



## Three Examples of a New Industry-authored Flexible Plan B.S. Degree

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### John Carlson, Red Gold

Four generations of the Reichart family have been producing premium quality tomato products since 1942, when it began producing tomato products for the soldiers overseas. Since then Red Gold has become the largest privately-owned tomato processor in the nation with three state-of-the-art facilities in Elwood, Geneva, and Orestes, Indiana. The company also boasts a million square foot distribution center in Orestes and operates a wholly-owned subsidiary RG Transport trucking fleet in Elwood. Partnering with over 50 family farms across Indiana, southern Michigan, and Northwest Ohio to sustainably produce premium quality canned tomatoes, ketchup, sauces, salsas, and juices for foodservice, private brands, export, co-pack and club channels of distribution. The Red Gold family of consumer brands includes Red Gold, Redpack, Tuttorosso, and Sacramento. Exceptional quality and operational excellence are the shared values that contributed to the employee-created mission statement: "To produce the freshest, best tasting tomato products in the world."

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# **Three Examples of a New Industry-Authored Flexible Plan BS Degree**

## **Introduction**

Based on ongoing discussions with numerous industry partners at key companies across Indiana, and coupled with the implementation of Purdue University's Polytechnic Institute, the Polytechnic created a flexible degree plan of study through which industry partners can suggest, with faculty oversight and final approval, their own customized degree plans to meet unique and evolving workforce education requirements. This degree option is appropriate only in cases where "traditional" Purdue degrees do not meet specific, industry education needs. This paper may be of interest to CIPD members and other ASEE attendees and members who wish to explore new approaches that assist industry in meeting employee education and development needs.

This paper significantly expands upon a paper presented at the 2017 ASEE-CIEC Conference [1]. That CIEC paper outlined the template for this new BS degree, "Multidisciplinary Technology" (MDT), that features a flexible plan of study. MDT allows company partners considerable input into degree course requirements to meet unique employee education needs, which may differ from traditional academic plans of study.

This ASEE 2018 paper presents the specific degree requirements for three unique versions of MDT which have been developed since the 2017 CIEC paper. One plan is with Subaru of Indiana Automotive (SIA) at its US based automotive assembly plant. Another plan is with Red Gold, the nation's largest privately-owned tomato processor. A third plan is with another major automotive company and affiliated manufacturers/supplies, all of which prefer to remain unnamed at this time. Additionally, this third example meshes with another College's AS degree to create a "2+2" AS-to-BS program.

This paper first outlines the basic process used with each company to develop the plans, and then present the specific requirements for each unique MDT plan of study.

## **Methodology for Constructing a Customized Plan of Study**

As presented at the 2017 CIEC [1], the procedure for building a custom plan of study within the MDT program is as follows:

- A company or industry representative contacts the local Purdue Polytechnic Statewide Location or is solicited by faculty or staff from the Location.
- Statewide Location staff or faculty arrange an initial meeting to discuss specific educational outcomes and knowledge and skill proficiencies needed by the company. If these outcomes describe an existing Polytechnic or other Purdue degree, then the MDT degree is not warranted.

- If unique educational needs are identified, then a second meeting is arranged between the company and appropriate faculty/staff members who represent the Polytechnic subject areas of interest to the company.

- Faculty and company representatives match the company's desired educational outcomes with appropriate University, Polytechnic, and other courses. Faculty also ensure that a primary and secondary focus area is identified and all course prerequisites and other Purdue University B.S. degree requirements are met in the proposed plan of study. A company may develop more than one MDT plan of study, or have variants of a single plan.

- Upon completion of the proposed plan of study, that draft plan is submitted to the MDT Curriculum Advisory Committee for review, audit of requirements, and a vote to approve the plan for the company -- or to revise and resubmit.

- Industry partners who desire stackable certificates, or micro-credentialing, will identify those curricular subsets after the B.S. plan of study is fully approved.

### **Example Degree Subject/Course Requirements**

#### **Purdue University Core**

Purdue University has core, minimum subject requirements, common to all Purdue degrees, which are required and included in all BS-MDT plans of study:

English composition  
Speech communication  
Math/quantitative reasoning  
Science and laboratory science  
Humanities  
Behavioral / Social Sciences  
Design thinking

#### **Subaru of Indiana Automotive (SIA)**

SIA is located in Lafayette, Indiana and currently assembles four Subaru vehicles: the Outback, Legacy, Impreza, and Ascent. The company employs over 5,600 associates at the Lafayette facility where it has produced over five million vehicles, and has hosted a Purdue Polytechnic Location onsite since 1996.

