Technology, Art, and Design

The Department of Technology, Art and Design offers a variety of programs that span the application of technology, art and design in response to a range of human wants and needs. Courses nurture the development of individual creative expression, critical thinking and problem solving skills. Degree programs foster the development of knowledge and skills to design and develop creative solutions that address operations and future needs in an array of cultural, design, business, technological and industrial settings.

The department offers a nationally accredited* Bachelor of Science program in Engineering Technology, with specializations in Construction Management and Manufacturing Management. Along with the associated Bachelor of Applied Science programs in Applied Engineering and Technology Management, these degree options offer both four-year and transfer students the opportunity to prepare for leadership roles in a wide range of technologically based enterprises including but not limited to the fields of construction, energy, manufacturing and sustainability.

Transfer students have the option to enroll in either the Bachelor of Applied Science program in Applied Engineering or Technology Management. Both degrees are offered as "2 + 2" programs online or on campus for working professionals who have either an Associate of Science degree, Associate of Applied Science degree, diploma or certificate and wish to complete a Bachelor's degree.

The Bachelor of Science in Art and Design offers students a unique and exciting opportunity to pursue careers that demand excellence in a combination of technical, creative, and artistic capabilities. Students can pursue specializations in either Studio Arts or Digital and Exhibit Design. All Art and Design students benefit from a portfolio review process, a graduation requirement that offers them the opportunity to present their professional portfolios to leaders in their industries from across the nation. Students transferring from a MnSCU Community and/or Technical College with an Associate degree in a related design field may be eligible for articulated transfer into the Art and Design program.

The Department of Technology, Art and Design offers five exhibition spaces that present local, regional, national and international exhibits. The gallery program also maintains permanent collections in ceramics and prints.

*The BS in Engineering Technology is accredited by the Association of Technology, Management, and Applied Engineering (http://atmae.org).

Programs

- Applied Engineering, B.A.S. *major*
- Art and Design, B.S. (Articulated Emphasis) *major*
- Art and Design, B.S. (Digital and Exhibit Design Emphasis) *major*
- Art and Design, B.S. (Studio Arts Emphasis) *major*
- Engineering Technology, B.S. (Construction Management Emphasis) *major*
- Engineering Technology, B.S. (Manufacturing Management Emphasis) *major*
- Project Management, B.S. (Construction Management Emphasis) *major*
- Project Management, B.S. (Facility Management Emphasis) *major*
- Project Management, B.S. (Operations Management Emphasis) *major*
- Technology Management, B.A.S. *major*
- Design *minor*
- Project Management *minor*
- Studio Arts *minor*

Career Directions

Applications Engineering
Art Director
Artist/Technician
Construction Management
Construction Management Engineer
Engineer
Exhibit Designer
Field Engineer
Graphic Designer
Industrial/Architectural Rendering
Management
Manufacturing Engineering
Model Building
Multimedia Specialist/Designer
Pre-press Production
Print Production
Process Planning
Quality Control Engineering
Research and Development
Safety Engineer
Teaching
Technical Sales
Web Page Development
Also: Graduate Study

Preparation

Recommended High School Courses
Drafting
Graphic Arts
Production
Construction
Manufacturing
Electronics
Robotics
Art/Fine Arts
CADD/Computer Programming
Project Lead the Way classes

Applied Engineering, B.A.S. *major*

The Applied Engineering Program is designed to prepare individuals to work in a variety of applied engineering career paths in business or industry. The program is designed specifically for individuals who typically possess a two-year technical degree and are interested in advancing their professional career. The program is a "2+2" degree that permits students to apply their 2 year technical degree credits toward a baccalaureate degree. Coupled with a two-year technical degree providing a focused foundation, students will complete junior- and senior-level courses covering a broad range of applied engineering concepts and applications. This breadth will provide maximum flexibility for graduates to pursue diverse employment opportunities. Completion of the degree is available through a web-based distance delivery format. Students should work closely with an advisor to obtain program and course selection information.

Note: Transfer students must take a minimum of 30 semester credits from Bemidji State University. Forty (40) upper division semester credits are also required for graduation.

Required Credits: 67
Required GPA: 2.25

I REQUIRED TECHNICAL CORE COURSES

Requires 26 technical credits transferred from an A.S. or A.A.S. degree, or a diploma (e.g., Manufacturing Technology, Automation Technology)

II REQUIRED APPLIED ENGINEERING TECHNOLOGY CORE

COMPLETE THE FOLLOWING COURSES:

- TADT 3100 Principles and Practices of Professional Development (2 credits)
- TADT 3267 Engineering Economic and Cost Analysis (4 credits)
- TADT 3700 Production Planning and Control (4 credits)
- TADT 4537 Industrial Design/Innovation (4 credits)
- TADT 4878 Quality Assurance (4 credits)
- TADT 4879 Service Process Design and Improvement (4 credits)
- TADT 4897 Project Management (4 credits)

III APPLIED ENGINEERING TECHNOLOGY ELECTIVES

SELECT 12 CREDITS FROM THE FOLLOWING WITH ASSISTANCE FROM A FACULTY ADVISOR:

- BUAD 3281 Decision Support Systems (3 credits) **
- BUAD 3361 Marketing (3 credits) **
- BUAD 3381 Management Information Systems (3 credits) **
- BUAD 4469 Small Business Case Analysis (3 credits) **
- TADT 3217 Materials Science and Metallurgy (4 credits)
- TADT 3260 Project Bidding and Estimating (4 credits)
- TADT 3460 3D Parametric Modeling and Printing (4 credits)
- TADT 3877 Engineering Problem Solving (4 credits)
- TADT 3878 Industrial/Engineering Production Studies (4 credits)
- TADT 3885 Technical Sales, Service and Training (4 credits)
- TADT 4385 Sustainability and Emerging Technologies (4 credits)
- TADT 4778 Advanced Topics in Technology (4 credits)
- TADT 4875 Facilities Management (4 credits)

** require prerequisites, or junior status and consent of instructor

MAY INCLUDE TADT 4970 FOR 1-2 CREDITS

- TADT 4970 Internship (1-12 credits)

IV REQUIRED ENGINEERING CAPSTONE

COMPLETE THE FOLLOWING COURSE:

- TADT 4820 Engineering Case Study (3 credits)

Art and Design, B.S. *major*
Articulated Emphasis

Required Credits: 68
Required GPA: 2.75

REQUIRED CORE COURSES

Articulated students transfer their credits from the related program directly into BSU's Art and Design program as 8 lower level credits in the Required Core and 20 credits into the articulated specialization. All other transfer credits fulfill general elective requirements for the degree. (maximum of 28 credits accepted into the major)

COMPLETE THE FOLLOWING COURSES:

- TADD 3440 3D Digital Foundations (4 credits)
- TADD 3450 History of Modern Design (4 credits)

COMPLETE an additional 28 upper division credits from Digital & Exhibit Design or Studio Arts emphasis options and the related Senior Culmination (TADD 4440 or TADD 4450) emphasis course.

