

A Fully Articulated International Program in Manufacturing Engineering Technology

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Abstract

The Industrial and Engineering Technology Department (IET) at Central Michigan University (CMU) and the Mechanical Engineering Technology Division (MET) of Humber College in Toronto, Canada have been working to develop a dual enrollment program which responds to international student needs and interests in the global marketplace. The program is designed so that students are enrolled concurrently at both institutions and are able to take specified CMU courses before completing the Humber diploma option of the program. To support this initiative the programs have been linked, harmonizing the curriculum to ensure the smooth transition from one institution's program to the other.

The steering committee for this program is staffed by personnel from both institutions. This staffing includes Department Chairs, Directors of International Education and administrators. The committee has worked to develop strategies to design, develop and deliver the program. This strategy includes marketing issues as well.

The conference presentation will include issues raised and resolved at each level and stage of the program development.

History of the challenge:

The development of international partnership programs do not always progress smoothly from inception through to completion. There can and will be many stops and starts along the way. Of key importance to the completion of such a project is the bringing together of the key players that have a commitment to the principles of international partnerships and the willingness and ability to follow through with the process. If the process were easy, there would be many more examples of such programs in existence today. There is little question that international partnerships can offer advantages to all involved yet the reality is that crossing national borders uncovers restrictions that are not apparent when working within one's own political borders. There are many political, as well as legal issues that must be addressed. The normal mode of operation in one country may well be prohibited in another. One of the first steps to overcoming the obstacles is to identify them. This is not as simple as it may seem. Often the educational structures in different countries are so different in structure that there can even be a lack of common vocabulary to explain them. It is often very difficult to ask the right questions let alone

determine the answers. The challenges for such programs are formidable but worth the time and effort upon completion.

Central Michigan University (CMU) and Humber College (HC) first attempted to develop an articulated program in the spring of 1994. It was planned that this program would allow students from Malaysia to complete a diploma program at HC and then transfer to CMU to complete the Bachelors of Science degree in Engineering Technology. Preliminary discussions at the administrative levels failed to accomplish the desired outcomes largely because several key players were missing from the discussions. These key players include the faculty from the respective schools that were able to address the issues associated with course content and the staff members that understood the program structures of their respective schools.

The second attempt to develop a program was initiated in 1996. This time, not only administrators were involved in the initial discussions but the faculty and staff counterparts were also involved. The administrative personnel were able to provide the respective institutional commitment to the project, and the faculty / staff were able to identify and address the many diverse details. Of particular difficulty for the faculty and staff was the blending of two pre-existing programs, both of which already had students enrolled. Notwithstanding these challenges, this time the project moved to the point of an agreed-upon program between CMU and HC. Unfortunately, we had not sufficiently involved the Malaysian counterparts into the discussion to determine that the program had a fatal flaw. The Malaysians required a specific type of program accreditation that was lacking from our program. Once again the efforts failed to reach its goals.

The third attempt to develop the program started in 1997. This time we were able to capitalize on what had been learned from prior attempts and to avoid many of the old pitfalls. The blended program was designed from scratch. This meant that the program was brand new and did not already have students enrolled in it. We were able to define the overall program objectives up front and did not have to attempt to match previously established program objectives. This made the whole process much easier than trying to take an existing program and make it fit. Of equal, if not greater importance was that we were able to build on the professional skills and understandings of the respective institutions that had been developed through the prior attempts.

The prior unsuccessful attempts were not failures; they represented the necessary preparation that was needed to bring the international partnership program to fruition.

The program:

The newly developed Mechanical Engineering Technology (MET) program at HC involves two “diploma” programs. The first diploma is granted after completion of four semesters of the MET program and results in a “Technician” diploma. The second diploma is granted after completion of two more semesters in the MET program and results in a “Technologist” diploma. The breakout of courses for the Technician diploma and the Technologist diploma are shown in Table 1 (see attachment).

