



**College of Engineering, Technology, and Computer Science**  
**Division of Engineering Technology**  
**Master of Science in Technology**  
**Assessment and Continuous Improvement Plan**

### **I. Introduction**

The Division of Engineering Technology (ET) in the College of Engineering, Technology and Computer Science serves the needs of students, industry and government in northeastern Indiana.

The division offers a Master of Science (MS) degree program in Technology. The MS program is offered in two tracks that are: 1) Information Technology/Advanced Computer Applications (ITAC), and 2) Industrial Technology/ Manufacturing (ITM).

The primary focus of the ET division is the development of students. Students are encouraged to acquire the knowledge and understanding that helps them contribute to society by leading meaningful and productive lives.

The major goal of the MS in Technology Program is to prepare graduates to understand the applications of advanced concepts and knowledge of structured and analytical techniques of decision making in industry and technology. MS Tech students study one technical track in sufficient depth to appreciate its methodologies and fundamental unresolved questions, and acquire a basis for life- long learning. Required courses for the program are established in: 1) Technology core, 2) required technical courses in the track area, 3) elective courses combining breadth of subject matter with specific study in depth, and 4) MS directed project focused on applied research. Hands-on experience of cutting edge technology and the applied research experience are essential parts of MS in Technology program.

### **II. Program Objectives**

The objective of Technology Graduate Program is to offer a Master of Science Degree in Technology that meets the needs of regional manufacturing and service industries, research and development organizations, government, and not-for-profit organizations to prepare successful industry leaders and technical managers. The program is designed for students with both technical and non-technical backgrounds and will provide the knowledge and skills required for its graduates to function effectively in a technical environment and to accept increasing responsibility in technical leadership positions. The program permits specialization in an area of modern technology applicable to each student's working environment or area of interest. Emphasis is placed on preparing students for technical leadership positions in business and industry, faculty positions in technology and engineering technology programs, or to continue for a PhD in Technology or a closely related field at Purdue or another university.

The following sections describe the educational objectives of each specific track.

### **Information Technology/Advanced Computer Applications (ITAC)**

Provide the education experiences and technical leaderships in the areas of enterprise information technology architecture, information technology security, mobile computing and networking, human-computer interaction, and strategic technology management. Learn and apply the principles of system methodologies including analysis, design, creation, and management to contemporary problems that involve advanced computer applications and information technology systems.

### **Industrial Technology/Manufacturing (ITM)**

Develop advanced leadership skills needed by technical managers and related positions in world-class industries. Widen student career potential with project management skills for organizing resources, implementing systems, increasing productivity, reducing waste and improving product quality using statistics and business research methods.

## **III. Program Outcomes**

Program outcomes describe the knowledge, skills, and abilities students are expected to acquire from the program, and prepare them to achieve the program educational objectives. Measurement will be in accordance with the program assessment and continuous improvement tools chart given in section IV.

It is intended that graduates of Master of Science in Technology program will demonstrate:

1. Ability to apply scientific thinking and structured research methods to make complex short term and long term strategic decisions making problems in industry and technology
2. Ability to apply statistical techniques to perform empirical research in industry and technology.
3. Ability to deploy existing technological systems and use emerging technologies in their functional disciplines.
4. Ability to apply specialized skills to technological problems inherent in their respective disciplines:
  - a. Telecommunication network and security
  - b. Mobile and wireless information technologies
  - c. Enterprise service information and architectures
  - d. Performance analysis and quality improvements in industry and technology
  - e. Design, analysis, and optimization of product and manufacturing systems
  - f. Management and risk mitigation of technological projects
5. Ability to perform scholarly and applied research works independently as well as in teams.
6. Effective written, oral and presentation skills
7. Consider professional and ethical responsibilities in the conduct of research projects.

#### IV. Program Assessment and Continuous Improvement Tools

Program Outcomes	Tool	Purpose	Frequency	Primary Responsibility	Action
1-7	Course Syllabus	Course schedule, prerequisites, learning objectives	Each time course is offered	Instructor	Academic Department Chair and MS Tech committee
1-7	Student cafeteria evaluation	to learn student's evaluation of course & change the course accordingly	Each time course is offered	Instructor	Instructor and Academic Department Chair
1,2-7	Student performance assessments (exams, quizzes, homework, projects, presentations)	to evaluate if program/course outcomes are fulfilled	Each time course is offered	Instructor	Instructor
5-7	MS Directed Project	To evaluate if program outcomes are fulfilled	Upon project defense	Project Advisory Committee	Academic Dept Chair and M.S. Tech Committee
1-7	student exit interview (Questionnaire)	student's reflections on program	upon graduation	MS Tech Committee	MS Tech Committee and Academic Department
1-7	Alumni survey (Questionnaire)	Alumni perception of achievement of program goals	Every 2 years	MS Tech Committee	MS Tech Committee and Academic Department
1-4,6,7	Employer survey (Questionnaire)	Employer perception of achievement of program goals.	Every 2 years	MS Tech Committee	MS Tech Committee and Academic Department Chair

#### V. Assessment Measures

The “curriculum map for M.S. in Technology” shows how the MS Tech program outcomes are achieved through the general core and specialty courses. The Table in section IV illustrates a broad plan and tools used in measuring the program/course outcomes. Two types of measures (direct and indirect) are used to assess the level of accomplishment of program outcomes.

##### Direct Measures

The Directed Master’s Project provides the first direct measure of the overall level of program outcomes achieved by the graduates of M.S. Tech program. Several MS Tech courses (e.g., IT508, TECH 646, and some specialty courses) have team projects with real life companies/organizations embedded in the course work. A formal assessment of course embedded team projects by “client” organization using a standardized questionnaire which addresses the outcomes of the MS Tech program is the second direct measure.

