PREAMBLE
For nearly 50 years, IPFW has offered degrees in engineering and technology, providing exceptional hands-on education for students with diverse backgrounds from Northeast Indiana and beyond. The College of Engineering, Technology and Computer Science (ETCS), as we know it today, formed in 1995 and boasts distinctive features including rigorous academic programs, small average class sizes, small student-faculty ratio, and senior design capstone projects which are typically sponsored by industry. These attributes, along with a vibrant campus, provide a student-centered learning environment where IPFW students collaborate on projects in and out of the classroom and are mentored by highly qualified and dedicated faculty. In addition, strong industry-based partnerships have enriched the educational experience of ETCS students through internship and co-op programs. Graduates of ETCS programs have been contributing to the economic development of the region in health-care, manufacturing, defense, biomedical fields, and much more. ETCS strives to become a premier college in Northeast Indiana and beyond. To that end, the college has embarked on an ambitious strategic plan to realize its vision. The following narrative details the path forward along with the innovative process used to design the strategic plan.

PROCESS
The College launched the strategic planning process in Fall 2016. The process was designed to ensure input and collaboration from faculty, staff, current students, alumni, and industry partners. Planning took place over the course of November 2016 – July 2017. Key milestones are outlined below:

Strategic Planning Steering Committee: A faculty and staff committee consisting of representatives from each academic department and the Dean’s office was convened to develop the plan. The committee developed and managed the process for collecting input, reviewed and analyzed data and stakeholder input, and drafted the plan.

Strategic Planning Retreat: At the spring 2017 college retreat, SOAR analysis was used as a framework to engage all faculty and staff to provide input in relation to strengths, challenges and opportunities, aspirations, and results and actions to achieve the vision of the ETCS. Participants also reviewed the strategic planning process and timeline, which they were invited to share feedback on along with the draft mission, vision, and core values.

Collective System Design: Steering Committee members participated in the Collective System Design methodology, collaboratively and intentionally defining requirements and solutions in order to best meet the needs of our stakeholders. The resulting design augments the basis of the strategic plan, providing the framework for our approach.

Stakeholder Surveys: Input from key stakeholders was requested via an online survey from current students, alumni, adjunct faculty, and industry advisory board members. Questions focused on our strengths, our challenges, and our opportunities. After being sorted and categorized, the data from each survey was used to inform our strategic initiatives and actions.

Open Forums: Dr. Manoochehr Zoghi, the Dean of ETCS College, held multiple informal gatherings of students aimed at seeking input from students and hear from them directly about their academic and college experience.
**Input from Faculty and Staff:** Each draft of the strategic plan was shared with the ETCS Assembly, the college’s faculty governance body and throughout the college, soliciting input from all internal faculty and staff.

**IPFW Plan 2020 Alignment:** This plan aligns with the university’s vision, mission and values and supports the four major goal areas outlined in the [university-level strategic plan](http://www.engineeringchallenges.org/GrandChallengeScholarsProgram.aspx#tabs).

**Grand Challenges Scholars Program**: The National Academy of Engineering (NAE) Grand Challenges Scholars Program (GCSP) entails a combination of curricular and extra-curricular activities that is aimed to prepare the future generations of graduates who will be equipped to solve the grand challenges facing society in 21st century. The five pillars of GCSP comprise: (1) hands-on project or research experience related to a Grand Challenge, (2) interdisciplinary curriculum, (3) entrepreneurship, (4) global dimension, and (5) service learning. GSCP will be embedded throughout the strategic plan.

**Final Review:** Feedback from all key stakeholders was incorporated into the draft of the strategic plan and reviewed for final delivery in August 2017.
SECTION I – VISION, MISSION, CORE VALUES, IDENTITY

VISION
ETCS strives to be a transformative premier college of choice, providing a world-class engineering, polytechnic, computer science and leadership education through excellence in teaching and learning, research and innovation, engagement, partnership, and entrepreneurship.

MISSION
To provide a comprehensive education that will prepare career-ready graduates for a variety of roles in engineering, polytechnic, computer science and leadership, serving the needs of Northeast Indiana and beyond.

