

Technology (TECH)

<http://www.business.und.edu/technology>

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The undergraduate degree programs offered through the College of Business and Public Administration's Department of Technology are the Bachelor of Science in Graphic Design Technology (BSGDT) and the Bachelor of Science in Industrial Technology (BSIT), which is accredited by ATMAE (Association of Technology, Management, and Applied Engineering). Minors in Technology, including Electronic Technologies, Manufacturing Technologies, Technical Design, and Graphic Design Technology are an integral part of the department's offerings. A Master of Science degree in Technology is also available for graduate study.

B.S. Industrial Technology (IT) Degree Program (p.)

College of Business and Public Administration

B.S. in Graphic Design Technology

The B.S. in Graphic Design Technology (GDT) is an innovative, multidisciplinary degree that prepares you for an exciting array of careers in the private and public sectors. We teach you to plan, analyze, and create solutions to visual communication problems. You learn to consider cognitive, cultural, physical, economic, psychological, and social factors in planning and executing design solutions using a variety of media and technologies. We provide you with a diverse range of experiences and opportunities in a flexible learning environment. You attain a solid education that combines theory, practice, and application.

Graphic design is applicable to virtually any discipline so the B.S. in Graphic Design Technology is designed to give you the flexibility to seek education in other disciplines as well. Before completion of 9 hours of the GDT required courses, you are required to submit a Statement of Educational and Life Objectives (SELO) and a related Program of Study. The Program of Study must consist of a minimum of 32 additional semester hours and must be designed to help you achieve the objectives identified in your SELO. Your Program of Study cannot include any of the GDT required courses. The Program of Study must be approved by the School of Entrepreneurship before the student can be admitted to the B.S. GDT degree program.

The remaining hours are available for you to complete Essential Studies requirements and to seek other knowledge, credentials (degrees, majors, minors, etc.).

Required 125 credit hours including:

I. Essential Studies Requirements, see University ES Listing.

II. The College of Business and Public Administration GPA Graduation Requirement (2.50), see College section.

III. Graphic Design Technology Major Program Requirement, at least a 2.50 GPA in courses that apply toward the degree and major.

Technology Requirements (40 Credit Hours Required)

TECH 102	Digital Design Software	3
ISBC 117	Personal Productivity with Information Technology	1
TECH 122	Computer-Aided Design	3
TECH 212	Visual Literacy	3
TECH 230	User Experience and Interface Design	3
TECH 232	Web Design	3
ISBC 330	Database Design	3
TECH 322	Digital Photography Fundamentals	3
TECH 332	Industrial Design	3
ISBC 370	Web Development	3
TECH 422	Advanced Digital Photography and Imaging	3
TECH 442	Industrial/Applied Graphic Design	3

TECH 450	Packaging Design	3
ISBC 490	Information Systems Analysis and Design Seminar	3

B.S. Industrial Technology (IT) Degree Program

Industrial Technology is a field of study designed to prepare technical/management-oriented professionals for employment in business, industry, and government. The curriculum is organized to equip students with critical knowledge and skills for product innovation and process improvement.

Required 125 credit hours, and including:

I. Essential Studies Requirements, see University ES listing.

II. The College of Business and Public Administration GPA Graduation Requirement (2.50), see College section.

III. Industrial Technology Major Program Requirements: At least a 2.50 GPA in courses that apply toward the degree and major, and the following:

TECH 110	Fundamentals of Technology	2
TECH 122	Computer-Aided Design	3
TECH 201	Electromechanical Fundamentals	4
TECH 203	Production Processes & Material Testing	4
TECH 211	Electric Circuits and Devices	4
TECH 223	Applied Synthetics	3
ISBC 300	Application Development	3
TECH 300	Technology and Society	3
MGMT 301	Operations Management	3
TECH 332	Industrial Design	3
ENTR 386	Entrepreneurship: The Numbers	3
ENTR 410	Marketing and Management Concepts for Entrepreneurship	3
TECH 433	Manufacturing Strategies	3
TECH 440	Occupational Safety	3
TECH 498	Senior Capstone I	1
TECH 499	Senior Capstone II	3
Total Credits		48

IV. The following 20 credits of Support Courses are required:

MATH 103	College Algebra	3
MATH 105	Trigonometry	2
CHEM 121 & 121L	General Chemistry I and General Chemistry I Laboratory	4
PHYS 161	Introductory College Physics I	4
PHYS 162	Introductory College Physics II	4
ECON 210	Introduction to Business and Economic Statistics	3
Total Credits		20

Department of Technology Minors

These minors are not available to Department of Technology majors, and students may select only one minor.

