TO: Jay T. Akridge, Executive Vice President for Academic Affairs and Diversity; and Provost

FROM: Linda J. Mason, Interim Dean of the Graduate School

DATE: March 29, 2018

SUBJECT: Proposal for a Doctor of Technology Degree in the Purdue Polytechnic Institute

The enclosed proposal for a Doctor of Technology Degree in the Purdue Polytechnic Institute at West Lafayette was approved by the Graduate Council on March 22, 2018. The suggested CIP Code is 15.9999, Engineering Technologies and Engineering Related Fields, Other.

The proposed curriculum develops enhanced skills and understandings that enable professionals, already holding a Master’s degree or equivalent, to apply their heightened technical and conceptual understandings of technology, research, and development as they work to develop strategies to advance/enhance their enterprise. Consequently, the Doctor in Technology will accelerate and further the career of such individuals as they contribute to enterprise performance, efficiencies, and sustainability through contemporary applied research-based techniques.

I am pleased to add my endorsement to the proposal and hope that you can endorse it and transmit it to the president for approval by the Indiana Commission for Higher Education.

Please let me know if you have any questions about this recommendation for a Doctor of Technology Degree in the Purdue Polytechnic Institute.

Enclosure

Copies: James Mohler, Candiss Vibbert, Kathy Newton, Mitch Springer, Mark Schuver

LJM/tlp

Approval Recommended: Jay T. Akridge, Provost and Executive Vice President for Academic Affairs and Diversity

Approved: Mitchell E. Daniels, Jr. President
INSTITUTION: Purdue University

CAMPUS: West Lafayette

COLLEGE: Polytechnic Institute

DEPARTMENT/SCHOOL: Technology

DEGREE PROGRAM TITLE: Dr. of Technology

SUGGESTED CIP CODE: 15.9999 Engineering Technologies and Engineering-Related Fields, Other

PROJECTED DATE OF IMPLEMENTATION: Fall, 2018
NEW DEGREE PROGRAM
PRE-PROPOSAL SIGNATURE PAGE

Degree Title: Doctor of Technology

Name of academic unit offering the new degree: Purdue Polytechnic Institute, Purdue University

Signatures from all involved programs:

Kathryne A. Newton
Kathryne A. Newton, Associate Dean
Purdue Polytechnic Institute Graduate Programs
Purdue University

Gary Bertoline
Gary Bertoline, Dean
Purdue Polytechnic Institute
Purdue University

Mitchell E. Daniels, Jr.
President
Purdue University

5/1/2018
Date

5/1/2018
Date

5/4/18
Date

5/1/18
Date
EXECUTIVE SUMMARY
A Proposal to Establish a new Doctor of Technology Program at the Purdue Polytechnic Institute, Purdue University

The Purdue Polytechnic Institute at Purdue University is proposing the creation of a Doctor of Technology graduate degree program to be delivered as a hybrid model from the Purdue University-West Lafayette campus to active/employed technology professionals. This degree program will be distinctly different than the existing Ph.D. in the Polytechnic in multiple ways including the delivery mode, the target clientele, the focus of learning activities, and the research aims of the program. In addition to purposing the degree towards the development of technology and R&D competence needed by business, industry and government, our vision is to employ a hybrid delivery system involving predominantly distance learning education plus some campus-based experiences that make the achievement of a doctoral degree far more accessible to practicing professionals who would not pursue a doctorate or Ph.D. in a traditional campus setting due to their work and home responsibilities.

The proposed Doctor of Technology degree is a professional doctorate (PD)\(^1\), i.e., a terminal degree, focusing on in-depth understanding of and capability with technology and the concomitantly necessary, innovation and leadership skills of middle and senior leaders in industry, business, and government as well as NGOs. As contrasted to the ‘traditional’ Doctor of Philosophy’s intent to develop professional researchers, the professional doctorate is designed to develop researching professionals in technology primarily for environments other than the academy.

In the United States, the Higher Learning Commission\(^2\) created a task force to report on the professional doctorate based on the fundamental assumptions that: “a convincing case can be made that the professional doctorate has a clearly defined place in the hierarchy of U.S. higher education degrees, and it should be perceived as different from and not as a substitute for the research doctorate... the professional doctorate should be considered as a degree level within the hierarchy of U.S. degrees” (Executive Summary, p.2) and that this degree will emerge in further fields.

By offering such a degree, the Purdue Graduate School and the Purdue Polytechnic Institute would be joining a vanguard of leading institutions, in the USA and overseas, committed to advanced practice in applied fields. Currently the professional doctorate already exists in numerous fields including: design, industrial technology, engineering, systems, management, various health fields, architecture, technology, visual arts, organizational dynamics, and STEM fields\(^3\) Institutions with such degrees include Texas A&M, University of

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California-Berkeley, Warwick University, Queensland University of Technology, Delft University of Technology, Imperial College-London, Nottingham Trent University, University of Edinburgh, University of Salford, Bristol University, Southern Methodist University, and Case Western University among others.

The NSF’s 2014 report on science and engineering indicators stated: “four industry groups—professional, scientific, and technical services; manufacturing; government; and educational services—had a disproportionate concentration of S&E jobs. Together, these industry groups employed about two-thirds of all workers in S&E occupations (68%)”. Additionally the NSF reported “For the most part, scientists and engineers performing R&D activity are distributed similarly across broad employment sectors as scientists and engineers who do not perform R&D as a primary or secondary work activity. About 70% of scientists and engineers in each group are employed in the business sector (68% and 71%, respectively), about 20% are employed in the education sector (21% and 18%, respectively), and 11% are employed in the government sector.”

The NSF’s most recent report updating the 2014 indicators stated: “The broader STEM workforce—including S&E technicians and managers—by May 2014 (8.2 million) had surpassed its previous 2008 (7.9 million) high. In contrast, the total workforce declined from 135 million in May 2008 to 128 million in May 2011 and then rose to 135 million by May 2014, similar to the 2008 level.” Notably the 2016 publication also reported that the overall unemployment rate for science, engineering and technology graduates (all levels) was between 2.1 and 2.3% and that among these the rate for those with doctorates was the lowest.

The evidence we have cited documents the career opportunities necessary for the success of our professional doctorate degree as well as a likely increasing growth rate for occupations that require or benefit from an advanced professional degree in technology. Subsequent sections of this pre-proposal will further illuminate the rationale and will document why it is particularly appropriate for Purdue University and its Graduate School and Polytechnic Institute to offer this degree.


Program Description

Doctor of Technology to be offered by Purdue University Polytechnic Institute
Purdue University West Lafayette

1. Characteristics of the Program

   a. Campus Offering Program: Purdue University, West Lafayette.

   b. Scope of Delivery (Specific Sites or Statewide): Purdue University West Lafayette campus.

   c. Mode of Delivery (Classroom, Blended, or Online): The Doctor of Technology degree program is a predominately distance program with an on-campus weekend face-to-face element; in this sense it is a distance-hybrid program. Over 50% of the program will be administered through distance modalities.

   In a typical weekend format, each three-credit hour course will meet for approximately 5-7 face-to-face class hours; three times per semester, for a total of 15-21 seat hours in a given semester. Given 15 seat hours per credit hour in a given semester (45 seat hours per 3-credit hour course), that directly implies a distance percentage of 53% to 66% of each course will be provided via distance delivery. This mode of delivery will enable the practitioners to continue to work at their current jobs while taking courses to expand their breadth and depth of knowledge for their specialty.

   As the program evolves, the program will dynamically adjust its distance delivery versus on-campus face-to-face delivery, on a course by course basis, in a manner best suited to create the highest quality program and that appropriate to professional working adult learners; our target audience. In any permutation, by definition, each course will always be considered a predominately distance delivered course.

   d. Other Delivery Aspects (Co-ops, Internships, Clinicals, Practica, etc.): Participation in research and/or company-based internships.

   e. Academic Unit(s) Offering Program: Purdue Polytechnic Institute at Purdue University, West Lafayette. The Graduate Programs Office of the Polytechnic Institute will administer the program,

2. Rationale for the Program

   a. Institutional Rationale (Alignment with Institutional Mission and Strengths)

Consistent with Purdue University’s land grant mission and specifically to address the national imperative identified by CGS and ETS, we propose the Doctor of Technology as outlined in the following pages.

The Doctor in Technology is designed to encompass best practice techniques that can be implemented in business, industry, government and NGOs, as well as by entrepreneurs, to solve complex technology-
related problems. The proposed curriculum systematically develops enhanced skills and understandings that enable professionals, already holding a Master’s degree or equivalent, to apply their heightened technical and conceptual understandings of technology, research and development as they work to develop strategies to advance/enhance their enterprise. Consequently, the Doctor in Technology will accelerate and further the career of such individuals as they contribute to enterprise performance, efficiencies and sustainability through contemporary applied research-based techniques. The program’s andragogic approach incorporates professional tailoring of the learning experiences that aid aspirants in furthering their education while using contemporary technology. All students will be required to complete a dissertation focusing on applied/use-inspired research of direct relevance to professional practice.

The program builds upon the particular strengths of Purdue University, and its Polytechnic Institute (the largest technology unit at a Research 1 institution in the nation), by leveraging the national recognition and well-established capabilities from existing units including Aviation and Transportation Technology, Computer and Information Technology, Computer Graphics Technology, Construction Management Technology, Engineering Technology and Technology Leadership and Innovation. Given the importance of information to advances in technology, engineering and science the noted strength of Purdue’s Potter Library is germane to this point also. Furthermore, other units across the Purdue University Campus also provide a rich environment for the proposed professional doctoral program by enabling supporting/cognate areas of study. These units include, but are not limited to, the Krannert School of Management, and the Colleges of Education, Engineering and Science.

The professional doctorate is a growing trend in program and title offerings for professionals across enterprises that need advanced skills to stay competitive within industry. The fields of nursing, education, engineering, planning and development, public administration, business administration and music are among 33 that have evolved professional doctorates in the US². Worldwide, Zusman⁷ identified that the emergence and growth of over 500 new professional doctorates since 1998 is due to increasing credential requirements and expectations for entry into, and/or advancement in, the professions. With Purdue University's land grant mission calling for responsiveness to the needs of business and industry, and also for leadership in providing for a constructive environment for these sectors to flourish, Purdue University's Polytechnic Institute, in concert with its ProSTAR arm, is launching this initiative to deliver a professional doctorate focusing on technology leadership and innovation.