From the Technologist program, Sixty-nine (69) semester hours directly transfer from HC into the Bachelor of Science in Engineering Technology (BSET) at CMU. The specific program within the BSET is Manufacturing Engineering Technology. The program requirements for the Manufacturing Engineering Technology program are shown in Table 2 (see attachment). The transfer students have sixty-two (62) semester hours of course work to complete the BSET at CMU. The listing of specific courses to be completed through CMU is shown in Table 3 (see attachment).

The logistics of implementation:

Even though it took five years to reach the completion of a workable program between the institutions, the real work is still to come.

The steering committee has set September 2000 as the entry date for the first class of students. Promotional materials will be ready for distribution in September 1999. CMU and HC have agreed to share costs associated with the design and production of promotional materials. A full, color glossy brochure with an application for admission as an insert will be the primary source of program promotion. As each institution actively recruits in other countries, the appropriate admissions' representatives will be thoroughly briefed regarding program details, and will carry along promotional materials on various recruiting venues. Mailings will also be targeted to U.S. and Canadian advising centers around the world, as well as strategic businesses and organizations in Southeast Asia, in particular.

CMU and HC have agreed to develop a joint admissions process, effectively admitting students to both institutions concurrently. Since HC will be the first point of entry for students into the program, HC will receive applications, make admission decisions following agreed-upon standards, and forward materials to CMU. Students will pay one application fee, which will then be split between HC and CMU.

Every effort will be made to integrate students at both institutions as early in the program as possible. Since students will first attend HC, plans are underway for CMU faculty to either travel to HC to deliver a course or two, or to deliver a CMU course via distance learning. Given potential complications with immigration matters, students will not be traveling back and forth from one institution to the other. Faculty will work to integrate curricular matters whenever feasible and when most appropriate.

Conclusion:

The process of developing international articulation agreements is long and filled with setbacks. The obstacles are not always apparent nor the solutions readily clear. The key to implementation of such projects is the bringing together of individuals dedicated to the principles of the project. These individuals must come from all levels of the respective institutions and not be limited to administrative levels. The task is formidable yet doable. The results are well worth the effort. Students from all involved institutions benefit from the program and that, after all, is what we are all about.

LAWRENCE FRYDA

Lawrence Fryda is a Professor and Chairperson in the Department of Industrial and Engineering Technology at Central Michigan University. He has a Bachelors and Masters degree from the University of South Dakota and a Ph.D. from Colorado State University. Dr. Fryda has extensive experience in the fields of electronics, automation and computer interfacing. His area of research emphasis includes moving experimental technology-based systems out of the laboratory and into everyday applications.

CHRISTOPHER J. VIERS

Christopher Viers directs the International Services Office at Wayne State University. He is the current chair of the Michigan Association of Foreign Student Affairs and Board Member and Conference Chair of the College Consortium for International Studies. Prior to joining Wayne State, he served as Director of International Education at Central Michigan University. Mr. Viers is a doctoral candidate at Michigan State University in the Higher, Adult and Lifelong Education program.

ED ESPIN

Ed Espin is a Professional Engineer with more than 10 years of experience as a professor at Humber College (Canada), as well as international experience in the design and delivery of academic programs and curricula to international students. He is a graduate of Queen's University (Kingston, Ontario), where he received his Master Degree in Engineering, is very active in the promotion of Humber College Mechanical programs at the local and international levels. His industrial engineering experience is in the mechanical engineering and design fields.

FRANK FRANKLIN

Frank Franklin, a 27-year employee of Humber College of Applied Arts and Technology, Toronto, Canada, is the Chair of International Projects, responsible for Humber's international activities and visa student recruiting. With a background in technology and a current focus on international training and education, his interests include the building of collaborative international programs.