### Indirect Measures

The indirect measures include alumni surveys and student exit surveys. These surveys include a wide range of attributes related to alumni and student satisfaction. The employer survey also provides yet another indirect measure for assessment of MS Tech program outcomes. Cafeteria evaluation is the indirect measure of the individual course outcomes.

### **VI. Program Assessment and Continuous Improvement Process**

The MS Tech committee will oversee the overall assessment and continuous improvement process. Subcommittees will be formed to analyze the specific measures of assessment. For example, Project Advisory Committees will be formed to evaluate the students' directed projects. Each student's major advisor will provide the assessment outcomes to the MS Tech committee. These outcomes will be compiled and reviewed annually by the MS Tech committee to ensure continuous improvement. Another subcommittee will be formed under the leadership one of the MS Tech Committee members and one faculty member from relevant academic department to conduct the alumni, exit and employer surveys. In other words, an MS Tech Committee member from MCET department and another MCET faculty member will form a team to conduct the ITM student exit interviews, and alumni and employer surveys. The same team will analyze the data and the results will be reviewed in the MS Tech committee. Student exit interviews are conducted upon graduation and alumni and employer surveys will be conducted once every two years. The MS Tech committee will identify, prioritize, and recommend necessary actions for continuous improvement to concerned academic department or faculty members.

The analysis of each course assessment (cafeteria evaluation) will be reviewed by the instructor and the academic department chair offering the course. The review information will be included in the annual assessment report. If required, the MS Tech Committee will make recommendations to the instructor and academic department chair offering the course to ensure continuous improvement.

### **VII. Timeline**

The program began during spring semester of 2007. The first graduate will probably be in spring 2009. Implementation of some elements of assessment plan will begin as early as fall 2008, however the full program assessment process will not be completed until after fall 2010. Below is a tentative timeline for M.S. Tech assessment implementation.

#### Fall 2008

- Assessment of learning outcomes of Tech 646
- Assessment of projects done in Tech 646 by client companies
- Preparation of annual report of assessment activities done in Academic Year 2007-08

#### Spring 2009

- Assessment of learning outcomes of CPET 575
- Assessment of projects done in CPET 575 by client companies
- Assessment of Directed Project (if applicable)

Exit Student Interview (If applicable)

Fall 2009

Discussion of Assessment Report and Recommendations  
Assessment of learning outcomes of IT 508  
Assessment of learning outcomes of CPETXXX  
Assessment of projects by client companies  
Assessment of Directed Project (if applicable)  
Preparation of annual report of assessment activities done in Academic Year 2008-09  
Exit Student Interview (if applicable)

Spring 2010

Assessment of learning outcomes of IT507  
Assessment of learning outcomes of CPETXXX  
Assessment of projects done by client companies  
Assessment of Directed Project (if applicable)  
Exit Student Interview (if applicable)

Fall 2010

Discussion of Assessment Report and Recommendations  
Assessment of learning outcomes of Tech 571  
Assessment of learning outcomes of Tech 646  
Assessment of learning outcomes of CPETXXX  
Assessment of learning outcomes of CPETXXX  
Assessment of projects by client companies  
Assessment of Directed Project  
Preparation of annual report of assessment activities done in Academic Year 2009-10  
Exit Student Interview  
Alumni survey

Spring 2011

Assessment of learning outcomes of every course that is offered in this semester  
Assessment of projects by client companies  
Assessment of Directed Project  
Exit Student Interview  
Employer Survey

Fall 2011

Discussion of Assessment Report and Recommendations  
Assessment of learning outcomes of every course that is offered in this semester  
Assessment of projects by client companies  
Assessment of Directed Project  
Preparation of annual report of assessment activities done in Academic Year 2010-11  
Exit Student Interview

### VIII. Sample Curriculum Map (M.S. Tech)

Course Number and Title	1	2	3	4a	4b	4c	4d	4e	4f	5	6	7
IT 507 Meas & Eval in Indus Tech	3	2								2	2	
IT 508 Qual & Prod in Indus Tech							3				2	
TECH 646 Anal of Res in Indus Tech		3								2	3	2
CPET 545 Service Orient. Architecture				3								
CPET 581(a) * Advanced Network Security					3							
CPET 565 Mobile Computing Sys						3						
CPET 575 Management of Tech			3	2								
CPET 581 (b) Wireless Sensors Networks					2							
TECH 540 Reliability & Maintenance						2						
TECH 567 Tolerancing Techniques							3				2	
TECH 569 Simulation Modeling						2	2					
TECH 561 Indus Project Mgmt & Cont									3		2	
TECH 574 Adv Quality Engineering Tech.							3	2				
XXX 590 Special Topic Courses										2		3
XXX598 MS Directed Projects										3		3

#### Legends:

1= Not Applicable

2= Moderately Addressed

3 = Significantly Addressed

Program outcomes descriptions:

1. Ability to apply scientific thinking and structured research methods to make complex short term and long term strategic decisions making problems in industry and technology
2. Ability to apply statistical techniques to perform empirical research in industry and technology.
3. Ability to deploy existing technological systems and use emerging technologies in their functional disciplines.
4. Ability to apply specialized skills to technological problems inherent in their respective disciplines:
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  - f. Management and risk mitigation of technological projects
5. Ability to perform scholarly and applied research works independently as well as in teams.
6. Effective written, oral and presentation skills
7. Consider professional and ethical responsibilities in the conduct of research projects.

\* As some courses are still awaiting the approval, the current course number and title are subject to change.