The Polytechnic Institute at Purdue University has been delivering a college-based Ph.D. degree of its own, since 2005, and it successfully places graduates primarily in academic careers in universities, commercial and research institutions every year. Such PhD graduates are typically engaged in contributing to knowledge, research and theory in their field as a career endeavor. In contrast, the proposed Doctor of Technology targets individuals who are interested in expanding and applying existing knowledge and research to solve practice-based problems in technology and society.

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The proposed Doctor of Technology program will strengthen Purdue’s leadership role in Indiana’s economic and social development by preparing high level technology graduates with technology, R&D, leadership and innovation capabilities that enhance their professional careers. The creation of the Doctor of Technology degree will further contribute to meeting the land grant mission and strategic goals of the university by providing affordable, accessible, and pedagogically-structured education for advanced level professionals. As proposed, this is an innovative degree program that will provide vital transformative STEM education and world changing research opportunities for graduate students working primarily outside the academy.

Of the new engineering and physical science doctorates (a category which included technology) reporting employment in the NSF Survey of Earned Doctorate\(^8\), only 15-29% reported employment in academe. This means that 71-85% were pursuing careers in business, industry, government, NGOs or entrepreneurship. Given that information, it must be considered that since according to the American Society for Engineering Education’s publication Engineering by the Numbers\(^9\), there is a significantly larger number of engineering positions in academe as contrasted to technology. It is therefore likely that for technology doctorates the proportion of graduates moving to non-academic employment is even higher.

From a study in England\(^10\), one of the distinctions is that most professional doctorates “...have been designed to provide research-based career development for experienced and senior practitioners in the professions. Whereas the ‘traditional’ Doctor of Philosophy degree is intended to develop professional researchers, the professional doctorate is designed to develop researching professionals.” (p.70-71) “The PhD is concerned with making a contribution to theory per se whereas the professional doctorate is concerned with making a research-based contribution to practice” (p.75).

This new program builds on Purdue University’s strong grounding in STEM leadership, and leverages the Polytechnic Institute’s commitment to transform the curriculum to teach the science of demand-driven technology innovation and entrepreneurship.

According to the 2014 Survey of Earned Doctorates\(^4\) published by the NSF, Purdue University ranks 9\(^{th}\) among US universities in terms of number of doctorates awarded and it is the only university in the top ten ranks that is a science, engineering and technology focused university. Furthermore, according to the same source, Purdue University’s Polytechnic Institute is the nation’s largest technology degree producer at an R1 institution.

One of the current strengths at Purdue is the movement towards transformative education; i.e., being at the forefront of innovation in delivering higher education, both inside and outside of the classroom.

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Graduate students pursuing the Professional Doctorate must, in addition to studying cutting-edge content, necessarily employ and integrate a significant variety of performance learning technologies, self-directed learning and corporate support for experiential learning. These programs will enable graduates to effectively address the myriad of challenges facing business and industry and to do so at the pace of such enterprises.

Another movement at Purdue is a focus on accessibility: *Keep the doors to higher education wide open* – “life-changing” benefit open to all who are ready and able to meet its standards and requirements. The proposed Professional Doctor of Technology degree will be structured to provide qualified students the opportunity to develop and demonstrate technology, leadership, management and research skills while still working in their chosen profession.

*b. State Rationale* “Reaching Higher, Achieving More calls for institutions to develop programs that advance the specific mission and strengths of each institution.”

Purdue University’s mission is to serve diverse populations of Indiana, the nation and the world through discovery that expands the frontiers of knowledge, learning that nurtures the sharing of knowledge, and engagement that promotes the application of knowledge. The Vision of Purdue University is to set the Pace for new interdisciplinary synergies that serve citizens worldwide with profound scientific, technological, social, and humanitarian impact on advancing societal prosperity and quality of life.

The professional doctorate program addresses the priorities of completion, productivity and quality reflected in the Indiana Commission on Higher Education’s *Reaching Higher, Achieving More*. An accessible professional doctorate degree enables students to build onto the existing MS Technology degree offerings allowing students to attain an even more advanced degree. Citizens with advanced degrees earn higher salaries, enjoy accelerated career trajectories, and contribute more to local and regional economic prosperity. The Doctorate degree increases programmatic productivity and provides incentives to students to achieve completion. By utilizing existing space, courses and faculty across much of the College and University, this Doctor in Technology will also contribute to a fuller utilization of existing resources.

c. *Evidence of Labor Market Need*

Archbald\(^{11}\) described a growing need for professional doctorates. Students seeking such a degree are usually mid-career professionals in specific areas like healthcare, education, information technology, and business. Because technology is rapidly changing, growth in the industries/arenas mentioned demands a higher baseline of knowledge to adapt to the changing environment to stay competitive for the individual as well as the business unit. Kot & Hendel\(^{12}\) summarized forces contributing to the emergence of professional doctorates with a detailed analysis that can be captured in three categories:


(a) Employability, (b) Growth of the knowledge economy, and (c) Government involvement and public policy. Additionally, literature documenting the reasons for the rise of PDs was well summarized by Butcher & Sieminski’s\(^{13}\) three themes:

- A trend towards the “professionalization of the doctorate as part of a wider examination of the nature and purposes of doctoral education” (p.62).
- Awareness of “the dissonance between the academy and professional practice” (p.62).
- “important difference between career aspirations” (p.62), particularly with respect to the nature of the research, development, process and product improvement activity such degree seekers see themselves as doing in their work after earning the degree.

Industry has recognized the importance of their human resource supply chain – the Purdue University Polytechnic Institute is thinking of our nation’s supply chain for technologically capable people – particularly at the high talent/highly innovative end of the spectrum. Sperling\(^{14}\) then director of the National Economic Council, pointed to the strengthening of skills, i.e., “investing in a skilled workforce” as one of the five pillars of a proposed National Manufacturing Strategy. Industry needs technologically capable people at the high-capability end of the human resource spectrum\(^{15,16}\).

In summary, given the convergence of forces documented in this section, it is clear there exists a rationale for adding a professional doctorate in technology to the array of programs serving our nation. But there is more to this call than just academic analysis and reasoning. The rationale is further supported by evidence collected by ProSTAR, the outreach arm of Purdue’s Polytechnic Institute. ProSTAR has already assembled a significant list of over 45 people who have expressed an interest in pursuing a professional doctorate such as outlined in the Survey Results sections.

\textit{i. National, State, or Regional Need}

The rationale for the Polytechnic Institute’s proposed Doctor of Technology degree is based on three main tenets: needs of business and industry, growth of professional doctoral programs, and the demand for the emerging skills in a knowledge-based and technology-based economy.


Needs of Business and Industry
The NSF’s SEST data from 2010 indicate that 27% of employed scientists and engineers reported R&D as a primary or secondary work activity.” This same source indicated that “R&D activity spans a broad range of occupations.” and that “Those with doctorates account for a disproportionate segment of R&D performers. 11% of SESTAT respondents reported R&D as a major work activity.”

The Council of Graduate Schools, our nation’s flagship society for graduate education, recently reported in Understanding PhD Career Pathways for Program Improvement17, that “roughly one-half of PhD holders find their first jobs in non-academic sectors such as non-profits and governmental agencies, corporations, and start-ups.” (p. iii) This figure is even higher (61%) for the STEM fields (p.4). Given that the PhD programs from which such students graduated were designed for purposes of developing future academics, we propose that deployment of an innovative and purpose-built program for professionals seeking such careers is a promising addition to the current array of Purdue’s graduate programs and one that meets their needs and goals. A similar rationale was the impetus for the rise of other professional doctorates in the USA as well as in Europe and Australia.

Additionally, despite the apparent success of PhDs in non-academic sectors, it must also be acknowledged that there exists significant dissatisfaction with what was for a long time the only route to a doctoral degree, namely the traditional PhD18. This line of reasoning is rooted in a long history of concern regarding the applicability of traditional PhD designs to the needs of contemporary society outside of the academy. The CGS20 documented this stating: “Since at least the early 1990s, the disconnect between how PhD students are prepared and the careers they enter has sparked persistent calls for reform (CGS & AAC&U, 2003; CGS & ETS, 2012; LaPids, 1995; National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 1995) (p.4).

Also supporting the need for this new doctorate are job trends in industry and the shift in the distribution of needed capabilities in the new economy. The Commission on Pathways through Graduate Schools and into Careers, which was formed by ETS and the CGS, reported\textsuperscript{21} that “Between 2010 and 2020, about 2.6 million new and replacement jobs are expected to require an advanced degree, with a projected increase of about 22% for jobs requiring a master’s degree and about 20% for jobs requiring a doctorate or professional degree.”

\noindent \textit{ii. Preparation for Graduate Programs or Other Benefits}\noindent

A doctorate is an academic degree of the highest level. There are three types of doctorates: research, professional, and honorary. The most common type of research doctorate is a Ph.D. (Philosophy Doctor or Doctor of Philosophy). Professional doctoral degrees (also called first professional degrees) are awarded in certain fields where most holders of the degree are in a profession, such as law, medicine, music, or ministry, and, are not engaged primarily in scholarly research and academic activities.\textsuperscript{22}

The proposed Doctor of Technology is a research-based doctorate, with predominately applicable to use-inspired basic research and/or purely applied research and development, versus the traditional pure-basic research of the Ph.D.