Table 1

HUMBER COLLEGE-CENTRAL MICHIGAN UNIVERSITY
B. TECH ARTICULATION PROGRAM
MANUFACTURING ENGINEERING TECHNOLOGY

1st Semester

<u>Course Number</u>	<u>Cr.</u>	<u>CMU</u>	<u>Cr.</u>		
<u>Comments</u>					
Mech 103 Emec-1	4	IET 292 D.C. Circ. Analysis	3	Tech. Core	
Mech 106 W.Shop Prac	3				
Mech 108 Eng. Graph	4	IET 154 Eng. Design Graph.	3	Tech. Elect.	Mech 101
Mech 204 Comp. App	3	IET 204 IET – CR	3	Tech. Elect.	
Mech 207 Eng. Mat'ls	4	IET 475 Mat'l Testing	3	Tech. Elect.	Mech 202
Tmat 105 Math.1	3				
Com 200 Communications 200	3		3		ESL-200
<u>TOTAL</u>	24		15		

2nd Semester

<u>Course Number</u>	<u>Cr.</u>	<u>CMU</u>	<u>Cr.</u>		
<u>Comments</u>					
Mech 107 Man. Proc.	3	IET 170 Metal Tech.	3	Tech. Core	Mech 304
Mtrn 202 Pneumatics	3	IET 284 Fluid Power	3	Tech. Core	Emec 401
Manf 201 NC1	3	IET 377 NC-Programming	3	Tech. Spec.	
Tmat 204 Math. 2	4	MTH 130 Pre-Calculus	4	Basic Sc.	
Com 300 Communications 300	3	Written Compt.	3	Eng. Comp.	ESL-300
Gen. Education	3				
<u>TOTAL</u>	19		16		

3rd Semester

<u>Course Number</u>	<u>Cr.</u>	<u>CMU</u>	<u>Cr.</u>		
<u>Comments</u>					
Mech 203 AutoCad	4				
Mcam 301 Tool & Adv. Fixt. Design	4	IET 455 Tool Design	3	Tech. Elect.	Tdes 201
Manf 301 NC2	4				
Manf 403 Cam1	4	IET 477 CNC-Prog	3	Tech. Spec.	
Gen. Education	3	PSY 001	3	GIII-A	
<u>TOTAL</u>	19		9		

Table 1 (continued)

4th Semester

<u>Course Number</u>	<u>Cr.</u>	<u>CMU</u>	<u>Cr.</u>	
<u>Comments</u>				
Mech 501 Adv. Comp. Applic	4	CPS 180 Comp. Prog.	3	Basic Sc.
Manf. 401 Cam2	4			
Mech 305 Adv. Man. Systems (R)	4	IET 375 Robotics	3	Tech. Core
Mech 604 Ind. Attachment	4			
Humanities	3			
Gen. Education	3			
<u>TOTAL</u>	22		6	

5th Semester

<u>Course Number</u>	<u>Cr.</u>	<u>CMU</u>	<u>Cr.</u>	
<u>Comments</u>				
Manf 402 Man. Proc. Planning	4	IET 225 Man. Proc. Planning	3	Tech. Spec.
TSTA 104 Statistics	4			
Calc 103 Introductory Calculus	3	MTH 132 Calculus-1	3	GII-B
Chem 101 Chemistry 1	5	CHM 120 Surv. Chem	4	Basic Sc.
		CHM 127 Chem Lab	1	Basic Sc.
Emec 302 Ind. Hydr.	4	IET 284 Fluid Power	3	Tech. Core
English 013	3	Open	3	GI-A
<u>TOTAL</u>	23		17	Emec 302

6th Semester

<u>Course Number</u>	<u>Cr.</u>	<u>CMU</u>	<u>Cr.</u>	
<u>Comments</u>				
Manf 602 Adv. Man. Systems	4	IET 576 Adv. Automation	3	Tech. Core
Mech 408 Cadkey	4			
Manf 603 PLC-Applications	4			
IENG 502 Engineering Econ. A	4			
Plas 404 Quality Control (SPC)	4	IET 428 Manuf. Qlty	3	Tech. Spec.
Scie 016 Fossils to Primates	3	ANT 002	3	GII-A
<u>TOTAL</u>	23		9	