Art and Design, B.S. *major*
Digital and Exhibit Design Emphasis

Required Credits: 68
Required GPA: 2.75

REQUIRED CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- TADD 1440 Design and Drawing Foundations (4 credits)
- TADD 2440 2D Digital Foundations (4 credits)
- TADD 3440 3D Digital Foundations (4 credits)
- TADD 3450 History of Modern Design (4 credits)

DIGITAL AND EXHIBIT DESIGN EMPHASIS

REQUIRED COURSES

- TADD 3548 Digital Media/3D (4 credits)
- TADD 3549 Digital Media/Interactive (4 credits)
- TADD 3568 Exhibit Design/Trade Show (4 credits)

- TADD 3569 Exhibit Design/Environments (4 credits)
- TADD 3578 Digital Print/Typography and Grid (4 credits)
- TADD 3579 Digital Print/Branding and Publication (4 credits)
- TADD 4440 Digital Design Senior Culmination (4 credits)
- TADD 4549 Advanced Digital Media Design (4 credits)
- TADD 4569 Advanced Exhibit Design (4 credits)
- TADD 4579 Advanced Digital Print Design (4 credits)

REQUIRED GUIDED ELECTIVES
WITH CONSENT OF PROGRAM ADVISOR SELECT 12 CREDITS FROM
THE STUDIO ARTS EMPHASIS, TADT COURSES, AND/OR
TADD/TADT 4970 INTERNSHIP (UP TO 4 CREDITS).

- TADD 3648 Color Theory (4 credits)
- TADD 3649 Introduction to Painting (4 credits)
- TADD 3658 Advanced Drawing (4 credits)
- TADD 3659 Life Drawing (4 credits)
- TADD 3669 Photography and Digital Imaging (4 credits)
- TADD 3748 Ceramics/Hand Building (4 credits)
- TADD 3749 Ceramics/Wheel (4 credits)
- TADD 4649 Advanced Painting (4 credits)
- TADD 4659 Trends in Visual Arts (4 credits)
- TADD 4749 Ceramics/Non-Vessel (4 credits)
- TADD 4450 Studio Arts Senior Culmination (4 credits)
- TADT 4970 Internship (1-12 credits)
- TADD 4970 Internship (1-12 credits)

Art and Design, B.S. *major*
Studio Arts Emphasis

Required Credits: 68
Required GPA: 2.75

REQUIRED CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- TADD 1440 Design and Drawing Foundations (4 credits)
- TADD 2440 2D Digital Foundations (4 credits)
- TADD 3440 3D Digital Foundations (4 credits)
- TADD 3450 History of Modern Design (4 credits)

STUDIO ARTS EMPHASIS

REQUIRED COURSES
COMPLETE 36 CREDITS FROM THE FOLLOWING COURSES:

- TADD 3648 Color Theory (4 credits)
- TADD 3649 Introduction to Painting (4 credits)
- TADD 3658 Advanced Drawing (4 credits)
- TADD 3659 Life Drawing (4 credits)
- TADD 3669 Photography and Digital Imaging (4 credits)
- TADD 3748 Ceramics/Hand Building (4 credits)
- TADD 3749 Ceramics/Wheel (4 credits)
- TADD 4649 Advanced Painting (4 credits)
- TADD 4659 Trends in Visual Arts (4 credits)
- TADD 4749 Ceramics/Non-Vessel (4 credits)

REQUIRED COURSE

- TADD 4450 Studio Arts Senior Culmination (4 credits)

REQUIRED GUIDED ELECTIVES
WITH CONSENT OF PROGRAM ADVISOR SELECT 12 CREDITS FROM
TADD/TADT COURSES AND/OR
TADD/TADT 4970 INTERNSHIP (UP TO 4 CREDITS)

- TADD 4970 Internship (1-12 credits)
- TADT 4970 Internship (1-12 credits)
- TADD****

Engineering Technology, B.S. *major*
Construction Management Emphasis

The Engineering Technology program prepares individuals for a wide range of career opportunities in business and industry in such areas as management, construction, engineering, product development, quality assurance, safety, and sustainable energy. There are two emphasis options in construction and manufacturing management that provide an opportunity to develop a focused study of management theories and practices in these areas.

Note: Upon approval of the Department of Technological Studies, certain major courses can be substituted in the technical core, professional core, or area of emphasis from related technical and community college programs.

Required Credits: 78
Required GPA: 2.25

I REQUIRED TECHNICAL CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- TADT 1210 Materials and Processes - Forming (3 credits)
- TADT 1220 Materials and Processes - Separating (3 credits)
- TADT 1315 Energy and Power Technology (3 credits)
- TADT 1350 Electrical/Electronic Technology (3 credits)
- TADT 1460 2D Graphics And Laser Etching (3 credits)
- TADT 2250 Construction Technology (3 credits)
- TADT 2370 Automation Technology (3 credits)

II REQUIRED PROFESSIONAL CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- TADT 3267 Engineering Economic and Cost Analysis (4 credits)
- TADT 3885 Technical Sales, Service and Training (4 credits)
- TADT 4385 Sustainability and Emerging Technologies (4 credits)
- TADT 4537 Industrial Design/Innovation (4 credits)
- TADT 4875 Facilities Management (4 credits)
- TADT 4878 Quality Assurance (4 credits)
- TADT 4897 Project Management (4 credits)

III REQUIRED FOUNDATION COURSES

TAKE 6 SEMESTER CREDITS OF MATH AT THE 1100 OR HIGHER LEVEL. STUDENTS ARE ENCOURAGED TO TAKE STATISTICS AND CALCULUS.

TAKE 7 SEMESTER CREDITS FROM AMONG THE PHYSICS, CHEMISTRY, OR PHYSICAL SCIENCE (SPECIFICALLY, SCI 1110 AND SCI 1120) COURSES THAT ARE APPROVED TO FULFILL LIBERAL EDUCATION CATEGORY 3. OTHER CATEGORY 3 COURSES

MAY BE SUBSTITUTED IF APPROVED BY THE CHAIR OF THE DEPARTMENT OF TECHNOLOGICAL STUDIES. STUDENTS ARE ENCOURAGED TO TAKE A COMBINATION OF PHYSICS AND CHEMISTRY.

CONSTRUCTION MANAGEMENT EMPHASIS

SELECT 16 CREDITS FROM THE FOLLOWING COURSES: STUDENTS MUST CHOOSE A CONSTRUCTION-RELATED TOPIC FOR TADT 4778, ADVANCED TOPICS IN TECHNOLOGY

- TADT 3250 Print Reading and Project Documentation (4 credits)
- TADT 3260 Project Bidding and Estimating (4 credits)
- TADT 4259 Construction Management (4 credits)
- TADT 4260 Computerized Construction Estimating
- TADT 4778 Advanced Topics in Technology (4 credits)

TADT 4970 MAY BE TAKEN FOR 4 CREDITS

- TADT 4970 Internship (1-12 credits)

Engineering Technology, B.S. *major* Manufacturing Management Emphasis

The Engineering Technology program prepares individuals for a wide range of career opportunities in business and industry in such areas as management, construction, engineering, product development, quality assurance, safety, and sustainable energy. There are two emphasis options in construction and manufacturing management that provide an opportunity to develop a focused study of management theories and practices in these areas.

Note: Upon approval of the Department of Technological Studies, certain major courses can be substituted in the technical core, professional core, or area of emphasis from related technical and community college programs.