The list presented below contains just a few of the many identified research doctorates:

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<tr>
<td>Doctor of Architecture (D.Arch.)</td>
<td>Doctor of Ministry (D.Min./D.M.)</td>
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<tr>
<td>Doctor of Business Administration (D.B.A.)</td>
<td>Doctor of Music Ministry (D.M.M.)</td>
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<tr>
<td>Doctor of Canon Law (J.C.D.)</td>
<td>Doctor of Medical Science (D.M.Sc.)</td>
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<tr>
<td>Doctor of Chemistry (D.Chem.)</td>
<td>Doctor of Nursing Science (D.N.Sc.)</td>
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<tr>
<td>Doctor of Criminal Justice (D.C.J.)</td>
<td>Doctor of Public Administration (D.P.H.)</td>
</tr>
<tr>
<td>Doctor of Comparative/Civil Law (D.C.L.)</td>
<td>Doctor of Physical Education (D.P.E.)</td>
</tr>
<tr>
<td>Doctor of Criminology (D.Crim.)</td>
<td>Doctor of Public Health (D.P.H.)</td>
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<tr>
<td>Doctor of Environmental Design (D.E.D.)</td>
<td>Doctor of Design (Dr.DES.)</td>
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<tr>
<td>Doctor of Engineering (D.Eng.)</td>
<td>Doctor of Religious Education (D.R.E.)</td>
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<tr>
<td>Doctor of Environment (D.Env.)</td>
<td>Doctor of Recreation (D.Rec./D.R.)</td>
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<tr>
<td>Doctor of Forestry (D.F.)</td>
<td>Doctor of Sacred Theology (S.T.D.)</td>
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<tr>
<td>Doctor of Health and Safety (D.H.S.)</td>
<td>Doctor of Science in Veterinary Medicine (D.Sc.V.M.)</td>
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<tr>
<td>Doctor of Industrial Technology (D.I.T.)</td>
<td>Doctor of Social Science (D.S.Sc.)</td>
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<tr>
<td>Doctor of Juridical Science (S.J.D.)</td>
<td>Doctor of Social Work (D.S.W.)</td>
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<tr>
<td>Doctor of Juristic Science (J.S.D.)</td>
<td>Doctor of Technology (D. Tech.)</td>
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<tr>
<td>Doctor of Music (D.M.)</td>
<td>Doctor of Theology (Th.D.)</td>
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<tr>
<td>Doctor of Musical Arts (D.M.A.)</td>
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Professional Doctorates are typically categorized as:

<table>
<thead>
<tr>
<th>D.C. (Doctor of Chiropractic)</th>
<th>D.P.M. (Doctor of Podiatric Medicine)</th>
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<tbody>
<tr>
<td>D.D.S. (Doctor of Dental Surgery)</td>
<td>D.M.D. (Doctor of Dental Medicine)</td>
</tr>
<tr>
<td>J.D. (Juris Doctor or Doctor of Law)</td>
<td>D.V.M. (Doctor of Veterinary Medicine)</td>
</tr>
<tr>
<td>M.D. (Medicinae Doctor or Doctor of Medicine) (US)</td>
<td>Psy.D. (Doctor of Psychology)</td>
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<tr>
<td>D.P.T. (Doctor of Physical Therapy)</td>
<td>Pharm.D. (Doctor of Pharmacy)</td>
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<tr>
<td>D.O. (Doctor of Osteopathic Medicine)</td>
<td>O.D. (Optometry Doctor or Doctor of Optometry)</td>
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### iii. Summary of Indiana DWD and/or U.S. Department of Labor Data

The Indiana Department of Workforce Development (DWD) data do not specifically address demand for doctor of technology graduates, but overall demand for advanced degrees is expected to increase by 14.5% over the current decade, and the projected increase in jobs for STEM occupations needing advanced degrees is projected to increase by 27.1%. The DWD predicts strong statewide growth during the same time frame for multiple STEM-related occupations that this degree program would potentially serve at varying levels including:

- Construction Managers, 7,839 positions, 7.8% increase projected
- Medical and Health Services Managers, 9,890 positions, 19.9% increase projected
- Management analysis, 11,802 positions, 20% increase projected
• Computer Systems Analysts, 9,814 positions, 25.2% increase projected
• Software Developers, Systems Software, 3,864 positions, 17.9% increase projected
• General and Operations Managers, 4,187 positions, 10.9% increase projected
• Database Administrators, 1,929 positions, 13.1% increase projected
• Computer and Information Systems Managers, 1,550 positions, 18.7% increase projected
• Training and Development Specialists, 5,490 positions, 10.9% increase projected
• Education Administrators, Elementary & Secondary, 4,330 positions, 6.6% increase projected
• Network and Computer Systems Administrators, 7,743 positions, 10.8% increase projected
• Chief Executives, 4,438 positions, 1.5% increase projected

iv. National, State, or Regional Studies

The US Bureau of Labor Statistics’ *Occupational Outlook Handbook*\(^24\) included the middle level business and industrial operational personnel among their list of 20 occupations with the highest projected number of new jobs projected for 2014-2024. Based on the proportion of R&D employment in America’s workforce we estimate that between 5-11% of the 151,000 reported new jobs will involve R&D and of these a significant proportion will require higher levels of education such as master’s and doctoral degrees. The U.S. Bureau of Labor Statistics projects increases in many of the tracks for this program for doctoral or professional degrees as shown below. Additionally, the US Department of Labor reports that .8% of all civilian employment requires a doctoral degree.

• Construction Managers, 373,200 positions, 5% increase projected
• Architectural and Engineering Managers, 182,100 positions, 2% increase projected
• Management Analysts, 758,000 positions, 14% increase projected
• Computer and Information Systems Managers, 348,500 positions, 15% increase projected
• Computer and Information Research Scientists, 25,000 positions, 11% increase projected
• Software Developers, 1,114,000 positions, 17% increase projected
• Network and Computer Systems Administrators, 382,600 positions, 8% increase projected
• Industrial Designers, 38,400 positions, 2% increase projected
• Operations Research Analysts, 91,300 positions, 30% increase projected
• Top Executives, 2,467,500 positions, 6% increase projected
• Human Resource Managers, 122,500 positions, 9% increase projected\(^24\)

\(^{23}\)Indiana Department of Workforce Development, Research & Analysis, Long-term Projections. (2016).

http://www.bls.gov/ooh/
v. *Surveys of Employers or Students and Analyses of Job Postings*

To better understand the demand for the proposed Doctor of Technology degree, the Purdue University Polytechnic Institute’s Center for Professional Studies in Technology and Applied Research (ProSTAR) administered a Qualtrics survey to almost a thousand past and current students (1999-2017) of professional fee-based credit programs who have either graduated or are planning to graduate in the spring of 2017. The survey asked each recipient to rate their interest in a new Doctor of Technology (D. Tech.) degree, as described in this proposal, on a Likert scale, where 0 = no interest and 5 = very interested.

Of the 978 surveys sent out, 334 responded (34%). Of the 334 respondents, 219 (66%) were either “very interested” or “interested” in the newly proposed Doctor of Technology program. Of the 334 respondents, 80 (24%) said they “might have an interest” in the newly proposed program, and only 35 (10%) were not interested at this time.

Figure 1.0 below depicts the number of respondents per Likert scale rating.

![Figure 1.0 – Percent of Respondents by Interest Level (n = 334).](image)

Of the 219 respondents who were either very interested or interested in the newly proposed Doctor of Technology program, 109 (50%) said there were likely to receive some form of company financial support.

Of the 219 students who were either very interested or interested in the newly proposed Doctor of Technology program, 191 respondents stated they were U.S. citizens. Of those 191 respondents, 103 (53.9%) were from inside the state of Indiana; while 88 respondents (46.1%) were from outside the state of Indiana. Figure 2.0 depicts the in- versus out-of-state residents.
Of the 219 respondents, 191 (87%) are from within the U.S., while 28 respondents (13%) are outside of the U.S. Of the 28 respondents from outside of the U.S., the largest populations are from Nigeria (3.7%), Kenya (2.7%) and Uganda (2.3%). Figure 3.0 reflects the number of respondents by country.

Of the 219 respondents, there were 159 unique companies represented with the top industries being pharmaceuticals, defense and heavy machinery.

Figure 4.0 depicts the number of respondents represented by various ProSTAR administered programs. Of the 219 respondents, the following cohorts were largest:
- 67 (31%) were from the weekend distance-hybrid programs (with 55% from the Leadership weekend programs)
- 66 (30%) were from the Biotechnology and Regulatory Science cohorts
- 37 (17%) were from information technology and related cohorts
- 21 (9.6%) were from aviation and related cohorts
- 28 (12.8%) did not identify a program

Figure 4.0 – Number of Respondents Represented by Various ProSTAR Administered Programs (n=219)

The 219 respondents reported an average age of 41 years. Their largest single age range was 31-35 years of age (22%), followed by 36-40, 41-45 and 46-50, each at 16% respectively. The chronological age of the respondents is typically related to the number of years of work experience, and subsequently as a professional working adult learner. Figure 5.0 presents the percentage of the 219 respondents in the age ranges from the survey. Clearly the interested respondents are in their mid-career stage – exactly the target clientele for our professional doctorate.
Of the 219 respondents, 145 (66%) were male, while 74 (34%) were female.

While ethnicity reporting is voluntary and highly variable, of the 219 respondents reporting, 48 (22%) self-reported as underrepresented minorities. Of the 48 respondents who self-reported, the largest ethnicities were black or African American (58%), Asian (23%) and Hispanic (19%).
Figure 7.0 – Percent Respondents Self-Reporting as Underrepresented Minorities by Ethnicity (n=48)

vi. Letters of Support (See Appendix D)
3. Costs of and Support for the Program

   a. Costs

Example Student Costs per credit hour:

MS BIRS Fees per student  
(Preparatory to D. Tech if needed)  
In-State: $1000.00 x 33 = $33,000.  
Out-of-State: $1,030.00 x 33 = $33,990.

D. Tech. Fees per student  
In-State: $1,050 x 60 = $63,000.  
Out-of-State: $1,250.00 x 60 = $75,000.

Table one was calculated based on 2 concurrently offered cohorts. Faculty costs will vary dependent upon whether faculty are teaching “in load” or whether a given course is taught to multiple cohorts at the same time, thereby leveraging faculty costs across cohorts.