TOTAL	130		72	
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Table 2

Degree: BSET
Major: Manufacturing Technology (678)
Minor: None Required

Student's Name: _____

Minor: _____

Course	Cr. Hrs.	Grade	Course	Cr. Hrs.	Grade
FRESHMAN YEAR					
Semester: <u>Fall</u> Total Credit Hours: <u>16</u>			Semester: <u>Spring</u> Total Credit Hours: <u>16-17</u>		
Competency	3		IET 225	3	
UP	3		IET 284	3	
IET 120	3		UP (MTH 132 or 136) elective	4-5	
IET 170	3		Competency	3	
MTH 130 (competency)	4		UP	3	
Faculty Advisor: _____ General Advisor: _____			Faculty Advisor: _____ General Advisor: _____		
SOPHOMORE YEAR					
Semester: <u>Fall</u> Total Credit Hours: <u>16-18</u>			Semester: <u>Spring</u> Total Credit Hours: <u>14</u>		
IET 292	3		Technical elective	3	
MTH 133 or 137	4-5		PHY 130 or 145	4	
UP (CHM 120 or 131) IIB	4		PHY 170 or 175	1	
CPS 180 or CPS 150	2-3		UP	3	
Competency	3		UP	3	
Faculty Advisor: _____ General Advisor: _____			Faculty Advisor: _____ General Advisor: _____		
JUNIOR YEAR					
Semester: <u>Fall</u> Total Credit Hours: <u>16-17</u>			Semester: <u>Spring</u> Total Credit Hours: <u>15</u>		
IET 365	3		IET 375	3	
IET 326	3		IET 426	3	
IET 377	3		IET 477	3	
PHY 131 or 146	4		UP	3	
PHY 171 or 176	1		UP	3	
*Elective	2-3				
Faculty Advisor: _____ General Advisor: _____			Faculty Advisor: _____ General Advisor: _____		
SENIOR YEAR					
Semester: <u>Fall</u> Total Credit Hours: <u>15</u>			Semester: <u>Spring</u> Total Credit Hours: <u>15</u>		
IET 428	3		IET 500	3	
UP	3		Elective	3	
UP	3		Elective	3	
IET 576	3		Technical elective	3	
Elective	3		Technical elective	3	
Faculty Advisor: _____ General Advisor: _____			Faculty Advisor: _____ General Advisor: _____		

124 hours minimum required for graduation.
40 hours 300 level or above required.
*Not required if MTH 136 and MTH 137 are taken.

Humber / CMU
Articulation
Manufacturing Engineering Technology Program

Courses to be taken at CMU: (62 Hr.)

➤ 300 level (21 Hr.)

Technology Core

IET 120	Intro. to Engineering Tech	3 Hr.
IET 365	Plastics Tech	3 Hr.

Technical Specialty

IET 326	Man Method Analysis	3 Hr.
IET 426	Plant Layout & Mat Handling	3 Hr.
IET 500	Production Concepts	3 Hr.

Technical Electives

IET	Elective (IET 359 CAD)	3 Hr.
IET	Elective (IET 3xx)	3 Hr.
IET	Elective (IET 3xx)	3 Hr.
IET	Elective (IET xxx)	<u>3 Hr.</u>
Total IET		27 Hr.

Basic Science and Math (BSET)

MTH 133	Calculus II	4 Hr.
PHY 130	College Physics I	4 Hr.
PHY 170	Physics Lab I	1 Hr.
PHY 131	College Physics II	4 Hr.
PHY 171	Physics Lab II	<u>1 Hr.</u>
Total		14 Hr.

Competency Requirements

ENG 201	Advanced Composition	3 Hr. Written Competency
TAI 170	Fund of Interpretive Reading	<u>3 Hr.</u> Oral Competency (I-B)
Total		6 Hr.

UP

Group II-A	3 Hr.	
Group III-B	3 Hr.	
Group IV-A	3 Hr.	
Group IV-B	3 Hr.	
Group IV-C	<u>3 Hr.</u>	
Total		15 Hr.