Required Credits: 78
Required GPA: 2.25

I REQUIRED TECHNICAL CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- TADT 1210 Materials and Processes - Forming (3 credits)
- TADT 1220 Materials and Processes - Separating (3 credits)
- TADT 1315 Energy and Power Technology (3 credits)
- TADT 1350 Electrical/Electronic Technology (3 credits)
- TADT 1460 2D Graphics And Laser Etching (3 credits)
- TADT 2250 Construction Technology (3 credits)
- TADT 2370 Automation Technology (3 credits)

II REQUIRED PROFESSIONAL CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- TADT 3267 Engineering Economic and Cost Analysis (4 credits)
- TADT 3885 Technical Sales, Service and Training (4 credits)
- TADT 4385 Sustainability and Emerging Technologies (4 credits)
- TADT 4537 Industrial Design/Innovation (4 credits)
- TADT 4875 Facilities Management (4 credits)
- TADT 4878 Quality Assurance (4 credits)
- TADT 4897 Project Management (4 credits)

III REQUIRED FOUNDATION COURSES

TAKE 6 SEMESTER CREDITS OF MATH AT THE 1100 OR HIGHER LEVEL. STUDENTS ARE ENCOURAGED TO TAKE STATISTICS AND CALCULUS.

TAKE 7 SEMESTER CREDITS FROM AMONG THE PHYSICS, CHEMISTRY, OR PHYSICAL SCIENCE (SPECIFICALLY, SCI 1110 AND SCI 1120) COURSES THAT ARE APPROVED TO FULFILL LIBERAL EDUCATION CATEGORY 3. OTHER CATEGORY 3 COURSES
MAY BE SUBSTITUTED IF APPROVED BY THE CHAIR OF THE DEPARTMENT OF TECHNOLOGICAL STUDIES. STUDENTS ARE ENCOURAGED TO TAKE A COMBINATION OF PHYSICS AND CHEMISTRY.

MANUFACTURING MANAGEMENT EMPHASIS

SELECT 16 CREDITS FROM THE FOLLOWING COURSES: STUDENTS MUST CHOOSE A MANUFACTURING-RELATED TOPIC FOR TADT 4778, ADVANCED TOPICS IN TECHNOLOGY

- TADT 3217 Materials Science and Metallurgy (4 credits)
- TADT 3260 Project Bidding and Estimating (4 credits)
- TADT 3700 Production Planning and Control (4 credits)
- TADT 3878 Industrial/Engineering Production Studies (4 credits)
- TADT 4778 Advanced Topics in Technology (4 credits)

TADT 4970 MAY BE TAKEN FOR 4 CREDITS

- TADT 4970 Internship (1-12 credits)

Project Management, B.S. *major* Construction Management Emphasis

The Project Management degree prepares graduates for planning and managing resources under the constraints of scope, cost and time to successfully achieve a specific, unique objective. This program addresses the tools, skills and knowledge necessary to initiate, plan, implement and evaluate projects to deliver solutions. Program disciplines include: safety and risk management, leadership, quality assurance, technical sales, training, sustainability, engineering economics and cost analysis. Project Management majors have the option to select from three distinct technology related emphases: Construction Management, Facility Management or Operations Management.

Required Credits: 78
Required GPA: 2.25

I REQUIRED TECHNICAL CORE COURSES

SELECT 22 SEMESTER CREDITS FROM THE FOLLOWING COURSES:

- TADT 1227 Fabricating Fundamentals (3 credits)
- TADT 1315 Energy and Power Technology (3 credits)
- TADT 1350 Electrical/Electronic Technology (3 credits)
- TADT 1460 2D Graphics And Laser Etching (3 credits)
- TADT 2370 Automation Technology (3 credits)
- TADT 3460 3D Parametric Modeling and Printing (4 credits)
- TADT 4537 Industrial Design/Innovation (4 credits)
- TADT 4778 Advanced Topics in Technology (4 credits)

22 Application/Technical Core credits may be transferred into this section

from other institutions with approval of advisor.

II REQUIRED PROFESSIONAL CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- TADT 1110 Introduction to Project Management (4 credits)
- TADT 3267 Engineering Economic and Cost Analysis (4 credits)
- TADT 3877 Engineering Problem Solving (4 credits)
- TADT 3885 Technical Sales, Service and Training (4 credits)
- TADT 3887 Safety and Risk Management (4 credits)
- TADT 4385 Sustainability and Emerging Technologies (4 credits)
- TADT 4812 Leadership Mentoring (1 credit)
- TADT 4820 Engineering Case Study (3 credits)
- TADT 4867 Lean Principles and Practices (4 credits)
- TADT 4878 Quality Assurance (4 credits)
- TADT 4897 Project Management (4 credits)

CONSTRUCTION MANAGEMENT EMPHASIS

COMPLETE THE FOLLOWING COURSES:

- TADT 2250 Construction Technology (3 credits)
- TADT 3250 Print Reading and Project Documentation (4 credits)
- TADT 3260 Project Bidding and Estimating (4 credits)
- TADT 4259 Construction Management (4 credits)

TADT 4970 (1 CREDIT)

- TADT 4970 Internship (1-12 credits)

Project Management, B.S. *major* Facility Management Emphasis

The Project Management degree prepares graduates for planning and managing resources under the constraints of scope, cost and time to successfully achieve a specific, unique objective. This program addresses the tools, skills and knowledge necessary to initiate, plan, implement and evaluate projects to deliver solutions. Program disciplines include: safety and risk management, leadership, quality assurance, technical sales, training, sustainability, engineering economics and cost analysis. Project Management majors have the option to select from three distinct technology related emphases: Construction Management, Facility Management or Operations Management.

Required Credits: 78
Required GPA: 2.25

I REQUIRED TECHNICAL CORE COURSES

SELECT 22 SEMESTER CREDITS FROM THE FOLLOWING COURSES:

- TADT 1227 Fabricating Fundamentals (3 credits)
- TADT 1315 Energy and Power Technology (3 credits)
- TADT 1350 Electrical/Electronic Technology (3 credits)
- TADT 1460 2D Graphics And Laser Etching (3 credits)
- TADT 2370 Automation Technology (3 credits)
- TADT 3460 3D Parametric Modeling and Printing (4 credits)
- TADT 4537 Industrial Design/Innovation (4 credits)
- TADT 4778 Advanced Topics in Technology (4 credits)

22 Application/Technical Core credits may be transferred into this section

from other institutions with approval of advisor.

II REQUIRED PROFESSIONAL CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- TADT 1110 Introduction to Project Management (4 credits)
- TADT 3267 Engineering Economic and Cost Analysis (4 credits)
- TADT 3877 Engineering Problem Solving (4 credits)
- TADT 3885 Technical Sales, Service and Training (4 credits)
- TADT 3887 Safety and Risk Management (4 credits)
- TADT 4385 Sustainability and Emerging Technologies (4 credits)
- TADT 4812 Leadership Mentoring (1 credit)
- TADT 4820 Engineering Case Study (3 credits)
- TADT 4867 Lean Principles and Practices (4 credits)
- TADT 4878 Quality Assurance (4 credits)
- TADT 4897 Project Management (4 credits)

FACILITY MANAGEMENT EMPHASIS

COMPLETE THE FOLLOWING COURSES:

- TADT 2250 Construction Technology (3 credits)
- BUAD 3677 Principles of Real Estate (3 credits)
- TADT 4873 Emphasis Related Capstone (4 credits)
- TADT 4875 Facilities Management (4 credits)

TADT 4970 (2 CREDITS)

- TADT 4970 Internship (1-12 credits)

Project Management, B.S. *major* Operations Management Emphasis

The Project Management degree prepares graduates for planning and managing resources under the constraints of scope, cost and time to successfully achieve a specific, unique objective. This program addresses the tools, skills and knowledge necessary to initiate, plan, implement and evaluate projects to deliver solutions. Program disciplines include: safety and risk management, leadership, quality assurance, technical sales, training, sustainability, engineering economics and cost analysis. Project Management majors have the option to select from three distinct technology related emphases: Construction Management, Facility Management or Operations Management.