<table>
<thead>
<tr>
<th>ProSTAR Doctorate of Technology (D. Tech.)</th>
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<tr>
<td>Table 1. Cost of and Support for the Program</td>
</tr>
<tr>
<td>Detail on Direct Program Costs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Purdue West Lafayette Campus</th>
</tr>
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<tbody>
<tr>
<td>Total Yr 1 FY 2019</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>FTE COST</td>
</tr>
<tr>
<td>1. Faculty and Staff</td>
</tr>
<tr>
<td>a. Faculty</td>
</tr>
<tr>
<td>b. Limited Term Lecturers</td>
</tr>
<tr>
<td>b. Support Staff - Prog. Manager</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
<tr>
<td>2. Supplies and Expenses</td>
</tr>
<tr>
<td>a. General Supplies/Expenses</td>
</tr>
<tr>
<td>b. Recruiting</td>
</tr>
<tr>
<td>c. Travel</td>
</tr>
<tr>
<td>d. Library</td>
</tr>
<tr>
<td>e. Other - Facilities</td>
</tr>
<tr>
<td>TOTAL Supplies and Exp.</td>
</tr>
<tr>
<td>3. Equipment</td>
</tr>
<tr>
<td>a. Additional Lab Equipment</td>
</tr>
<tr>
<td>b. Routine Repair &amp; Replace</td>
</tr>
<tr>
<td>Total Equipment</td>
</tr>
<tr>
<td>4. Student Assistants</td>
</tr>
<tr>
<td>a. Graduate Fee Scholarships</td>
</tr>
<tr>
<td>b. Fellowships</td>
</tr>
<tr>
<td>Total Student Assistants</td>
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<tr>
<td>Sum of All Direct Program Costs</td>
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### ProSTAR Doctorate of Technology (D. Tech.)

#### Table: 1B Detail on Incremental or Out of Pocket Direct Program Costs

<table>
<thead>
<tr>
<th>Non-Recurring Expenses</th>
<th>Year 1</th>
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<tr>
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<tr>
<td>1. Personnel Services</td>
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<tr>
<td>a. Faculty - Course Development</td>
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<td>b. Support Staff - Program Manager</td>
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<tr>
<td>c. Graduate Teaching Assistants</td>
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<td>TOTAL</td>
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</tr>
<tr>
<td>2. Supplies and Expenses</td>
<td></td>
</tr>
<tr>
<td>a. General Supplies/Expenses</td>
<td></td>
</tr>
<tr>
<td>b. Recruiting - Marketing</td>
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</tr>
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<td>c. Travel</td>
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<tr>
<td>d. Library Acquisitions</td>
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<tr>
<td>TOTAL</td>
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</tr>
<tr>
<td>3. Equipment</td>
<td></td>
</tr>
<tr>
<td>a. New Equipment Necessary for Programs</td>
<td>$</td>
</tr>
<tr>
<td>b. Routine Replacement</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
<tr>
<td>4. Facilities</td>
<td></td>
</tr>
<tr>
<td>5. Student Assistants</td>
<td></td>
</tr>
<tr>
<td>a. Graduate Fee Scholarships</td>
<td></td>
</tr>
<tr>
<td>b. Fellowships</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
<tr>
<td><strong>SUM OF ALL INCREMENTAL DIRECT COSTS</strong></td>
<td>$ 100,000</td>
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</table>

i. Faculty and Staff
Program Faculty and Administration

Administration
Dr. Kathryne Newton
Associate Dean for Graduate Programs
Rank: Associate Dean and Professor
Disciplinary Training: Industrial Distribution, MBA, PhD

Dr. Mitch Springer
Executive Director, Purdue Polytechnic Institute
Rank: Non-faculty, Management/Professional Staff
Disciplinary Training: Systems and Software Engineering, PhD

Core Polytechnic Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Discipline/Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thomas Carney</td>
<td>Professor</td>
<td>PhD</td>
</tr>
<tr>
<td>Kari Clase</td>
<td>Professor</td>
<td>PhD</td>
</tr>
<tr>
<td>Stephen Elliott</td>
<td>Professor</td>
<td>PhD</td>
</tr>
<tr>
<td>Richard Fanjoy</td>
<td>Assoc. Professor</td>
<td>PhD</td>
</tr>
<tr>
<td>Bryan Hubbard</td>
<td>Assoc. Professor</td>
<td>PhD</td>
</tr>
<tr>
<td>Mary Johnson</td>
<td>Assoc. Professor</td>
<td>PhD</td>
</tr>
<tr>
<td>Michael Kane</td>
<td>Assoc. Professor</td>
<td>PhD</td>
</tr>
<tr>
<td>Julius Keller</td>
<td>Assis. Professor</td>
<td>PhD</td>
</tr>
<tr>
<td>Chad Laux</td>
<td>Assoc. Professor</td>
<td>PhD</td>
</tr>
<tr>
<td>Linda Naimi</td>
<td>Assoc. Professor</td>
<td>JD, PhD</td>
</tr>
<tr>
<td>H. Nicholas Dib</td>
<td>Assoc. Professor</td>
<td>PhD</td>
</tr>
<tr>
<td>Joseph Orczyk</td>
<td>Assoc. Professor</td>
<td>PhD</td>
</tr>
<tr>
<td>Jon Padfield</td>
<td>Assis. Professor</td>
<td>PhD</td>
</tr>
<tr>
<td>Randy Rapp</td>
<td>Assoc. Professor</td>
<td>DMgt</td>
</tr>
<tr>
<td>Mark Shaurette</td>
<td>Assoc. Professor</td>
<td>PhD</td>
</tr>
</tbody>
</table>

Affiliated Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Discipline/Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stephen Byrn</td>
<td>Professor, Indus. Pharm.</td>
<td>Medicinal Chemistry</td>
</tr>
<tr>
<td>Stewart Schreckengast</td>
<td>Limited Term Lect., Polytechnic</td>
<td>Aviation Safety and Sec.</td>
</tr>
<tr>
<td>Tyler Spence</td>
<td>Assis. Prof., San Jose State Univ.</td>
<td>Aviation Technology</td>
</tr>
<tr>
<td>James Tanoos</td>
<td>Clinical Assoc. Professor</td>
<td>Industrial Technology</td>
</tr>
<tr>
<td>Louis Yu</td>
<td>Chief Qual. Officer, Valeant</td>
<td>Analytical Chemistry</td>
</tr>
</tbody>
</table>

ii. Facilities

No additional facilities will be needed for this program because it is delivered at a distance with existing space and technologies.

iii. Other Capital Costs (e.g. Equipment)

No additional learning resources are necessary for the implementation of the D. Tech program.

b. Support
i. Nature of Support (New, Existing, or reallocated)

Special Fees above Baseline Tuition. The Doctorate of Technology is proposed to be a fee-based program. This provides the opportunity to design, develop and implement the program under an umbrella supportive of increased costs, beyond those recoverable through normal tuition-based programs. The administration of this program will be through the Purdue University Polytechnic Institute’s Center for Professional Studies in Technology and Applied Research (ProSTAR). All ProSTAR programs are fee-based by design and subsequent approvals are by the College, University and the Indiana Commission of Higher Education (ICHE).

ii. Special Fees above Baseline tuition

There will be no additional fees for the D.Tech. Program other than the current Polytechnic Institute Differential fee.

4. Similar and Related programs

a. List of Programs and Degrees Conferred

i. Similar Programs at Other Institutions

As far as the authors of this proposal know, there is no identical program offered by any R1 institution. Indiana State University offers a PhD in Technology Management that was started deliberately to help meet the need for faculty at various technological universities.

ii. Related Programs at the Proposing Institution

There is currently a Ph.D. in Technology offered by the Polytechnic Institute for on-campus students who wish to develop advanced interdisciplinary skills to serve as an academic scholar or an advanced leader or researcher in the public and private sectors. This degree is not accessible by working professionals in industry due to the residency requirements of the program.

b. Similar Programs Outside Indiana

There are somewhat analogous programs both in the USA and in other countries around the world. Texas A&M University (TAMU) has a D. Engineering program in their College of Engineering. Also, for example, Appendix B documents the requirements of the Doctor of Industrial Technology offered by the Department of Technology at the University of Northern Iowa—a regional university. This program fills a need on a campus that has very few doctoral programs. This is an on-campus program that has similar requirements to the proposed D. Tech. including 60 credit hours post MS, and a dissertation. Enrollment ranges from 7 – 15 over the past few years. This degree program also promotes the applied research model in calling for a doctoral internship.

c. Articulation of Baccalaureate Programs and Transfer Students

Direct admit from a Bachelor’s degree into the Doctor of Technology (D. Tech.) degree will not be allowed. Those wishing to enter into the D. Tech. degree will need an accredited Master’s degree as approved by the Purdue University Graduate School. If a student has a Master’s degree from the Polytechnic Institute’s Center for Professional Studies in Technology and Applied Research (ProSTAR), then pursuit of a similar track within the D. Tech. degree will likely result in transfer in of the maximum (30) hours
allowed. If the student has a Master’s degree from an accredited college/university, as approved by the Purdue University Graduate School, but not obtained through the Polytechnic’s ProSTAR organization, then the number of hours allowed to be transferred into the D. Tech. degree will be variable as determined and subsequently approved by the academic department of the track the student wishes to pursue. In either scenario, the maximum allowable hours to be transferred into the D. Tech. program will be 30.

Transfer of students from other degree programs, or other universities will follow Purdue University’s standard transfer admission process. Course equivalencies will be determined through the normal processes, and the number of graduate courses allowed will be determined following the guidelines of Purdue University Graduate School.

We anticipate the number of students transferring in from other universities into the D.Tech program will be relatively small.

d. Collaboration with Similar or Related Programs on Other Campuses - None

5. Quality and Other Aspects of the Program

a. Credit Hours Required/Time to Completion

- Credit hours required for the program and how long a full time student will need to complete the program.

The Doctor of Technology will require at least 90 credit hours of course work and research. Students who enter the Doctor of Technology program with an earned Master’s degree from an accredited/recognized university can apply a maximum of 30 credit hours toward the 90 credit hours required for the degree.

Program requirements include selecting a Research Advisor/Major Professor, establishing a graduate program/advisory committee, securing approval of and successfully completing the Plan of Study, passing a Preliminary Exam including Written and an Oral, submitting a dissertation proposal, submitting and defending a dissertation. For a sample plan of study, see Appendix A.

Doctor of Technology students will be guided by a 4-member graduate committee consisting of at least three regular members of Purdue Graduate faculty, with one of the three Purdue graduate faculty members representing the student’s cognate discipline. Additionally, one member should come from business/industry or other relevant practice arena as relevant to the student’s purpose statement. The business/industry mentor will have earned at least a master’s degree and will occupy a position of responsibility that represents an aspiration of the doctoral student. This proposal incorporates a request that Graduate School will afford such a member an appropriate classification to permit their participation on both the student’s graduate and examining committees.

