Senate Reference No. 08-16

TO: Bruce Abbott, Chair, Senate Executive Committee

FROM: Ann Livschiz, Co-Chair, Curriculum Review Subcommittee

Susan Skekloff, Co-Chair, Curriculum Review Subcommittee

DATE: 22 January 2009

SUBJECT: Request for a New Credit Certificate Program—Advanced Manufacturing Management Certificate—from the Department of Manufacturing & Construction Engineering Technology & Interior Design

The Curriculum Review Subcommittee supports the proposal for the Advanced Manufacturing Management Certificate, and finds that the proposal requires no Senate review.

Approving	Not Approving	Absent
R. Duchovic		C. Sorge
B. Hancock		
G. Hickey		
A. Karim		
C. Lawton		
A. Livschiz		
D. Mansour-Cole		
S. Skekloff		

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IPFW

Manufacturing & Construction Engineering Technology & Interior Design

Request for a New Credit Certificate Program

Campus: IPFW

Proposed Title of Certificate Program: Advanced Manufacturing Management Certificate

Projected Date of Implementation: Fall 2009

TYPE OF CERTIFICATE: (check one)

X☐ UNDERGRADUATE CERTIFICATES – These programs generally require 12-29 credits of undergraduate-level academic work.

☐ GRADUATE CERTIFICATES – These programs generally require 12-29 credits of graduate-level academic work or undergraduate academic work carrying graduate credit.

☐ POST-BACCALAUREATE CERTIFICATES –These programs generally require 12-29 credits of undergraduate-level academic work, although students enrolling in these programs must have completed their baccalaureate degrees.

I. Why is this certificate needed? (Rationale)

Working professionals in various manufacturing sectors (e.g., biomedical, military, automotive, electronics, construction, and sports) seek additional knowledge for career advancement to management and ownership roles, rather than to acquire entry-level employment. Manufacturing operations management; quality assurance; process & product development; logistics and inventory control; cost analysis and health, safety and environmental assurance are among themes of study that are expected to remain in high demand, according to the Manufacturing Skill Standards Council and other industrial groups.

II. List the major topics and curriculum of the certificate.

Credits	Course	
3	IET 105	Industrial Management
3	IET 204	Techniques for Maintaining Quality
3	IET 224	Production Planning and Control
3	IET 267	Work Methods Design
3	IET 350	Engineering Economy
3	IET 478	Lean Manufacturing & Design
18 Total		

III. What are the admission requirements?

The program is available to individuals admitted to IPFW (See IPFW bulletin for admission requirements). Students must complete MA 159 or MA 153 & MA 154 or equivalent before starting on the certificate program.

IV. List the major student outcomes (or set of performance based standards) for the proposed certificate.

Students will have basic understanding and knowledge of the following:

- Forecasting methods
- Aggregate production planning
- Scheduling of operations
- Materials requirements planning
- Breakeven analysis
- Project management techniques
- Theory of constraints
- Statistical process control techniques
- Quality control charts
- Process capability studies
- Operation of metrology instruments
- Benefit cost analysis
- Equipment justification and replacement
- Cost evaluation of alternatives
- Project and product costing
- Use of computers in manufacturing
- Just-in-time concepts
- Waste elimination
- Inventory reduction techniques
- 5S
- Visual management
- Standardized work
- Error proofing
- Setup reduction
- Lean layout design
- Pull system
- Value stream mapping
- Lean measurable
- Kaizen

V. Explain how student learning outcomes will be assessed (student portfolios, graduate follow up, employer survey, standardized test, etc.) and describe the structure/process for reviewing assessment findings for the purpose of ensuring continuous improvement of the certificate.

The classes offered in the certificate are offered in the Industrial Engineering Technology (IET AS & BS) program that is housed in the MCET department. The courses are assessed using the assessment guidelines required by Accreditation Board for Engineering and Technology (ABET).

ABET program outcomes:

a. an appropriate mastery of the knowledge, techniques, skills and modern tools of the appropriate ET program.

b. an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology.

c. an ability to conduct, analyze and interpret experiments and apply experimental results to improve processes.

d. an ability to apply creativity in the design of systems, components or processes.

e. an ability to function effectively on teams.

f. an ability to identify, analyze and solve technical problems.

g. an ability to communicate effectively.

h. a recognition of the need for, and an ability to engage in lifelong learning.

i. an ability to understand professional, ethical and social responsibilities.

j. a knowledge of and respect for diversity, contemporary societal and global issues related to the profession.

k. a commitment to quality, timeliness, and continuous improvement.

IET AS Degree

a. An appropriate mastery of the knowledge, techniques, skills and modern tools of industrial engineering technology.

a1. technical expertise in quality, metrology, and SPC.

a2. technical expertise in ergonomics, and work methods design.

a3. technical expertise in facilities layout, and production planning and control.

a4. technical expertise in CAD, engineering graphics, and GD&T.

a5. technical expertise in materials and processes, and basic machining.

g1. an ability to communicate effectively.

g2. an ability to communicate effectively through oral presentation.

j1. a knowledge of and respect for diversity.

j2. a knowledge of contemporary societal issues related to the profession.

j3. a knowledge of contemporary global issues related to the profession.

k1. a commitment to quality.

k2. a commitment to timeliness.

k3. a commitment to continuous improvement.