Graphic Design Technology

21 credits including the following courses:

TECH 102	Digital Design Software	3
TECH 212	Visual Literacy	3
TECH 230	User Experience and Interface Design	3
TECH 232	Web Design	3
TECH 322	Digital Photography Fundamentals	3
TECH 422	Advanced Digital Photography and Imaging	3

TECH 442	Industrial/Applied Graphic Design	3
Total Credits		21

Electronic Technologies, Manufacturing Technologies, and Technical Design

TECH 110	Fundamentals of Technology	2
TECH 122	Computer-Aided Design	3
TECH 201	Electromechanical Fundamentals	4
TECH 203	Production Processes & Material Testing	4
TECH 300	Technology and Society	3
TECH 332	Industrial Design	3
TECH 440	Occupational Safety	3

Courses

TECH 102. Digital Design Software. 3 Credits.

Learn to use industry-standard software to explore the principles of graphic design. You learn the principles of design production and develop the ability to communicate effectively in a visual format. F.

TECH 110. Fundamentals of Technology. 2 Credits.

The study of the philosophy and objectives of technology with emphasis on the theories, principles, and concepts of manufacturing, design, and electronics. F.

TECH 122. Computer-Aided Design. 3 Credits.

You are introduced to computer-aided design/drafting using AutoCAD software and technical drawing techniques to include blueprint interpretation, various projections, pictorials, dimensioning, developments and tolerancing. Hands-on exercises and drawing problems are reflective of industry and business. S.

TECH 200. Energy Fundamentals. 3 Credits.

The objective of the Energy Fundamentals course is to provide students with the fundamental knowledge to understand, and qualitatively and quantitatively calculate how energy is converted from basic energy sources such as fossil fuels, biomass, solar energy and wind to electrical energy. F.

TECH 201. Electromechanical Fundamentals. 4 Credits.

The study of the fundamental properties of mechanical, hydraulic, and electronic/electrical systems (primarily those that revolve around Direct Current (DC) including an introduction to Programmable Logic Controllers (PLCs). Experiential learning is facilitated through the use of project design and development. Prerequisite: MATH 103. Corequisite: PHYS 161 or equivalent. F.

TECH 202. Advanced Application of CADD Techniques. 3 Credits.

The advanced study of computer aided design/drafting to include 3D coordinates and layout, subsurface meshes, regions, solid modeling, and connection to computer numerical control (CNC). The creation of presentation graphics using bitmap files, shading, and rendering is also presented. Prerequisite: TECH 122 or consent of instructor. S.

TECH 203. Production Processes & Material Testing. 4 Credits.

This course provides students with an understanding of manufacturing processes and the strong interrelationships between manufacturing processes, product design, and material properties. Emphasis is placed on standard manufacturing processes such as casting, heat treatment, forming, turning, and milling. Additional topics covered will include material testing and inspection, and the interpreting technical drawings. S.

TECH 204. Industrial Materials. 4 Credits.

The theoretical and laboratory study of the physical and chemical attributes of organic and inorganic materials for conversion into industrial materials are explored. Source, structure, characteristics, properties, and practical applications of metallic, polymer, wood, ceramic, and composite materials are introduced. Laboratory activities are designed to explore the attributes of these materials as well as to practice the material testing processes. F.

TECH 211. Electric Circuits and Devices. 4 Credits.

The subject matter covered in this course will include concepts, principles, and operational characteristics of electronic/electrical components with a focus on Alternating Current (AC), discrete and integrated devices including computer driven electronic control systems. Design and developmental activities are facilitated through the use of simulation-Multisim software-and Ultiboard, a Printed Circuit Board (PCB) design and development software. Prerequisite: TECH 201, MATH 103 and MATH 105. S.

TECH 212. Visual Literacy. 3 Credits.

This course introduces the basic concepts of graphic design and visual communication. You sharpen brainstorming and problem-solving skills via design principles, color theory, and typography as they sharpen brainstorming and problem-solving skills. Prerequisite: TECH 102. S.

TECH 213. Wood Products Manufacturing. 3 Credits.

An introductory study of wood manufacturing methods and techniques utilizing tools and machines leading to the production of constructed assemblies. Prerequisite: TECH 110 or TECH 204 or consent of instructor. F, even years.

TECH 223. Applied Synthetics. 3 Credits.