SIA plans to utilize the BS-MDT degree as an employee development and succession planning tool, with interim certificates of completion built within for identifying eligibility for promotions before the completion of the entire degree. For the BS degree itself, SIA has identified two educational tracks, a supervisory track, and a technical track. Many of the courses in the MDT track are required for employee/students in both tracks, and the degree requirements then diverge at the upper division courses depending on the employee's career track.

SIA reviewed plans of study for Purdue Polytechnic's existing BS degrees in Engineering Technology, Industrial Engineering Technology, Manufacturing Engineering Technology, Mechanical Engineering Technology, and Organizational Leadership and drew the MDT course plan out of those degree programs. Each of those traditional degree plans holds value for SIA, and the company hires graduates from those programs, but for the company's in-house employee development and career planning program, SIA prefers a more customized plan with elements of the degrees cited above. Thus, SIA worked with Purdue to develop the unique MDT plan outlined below.

In addition to Purdue's basic core requirements, both supervisory and technical track SIA employees would complete the following courses, identified here by subject areas:

Communication:

Small Group Communication  
Technical Writing

Mechanical Engineering Technology:

Production Design and Specifications  
Materials and Processes I  
Manufacturing Systems

Supervision, Management, and Operations:

Introduction to Manufacturing and Supply Chain Systems  
Foundations of Organizational Leadership  
Business Principles for Organizational Leadership  
Project Management  
Introduction to Lean and Sustainable Systems  
Leading Change in Technology Organizations  
Foundations of Human Resource Development  
Leading Innovation in Organizations  
Statistical Quality Control  
Economic Analysis for Technology Systems  
Human Factors for Technology Systems  
Total Productive Maintenance  
Critical Thinking and Ethics  
Lean Six Sigma  
Cross-Cultural Issues in Organizations

Technical track employees also would complete these courses late in the program progression:

Applied Statics  
Materials and Processes II  
Electronic Systems  
Introduction to "C" Programming  
Introduction to Industrial Controls  
Introduction to Robotics  
Automated Manufacturing Processes

Supervisory track employees also would complete these courses late in the program progression:

- Supply Chain Management
- Designing Technology for People
- Risk Analysis and Assessment
- Warehouse and Inventory Management
- Legal Aspects and Issues in Organizations

SIA also is in the process of identifying blocks of courses within the full BS-MDT degree to meet interim employee educational needs and make those employees eligible for promotion opportunities. Upon completion of these sets of courses, employees will be awarded “Certificates of Completion” and be eligible for promotion to the associated job family at SIA.

Currently, the career track for those completing these interim Certificates are: Team Leader; Group Leader; and the completed BS-MDT would be required for promotion to certain levels of management. The specific course plans for these interim certificates are still in development as of the paper submission deadline.

## **Red Gold**

Red Gold has been producing premium-quality tomato products since 1942 and is the largest privately-owned tomato processor in the nation. It operates three state-of-the-art facilities and a 1-million square foot distribution center, all in Indiana. Red Gold also operates a wholly-owned subsidiary trucking fleet, RG Transport. Partnering with over 50 family farms across Indiana, southern Michigan, and Northwest Ohio, Red Gold sustainably produces premium quality canned tomatoes, ketchup, sauces, salsas, and juices. The Red Gold family of consumer brands includes Red Gold, Redpack, Tuttorosso, and Sacramento.

Red Gold reviewed plans of study for Purdue Polytechnic’s existing BS degrees in Computer and Information Technology, Engineering Technology, Industrial Engineering Technology, Manufacturing Engineering Technology, and Organizational Leadership and drew the MDT course plan largely out of those degree programs, with the addition of some agriculture content. Red Gold traditionally has supported tuition reimbursement and employee educational development through the Organizational Leadership degree, but for the company’s future in-house employee development and career planning program, Red Gold has taken advantage of this flexible MDT plan of study to create a more customized degree plan with subject content that the company deems most appropriate for career success.