The purpose of the proposed Doctorate in Technology is to develop advanced level practitioner-researchers able to work at the forefront of technology, and as such will require a traditional doctoral dissertation. Much of such work occurs at the emerging interface of two or more
technology disciplines and this necessarily involves research and development. To succeed in such demanding arenas advanced practitioner-researchers need to be able to understand, evaluate, conceptualize and conduct research and in particular applied, use-inspired research. While this might be teachable at an abstract level, the faculty are convinced that by actually conceptualizing, proposing and conducting such research advanced practitioners develop higher level skills, understandings and appreciation for the complexities, trade-offs and nuances involved in research and the dissertation is the preferred method for accomplishing this. It should also be noted that most of the comparable doctoral programs, e.g., the UNI, TAMU, and those of the English Universities previously cited, also require dissertations or other “records of study” requirements.

b. *Exceeding the Standard Expectation of Credit Hours*

In exceptional cases and for reasons agreed to by the student’s graduate committee, this may be permissible but is not generally encouraged.

c. *Program Competencies or Learning Outcomes*

- List the significant competencies or learning outcomes that students completing this program are expected to master.

Upon completion of the D. Tech, students should be able to:

- Envision, plan and conduct applied research and development activities;
- Identify, comprehend, analyze, evaluate and synthesize research and professional practice;
- Evaluate technologies and technology-related programs;
- Assess individual performance with, and understanding of, technology;
- Communicate effectively and employ constructive professional and interpersonal skills; and
- Function at a high level in one or more of the technology disciplines.
- Employ quantitative, qualitative, analytic and statistical techniques to technological problems
- Apply advanced leadership practices to organizational challenges
- Conduct sophisticated systems analysis and design activities

Examples of sub-outcomes for learning outcomes listed above.

- Envision, plan and conduct applied research and development activities;
  - An applied dissertation
  - A proposal for an applied R&/or D project
- Identify, comprehend, analyze, evaluate and synthesize research and professional practice;
  - Advanced literature search & retrieval from government, corporate, and international sources
  - Employ data analytics
- Evaluate technologies and technology-related programs;
  - Perform a technology assessment employing critical criteria
  - Describe the pros and cons and intended and unintended consequences of technology policy
- Assess individual performance with, and an understanding of, technology;
  - Engage in systematic technological futuring
  - Develop and implement a personal professional development plan focusing on technological capability
- Communicate effectively and employ constructive professional and interpersonal skills;
• Document the conceptualization and conduct of an industrial/business technology-related research R and/or D project with an in-depth cogent research report
• Prepare compelling presentations tailored for specific audiences
• Function at a high level in one or more of the technology disciplines.
  • Apply systems theory to root cause analysis of a technological challenge/problem
  • Demonstrate the ability to resolve technological problems into their energy, material and information components
• Employ quantitative, qualitative, analytic and statistical techniques to technological problems
  • Perform multivariate analyses and test the significance of the finding
  • Demonstrate effective content analysis of textual or verbal data
• Apply advanced leadership practices to organizational challenges
  • Employ conflict resolution techniques to increase the effectiveness of an organizational unit/team
  • Evolve a plan to capitalize on the diversity of a work group
• Conduct sophisticated systems analysis and design activities
  • Develop an analysis matrix of information, material, & energy flows in a technological system
  • Design a solution to a technological challenge by addressing root causes

d. Assessment

Assessment of progress towards the achievement of the competencies required for the D.Tech graduates will be completed throughout the student’s doctoral program:

• Competency in coursework will be assessed through examination, oral presentation and written reports and other artefacts demonstrating individual and team capability.
• At the end of the Spring semester of the second year, students will present a formal proposal for their dissertation research
• Students will be assessed on their knowledge of their chosen technology discipline with a written and orally defended preliminary exam conducted by their graduate advisory committee at the end of their third year.
• Students are expected to communicate with their advisory committee each semester to review progress towards completion of the coursework and research.
• Students will submit a final dissertation to his/her advisory committee for approval and satisfactorily defend it during an oral examination and defense by their graduate advisory committees.

e. Licensure and Certification – None required

f. Placement of Graduates

As demonstrated by the support letters and the survey responses, it is expected the majority of students enrolled in the D.Tech program will be working professionals. Placement will not be of high concern for these students. For those seeking employment, they will likely have a large network from which they can seek employment opportunities in addition to the significant assistance and support available from Purdue University’s Center for Career Opportunities.

g. Accreditation – None available
6. Projected Headcount and FTE Enrollment and Degrees Conferred

In addition to purposing the Doctor of Technology degree towards the development of technology and R&D competence needed by professionals in business, industry and government, the vision is to employ a hybrid delivery system involving predominantly distance learning education plus some campus-based experiences. It is believed this will make the achievement of a doctoral degree far more accessible to practicing professionals who would not pursue a doctorate or Ph.D. in a traditional campus setting due to their work and home responsibilities.

The proposed Doctor of Technology degree is a professional doctorate, i.e., a terminal degree, focusing on in-depth understanding of and capability with technology and the concomitantly necessary, innovation and leadership skills of middle and senior leaders in industry, business, and government as well as NGOs.

It is expected that the program will initially enroll up to 20 professional working adult learners in year one; 20 additional working professional adult learners will be admitted in year two and 20 additional working professional adult learners in year 3 (Table 2). Annual enrollments are expected to hold steady at 20 new students each subsequent year. Given the three year expected time to program completion and graduation, this yields an average total student enrollment of 55-60 students at any one point in time (assuming normal attrition/deferment rates based on ProSTAR experience).

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
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<tbody>
<tr>
<td>Annual Enrollment Projections (Headcount)</td>
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<tr>
<td>Total (Cumulative) Enrollment Projections (FTE)</td>
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<td>38.0</td>
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<tr>
<td>Degree Completion Projection</td>
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Appendix A

Curriculum and Requirements

- Admission Requirements

A description of Purdue University admission and registration requirements for graduate students is available in the Graduate Policies and Procedures Manual, Sections III and V respectively. That document is available online at:
http://catalog.purdue.edu/content.php?catoid=7&navoid=2929

In addition to the general requirements for Purdue University, admission to graduate study in the Doctor of Technology degree program will require satisfactory prior completion of a master’s degree at a college or university of recognized standing. Because of the diversity of topics within Technology, no particular kind of undergraduate or master’s degree preparation is required. However, if deficiencies in math or specific technology/professional topics are identified by the graduate committee or advisor, admitted students may be required to address and successfully attend to such deficiencies (in addition to the normally expected number of degree credits) during the first one or two semesters of their plan of study.

Before a candidate will be considered for admission, an application package for admission must be completed and received by Purdue’s Graduate School and the Polytechnic Institute’s graduate program office. In addition to the application form a number of supplementary documents must be submitted.

The Polytechnic envisions that the bulk of the students who will be choosing to pursue the proposed Doctor of Technology will be practitioners from the middle and upper ranks of business and industry, i.e., persons with a documented record of performance. The faculty propose to use evidence from this record of performance, as documented in a detailed resume, to screen applicants for indicators of high talent, initiative and performance. Typically, this is observable by an upwardly directed career trajectory of increasing responsibility. Because the Doctor of Technology focuses on advanced practice, such indicators have more utility for predicting success potential than the GRE or GMAT exam, therefore they are not required. Additionally, requirements for the GRE or GMAT are in accordance with those set forth by the Polytechnic Institute Office of Graduate Studies, Polytechnic Institute Graduate Education Committee (GEC), Purdue University Graduate School and Purdue University.

The faculty also propose to require applicants to further document their writing ability by providing a significant sample of their writing, e.g., a major report, a previously published article, or a purposefully generated narrative assigned by the program.

Applicants must submit a Statement of Purpose essay of approximately 300-500 words stating clearly and succinctly the reason for seeking graduate study in Technology at Purdue University, the applicant’s career goals, and research interests. The applicant may include information about any unique circumstances, special abilities, awards, achievements, scholarly publications, or
professional history that are relevant to the admission decision. It is recommended that applicants also submit a letter of support from their employer whenever possible.

Letters of recommendation from three people who are knowledgeable about the applicant’s academic, professional and scholarly ability and potential must be submitted. Applicants should not request letters from individuals who would have a conflict of interest (e.g. friends and family). Additional recommendations may be requested. Applicants are also encouraged to establish effective contact with at least one of the graduate faculty piloting the Doctor of Technology program.

Official original transcripts from each college or university at which the applicant has completed course work must be on file before an application can be processed.

English Proficiency Requirements - At the time of enrollment, the records of all incoming on-campus graduate students are reviewed to determine whether or not they have met the minimum written English proficiency requirements as established by Purdue Polytechnic Institute. The minimum TOEFL requirements for both the Graduate School and Polytechnic are as follows:

<table>
<thead>
<tr>
<th>Scale</th>
<th>Current GS Score</th>
<th>%tile</th>
<th>Dr. of Tech Required Minimum Score</th>
<th>%tile</th>
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<tbody>
<tr>
<td>Writing</td>
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<td></td>
<td>21</td>
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<tr>
<td>Speaking</td>
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<tr>
<td>Total</td>
<td>77</td>
<td>38</td>
<td>84</td>
<td>50</td>
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</table>

- Curriculum Requirements

Degree Characteristics and Requirements

The Doctor of Technology degree program will offer graduate curricula in technology areas aligned with the Polytechnic’s current graduate offerings including construction management, engineering technology, aviation technology, computer and graphics technology, and technology leadership and innovation. The programs are carefully structured to provide students with specialized learning experiences in the areas of the students’ choosing, recognizing that there is great value in professionals who understand the function, utilization, and interaction of these diverse areas in industry. Important to the design of this program is the requirement for a cognate block of courses that develops competence in an interface area of relevance to technology

The proposed Doctor of Technology degree will be structured to provide qualified students the opportunity to develop and demonstrate innovation, leadership, management and research skills
to the evolving challenges in technology across organizations, industries and society. This requires building on and raising both the breadth and depth of the master’s degree-developed skill set. Because of both the land grant mission of Purdue and the needs of business and industry, the program will also develop essential research and development skills as well as the heightening of communication skills. Graduate students will need to successfully plan, conduct and defend an advanced project in dissertation form. These are working professional adult learners, intending to use their newly acquired knowledge in business and industry. Students will be cohort based, meeting three times per semester as a group. Historically, this approach has created a cohesive unit with significant comradery among the group.