Required Credits: 78
Required GPA: 2.25

I REQUIRED TECHNICAL CORE COURSES

SELECT 22 SEMESTER CREDITS FROM THE FOLLOWING COURSES:

- TADT 1227 Fabricating Fundamentals (3 credits)
- TADT 1315 Energy and Power Technology (3 credits)
- TADT 1350 Electrical/Electronic Technology (3 credits)
- TADT 1460 2D Graphics And Laser Etching (3 credits)
- TADT 2370 Automation Technology (3 credits)
- TADT 3460 3D Parametric Modeling and Printing (4 credits)
- TADT 4537 Industrial Design/Innovation (4 credits)
- TADT 4778 Advanced Topics in Technology (4 credits)

22 Application/Technical Core credits may be transferred into this section

from other institutions with approval of advisor.

II REQUIRED PROFESSIONAL CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- TADT 1110 Introduction to Project Management (4 credits)
- TADT 3267 Engineering Economic and Cost Analysis (4 credits)
- TADT 3877 Engineering Problem Solving (4 credits)
- TADT 3885 Technical Sales, Service and Training (4 credits)
- TADT 3887 Safety and Risk Management (4 credits)
- TADT 4385 Sustainability and Emerging Technologies (4 credits)
- TADT 4812 Leadership Mentoring (1 credit)
- TADT 4820 Engineering Case Study (3 credits)
- TADT 4867 Lean Principles and Practices (4 credits)
- TADT 4878 Quality Assurance (4 credits)
- TADT 4897 Project Management (4 credits)

OPERATIONS MANAGEMENT EMPHASIS

COMPLETE THE FOLLOWING COURSES:

- TADT 3700 Production Planning and Control (4 credits)
- TADT 3878 Industrial/Engineering Production Studies (4 credits)
- TADT 4873 Emphasis Related Capstone (4 credits)
- TADT 4879 Service Process Design and Improvement (4 credits)

Technology Management, B.A.S. *major*

The Technology Management program is designed to prepare individuals to pursue a variety of technology-related management career paths in business or industry. The program is designed specifically for individuals who typically possess a two-year technical degree and are interested in advancing their professional career. The program is a "2+2" degree that permits students to apply their 2 year technical degree credits toward a baccalaureate degree. Coupled with a two-year technical degree providing a focused foundation, students complete junior- and senior-level courses covering a broad range of technology management concepts and applications. This breadth provides maximum flexibility for graduates to pursue diverse employment opportunities. Completion of the degree is available through a web-based distance delivery format. Students should work closely with an advisor to obtain program and course selection information.

Note: Upon approval of the Technological Studies staff, certain major courses can be substituted in the Technical and/or Professional Core from related technical and community college programs.

Note: Transfer students must take a minimum of 30 semester credits from Bemidji State University. Forty (40) upper division semester credits are also required for graduation.

Required Credits: 66
Required GPA: 2.25

I REQUIRED TECHNICAL CORE COURSES

Requires 26 technical credits transferred from an A.S.
or A.A.S. degree, diploma or certificate
(e.g., Manufacturing Technology, Automation Technology)
or 26 technical credits from the Department of
Technological Studies course offerings.

II REQUIRED PROFESSIONAL CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- TADT 3100 Principles and Practices of Professional Development (2 credits)
- TADT 3267 Engineering Economic and Cost Analysis (4 credits)
- TADT 3885 Technical Sales, Service and Training (4 credits)
- TADT 4385 Sustainability and Emerging Technologies (4 credits)
- TADT 4537 Industrial Design/Innovation (4 credits)
- TADT 4875 Facilities Management (4 credits)
- TADT 4878 Quality Assurance (4 credits)
- TADT 4897 Project Management (4 credits)

III TECHNOLOGY MANAGEMENT ELECTIVES

SELECT 10 CREDITS FROM THE FOLLOWING WITH ASSISTANCE FROM A FACULTY ADVISOR:

- BUAD 3281 Decision Support Systems (3 credits)
- BUAD 3361 Marketing (3 credits)
- BUAD 3381 Management Information Systems (3 credits)
- BUAD 4469 Small Business Case Analysis (3 credits)
- TADT 3260 Project Bidding and Estimating (4 credits)
- TADT 3700 Production Planning and Control (4 credits)
- TADT 3877 Engineering Problem Solving (4 credits)
- TADT 3878 Industrial/Engineering Production Studies (4 credits)
- TADT 3878 Industrial/Engineering Production Studies (4 credits)
- TADT 4778 Advanced Topics in Technology (4 credits)

MAY INCLUDE TADT 4970 for 1-2 CREDITS

- TADT 4970 Internship (1-12 credits)

Design *minor*

Required Credits: 24
Required GPA: 2.00

I REQUIRED COURSES

COMPLETE THE FOLLOWING COURSES:
These courses must be completed before taking the
courses below.

- TADD 1440 Design and Drawing Foundations (4 credits)
- TADD 2440 2D Digital Foundations (4 credits)
- TADD 3440 3D Digital Foundations (4 credits)

II REQUIRED ELECTIVES

SELECT 3 OF THE FOLLOWING COURSES:

- TADD 3548 Digital Media/3D (4 credits)
- TADD 3549 Digital Media/Interactive (4 credits)
- TADD 3568 Exhibit Design/Trade Show (4 credits)
- TADD 3569 Exhibit Design/Environments (4 credits)
- TADD 3578 Digital Print/Typography and Grid (4 credits)
- TADD 3579 Digital Print/Branding and Publication (4 credits)
- TADD 4549 Advanced Digital Media Design (4 credits)
- TADD 4569 Advanced Exhibit Design (4 credits)
- TADD 4579 Advanced Digital Print Design (4 credits)

Project Management *minor*

Required Credits: 24
Required GPA: 2.00

COMPLETE THE FOLLOWING COURSES:

- TADT 1110 Introduction to Project Management (4 credits)
- TADT 3267 Engineering Economic and Cost Analysis (4 credits)
- TADT 3887 Safety and Risk Management (4 credits)
- TADT 4812 Leadership Mentoring (1 credit)
- TADT 4820 Engineering Case Study (3 credits)
- TADT 4878 Quality Assurance (4 credits)
- TADT 4897 Project Management (4 credits)

Studio Arts *minor*

Required Credits: 24
Required GPA: 2.00

I REQUIRED COURSES

COMPLETE THE FOLLOWING COURSES:
These courses must be completed before taking the courses below.