CORE VALUES
We value:
- Community engagement
- Continuous improvement
- Creativity and innovation
- Discovery, integration and application of knowledge
- Diversity and inclusiveness
- Entrepreneurial mindset and leadership
- High-impact learning practices
- Integrity and professionalism
- Life-long learning and professional development
- Student-centered approaches
- Supportive, collegial and collaborative relationships

IDENTITY
ETCS at IPFW is grounded in the principles of excellence through industry partnerships, engagement within the region and affiliation with Purdue, an internationally known university. Small class sizes and low student-to-faculty ratios provide personalized, hands-on, enriching educational experiences comparable to prestigious private institutions at a public university price.
SECTION II – STRATEGIC FOCUS AREAS

The Strategic Planning Steering Committee employed the Collective System Design methodology to determine the necessary components for achieving the ETCS mission, vision, core values, and identity. The resulting design identifies that the current and continued success of the college requires an organizational approach that focuses on four pillars:

- Sustainability and improvement
- Value creation
- Cost and waste reduction
- Resource allocation and investment

The sustainability and advancement of the college are tied to the creation of an environment of continuous improvement. This environment is necessary to ensure the success of ETCS by growing and adapting to meet the changes and challenges of our students, faculty and staff, and the region. The strategic plan map identifies the need that continuous improvement should be the foundation of how the college operates and that it should be based on departmental and inter-departmental continuous improvement.

The opportunity to enhance ETCS and grow the college comes from the concept of value creation, or providing the best programs and outcomes for our stakeholders. The committee identified four strategic focus areas which were expanded to add detail to the strategic plan. Data collected from the retreat and stakeholder survey results were used to inform the development of initiatives and actions within each area.

The strategic focus areas are:

1.0: Improve student success
Enhance the use of high-impact practices to support students from recruitment to post-graduation success, including advising, learning, and career readiness.

2.0: Develop research opportunities and innovation
Bolster the research capacity of the college by creating infrastructure and support for funding, collaborating and recognizing published and patented research. Stimulate entrepreneurship mindset, innovation, and design thinking.

3.0: Improve engagement
Expand and strengthen partnerships with alumni, regional partnerships and industry, creating enhanced opportunities for student-faculty projects that promote experiential learning and applied research and impact regional economic development efforts.

2 The full details of the Collective System Design process and results (including the ETCS Strategic Plan Map) are included in Appendix B.
4.0: Enhance diversity

Foster a diverse population throughout the college and support and harness the diversity for student success, research and innovation, and engagement.

The remaining two pillars of cost and waste reduction and resource allocation and investment, while of critical importance, are only significant if the prior pillars are in place. Since achievement of cost and investment constraints relies on the administrative management of the college, the latter two pillars will be addressed in the implementation of the strategic plan in our daily operations.
Section II – Strategic Initiatives for Focus Area 1.0
Improve Student Success

Initiative 1.1: Increase use of high-impact, evidence-based practices to improve student success

Action 1.1.1: Identify root causes that impede student success and develop effective solutions to address them
Action 1.1.2: Offer applied mathematics classes and enrichment in ETCS, in collaboration with the Mathematics Department
Action 1.1.3: Establish central advising by professional advisors during students’ first year (up to 30 credits)
Action 1.1.4: Establish Peer mentoring program whereby upper division ETCS students mentor freshmen and probationary students
Action 1.1.5: Establish intervention advising and enrichment for pre-probationary and probationary students
Action 1.1.6: Establish high-impact practices to incorporate undergraduate research, interdisciplinary-curriculum, service learning, entrepreneurial thinking, learning community, industry mentoring, and global dimensions to our programs

Initiative 1.2: Create an enhanced collaborative learning environment

Action 1.2.1: Obtain funding to build and improve laboratories and prepare plans for a new ETCS building
Action 1.2.2: Expand classroom and laboratory space and transform existing ones into collaborative learning environment
Action 1.2.3: Create a collaborative space for students to study and collaborate
Action 1.2.4: Ensure faculty availability to support desired faculty-to-student ratios, small class sizes, and out-of-the-classroom engagement

Initiative 1.3: Increase use of high-impact, evidence-based practices to improve teaching and learning

Action 1.3.1: Identify best teaching practices within ETCS and other evidenced-based high impact practices; share via faculty-led seminars
Action 1.3.2: Incentivize, reward, and develop online classes as well as hybrid and flipped classroom approaches