a. Requirements

Students will complete a minimum of 90 credit hours for the Professional Doctor of Technology degree. Each student’s Electronic Plan of Study must first be approved by the student’s advisor and graduate committee and subsequently by the Purdue Graduate School. Students will typically complete a total of 90 credit hours for the Doctoral degree. Up to 30 credit hours may be accepted from a M.A. or M.S. credentialed program. Additional courses consist of 21 credit hours of core curriculum. There are 24 hours consisting of electives offered by the Polytechnic Institutes constituent units or from relevant courses offered by other Colleges or Schools on Purdue University’s West Lafayette campus. These courses include, but are not limited to, areas such as: Project Management, Biometrics, Systems Simulation, Lean/Six Sigma, Supply Chain Management, Developing Courses for Industry and Technology, Statistics, and Design of Experiments. The last 15 credit hours earned by successfully proposing and completing an applied/use-inspired dissertation

Pursuant to such plans of study, students are required to take:

- 21 credit hours of core curriculum consisting of:
  - Technology and Society (3 credit hours)
  - History of Science and Technology (3 credit hours)
  - Philosophy of Technology (3 credit hours)
  - (To be Developed) Technology Policy and Economics (3 credit hours)
  - The Design Process (3 credit hours)
  - Technology from a Global Perspective (3 credit hours)
  - Technology Clusters and Domains (3 credit hours)

- 15 credit hours for a Dissertation, for the Professional Doctor Technology degree
  - Dissertation (15 credit hours)
  - This requirement consists of a 15-credit hour research or project that is focused on a current problem in a company which the dissertation is completed and the results defended to the graduate committee. It is recommended that the graduate committee contain one member from the company that the student works for.
• 24 credit hours of specialization: following are potential coursework tracks that Polytechnic departments could create for students in their programs. See below for existing Graduate courses in the Polytechnic Institute.

<table>
<thead>
<tr>
<th>Construction Management Technology</th>
<th>Engineering Technology</th>
<th>Aviation Technology</th>
<th>Computer Graphics Technology</th>
<th>Computer and Information Technology</th>
<th>Technology Management</th>
<th>Technology Leadership and Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Credit Hours</td>
<td>24 Credit Hours</td>
<td>24 Credit Hours</td>
<td>24 Credit Hours</td>
<td>24 Credit Hours</td>
<td>24 Credit Hours</td>
<td>24 Credit Hours</td>
</tr>
</tbody>
</table>

• Graduate courses in the Polytechnic Institute
All of the following courses already exist and have been taught at Purdue, West Lafayette. In any given semester, there is a large number of courses offered by ProSTAR that represent a catalog of classes that may be taken by the D.Tech. students. For example, in Fall 2017 there were 48 different classes offered by ProSTAR scattered among 7 different MS and graduate certificate programs. These would be in addition to the core Ph.D. courses that will be offered each semester. Additionally, the faculty propose that plans of study for the Doctor of Technology be limited to include a maximum of 6 credits of independent study and also a maximum of 6 credits of variable titled courses. It should be noted that any inclusion of such courses is subject to prior approval by the student’s major professor and program of study approval by the student’s graduate committee. The following course listing represents the possible set of classes that Polytechnic departments may choose from to establish their Professional Doctorate Coursework specialization tracks.

**Existing Courses**
AT 52000 3  Operational Assessment and Improvement
AT 52100 3  Resource Analysis and Optimization
AT 52400 3  Managerial Economic Decision Making
AT 52500 3 Process Improvement and Simulation
AT 52600 3 Aviation Leadership
AT 52800 3 Management and Design of Training Systems
AT 53000 3 Multi-Cultural Issues in Team Operations
AT 53100 3 International Civil Aviation Regulatory Systems
AT 53200 3 Contemporary Issues in Transportation Security
AT 54000 3 Aviation and Aerospace Sustainability
AT 54200 3 Aviation Fuels and Exhaust Emissions
AT 54400 3 Aircraft Lifecycle Management Innovations
AT 55000 3 Critical Systems Thinking
AT 57200 3 Human Error and Safety
AT 57300 3 Managing the Risk of Organizational Accidents
AT 57400 3 Exploratory Studies in Aviation Human Factors
BCM 51100 3 Energy Conserving Building Retrofit
BCM 52000 3 Preconstruction Project Management
BCM 52500 3 Managing Construction Quality and Production
BCM 53000 3 Construction Operations and Strategic Management
BCM 53500 3 Construction Accounting and Financial Management
BCM 54000 3 Law for Construction Managers
BCM 54500 3 Construction Management Training and Development
BCM 55000 3 Risk Management in Construction
BCM 55500 3 Construction Leadership and Marketing
CGT 51100 3 The Development of Graphics In Technology
CGT 51200 3 User Experience Design and Evaluation
CGT 51300 3 Interactive Multimedia Development and Research
CGT 51400 3 Product Lifecycle Management
CGT 51500 3 Virtual Environments
CGT 51600 3 Collaborative Virtual and Augmented Environments
CGT 51700 3 Product Development Using Virtual Environments
CGT 51800 3 Augmented Reality
CGT 51900 3 Projects in Graphics
CGT 52000 3 Computer Graphics Programming
CGT 52100 3 Advanced Real-Time Computer Graphics
CGT 60000 3 Spatial Ability Research and Assessment
CGT 61000 3 Visual Intelligence and Perception
CGT 61100 3 Computer Graphics Production Pipeline and Project Management
CGT 62000 3 Graphics Processing Unit Computing
CNIT 51100 3 Foundations in Homeland Security Studies
CNIT 51200 3 Managing Resources and Applications for Homeland Security
CNIT 55000 3 Organizational Impact of Information Technology
CNIT 55100 3 Information Technology Economics
CNIT 55200 3 Information Technology Project Management
CNIT 55300 3 Quality Management in Information Technology
CNIT 55500 3 Advanced Network Security
<table>
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<td>Basic Computer Forensic</td>
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<td>3</td>
<td>Bioinformatics Computing and Systems Integration</td>
</tr>
<tr>
<td>CNIT 55900</td>
<td>3</td>
<td>Data Warehousing</td>
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<tr>
<td>CNIT 56000</td>
<td>3</td>
<td>Advanced High Performance Computing Systems</td>
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<tr>
<td>CNIT 56100</td>
<td>3</td>
<td>Advanced Parallel Data Systems</td>
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<tr>
<td>CNIT 56500</td>
<td>3</td>
<td>Information Security Management</td>
</tr>
<tr>
<td>CNIT 62300</td>
<td>3</td>
<td>Contemporary Computer Technology Problems</td>
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<tr>
<td>ECET 52400</td>
<td>3</td>
<td>Applied Electromagnetics</td>
</tr>
<tr>
<td>ECET 52500</td>
<td>3</td>
<td>Applications in Forensic Engineering Technology</td>
</tr>
<tr>
<td>ECET 53500</td>
<td>3</td>
<td>Energy Management</td>
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<tr>
<td>ECET 53600</td>
<td>3</td>
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<td>3</td>
<td>Measurement and Evaluation</td>
</tr>
<tr>
<td>IT 50800</td>
<td>3</td>
<td>Quality and Productivity</td>
</tr>
<tr>
<td>IT 53000</td>
<td>3</td>
<td>Biometric Technology Test Design, Performance, and Evaluation</td>
</tr>
<tr>
<td>IT 53500</td>
<td>3</td>
<td>Global Supply Chain Management</td>
</tr>
<tr>
<td>IT 54000</td>
<td>3</td>
<td>Biometric Performance and Usability Analysis</td>
</tr>
<tr>
<td>IT 54500</td>
<td>3</td>
<td>Biometrics Technology and Applications</td>
</tr>
<tr>
<td>IT 56800</td>
<td>3</td>
<td>Development Instructional Materials for Industry and Technology</td>
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<td>3</td>
<td>Project Management in Industry and Technology</td>
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<td>Fingerprint Performance and Usability</td>
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<td>IT 65800</td>
<td>3</td>
<td>Biometric Systems Interoperability: Applications and Challenges</td>
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<td>OLS 57400</td>
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<td>OLS 57500</td>
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<td>Contemporary Employment Practices and the Law</td>
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<td>Advanced Topics in Human Resource Management</td>
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<td>Organization and Administration of Training and Development</td>
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<td>3</td>
<td>Leadership in International Human Resources</td>
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<td>OLS 57900</td>
<td>3</td>
<td>Emerging World Class Leadership Strategies</td>
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<tr>
<td>OLS 58000</td>
<td>3</td>
<td>Interpersonal Skills for Leaders</td>
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<tr>
<td>OLS 58200</td>
<td>3</td>
<td>Leadership and Organizational Change</td>
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<tr>
<td>OLS 58300</td>
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<td>Coaching and Mentoring in Organizations</td>
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<tr>
<td>OLS 58900</td>
<td>3</td>
<td>Leadership and Ethics</td>
</tr>
<tr>
<td>OLS 62300</td>
<td>3</td>
<td>Contemporary Organizational Leadership &amp; Supervision Problems</td>
</tr>
<tr>
<td>MET 50300</td>
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</tr>
<tr>
<td>MET 50700</td>
<td>3</td>
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</tr>
<tr>
<td>MET 52700</td>
<td>3</td>
<td>Technology from A Global Perspective</td>
</tr>
<tr>
<td>MET 53000</td>
<td>3</td>
<td>Facilities Engineering Technology</td>
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<tr>
<td>MET 53500</td>
<td>3</td>
<td>Optimization of Metal Casting Design</td>
</tr>
<tr>
<td>MET 54600</td>
<td>3</td>
<td>Industrial Applications of Computer Integrated Manufacturing</td>
</tr>
<tr>
<td>MET 54900</td>
<td>3</td>
<td>Micro and Nanomachining</td>
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<tr>
<td>TLI 62500</td>
<td>3</td>
<td>Research in Open Innovation I</td>
</tr>
<tr>
<td>TLI 62579</td>
<td>3</td>
<td>Global, Legal and Ethical Issues in Technology Leadership</td>
</tr>
<tr>
<td>TLI 62600</td>
<td>3</td>
<td>Life of Faculty Entrepreneur: Discovery, Delivery, &amp; Translation</td>
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<tr>
<td>TECH 62100</td>
<td>3</td>
<td>Seminar in Technology Innovation</td>
</tr>
<tr>
<td>TECH 63700</td>
<td>3</td>
<td>Research Focus: The Social Internet</td>
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</table>
• Sample Curriculum

Each student’s plan of study will be unique, designed to meet the needs of their individual background and interests. Advisory committees will work with students to develop a plan of study that best meets their individual academic needs and career goals. Shown below is a sample plan of study which might be taken by typical students with a technology background with an interest in technology leadership and innovation. All of the courses shown are already existing courses that have been taught on the West Lafayette campus. While a majority of the courses will come from within the Polytechnic, some cross-disciplinary courses will be offered as well to meet the requirements of each specific cognate, as in the case of the Biotechnology Innovation and Regulatory Science cognate presented below.