- TADD 1440 Design and Drawing Foundations (4 credits)
- TADD 2440 2D Digital Foundations (4 credits)
- TADD 3450 History of Modern Design (4 credits)

II REQUIRED ELECTIVES

SELECT 3 OF THE FOLLOWING COURSES:

- TADD 3648 Color Theory (4 credits)
- TADD 3649 Introduction to Painting (4 credits)
- TADD 3658 Advanced Drawing (4 credits)
- TADD 3659 Life Drawing (4 credits)
- TADD 3669 Photography and Digital Imaging (4 credits)
- TADD 3748 Ceramics/Hand Building (4 credits)
- TADD 3749 Ceramics/Wheel (4 credits)
- TADD 4649 Advanced Painting (4 credits)
- TADD 4659 Trends in Visual Arts (4 credits)
- TADD 4749 Ceramics/Non-Vessel (4 credits)

Technology, Art and Design - Design Courses

TADD 1440 Design and Drawing Foundations (4 credits)
Two-dimensional visual design and problem solving through introductory drawing experiences. An introduction to the various methods and techniques along with use of materials and understanding of the elements of design and drawing. Students gain a psychological understanding of the connection between humans and nature and the influence of natural forms in the creative process. Liberal Education Goal Area 6

TADD 2440 2D Digital Foundations (4 credits)
An introduction to 2D digital techniques used to create and edit bitmap, vector, and metafile graphic images for various print and digital outputs. Students gain experience in the ideation and critical thinking process used to design and analyze imagery.

TADD 2931 Experimental Course (4 credits)
A course proposed for inclusion in the University curriculum. May not be offered more than two times as an experimental course.

TADD 3251 Watercolor/Aqueous Media (3 credits)
Concentration on the study of composition, color and light, leading to an understanding of watercolor and/or acrylics. Prerequisite: VSAR 2250 or consent of instructor.

TADD 3440 3D Digital Foundations (4 credits)
A comprehensive study of 3D computer modeling and rendering as it relates to spatial definition and form in exhibition design. Prerequisite: 2.75 overall GPA or consent of instructor.

TADD 3450 History of Modern Design (4 credits)
An advanced level survey of major movements and tendencies, and key figures in the development of graphic, craft, and industrial design between the mid-nineteenth century and the present day. Prerequisite: 2.75 overall GPA or consent of instructor. Liberal Education Goal Area 6

TADD 3548 Digital Media/3D (4 credits)
Includes topics on advanced 3D modeling and digital video editing techniques. Focuses on 3D modeling, materials, lighting, and rendering. In combination with the 3D elements, also includes topics on video production, menu design, and video delivery methods. Prerequisites: TADD 1440, TADD 2440, TADD 3440, and 2.75 overall GPA, or consent of instructor.

TADD 3549 Digital Media/Interactive (4 credits)
Focuses on digital media development tailored towards interactive design. Includes topics on digital-signage, flash/web design, and application development. Prerequisites: TADD 1440, TADD 2440, TADD 3440, and 2.75 overall GPA, or consent of instructor.

TADD 3568 Exhibit Design/Trade Show (4 credits)
Focused study of the essential components of exhibition design as they relate to designing for the trade show industry. Engages the exhibit designer in project proposal and design of trade show booths of various types and sizes. Includes concepts relating to "green," modular/portable booths, fabric design solutions, and designing from an RFP. Prerequisites: TADD 1440, TADD 2440, TADD 3440, and 2.75 overall GPA, or consent of instructor; Corequisite: May be taken concurrently with TADD 3440.

TADD 3569 Exhibit Design/Environments (4 credits)
Focused study of the essential components of the exhibition design industry as they relate to designing for three-dimensional environments such as corporate lobbies, educational/museum exhibits, outdoor installations/museums, visitor centers, etc. Prerequisites: TADD 1440, TADD 2440, TADD 3440, and 2.75 overall GPA, or consent of instructor; Corequisite: May be taken concurrently with TADD 3440.

TADD 3578 Digital Print/Typography and Grid (4 credits)
A theoretical and practical study of the visual nature and expressive potential of digital type forms as a fundamental tool of the graphic designer. Students also practice digital print production that includes preparation of all digital typographic and/or graphic assets, and digital layout assembly to create single, spot, and process color documents. Prerequisites: TADD 2440 and 2.75 overall GPA, or consent of instructor.

TADD 3579 Digital Print/Branding and Publication (4 credits)
A theoretical and practical study of the visual and conceptual problems related to branding and packaging. Students also practice digital print production management techniques for all digital assets, and digital layout assembly to create 3D package design, visual identity systems, and related marketing materials. Prerequisites: TADD 2440 and 2.75 overall GPA, or consent of instructor.

TADD 3648 Color Theory (4 credits)
Addresses basic principles of color theories and applications of color in drawing, painting, and design. Using a variety of materials, tools, and techniques, students work on projects that demonstrate concepts such as color mixing, color interaction, color space, color emphasis, and color emotion. Prerequisites: TADD 1440 and 2.75 overall GPA, or consent of instructor. Liberal Education Goal Area 6

TADD 3649 Introduction to Painting (4 credits)
Gives students a basic foundation in painting. Students investigate basic materials, techniques, and form and content as applied to painting. Prerequisite(s): TADD 3648 and 2.75 overall GPA, or consent of instructor. Liberal Education Goal Area 6

TADD 3658 Advanced Drawing (4 credits)
A continued study and application of design elements and principles with a focus on expressive drawing. Drawing materials, papers, and techniques are explored, with an increased use of color. Prerequisites: TADD 1440 and 2.75 overall GPA, or consent of instructor.

TADD 3659 Life Drawing (4 credits)
Expanded instruction in drawing the human figure. This course allows the student to expand his/her knowledge and technical fluency on an individual basis, and encourages personal expression and development. Prerequisites: TADD 1440 and 2.75 overall GPA, or consent of instructor.

TADD 3669 Photography and Digital Imaging (4 credits)
Explores digital photography and imaging techniques with special application to art, design, and communication, with an emphasis on understanding the control and effects of light. Prerequisites: TADD 1440, TADD 2440, and 2.75 overall GPA, or consent of instructor.

TADD 3748 Ceramics/Hand Building (4 credits)
The study and application of hand building for 3-dimensional visual design and problem solving that is integrated with the introduction to basic forming methods, glazing and firing of ceramic forms. Prerequisite: 2.75 overall GPA or consent of instructor. Liberal Education Goal Area 6

TADD 3749 Ceramics/Wheel (4 credits)
Three-dimensional visual design and problem solving is integrated with an introduction to potters wheel forming methods, glazing, and firing of ceramic forms. Prerequisite: 2.75 overall GPA or consent of instructor. Liberal Education Goal Area 6

TADD 4250 Advanced Painting (1-4 credits)
Emphasis on individual understanding of painting media with special attention to creating a body of work appropriate to the individual painter. Prerequisite: VSAR 3252.

TADD 4440 Digital Design Senior Culmination (4 credits)
Focuses on the preparation and presentation of a professional portfolio and interviewing techniques. Students also gain an understanding of personnel management issues, leadership and management styles, basic business principles, and models. Prerequisites: TADD 4549, TADD 4569, TADD 4579, and 2.75 overall GPA, or consent of instructor.

TADD 4450 Studio Arts Senior Culmination (4 credits)
An examination and application of the functions and means of developing a well-designed art exhibition, culminating in an on-campus individual or group exhibition of an Art and Design major's personal art work. Thesis projects may culminate in research or experiential activities. Prerequisites: Senior status and 2.75 overall GPA, or consent of instructor.

TADD 4549 Advanced Digital Media Design (4 credits)
Focuses on combining several digital media elements. Combines 3D modeling, video-production, audio-production, and interactive delivery methods in order to produce advanced digital media content. Prerequisites: TADD 3548, TADD 3549, and 2.75 overall GPA, or consent of instructor.