Like SIA, Red Gold plans to utilize the BS-MDT degree as an employee development and succession planning tool, with interim sets of courses built within for identifying eligibility for job assignments before the completion of the entire degree. Those interim course sets are still in development. The Red Gold plan incorporates the following courses in addition to the Purdue core:

### Agriculture:

- Fundamentals of Horticulture
- Introduction to Plant Science

Additional Quantitative:

Elementary Statistics Methods  
Statistical Quality Control  
Economic Analysis for Technology Systems

Manufacturing / Technological:

Speech Communication of Technical Information  
Manufacturing Systems  
Human Factors for Technology Systems  
Designing Technology for People  
Intro to Lean and Sustainable Systems  
Lean Six Sigma  
Leading Innovation in Organization  
Global Technology Leadership  
Total Productive Maintenance

Leadership/Management/Supervision:

Organizational Leadership  
Business Principles for Organizational Leadership  
Human Resources Issues  
Conflict Management  
Project Management  
Leading Change in Organizations  
Leadership for Competitive Advantage  
Risk Analysis and Assessment  
Leadership through Teams  
Organizational Leadership Capstone Project

**Automotive Manufacturing AS-to-BS Program with Vincennes University**

Purdue Polytechnic has a Location in partnership with, and located on the campus of, Vincennes University in Southwest Indiana. Geographically, Vincennes lies between the larger Indiana cities of Evansville and Terre Haute. Local industry revolves around automotive manufacturing but also includes defense, plastics, and agriculture.

To meet the needs of multiple Southwest Indiana manufacturing entities, Vincennes and Purdue Universities created a “2+2” AS to BS degree plan with Vincennes University offering the AS degree, and Purdue offering the BS.

Vincennes University’s AS degree in Advanced Manufacturing forms the core of the program and includes the State of Indiana’s core requirements, which are accepted by Purdue, plus the following required technical courses (all of which include labs) at the AS level:

Electronics for Automation  
Electrical and Electronic Applications for Manufacturing

Programmable Logic Controllers  
Introduction to Robotics and Automation  
Robotics Applications and Servicing  
Mechanical Drives  
Motors and Motor Control  
Fluid Power Systems  
Instrumentation and Automated Processing Control  
Industrial Networking and PC Control Systems  
Troubleshooting Automated Systems

Upon successful completion of the AS degree, students are admitted to Purdue at the Vincennes Polytechnic Location and complete the following industry-determined courses delivered by Purdue within the “+2” to earn the BS degree in Multidisciplinary Technology:

Leadership and Innovation  
Supply Chain Management Technology  
Lean and Sustainable Systems  
Leading Change in Technology Organizations  
Statistical Quality Control  
Economic Analysis for Technology Systems  
Warehouse and Inventory Management  
Human Factors for Technology Systems  
Global Technology Leadership  
Operations Planning and Management  
Global Transportation and Logistics Management  
Design Thinking in Technology  
Technology and the Organization  
Technology and the Global Society

This 2+2 plan provides a solid grounding in the technology of advanced manufacturing at the AS level, and a solid grounding in manufacturing supervision and operations at the BS level. Graduates of this program have enjoyed 100% placement within a variety of local companies, although most are placed in the area of automotive manufacturing.

### **Conclusion**

A common issue emerged when discussing the MDT degree with employers, that issue being the employers’ desire for new graduates to be stronger in the so-called “soft skills” of oral and written communication and working in a team environment. While the technical and manufacturing-themed courses built into the various MDT plans of study are crucial, thus far the companies with which we are working are willing to trade off some technical courses in order to include courses and subjects that build on students’ oral and written communication skills. These companies also are willing to trade off some technical content to ensure students understand the importance of, and gain experience working in, multicultural teams.

Academic institutions not interested in this type of flexible plan degree still may be interested in reviewing these company-developed plans. Such a review would allow them to assess if their current degree offerings include some of the common subjects identified by these companies.

In closing, it is important to note that ABET accreditation has been considered, but at this time there are no immediate plans to seek ABET accreditation. The logic behind that current decision is as follows: 1) Thus far, no employer has asked for the unique MDT degree to be ABET accredited, 2) the various MDT plans of study, and thus degree outcomes, will vary based on the subject matter that company partners build into the plans of study - thus making consistent assessment metrics problematic, and 3) the first student to graduate with a BS-MDT will not be until 2020. The question of ABET accreditation will continue to be reviewed as the MDT degree grows and evolves.

## **Reference**

[1] R. A. Schaffer, "Meeting industry's educational needs: A new flexible plan degree program," in *Proceedings of the Conference for Industry and Education Collaboration, ASEE, Jacksonville, FL, USA, February 7-10, 2017*.