Sample Program of Study MS + Doctor of Technology (Example based on Biotechnology Innovation and Regulatory Science cognate)

It is expected a large percentage of our doctoral students will come from existing ProSTAR graduates who have earned at 33 credit hours for a MS degree. If the incoming student does not have a master’s degree, they will follow the following schedule.

<table>
<thead>
<tr>
<th>MS in BIRS</th>
<th>Total Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Term 1</strong></td>
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<tr>
<td>Course No.</td>
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<tr>
<td>TECH 64600</td>
<td>3</td>
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<td>IT 59000</td>
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<tr>
<td>IPPH 52100</td>
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<tr>
<td></td>
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</tbody>
</table>

| **Spring Term 1** | | |
| Course No. | Cr | Subject |
| IPPH 52200 | 3 | Good Regulatory Practice |
| OLS 58000 | 3 | Interpersonal and Group Skills |
| IT 57100 | 3 | Project Management in Industry and Technology |
| | | 9 |
### Fall Term 2

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>IPPH 52500</td>
<td>3</td>
<td>Molecular Basis of Manufacturing Pharmaceuticals</td>
</tr>
<tr>
<td>IT 50700</td>
<td>3</td>
<td>Measurement and Evaluation in Industry and Technology</td>
</tr>
<tr>
<td>OLS 58100</td>
<td>2</td>
<td>Workshop in Ethics, Law and Policy</td>
</tr>
<tr>
<td>IT 59800</td>
<td>1</td>
<td>Directed Project</td>
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### Spring Term 2

<table>
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<th>Cr</th>
<th>Subject</th>
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</thead>
<tbody>
<tr>
<td>IPPH 52300</td>
<td>3</td>
<td>Quality Management, Audits, and Inspections</td>
</tr>
<tr>
<td>IT 50800</td>
<td>3</td>
<td>Quality and Productivity</td>
</tr>
<tr>
<td>IT 59800</td>
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<td>Directed Project</td>
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Total Credit Hours for MS: 33

---

### D. TECH (Sample BIRS Cognate)

<table>
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<td>Seminar in Technology Innovation</td>
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<tr>
<td>TECH 69700</td>
<td>3</td>
<td>Qualitative Research Methods in Technology Studies</td>
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<tr>
<td>MET 52700</td>
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<td>Technology from a Global Perspective</td>
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### Fall Term 1

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<td>History of Science and Technology</td>
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<tr>
<td>TECH 53300</td>
<td>3</td>
<td>Design Theory and Technology</td>
</tr>
<tr>
<td>TECH 69900</td>
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<td>Dissertation Research</td>
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Preliminary Exam to be scheduled in Spring Term 1 of D. TECH study

### Fall Term 2

<table>
<thead>
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<th>Course No.</th>
<th>Cr</th>
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</thead>
<tbody>
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<td>TECH 64100</td>
<td>3</td>
<td>Advanced Analytics for Research and Industry</td>
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<tr>
<td>OLS 58000</td>
<td>3</td>
<td>Interpersonal and Group Skills</td>
</tr>
<tr>
<td>TECH 69900</td>
<td>3</td>
<td>Dissertation Research</td>
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### Spring Term 2

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<tr>
<td>IPPH 69000</td>
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<td>IT 54500</td>
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<td>Technology and Society</td>
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<tr>
<td>TLI 66200</td>
<td>3</td>
<td>Philosophy of Technology</td>
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<tr>
<td>TECH 69900</td>
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<td>Dissertation Research</td>
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### Fall Term 3

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<td>IT 53500</td>
<td>3</td>
<td>Global Supply Chain Management</td>
</tr>
<tr>
<td>TECH 62100</td>
<td>3</td>
<td>Strategic Management of Technology Innovation</td>
</tr>
<tr>
<td>OLS 62300</td>
<td>3</td>
<td>Contemp. Org. Leadership and Supervision Problems</td>
</tr>
<tr>
<td>TECH 69900</td>
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<td>Dissertation Research</td>
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**Spring Term 3**

<table>
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<td>3</td>
<td>Global, Legal and Ethical Issues in Technology Leadership</td>
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<tr>
<td>TECH 62500</td>
<td>3</td>
<td>Research in Open Innovation</td>
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<tr>
<td>TECH 69900</td>
<td>3</td>
<td>Dissertation Research</td>
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</tbody>
</table>

Total Credit Hours for D.TECH 60

Total Credit Hours for MS + D.TECH 93

Following this example, this student may take the following courses to satisfy the D. TECH degree requirements:

- **30 credit hours of ProSTAR master’s curriculum** consisting of:
  - TECH 64600: Analysis of Research in Industry (3 credit hrs.)
  - IT 59000: Research and Writing Seminar in Technology (1 credit hrs.)
  - IPPH 52100: Drug Development (3 credit hrs.)
  - IPPH 52200: Good Regulatory Practice (3 credit hrs.)
  - OLS 58000: Interpersonal and Group Skills (3 credit hrs.)
  - IT 57100: Project Management in Industry and Technology (3 credit hrs.)
  - IPPH 52500: Molecular Basis of Manufacturing Pharmaceuticals (3 credit hrs.)
  - IT 50700: Measurement and Evaluation (3 credit hrs.)
  - OLS 58100: Workshop in Ethics, Law & Policy (2 credit hrs.)
  - IT 59800: Directed Project (1 credit hrs.)
  - IPPH 52300: Quality Management, Audits, and Inspections (3 credit hrs.)
  - IT 50800: Quality and Productivity (3 credit hrs.)
  - IT 59800: Directed Project (2 credit hrs.)

- **24 credit hours of core courses** from graduate credit eligible courses offered by the Purdue Polytechnic Institute.
  - TECH62100: Seminar in Technology Innovation (3 credit hrs)
  - TECH 69700: Qualitative Research Methods in Technology Studies (3 credit hrs)
  - MET 52700: Technology from a Global Perspective (3 credit hrs.)
- AT 52000: History of Science and Technology (3 credit hrs.)
- TECH 53300: Design Theory and Technology (3 credit hrs.)
- TECH 64100: Advanced Analytics for Research and Industry (3 credit hrs.)
- TLI 66200: Philosophy of Technology (3 credit hrs.)
- TECH 62100: Seminar – Strategic Management of Technology Innovation (3 credit hrs.)

- 21 credit hours of Technology Leadership and Innovation, School of Engineering Technology electives and approved cross-disciplinary courses from graduate credit eligible courses.
  - OLS 58000: Interpersonal and Group Skills (3 credit hrs.)
  - IPPH 69000: Medical Devices and Diagnostics (BIRS Only) (3 credit hrs.)
  - IT 54500: Technology and Society (3 credit hrs.)
  - IT 53500: Global Supply Chain Management (3 credit hrs.)
  - OLS 62300: Contemp. Org. Leadership and Supervision Problems (3 credit hrs.)
  - TLI 62579: Global, Legal and Ethical Issues in Technology Leadership (3 credit hrs.)
  - TLI 62500: Research in Open Innovation I (3 credit hrs.)

- TECH 69900: Ph.D. Dissertation Research (15 credit hrs.)
Appendix B

Example description of requirements from UNI, a program in place since 1972.
REQUIRED CORE COURSES 18 SH

TECH 6282 Technology Seminar 3
TECH 6296 Research Design in Industrial Technology 3
TECH 7375 Historical and Contemporary Issues in Tech 3
TECH 7377 Tech and Societal Trends: Case Studies 3
TECH 7378 Technology, Ethics, and Leadership 3
STATISTICS (Psych 6001, STAT 5771, STAT 5777) 3

REQUIRED TECHNICAL ELECTIVE 9 SH

A minimum of 9 credit hours from 6000 or 7000 level courses should be taken in the Department of Technology related to the student’s career goals and competencies that are related to the student’s dissertation.

SUPPORTING COURSE WORK 15 SH

The supporting course work can be taken from any discipline at the university (including the technology department) as long as it relates to the career goals and competencies.
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tr>
<td>TECH 7388 Doctoral Internship</td>
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<tr>
<td>D.I.T. Dissertation</td>
<td>12 SH</td>
</tr>
<tr>
<td>TECH 7399 Doctoral Dissertation</td>
<td>12</td>
</tr>
<tr>
<td>Core Courses</td>
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<tr>
<td>Required Technical Elective Courses</td>
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<td>Supporting Course Work</td>
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<tr>
<td>D.I.T. Internship</td>
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<td>D.I.T. Dissertation</td>
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<td>Total D.I.T. program</td>
<td>60 SH</td>
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Department of Technology
University of Northern Iowa
25 Industrial Technology Center
Cedar Falls, IA 50614-0178

T: (319) 273-2561
F: (319) 273-5818
TENTATIVE COURSE ROTATION

FALL
TECH 6282 Technology Seminar
TECH 7375 Developments in Technology
TECH 7378 Technology, Ethics, and Leadership
TECH 7388 Doctoral Internship
TECH 7399 Research-Doctoral Dissertation

SPRING
TECH 6282 Technology Seminar
TECH 7377 Readings in Technology and Society
TECH 7388 Doctoral Internship
TECH 7399 Research-Doctoral Dissertation

SUMMER
TECH 6282 Technology Seminar
TECH 7388 Doctoral Internship
TECH 7399 Research-Doctoral Dissertation

FALL
TECH 6282 Technology Seminar
TECH 6296 Research Design in Industrial Technology
TECH 7378 Technology, Ethics, and Leadership
TECH 7388 Doctoral Internship
TECH 7399 Research-Doctoral dissertation
SPRING
TECH 6282 Technology Seminar
TECH 7375 Historical and Contemporary Issues in Technology
TECH 7388 Doctoral Internship
TECH 7399 Research-Doctoral dissertation