TADD 4569 Advanced Exhibit Design (4 credits)
Advanced application of exhibit industry design concepts. Includes custom booths, exhibit construction systems, and flexible modular/portable designs. Students are also engaged in various aspects of project management, cost estimation, and budgeting. Prerequisites: TADD 3568, TADD 3569, and 2.75 overall GPA, or consent of instructor.

TADD 4579 Advanced Digital Print Design (4 credits)
A practical study of digital print design production systems within a design team structure to solve practical and complex design problems. Prerequisites: TADD 3578, TADD 3579, and 2.75 overall GPA, or consent of instructor.

TADD 4620 Topics in Studio Arts: [subtitled] (2-4 credits)
Research, advanced exploration, and/or applied study of various topics related to studio arts. Prerequisite: 2.75 overall GPA or consent of instructor. May not be offered every year. Repeatable up to 8 credits

TADD 4630 Topics in Digital Design: [subtitled] (2-4 credits)
Research, advanced exploration, and/or applied study of various topics related to digital design. Prerequisite: 2.75 overall GPA or consent of instructor. May not be offered every year. Repeatable up to 8 credits

TADD 4649 Advanced Painting (4 credits)
Further develops students' understanding of painting. Students investigate use of materials, techniques, form, and content as applied to painting. Prerequisites: TADD 3649 and 2.75 overall GPA, or consent of instructor.

TADD 4659 Trends in Visual Arts (4 credits)
Through lectures, readings, gallery visits, and hands-on activities, students develop an understanding of the elements and principles of art, a basic vocabulary for describing visual art, a general understanding of the role art has played throughout history, and contemporary trends. Prerequisite: 2.75 overall GPA or consent of instructor.

TADD 4749 Ceramics/Non-Vessel (4 credits)
Two- and three-dimensional visual design and problem solving is integrated with the making of non-vessel ceramic forms such as sculpture and tiles. Glazing and firing of ceramic forms is also addressed. Prerequisite: 2.75 overall GPA or consent of instructor. May not be offered every year

TADD 4808 Special Readings (2 credits)
Reading assignments related to studio research. Prerequisite: Consent of instructor.

TADD 4970 Internship (1-12 credits)
The following description may apply: The Visual Arts Internship program gives students the opportunity to spend a semester working one-on-one with an artist or for a major cultural institution. Each field experience is individually designed to meet the needs of the student.

All-University Courses

The course numbers listed below, not always included in the semester class schedule, may be registered for by consent of the advisor, instructor, or department chair, or may be assigned by the department when warranted. Individual registration requires previous arrangement by the student and the completion of any required form or planning outline as well as any prerequisites.

1910, 2910, 3910, 4910 DIRECTED INDEPENDENT STUDY
1920, 2920, 3920, 4920 DIRECTED GROUP STUDY
1930, 2930, 3930, 4930 EXPERIMENTAL COURSE
1940, 2940, 3940, 4940 IN-SERVICE COURSE
1950, 2950, 3950, 4950 WORKSHOP, INSTITUTE, TOUR
1960, 2960, 3960, 4960 SPECIAL PURPOSE INSTRUCTION
1970, 2970, 3970, 4970 INTERNSHIP
1980, 2980, 3980, 4980 RESEARCH
1990, 2990, 3990, 4990 THESIS

Technology, Art and Design -Technology Courses

TADT 1110 Introduction to Project Management (4 credits)
Introduction to the principles and practices associated with project management in a professional environment, to include the utilization of project management methodology in support of planning the participants academic career as a student at Bemidji State University. In further support of the participants academic career, the course will also emphasize professional communications in various written and electronic formats.

TADT 1210 Materials and Processes - Forming (3 credits)
An overview of forming processes used in manufacturing such as welding, casting, spraying, compacting, bending, laminating, extruding, rolling, shaping, fastening, and drawing. Also included are the primary materials which are formed in the manufacturing environment and the application of the forming processes to contemporary industry.

TADT 1220 Materials and Processes - Separating (3 credits)
A comprehensive study of the separating processes which occur in manufacturing production. Traditional and non-traditional processes are introduced, along with the primary materials which are utilized in the separation processes.

TADT 1227 Fabricating Fundamentals (3 credits)
Overview of fundamental lab processes related to extremely diversified industry that produces products in a production environment. Traditional and Non-Traditional processes are introduced along with theories, rules and practices associated with fabrication.

TADT 1315 Energy and Power Technology (3 credits)
Survey of types and sources of energy. Addresses the transmission and application of energy and power systems in a variety of construction and industrial applications, including mechanical, fluid, and renewable technologies such as solar, wind and geothermal.

TADT 1350 Electrical/Electronic Technology (3 credits)
Fundamental principles of electricity and electronics. Various topics are explored including basic circuits, transformers and motors.

TADT 1460 2D Graphics And Laser Etching (3 credits)
An introduction to the principles and practices of technical drawing. The course provides a working familiarity with computer-aided design and drafting through the study of multi-view, pictorial drawing systems, and their applications to laser etching.

TADT 2100 Impact Of Technology (2 credits)
Defines technology and examines the relationship between technology, human civilization, and other disciplines. Course includes a focus on the related social, cultural, environmental and economic impacts of technology and encourages students to understand the development of technology from the earliest civilizations to implications for the 21st Century. This course is designed primarily for the liberal education program. Liberal Education Goal Areas 5 & 9.

TADT 2250 Construction Technology (3 credits)
A broad study of the building and heavy construction industries. Emphasis is given to residential and light commercial applications of materials, methods, tools, equipment, structural systems and personnel. Prerequisite: TADT 1220.

TADT 2310 Small Gasoline Engines (3 credits)
The theory and operation of small 2 cycle and 4 cycle engines. Laboratory exercises and rebuilding of components and engines. Prerequisite: TADT 1315. (Might not be offered every year.)

TADT 2370 Automation Technology (3 credits)
An introduction to the field of automation as found in the industrial environment. Concepts of CNC, CAM PLC's, vision systems, bar coding and robotics are explored.

TADT 3100 Principles and Practices of Professional Development (2 credits)
An overview for professionals in the field of Industrial Technology. Students research and report on such topics as historical and future technological developments, personality inventories, trade and professional organizations, professional publications, and personal professional development plans. Educational degree requirements and policies to meet development plans are also reviewed. Prerequisite(s): Junior status or consent of instructor.

TADT 3217 Materials Science and Metallurgy (4 credits)
A study of the five primary classifications of materials used in manufacturing. Basic physical and chemical aspects are reviewed, including fundamental laboratory testing processes, structure analysis and engineering requirements. Prerequisite(s): Junior status or consent of instructor.

TADT 3240 Construction Materials and Practices (3 credits)
Comprehensive study of construction materials, their characteristics, applications and testing. Prerequisite(s): Junior status or consent of instructor.

TADT 3250 Print Reading and Project Documentation (4 credits)
An introductory course in production specifications and contract documentation usage. The course includes the study of materials, methods and labor functions as they relate to use of specifications, documentation and drawings in construction related industries. Prerequisite(s): Junior status or consent of instructor.