A study of synthetic/polymer materials emphasizing identification of characteristics and properties; and their application as related to industrial products. Prerequisites: CHEM 115/115L or 121/121L. F, odd years.

TECH 230. User Experience and Interface Design. 3 Credits.

Have you ever felt frustrated using a website or digital interface that didn't function properly? This course introduces you to the common ways in which humans interact with digital interfaces. Through study of user experience principles, you will design digital interfaces that are easy to use. F.

TECH 232. Web Design. 3 Credits.

Learn how to design for the web using HTML and CSS. This class provides you with the principles and tools to create modern, aesthetically pleasing websites that are easy to navigate. S.

TECH 270. Design Thinking. 3 Credits.

Ever had a problem you didn't have any idea how to solve? Design thinking is actually a problem solving process you can learn! You will learn to approach highly unstructured problems and to create opportunities of them. Design thinking is an important entrepreneurial skill, but it is an equally important life skill. Design thinking is empowering--and a lot of fun. F,S.

TECH 300. Technology and Society. 3 Credits.

A lecture-recitation course emphasizing the various impacts of technology on the individual, society, environment and basic institutions. Technological matrix of various cultures. F,S.

TECH 311. Computers and Emerging Technologies. 3 Credits.

An introductory course to the personal computer with an emphasis on system hardware, boot-up sequence, configuration and customization, operating systems, upgrading, and troubleshooting. The course will also examine emerging computer technologies, various peripheral devices and interfaces, including network and computer wireless communications systems. F.

TECH 322. Digital Photography Fundamentals. 3 Credits.

Taking good pictures is more than point and click! This course is introduces the basic aesthetic and technical theories and techniques of digital photography. A digital camera with aperture priority, shutter priority, manual, and exposure compensation is required. F.

TECH 330. Quality Assurance. 3 Credits.

The study of principles and techniques of quality assurance and quality management, with an emphasis on the fundamentals of quality assurance for products, process control, and process capability. Related topics include quality design review, fundamentals of statistics, sampling and control chart systems, quality reporting, process capability analysis, tool and gauge control, document control, and troubleshooting quality control. Prerequisite: ECON 210 or consent of instructor. S, odd years.

TECH 332. Industrial Design. 3 Credits.

In this industrial design course students will learn how to design products in support of human activities and interactions. Principles and techniques of needs assessment, patent research, concept realization, design alternatives, and prototype development will be introduced through a creative and inventive process to address various instrumental factors such as product aesthetics, functionality, materials, sustainability, and usability. Prerequisite: TECH 122 or consent of instructor. F.

TECH 340. Cost Estimating. 3 Credits.

Principles and techniques necessary for the economic analysis and evaluation of industrial design projects. Prerequisites: ECON 210, MATH 146, or equivalent, or consent of instructor. S, even years.

TECH 341. Digital Integrated Circuits. 3 Credits.

The study of basic concepts of digital circuits and devices; operational characteristics of digital integrated circuits. Prerequisite: TECH 211 or consent of instructor. S, odd years.

TECH 373. Advanced Manufacturing Processes. 3 Credits.

This advanced course in manufacturing covers both the theory and practice of advanced manufacturing. The course will focus on advanced machines and processes that are used to a significant degree in modern manufacturing facilities including conventional CNC machines and also non-traditional processes such as additive manufacturing. Students will demonstrate their knowledge of these processes through a series of lectures, discussions, and laboratory activities with the resultant knowledge necessary to apply these principles and processes to appropriate applications. Prerequisites: TECH 122 and TECH 203, or equivalent. S.

TECH 396. Field Experiences in Technology. 1-6 Credits.

Provides students with supervised opportunities to engage in various technical industrial or business experiences by working with and learning from practicing professionals. Repeatable to 6 credits. Prerequisite: Junior standing or consent of instructor. Repeatable to 6 credits. F,S,SS.

TECH 397. Cooperative Education. 1-6 Credits.

A practical work experience with an approved company in business or industry, arranged by the student, faculty and employer. Repeatable to 6 credits. Prerequisites: junior standing, GPA of 2.5 overall, and faculty approval. Repeatable to 6 credits. S/U grading. F,S,SS.

TECH 399. Honors Tutorial. 1-3 Credits.**TECH 400. Teaching Technology Education. 3 Credits.**

An analysis of various methods employed in instructional techniques for industry and education. Development of methods and strategies of instruction use and ordering of instructional materials, based on behavioral objectives and classroom application of instructional techniques; lab activities. Prerequisites: Junior standing and consent of instructor. F, odd years.