SUMMER
TECH 6282 Technology Seminar
TECH 7388 Doctoral Internship
TECH 7399 Research-Doctoral dissertation

FALL
TECH 6282 Technology Seminar
TECH 6296 Research Design in Industrial Technology
TECH 7377 Technology and Societal Trends: Case Studies
TECH 7388 Doctoral Internship
TECH 7399 Research-Doctoral dissertation
Appendix C
Program Faculty and Administrators (To be included in the full proposal)

Appendix D

Letters of Support

Appendix D: Letters of Support
See attached letters from:

Todd Chermak, R.Ph, Ph.D.
Divisional Vice President Pharmaceutical Innovation & Development
Abbot Products Operations AG
Allschwil Switzerland

Louis W. Yu, Ph.D.
Chief Quality Officer
Valeant Pharmaceutical International
Bridgewater, NJ

Stacy Berkshire
Perrigo International
Dublin, Ireland

Dmitri Ruderman, Owner
XL Plumbing, Inc.
Bartlett, IL

Mark Goldstein, President
Builders Group, Ltd.
Northbrook, IL

Scott Bremmer, P.E.
Midwest Building, Inc.
Northfield, IL
Indiana Commission for Higher Education:

Please accept this letter of support for the new Doctorate of Technology graduate program proposed by Purdue University within the Polytechnic Institute. I view this new degree program as a natural and essential evolution in the education required to be successful within a dynamic technology intensive R&D setting. The new degree will provide necessary skills to work across scientific disciplines in a rapidly changing and highly regulated technological environment. These skill sets are critical for successfully developing and launching innovative products and services in complex global markets.

The new proposed degree program will better prepare students to:

1. Conceptualize, plan and conduct research and development activities
2. Identify new research opportunities and agendas
3. Assess emerging technologies and determine how to leverage technology to more effectively deliver an R&D pipeline
4. Communicate effectively across disciplines, which can optimize development timelines and cost
5. Contribute in more than one technology based disciple

I strongly support the proposed new graduate program and believe it will be invaluable to better prepare students for dynamic and complex roles in science and technology.

If you have any questions, please contact me using the information provided below.

Sincerely,

Todd E Chermak, R.Ph., Ph.D.
Divisional Vice President Pharmaceutical Innovation & Development
Abbott Products Operations AG
Hegenheimermattweg 127
4123 Allschwil Switzerland
Office: +41 (0) 61 487 01 09
todd.chermak@abbott.com
October 13, 2016

Dr. Mitchell L. Springer  
Executive Director  
Center for Professional Studies in  
Technology and Applied Research  
Seng-Liang Wang Hall, Suite 2500  
516 Northwestern Ave.  
West Lafayette, IN 47906

Dear Dr. Springer:

I am pleased to provide this letter of support for the proposed Doctorate of Technology to be offered through the Purdue Polytechnic Institute at Purdue University, West Lafayette, Indiana. The Biotechnology Innovation and Regulatory Science (BIRS) track would be very beneficial for the pharmaceutical industry.

A Ph.D level education is needed to serve the manufacturing and supply chain operations of pharmaceutical companies to assure effective, efficient and agile pharmaceutical manufacturing sector that serves the public. Improved supply of skilled practitioners in industry as it relates to quality and regulatory science is the solution to close this gap. Increasingly, schools of pharmacy are producing Doctors of Pharmacy graduates which are clearly needed to resource companies on their clinical development program. However, there are not enough qualified graduates with deep understanding of physical pharmacy, pharmaceutical engineering, pharmaceutical life cycle management and understanding of manufacturing control science which industry needs to assure delivery of products with consistent quality.

The BIRS curricula, based on what I have seen, are providing exactly the kind of professionals with skills and knowledge industry needs to strive for manufacturing excellence and help to stem drug shortages. As a quality leader in industry, I appreciated the ability and have sent high potential employees to this program to expand their knowledge and skills. I am a strong proponent of this program.

Thank you for providing me the opportunity to support your doctorate proposal effort.

Sincerely,

Louis W. Yu, Ph.D.  
Chief Quality Officer  
Valeant Pharmaceutical International
To: Indiana Commission for Higher Education

This is a letter of support for the Purdue professional Doctorate of Technology degree. I am a graduate of the Purdue BIRS MS program and also am an executive at Perrigo, a global consumer goods and pharmaceutical company. From both of my viewpoints, I strongly support this non-traditional degree which meets the needs of working professionals and the pharmaceutical industry employers. Traditional doctorate programs today are not responding to professional student nor employer needs.

As a graduate of the Purdue BIRS MS program, the doctorate personally appeals to me as a professional working adult. This program offers non-traditional flexibility to live and work away from the University while attending rigorous, focused learning weekends provided by Indiana’s top-notch educators and industry experts who understand current thinking and future strategies. Working professionals are often juggling their time between multiple time zones, global travel and family commitments and are unable to attend on-site traditional doctorate programs.

In my role as the Senior Vice President of European Operations at Perrigo, I strongly support Purdue’s proposed Doctorate program. My company has sponsored several employees whom have successfully graduated from the BIRS MS Program and, in all cases, these graduates have advanced their careers because of the top-notch education, competencies and skills acquired at Purdue’s weekend program.

The BIRS Doctorate of Technology program will provide companies such as Perrigo with graduates who have an in-depth understanding and analytical skills in quality, productivity, regulatory, global supply chain management, drug development, advanced manufacturing, technology and leadership skills. This degree will provide graduates with the knowledge, skills and core competencies much needed in the industry today and will provide pharmaceutical companies with graduates capable of leading teams through current and future challenges and changes.

As part of your “Reaching High, Achieving More” Strategic Plan, the Commission states “higher education institutions must respond to changing times and growing demands, rethink traditional notions and approaches...” The Purdue Polytechnic Institute is aligned with this objective by proposing this professional Doctorate of Technology degree to meet the needs of working professional students and current and future employers.

Please reach out to me if you would like further information.

Kind regards,

Stacy Berkshire
SVP European Operations
Omega Pharma nv/corporate
Venecoweg 26
89810 Nazareth
Quality Affordable Healthcare Products™
XL PLUMBING, Inc.  
2237 Grand Ave. Bartlett, IL 60103  
630-830-8429

To Purdue University ProSTAR Department,

We are proud and excited to write this letter in support of the above doctoral program. Our team member, Serge Cher is ready to enroll and fulfill his academic career. There is never a doubt about education aiding field practice, for the benefit of both employee and company.

It becomes more and more as a standard practice having employees with advanced education. This translates into prosperity for both. The advanced knowledge gained in academic environment is often paired with field experience and the result is a tremendous benefit for the company. We estimate our sales of plumbing services would grow exponentially because of having highly educated employees like Serge. His skilled management decision comes from experience while fine-tuned in an academic environment. Work experience alone, without formal education, leaves the plumbing professional with just the trade skill, mastered to perfection. When high level education comes into play, it brings both the management and organizational development knowledge to the table, moving forward businesses.

Serge has achieved a great combination of both work experience and formal education. He is now ready to help our company grow from a different perspective. His doctoral studies, through means of researches, will help him achieve his dream, either as the highest academic level or position he can hold with our company. His strategic thinking applied toward our business needs would help our company best position on plumbing services market and bring the needed revenue to support growth and expansion.

Purdue University has reached sky highs providing outstanding quality of education; we look forward to Serge Cher’s participation in Doctoral of Technology program.

Sincerely,

Dmitri Ruderman, Owner
BUILDERS GROUP LTD.  "BUILDING IS OUR PASSION!"

Builders Group Ltd.  
3735 Salem Dr., Northbrook, IL 60062

To whom it may concern,

We are releasing the below statements in regards to participation of our employee Gabe Goldstein at Purdue University Doctoral program.

We are pleased to know Gabe has such high academic aspirations and determination to achieve the highest academic honors. Gabe has been a tremendous asset since his arrival at the Group. His level of expertise and knowledge of construction management has benefited the organization and gave him the opportunity to practice, train, coach and mentor several other peers in the art and science of project management.

By having Gabe attending the Doctoral program at Purdue, we are confident he will bring back to our company his best: extended knowledge areas, fine-tuned skills and research-based approach to further his management style beyond common level. As such, we hope to have him both coaching the new generation of managers and bringing his level of knowledge toward major organizational goals.

Gabe’s current professional activity spans widely across management areas such as project controls, acquisitions, procurement, resource and risk allocation, communication and client management. He is coaching and mentoring young talent, peers and collegiate level students, spreading the latest construction management best practices through means of volunteerism and peer-reviews, aside from his regular duties.

We look forward to his enrollment and excited to have our first doctorate-level employee in our company.

Sincerely,

Mark A. Goldstein, President

10/20/16
To: Purdue University- West Lafayette, IN

ProSTAR – Distance Education Program

Dear Madam/Sir,

We are pleased to hear Purdue University Polytechnic Institute Distance Education Program ProSTAR is pursuing approval and accreditation for its first-ever PhD of Technology Program. The approval is definitively the final brick of this academic structure, the outcome of the outstanding academic work of its teaching staff and the Capstone of this program. It is finally here.

With its curriculum custom designed to serve the senior management and executive management of organizations while they continue working for their projects or manage companies’ strategic goals, the above doctoral initiative is regarded as the vital tool for the construction executive.

It is no secret large construction enterprises are in dire need of knowledgeable individuals who can envision the “construction of the road ahead”. Doctoral degrees are known to hold the key to knowledge, based on researches and in-depth approach into science. Broad vision and ability to understand complex organizational factors is the expected performance of a doctoral program graduate. Research-based thesis are answers to our strategic goals questions about both the management approach as well as the new long term cost efficient and quality of the materials we should use to build that road ahead.

Regardless of culture of our construction organizations and ability to undertake large projects, one fact remains; having doctoral degree graduates on board significantly lowers the risk of making uninformed costly decisions with regards to major strategical endeavors.

Purdue University ProSTAR Doctoral Program of Technology is definitively the answer for many of the above. We congratulate such initiative and welcome its graduates into our workforce.

Sincerely,

Scott A. Bremmer, P.E.

“We build your dreams, one structure at a time.”