TADT 3260 Project Bidding and Estimating (4 credits)
A foundational course in the analysis and determination of construction and manufacturing project costs. Bidding strategies and proposals; material, equipment and labor estimates, as well as overhead and profit are examined. Prerequisite: Junior status or consent of instructor.

TADT 3267 Engineering Economic and Cost Analysis (4 credits)
Introduction to the methods for determining costs related to developing and producing a product, for analyzing the present and future value of liquid and physical assets, and for analyzing the present and future value of a time series of payments. Other topics include basic accounting practices, cost estimating, and forecasting. Prerequisite: Junior status or consent of instructor.

TADT 3330 Industrial Automation (3 credits)
The integration of robotics and automated controls into manufacturing operations. Topics include planning for, specifying, and integrating sensors, actuators, part feeding devices, fixtures, material handling equipment, robotics, and programmable logic controllers in an automated environment, such as a work cell or an assembly line. Two hours lecture and two hours lab per week. Prerequisite(s): Junior status or consent of instructor.

TADT 3350 General Power (3 credits)
Theory and operating principles of internal combustion engines with over fifty cubic inches of displacement. Laboratory experiences include rebuilding procedures and related technical specifications and data. Prerequisite(s): Junior status or consent of instructor.

TADT 3460 3D Parametric Modeling and Printing (4 credits)
Examines current topics, research, exploration, testing, and evaluation of computer-aided drafting and design programs for Windows computers. Prerequisite(s): Junior status or consent of the instructor

TADT 3570 Commercial Architecture (3 credits)
Planning and design of commercial buildings and their structural systems, city and industrial planning, and landscaping. Might not be offered every year. Prerequisite(s): Junior status or consent of instructor.

TADT 3610 Industrial Prototypes (4 credits)
Development of industrial quality prototypes from engineering or designer prints. Includes the selection of materials and processes for production feasibility and market testing prototypes. Prerequisite(s): Junior status or consent of instructor.

TADT 3700 Production Planning and Control (4 credits)
The concepts, tools, techniques, and quantitative methods used to plan for and control operations in the production of goods and services. Topics include, but are not limited to, traditional inventory management, just-in-time inventory, materials- and enterprise-resource planning, facilities location and layout, process strategies, aggregate planning, scheduling, maintenance and reliability, project management, and supply chain management. Prerequisite: Junior status or consent of instructor.

TADT 3850 Foundation of Technology Education (2 credits)
Survey of the history, philosophy, curriculum, and instructional practices of the industrial technology education field. Emphasizes the goals and objectives of technology education programs in the K-12 public school system. Includes current issues, career options, professional organizations, and licensure requirements. Prerequisite(s): Junior status or consent of instructor.

TADT 3857 Methods of Teaching Industrial Technology/Vocational Education (4 credits)
Approaches and delivery strategies for teaching technology education. Instructional technologies, records management, lesson planning and classroom practice. Prerequisites: Junior status or consent of instructor.

TADT 3877 Engineering Problem Solving (4 credits)
Investigates the terminology, concepts, and analytical techniques essential to solving complex problems which occur in manufacturing. Prerequisite: Junior status or consent of the instructor.

TADT 3878 Industrial/Engineering Production Studies (4 credits)
Study and visitations/assessments of the various aspects of industry, particularly in the engineering and technology management fields. The strategy of benchmarking will be used as a primary tool to complete course research. Prerequisite(s): Junior status or consent of instructor.

TADT 3879 Performance Measurement (3 credits)
The establishment of time standards essential to the decision making, forecasting, and process control efforts of manufacturing engineering groups and operations management. Prerequisites: Junior status or consent of instructor.

TADT 3885 Technical Sales, Service and Training (4 credits)
The philosophy and practice of sales and service in a technical environment, including the methodology, planning and design of sales activity, and developing technical proposals and presentations. Course also examines aspects of assessing, designing and implementing human resource training programs. Prerequisite(s): Junior status or consent of instructor.

TADT 3887 Safety and Risk Management (4 credits)
Introduction to the general principles, regulations, responsibilities, policies and practices associated with Safety and Risk Management from the perspective of a manager in operations, facilities and/or construction. Prerequisite(s): Junior status or consent of the instructor

TADT 3897 Ergonomics and Human Factors (3 credits)
Students learn how to apply human-centered design principles to minimize the risk of harm while simultaneously facilitating the use of man-made artifacts. These principles may be applied in the work environment to design or improve work methods and work environments. They may also be used in the design of consumer goods. Includes a course project and lab activities. Two hours lecture and two hours lab per week. Prerequisites: Junior status or consent of instructor.

TADT 4259 Construction Management (4 credits)
An advanced study of construction project planning, contracting, and supervision. The management functions of a construction business environment are emphasized. Attention is given to the differences between construction management and construction contracting as well as a focus on the concept of green building. Prerequisites: Junior status or consent of instructor.

TADT 4260 Computerized Construction Estimating (4 credits)
An exploration and study of computerized construction estimating methods, software, and approaches for estimating, planning, and documenting construction projects. Prerequisite: Junior status.

TADT 4340 Industrial Controls (4 credits)
A study of industrial controls including electromechanical devices, programmable logic controllers and computer control. Prerequisites: Junior status or consent of instructor.

TADT 4349 Principles of Technology (3 credits)
A laboratory based study of electrical, mechanical, thermal and optical systems which combines theory and practice to develop an understanding of technological systems based on mathematical and physical models. Prerequisites: Junior status or consent of instructor.

TADT 4370 Computer Integrated Manufacturing (3 credits)
Study of how to synchronize operations in an environment that incorporates automated production equipment, material handling systems, plant control systems, design engineering functions, production- and inventory-control systems, and various management functions. Prerequisites: Junior status or consent of instructor.

TADT 4385 Sustainability and Emerging Technologies (4 credits)
A study of sustainability and the emerging technologies that support its major concepts in a laboratory-based course. Students will experience a variety of emerging technologies and understand how such content may be applied in design, engineering, manufacturing and/or the construction industries. Prerequisite(s): Junior status or consent of instructor.

TADT 4460 Design for Manufacturability (3 credits)
A study of the tools, techniques, and guidelines used to design parts and products, while minimizing costs, facilitating manufacturing operations, maximizing quality and functionality, and supporting modern production management techniques. Prerequisites: Junior status or consent of instructor.

TADT 4464 Machine Element Design (3 credits)
Application of mechanical principles, such as physics, stress analysis, motion analysis, mechanical power, fluid power, fastening and joining techniques, and electric motor selection/control to the design of components and mechanisms. Prerequisites: Junior status or consent of instructor.

TADT 4465 Mechanical Analysis of Parametric 3D Models (3 credits)
The use of a parametric 3D CAD package, in conjunction with either add-on or third-party software applications, to create virtual part and assembly models, and to analyze their physical performance using computer simulation techniques. Topics include shape optimization, and stress-, fatigue-, and kinematic-analysis, plus additional analysis techniques as planned by the instructor. Prerequisites: Junior status or consent of instructor.

TADT 4537 Industrial Design/Innovation (4 credits)
Exploration of the history, philosophy and application of industrial design. Includes defining specific customer needs and the research, identification, testing, assessment and implementation of effective solutions to technological problems. Also included is the development of a design proposal, written and graphic documentation, and the ethical, environmental, social and economic impacts of design solutions. Incorporates the role, purpose and relationship of innovation in business and industry with the design process. Prerequisite(s): Junior status or consent of instructor.