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**Initiative 1.4: Enhance strategic partnerships outside the university**

**Action 1.4.1:** Establish close collaboration with local schools to improve student readiness for ETCS programs and create pipelines for recruitment and outreach of high quality applicants

**Action 1.4.2:** Establish articulation agreements with community colleges in neighboring states

**Action 1.4.3:** Establish strategic partnerships with schools and industry to create pre-college through graduation and career pathways opportunities
Section II – Strategic Initiatives for Focus Area 2.0
Create Research Opportunities

Initiative 2.1: Support faculty scholarship, entrepreneurship and creative work

Action 2.1.1: Promote interdisciplinary discovery, research collaboration and scholarly activities
Action 2.1.2: Provide seed funding and assigned (release) times to promote faculty research and scholarly activities
Action 2.1.3: Establish closer collaborations between faculty and industry partners to engage in entrepreneurial solutions to industry’s challenging projects

Initiative 2.2: Establish relationships for research collaboration

Action 2.2.1: Promote greater faculty collaboration on interdisciplinary projects
Action 2.2.2: Strengthen research collaborations with Purdue West Lafayette
Action 2.2.3: Engage students in research opportunities and enhance discovery-enriched curriculum
Action 2.2.4: Identify signature areas, emerging technologies and areas of growth areas

Initiative 2.3: Publish and patent research

Action 2.3.1: Provide faculty, staff and students the tools and knowledge they need to support and bolster research and discovery
Action 2.3.2: Create opportunities and encourage undergraduate and graduate students to publish research from theses, course projects and/or poster presentations
Section II – Strategic Initiatives for Focus Area 3.0

Improve Engagement

Initiative 3.1: Provide effective marketing of ETCS programs

Action 3.1.1: Identify and allocate funding for an ETCS marketing person
Action 3.1.2: Make ETCS marketing a priority
Action 3.1.3: Designate a program for marketing focus each semester
Action 3.1.4: Request a designated person in Development for ETCS

Initiative 3.2: Establish more active alumni outreach

Action 3.2.1: Designate an alumni coordinator at the college level with release time
Action 3.2.2: Maintain an up-to-date database of all alumni and send frequent emails to update on current status of graduates and college
Action 3.2.3: Send annual department newsletters
Action 3.2.4: Create an alumni section on each department website

Initiative 3.3: Enhance collaboration with industry

Action 3.3.1: Invite experts in their field for in-class discussions
Action 3.3.2: Enhance infrastructure (facilities, resources, curriculum/programs) to facilitate faculty-student-industry collaborations
Action 3.3.3: Track and promote faculty involvement with TAP\textsuperscript{4} (Technical Assistance Program), IN-MaC\textsuperscript{5} (Indiana Manufacturing Competitiveness) and TAA (Technical Assistance Agreement)
Action 3.3.4: Partner and engage with industry in order to raise funds for collaborative research projects, potential endowments and other college priorities

\textsuperscript{4} Find more information at http://tap.purdue.edu/
\textsuperscript{5} Find more information at http://www.purdue.edu/in-mac/
Section II – Strategic Initiatives for Focus Area 4.0
Enhance Diversity

Initiative 4.1: Improve gender, racial, and ethnic diversity
- Action 4.1.1: Recruit and support women and under-represented students
- Action 4.1.2: Recruit and develop women and under-represented faculty and staff
- Action 4.1.3: Develop international relationships

Initiative 4.2: Support the needs of our existing ETCS community
- Action 4.2.1: Develop diversity safe-zones
- Action 4.2.2: Remove language barriers and improve communication
- Action 4.2.3: Support work-family-life balance for ETCS community

Initiative 4.3: Use diversity to enhance student success, research opportunities and engagement
- Action 4.3.1: Establish international educational opportunities and collaborations
- Action 4.3.2: Encourage and support faculty to add diversity into course content
- Action 4.3.3: Encourage diverse educational and research partnerships outside of ETCS
The signature areas* of ETCS represent synthesis of faculty and administrative priorities, most pressing concerns/needs of the region, industry’s distinctiveness in the region, areas of research excellence and educational innovation. The following list includes four ongoing and two proposed signature areas:

- Advanced materials and manufacturing
- Bioengineering (proposed)
- Information analytics, visualization and cybersecurity
- Systems engineering
- Wireless communication
- Innovation, entrepreneurship and system thinking (proposed)

The preceding signature areas will play a transformational role in enhancing the economic development and prosperity of our region, will generate considerable cross-disciplinary collaboration, and will foster partnership between academe, industry, and government.