TECH 403. Product Research and Development. 3 Credits.

The study of product development and production planning for manufacture through the application of research methodologies, design processes, and prototype development. Prerequisite: TECH 203 or consent of instructor. F.

TECH 420. Facilities Design. 3 Credits.

Principles and applications of designing industrial/business facilities with emphasis on site location, environmental consideration, qualitative and quantitative modeling. Computer application in facility planning and quantitative analysis; lab activities. Prerequisites: TECH 122. S.

TECH 422. Advanced Digital Photography and Imaging. 3 Credits.

Through specialized shooting techniques, this course builds upon the fundamentals learned in TECH 322 to expand your knowledge and abilities. You will explore several theme-based photographic topics that will challenge you visually and intellectually. Then you create a portfolio of unique photographs to tie these topics together into one theme. A digital camera with aperture priority, shutter priority, manual, and exposure compensation is required. Prerequisite: TECH 322 or consent of instructor. S.

TECH 433. Manufacturing Strategies. 3 Credits.

Theoretical and laboratory study of strategies utilized by business and industry to develop and maintain a competitive edge. Topics include lean manufacturing, Kanban, five S's, Kaizan, push and pull modeling, fishbone-4Ms, line balancing, and PoKayoke. Prerequisites: TECH 122 and TECH 203. F.

TECH 440. Occupational Safety. 3 Credits.

The major safety concerns and problems commonly associated with the industrial and occupational environment are addressed. Emphasis is placed on the study of safety rules and regulations, implementation of management tools to benefit people for optimum safety conditions and productivity, and the documentation required for record keeping. Prerequisite: Upper division students only. S.

TECH 442. Industrial/Applied Graphic Design. 3 Credits.

We explore the concepts of branding, info-graphics and various avenues of processing and translating information in a visual format. Emphasis is placed on the relationship between text and image through a series of design-based problems. The visual and conceptual aspects of branding focuses on the development of practical, multi-component design solutions including logo design and other business communication applications. Understanding and ordering complex data into useful and persuasive informational tools takes form via info-graphics, visual processes and procedures. Emphasis is placed on the use of formal design principles, creative brainstorming, conceptualizing, critical thinking, collaboration, and presentation. Prerequisites: TECH 212. S.

TECH 450. Packaging Design. 3 Credits.

This course introduces you to the unique challenges of packaging design. Through prototypes and finished products, you develop solutions to 3D design problems that will delight the user. Special emphasis is placed on social, sustainable, and environmental issues in the packaging industry. Prerequisite: TECH 122. F.

TECH 451. Computer Integrated Manufacturing. 3 Credits.

A study of computer integrated systems and their designs to facilitate the manufacture and production processes. Topics covered the application and integration of Programmable Logic Controllers (PLCs), microcontrollers, touch-screen, TCP/IP, and voice control systems to facilitate manufacturing processes. Students will also utilize commercial computer-aided design tools, i.e., Multisim and Ultiboard to design, simulate, and test designed manufactured systems. Prerequisites: TECH 201 and TECH 211. F.

TECH 452. Multimedia Production. 3 Credits.

This advanced graphics course is designed to explore multimedia production technologies, concepts, processes, methods, and techniques. The course provides hands-on experience applying multimedia technology to integrate graphics, text, sound and video into meaningful productions. On demand.

TECH 493. Workshop. 1-6 Credits.

A workshop course on a specific topic, primarily for, but not confined to, Continuing Education. Repeatable to 24 credits. Repeatable to 24 credits. F,S,SS.

TECH 497. Directed Studies in Technology. 1-8 Credits.

Studies in topics relevant to the students' needs in selected topics including, but not limited to, Graphics, Electronics, Production, and Technology Education. Prerequisites: Junior Standing and instructor consent. Repeatable to 8 credits. F,S,SS.

TECH 498. Senior Capstone I. 1 Credit.

This course is designed for students to select the topic for their final Senior Capstone project, conduct the preliminary required research, and plan the final project. Prerequisites: Senior standing and consent of instructor. F.

TECH 499. Senior Capstone II. 3 Credits.

The capstone course is designed to integrate and reflect on coursework covered throughout the student's program in order to demonstrate knowledge, understanding and competency related to the program goals. The course also facilitates students' transition from the academic to the professional world. Prerequisites: TECH 498, senior standing and consent of instructor. S.