TADT 4778 Advanced Topics in Technology (4 credits)
Current topics, or emerging research or exploration and assessment of topics in the applied engineering, industrial technology, and/or technology management fields, or any related field. Prerequisite(s): Junior status or consent of the instructor

TADT 4812 Leadership Mentoring (1 credit)
Introduction to leadership principles in practice through the shadowing of a volunteer mentor currently working in a senior leadership role of a local private sector organization. The student will observe how leadership provides direction and guidance in alignment of their respective organizations toward a common goal and in support of specific performance objectives. Prerequisites: Junior status or consent of the instructor.

TADT 4820 Engineering Case Study (3 credits)
Study and development of a solution to a new or existing engineering-related problem. Students propose an appropriate case within their field of interest to be given approval by the instructor. Based on instructor approval, students submit a case study which documents the proposal, implementation strategy, and results of the proposal.

TADT 4830 Foundations in Career and Technical Education (2 credits)
Students will research learning theory and demonstrate basic instructional competencies unique to career & technical education, including philosophy, methods of teaching, and student assessment. Course also addresses the inclusion of teaching strategies in reading, reading comprehension and writing. Prerequisites: Junior status or consent of instructor.

TADT 4837 Evaluation in Career and Technical Education (2 credits)
A study of testing and measurement techniques and applications in occupational programs. The construction of teacher-made performance test, written tests, rating scales and checklists is emphasized. Vendor and standardized are included. Prerequisites: Junior status or consent of instructor.

TADT 4839 Industrial/Career and Technical Education Student Organization (2 credits)
Acquaints students with the issues of planning and implementation of student organizations. Also includes student organizations at the secondary and post-secondary levels and their relationship to state and federal policy and legislation. Prerequisites: Junior status or consent of instructor.

TADT 4847 Methods of Teaching Career and Technical Education (2 credits)
Instructional methodology used in the implementation of occupationally and technically orientated curriculum. Prerequisites: Junior status or consent of instructor.

TADT 4849 Classroom Management in Career and Technical Education (2 credits)
Managing the career and technical education learning classroom, including impact on effective teaching approaches, laboratory safety, material purchase and inventory, equipment purchase and maintenance, and program budgeting. Prerequisites: Junior status or consent of instructor.

TADT 4850 Philosophy of Career and Technical Education (2 credits)
A study of the history, philosophy, and practices of career and technical education. Includes a survey of curriculum characteristics, certification requirements, professional organizations, and career options. Prerequisites: Junior status or consent of instructor.

TADT 4858 Curriculum Development in Technology Education & Career & Technical Ed (2 credits)
The philosophy of curriculum and course construction. Gives special attention to the formulation of purposes, selection and sequence of activities and learner outcomes and assessment. Prerequisites: Junior status or consent of instructor.

TADT 4859 Special Needs in Career and Technical Education (2 credits)
Objectives, materials, and methods of developing and modifying curriculum in the various vocational fields for students with special needs. Prerequisites: Junior status or consent of instructor.

TADT 4860 Management In Industrial Technology Education (4 credits)
Managing the learning environment, budget, equipment and student projects in the technology education setting, Also covers safety considerations and investigates strategies for learning within the technological clusters and for accommodating special needs students. Prerequisites: Junior status or consent of instructor.

TADT 4867 Lean Principles and Practices (4 credits)
This course teaches the principles and practical application of Lean methods and tools as they would apply in various types of organizational value streams allowing for continuously improving operational performances that are fast, flexible, focused and organizationally inclusive for all stakeholders. Prerequisite(s): Junior status or consent of the instructor

TADT 4873 Emphasis Related Capstone (4 credits)
A multifaceted project that utilizes the students culminating academic and intellectual experience to think critically, solve a challenging problem, and develop a solution using oral communication, public speaking, research skills, media literacy, teamwork, planning, self-sufficiency, or goal setting. Prerequisite(s): Senior status or consent of the instructor

TADT 4875 Facilities Management (4 credits)
This course is an exploration of the concepts and organization of an integrated approach to operating, maintaining, improving and adapting the buildings and infrastructure to an organization in order to create an environment that strongly supports the primary objectives of that organization. It includes a focus on preventive maintenance, planning and scheduling of maintenance, OSHA and the development of safety awareness. Prerequisite(s): Junior status or consent of instructor.

TADT 4878 Quality Assurance (4 credits)
The course teaches the theory and applications of statistical analysis, quality problem solving and implementation. Prerequisite(s): Junior status or consent of instructor.

TADT 4879 Service Process Design and Improvement (4 credits)
The design and improvement of work processes in the service industries and in the service functions of manufacturing organizations. Topics include, but are not limited to, the tools and techniques required for designing, setting up, and managing service systems; improving service quality; the impacts of technology on service management; managing nonprofit service organizations; services strategies; and the positioning and marketing of services. Prerequisite(s): Junior status or consent of instructor.

TADT 4880 Total Quality Management (3 credits)
An overview of the current quality control management techniques including process capability, action research and the international standards organization (ISO 9000). Prerequisites: Junior status or consent of instructor.

TADT 4887 Career Development Theory and Practice (2 credits)
A course designed to acquaint professionals with the various phases of lifetime career development. Strategies are reviewed to provide a comprehensive understanding of career awareness and the role that it plays in the life of each individual and society. Prerequisites: Junior status or consent of instructor.

TADT 4888 Work/Occupational Assessment of Learners (2 credits)
An investigation of the use of informal and formal techniques used in the design and implementation of occupational assessment with school systems. Prerequisites: Junior status or consent of instructor.

TADT 4889 Coordination Techniques of Career and Technical Education (2 credits)
The course involves the role of teacher-coordinators in the design and implementation of internships and other cooperative experimental learning methods. Prerequisites: Junior status or consent of instructor.

TADT 4897 Project Management (4 credits)
The combination of people, systems and techniques required to coordinate the resources needed to complete a project according to established goals, standards and deadlines. Includes the study of organizational structure, supervision and the related work of the supervisor as leader, staff relations and the improvement of industrial operations. Prerequisite(s): Junior status or consent of instructor.

TADT 4898 Simulation of Industrial Processes (3 credits)
Application of computer-based, discrete event simulation to improve or design work processes in business and industry. Emphasizes building mathematical systems models of work processes to be analyzed and optimized using simulation software such as, but not limited to, Promodel or Arena. Two hours lecture and two hours computer lab per week. Prerequisites: Junior status or consent of instructor.

TADT 4899 Design of Experiments (3 credits)
Planning, execution, and analysis of factorial-based industrial experiments. Topics include, but are not limited to, analysis of variance, fitting of regression models, two-level factorial designs, blocking strategies and confounding of variables, fractional factorial designs, response surface methods, nested and split-plot designs, three-level and mixed-level designs, and experiments with random factors. Prerequisites: Junior status or consent of instructor.

TADT 4970 Internship (1-12 credits)
Prerequesites: Junior status or consent of instructor.

All-University Courses

The course numbers listed below, not always included in the semester class schedule, may be registered for by consent of the advisor, instructor, or department chair, or may be assigned by the department when warranted. Individual registration requires previous arrangement by the student and the completion of any required form or planning outline as well as any prerequisites.

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1950, 2950, 3950, 4950 WORKSHOP, INSTITUTE, TOUR
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1970, 2970, 3970, 4970 INTERNSHIP
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