*Please note that the list included here is mostly the existing areas of strength. We will greatly appreciate your feedback regarding these and other/new strategic initiatives that we should consider.
A vital part of accomplishing the goals and enabling actions of the strategic plan is the successful implementation process. According to Lawrence G. Hrebiniak\textsuperscript{6}, it is essential for organizations to create a culture of execution. Hrebiniak asserts: “By creating and reinforcing behaviors and performance programs that affect the very essence of how organizations act and compete, i.e. their culture.” We have devised a robust execution plan in relation to ETCS strategic goals alongside tactics and enabling actions to accomplish these goals. It is important to realize that the strategy implementation plan will necessitate active participation and cooperation of all stakeholders, cornerstone of which will be integrity, trust, accountability, transparency, and shared governance.

APPENDIX A – COMMITTEE AND BOARD MEMBERS

Strategic Planning Steering Committee Members

Jason Barnes  
Associate Director of the IPFW Center of Excellence in Systems Engineering

Harold Broberg  
Professor of Computer, Electrical and Information Technology

David Cochran  
Associate Professor of Engineering and Director of the IPFW Center of Excellence in Systems Engineering

Barry Dupen  
Associate Professor of Mechanical Engineering Technology

John Licato  
Assistant Professor of Computer Science

Kim McDonald  
Professor of Organizational Leadership and Associate Dean

Joseph McKenna  
Business Manager for the College of Engineering, Technology and Computer Science

Paresh Mishra  
Assistant Professor of Organizational Leadership

Donald Mueller  
Associate Professor of Civil and Mechanical Engineering

Jennifer Oxtoby  
Senior Research Associate for the IPFW Center of Excellence in Systems Engineering

Manoochehr Zoghi  
Dean

Chairs and Directors Listing

David Cochran  
Director, IPFW Center of Excellence in Systems Engineering

Todor Cooklev  
Director, IPFW Center of Excellence in Wireless Technology

Carol Dostal  
Director, Outreach Programs

Abdullah Eroglu  
Chair, Electrical and Computer Engineering

Beomjin Kim  
Chair, Department of Computer Science and Director of IPFW Center of Excellence in Information Analytics and Visualization

Kim McDonald  
Associate Dean and Interim Chair of the Department of Organizational Leadership

Hosni Abu-Mulaweh  
Director of Graduate Programs and Chair of Faculty Assembly

Dawn Renner  
Director, Student Success Center

Gary Steffen  
Chair, Departments of Computer, Electrical & Information Technology and Manufacturing & Construction Engineering Technology

Nashwan Younis  
Chair, Department of Civil and Mechanical Engineering

Manoochehr Zoghi  
Dean
Advisory Board Members

TBD
APPENDIX B – COLLECTIVE SYSTEM DESIGN FOR ETCS

The Strategic Planning Steering Committee collaborated to create the depicted strategic plan map, initiating the development of the ETCS Strategic Plan, which proposes how to achieve the mission, vision, core values, and identity. Due to the path dependencies highlighted in the design process, the map illustrates that value creation should drive the cost and resource investments for the college. Similarly, Continuous Improvement is required to sustain the Strategic Plan for its planned lifespan.

The ETCS Strategic Plan Map

The Strategic Focus Areas of this plan are related to Level 3 of the design, while the planned initiatives are at Level 4 and actions are at Level 5.

The approach of Collective System Design is to gain organizational agreement and understanding of the design purpose before implementing programs, procedures, or resources. To accomplish this common understanding, Collective System Design uses a language to separate requirements (R) from solutions (S). Each solution may have further requirements which are iteratively developed. Evaluating the success of the design is achieved by adding measures on the achievement of individual requirements (Rm).

The Collective System Design process also evaluates the risk and dependencies within the design. Analysis of the chosen solutions can determine the order of importance of requirements or the implementation sequence of solutions by adding diagonal relationships within the design. Relationships that produce
loops highlight very risky designs that have high costs and long implementation times. The result of this analysis is referred to as a System Design Map.