IET BS Degree

a. An appropriate mastery of the knowledge, techniques, skills and modern tools of industrial engineering technology.

a1. technical expertise in quality, metrology, advanced SPC, SQC, TQM, ISO standards, and design of experiments.

a2. technical expertise in ergonomics, work methods design, optimization, engineering economy, and cost estimating.

a3. technical expertise in facilities layout, production planning and control, queuing theory, modeling, and simulation.

a4. technical expertise in CAD, engineering graphics, GD&T, gage capability studies, and measurement uncertainty.

a5. technical expertise in materials, manufacturing processes, design for manufacturing and assembly, and CNC machining.

g1. an ability to communicate effectively.

g2. an ability to communicate effectively through oral presentation.

j1. a knowledge of and respect for diversity.

j2. a knowledge of contemporary societal issues related to the profession.

j3. a knowledge of contemporary global issues related to the profession.

k1. a commitment to quality.

k2. a commitment to timeliness.

k3. a commitment to continuous improvement.

The student learning outcomes will be assessed by regular homework assignments, lab work, written reports, project work, oral presentations, and exams (see table A1). Annual graduate exit survey, alumni survey and employer survey are also conducted every three years.

The assessment findings and evaluation of the certificate program for continuous improvement will follow the Department's current assessment and continuous improvement plan.

VI. Describe student population to be served.

This certificate program will serve students in the following categories:

a. Students currently enrolled in a variety of programs at IPFW, such as:

- Organizational Leadership and Supervision with an Advanced Manufacturing Management Minor.
- General Studies with Advanced Manufacturing Management Option.
- Industrial Engineering Technology

b. Practicing engineers, and manufacturing managers who have a need to broaden their professional knowledge.

VII. How does this certificate complement the campus or departmental mission?

Manufacturing management is constantly evolving. With the availability of this certificate program, the MCET department will be able to help fulfill the campus and departmental missions by providing additional educational opportunities to local business, industries and communities.

VIII. Describe any relationship to existing programs on the campus or within the university.

The proposed certificate program is intended to be an independent program serving primarily the residents, business and industrial community of Northeastern Indiana.

Technical courses similar to those in the proposed certificate program are found in the bulletins of Purdue University.

IX. List and indicate the resources required to implement the proposed program. Indicate sources (e.g., reallocations or any new resources such as personnel, library holdings, equipment, etc.).

- Financial support to convert the above listed courses into hybrid courses to enable us to offer them through Continuing Studies.

- Library resources (including licensed database, electronic or print journals subscriptions, reference materials, and circulating books, along with electronics reserves and document delivery services) should be adequately covered by our existing collections that support teaching and research in related fields of study (e.g. industrial engineering technology, personnel, administration, supervision, or management). Librarian and library staff support for faculty or students seeking research consulting and information services should also be provided under current staffing arrangements

X. Describe any innovative features of the program (e.g., involvement with local or regional agencies, or offices, cooperative efforts with other institutions, etc.).

This certificate program will enable IPFW to bring state-of-the-art training that emphasizes practical applications to the local community and companies and help them to stay at the competitive edge.

Table A1. Curriculum Map of Industrial Engineering Technology.

Courses	Program Outcomes																				Total
	a1	a2	a3	a4	a5	b	c	d	e	f	g1	g2	h	i	j1	j2	j3	k1	k2	k3	
ETCS101													2	3	3	3	3		3		17
IET 105	2	2	2							3	3		2		3	2	3			3	25
IET 204	4					3	4		4	3	3			2			2	4		2	31
IET 224			4			2		4	2	3	3	3	2				2	2	2		29
IET 257		4				2	4	4	3	3	3	3			3		2				31
IET 267		4				2		4	2	3	3	3	2	2		2		2		2	31
IET 310			4			2	3	4	4	3	3	3						2		2	30
MET 104				4		2		4		3	3								3	2	20
MET 180					4	2	4		4	3	3			2	2		2		3		28
MET 223				4		2		4		3									3	2	20
MET 335					4	2	4	4		3											17
A.S. subtotal	6	10	10	8	8	19	19	28	19	30	27	12	8	9	11	7	14	10	11	13	279
MET 201					4	2				4	3								2		15
MET 300					4	2				4	3								2		15

MET 347					4	2	4		2	2	2						2	3			21
IET 304	2			2			4	4	2	3	3	3	2			2		2			29
IET 350		4								4				2	3	3	2				18
IET 362		4				2	2	4	2	4	3										21
IET 369			4			2	2	4	2	4	3										21
IET 401					4			4		4	3	2	2					2		2	23
IET 454	4					2		3		4	3										16
IET 480	2	3	3	3	3	2		4		3	4	4	3	3	3	2	2	3	3	3	53
B.S. subtotal	8	11	7	5	19	14	12	23	8	36	27	9	7	5	6	7	6	10	7	5	232
Total	14	21	17	13	27	33	31	51	27	66	54	21	15	14	17	14	20	20	18	18	511
Outcome Description	quality SPC	method ergo	layout ppc	CAD GDT	mat. procs	emerg knowledge	lab	design project	teams	tech probs.	written com	oral com	lifelong learning	ethics	diverse	social issues	global issues	quality	timeliness	cont. impr	
	traditional knowledge																				

4 = Outcome addressed considerably

3 = Outcome addressed moderately

2 = Outcome addressed briefly

1 = Outcome addressed but not assessed

0 = Outcome not addressed