONAL SIGNATURES

Keith Allred, MMET Department Chair

Date

Warren Hill, COAST Dean

Date

Kathleen Lukken, Interim Provost

Date