NORTHWEST TECH
NORTHWEST KANSAS TECHNICAL COLLEGE

2023-2024
NWKTC Catalog and Student Handbook

Engineering Tech- Civil

Description: The Engineering Technology Program provides an on- the-job atmosphere similar to an actual engineering firm. The four basic areas of mechanical, civil, architectural, and computer-aided drafting are covered. Students will train on the same type of advanced technical equipment, drafting boards, computers and software that industry uses. The applied drafting subjects such as Geometric Construction, Mechanical Drafting, Architectural Drafting, and CAD (Computer Aided Design) provide the necessary job skills for the graduate to be successful.

Mathematical applications are used throughout the various subjects and applied in actual job situations. Mathematical applications are introduced in basic and intermediate forms and expanded to higher levels throughout the course of study.

Degree/Certificates awarded:
AAS
Tech Cert A, Tech Cert B, Tech Cert C

Program Learning Outcomes:
Upon successful completion of the program, the student will be able to:

- Apply the theory of engineering to specific jobs using critical thinking/reasoning.
- Draw multi-view projections.
- Apply geometry to geometric designs.
- Draw prints from sectional views.
- Develop and prepare drawings for intersecting and transitional pieces.
- Analyze and perform surveying procedures.
- Apply architectural commands for office design.
- Prepare drawings in mechanical, civil, and architectural areas.
- Demonstrate mathematical and reasoning skills.
- Demonstrate effective reading, writing, speaking, listening, and time management skills.

Program Schedule:
Students will attend class from 7:00 a.m. – 2:30 p.m., Monday through Friday.

Miscellaneous Notes:
During the sophomore year students may participate in the Occupational Work Experience (OWE) as early as six weeks before the end of the program.

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PROGRAM GUIDE

YEAR I: FIRST SEMESTER

Course #	Course Name	Credits
CF 101	Computer Fundamentals	3
EN 105	Applications of Engineering Technology	3
EN 105A	Fundamentals of Drafting	2
EN 110	Drafting 2D Views and Dimensioning	2
EN 115	Engineering Technology Projects I	2
EN 120A	Civil Drafting Fundamentals	2
EN 130	CAD Fundamentals	2
ENGL 110 or 112	English Composition I (Required)	3
SO 100	Student Success Seminar (Required)	1

YEAR I: SECOND SEMESTER

Course #	Course Name	Credits
EN 101	OSHA 10	1
EN 150	Topographic Triangulation	2
EN 107	Into to UAS Flight	1
EN 160A	Applications of Spatial Reasoning in Engineering	2
EN 177	Mechanical CAD/CAM Drafting	2
EN 182	CAD Drafting Models.	1
EN 185	Civil CAD Fundamentals	2
EN 190	Basic Surveying with Mathematics	3
HUM 102	Workplace Ethics (Required, or Ethics, PSY, SOC)	3

YEAR II: FIRST SEMESTER

Course #	Course Name	Credits
BA 215	Personal Finance (Required)	3
EN 210A	Engineering Technology Projects II	3
EN 235	Geographical Information Systems (GIS)	2
EN 265	Civil Plans & Regulations	3
EN 285	Global Positioning Systems (GPS)	3
MATH 115 or 117	College Algebra (Required)	3

YEAR II: SECOND SEMESTER

Course #	Course Name	Credits
EN 257	Civil Design Capstone	7
EN 275	Civil CAD Advanced Procedures	3
EN 280A OR	Occupational Work Experience	5
EN 281	Special Projects	

COURSE DESCRIPTIONS

First Year Core Courses

EN 101 OSHA 10
1 CR
The student will learn the basic safety and health information needed for entry-level positions in the general industry. Industry safety practices, workplace hazards, workers' rights, and employers' responsibilities will be covered in this course.

EN105 APPLICATION OF ENGINEERING TECHNOLOGY
3 CR
This course provides student orientation for the Engineering Technology program, a short history of Engineering drawing and drafting technology, and an introduction to modern technology used in the various fields and professions that are within engineering technology. This course also includes fundamental operations and applications of fractions, decimals, ratios, proportions, percentages, and basic algebra as applied in the engineering technology field.

EN 105A FUNDAMENTALS OF DRAFTING
2 CR
The student will identify and display the basic use of drafting instruments. Emphasis will be placed on reading the various scales, engineering lettering, and manipulation of compasses, dividers, and other tools

EN 107 INTRODUCTION TO UAS FLIGHT
1 CR
Students will be introduced to the world of Unmanned Aerial Systems (UAS). This course exposes students to basic aviation flight principles, safety considerations, FAA regulations, and current UAS applications. The student will safely pilot an entry-level UAS within a controlled environment.

EN 110 DRAFTING 2D VIEWS AND DIMENSIONING
2 CR
Technical drawing exercises are produced using the methods of projection and the fundamentals of drafting. Emphasis in accuracy, completeness and time management. Multi-view drawings are produced through the application of the principles of orthographic projection. Problems and projects cover the relationship of views to each other, methods of developing views, alternate positions, and revolution.

EN 115 ENGINEERING TECHNOLOGY PROJECTS I
2CR
The student will be assigned projects, which will require application of basic design to develop all drawings from sketches and layouts to complete details of the assigned projects. Some projects will be developed using the team concept with a need for working with others. Emphasis is placed on the followership role.

EN 120A CIVIL DRAFTING FUNDAMENTALS
2CR
Methods of construction geometric figures, tangency's, ellipses, parabolas, and hyperbolas are used to complete the exercise and projects in this course.

EN 130 CAD FUNDAMENTALS
2 CR
This includes constructing various pictorial drawings using the various methods of projection. Methods applied are axonometric, oblique and perspective projection. Sectional views include full, half, broken, revolved, thin and removed sections. Dimensions involve complete size description. It includes aligned and unidirectional dimensions systems, decimal, metric and fractional dimensions, and notes and standard classification of cylindrical fits.

EN 150 TOPOGRAPHIC TRIANGULATION
2CR
This course consists of applications of triangles used in drafting and engineering with an emphasis placed on finding solutions to right and oblique triangles as related in the engineering field.

EN 160A APPLICATIONS OF SPATIAL REASONING IN ENGINEERING
3 CR
This course consists of a demonstration of the uses of fundamental geometric theorems applied to various drafting principles. Emphasis is placed on proper construction methods of all geometric figures and use of geometric formulas used in the field to assist the student in their CAD training. This course is essential and a prerequisite to Topographic Triangulation for the recognition of triangles contained in complex drawings.

EN 177 MECHANICAL CAD/CAM DRAFTING
2 CR
The student will learn the basics of production drawing by means of 3-dimensional modeling CAD program provided. The student will create parts, assemblies, and properly annotated production drawing sets in ways that align with industry practices.

EN 180A COMPUTER AIDED DRAFTING (CAD) I
2 CR
This course instructs on the application of computer-aided design (CAD) and computer-aided manufacturing (CAM) in the field of carpentry. Students will learn the basics of 3D CAD, CNC router programming, and operations. By the end of this course, students will have the knowledge and skills needed to design and build custom woodworking items using CNC machines.
Pre-requisite: open only to Carpentry students

EN 182 CAD DRAFTING MODELS
1 CR
The student will learn different methods for creating 3-dimensional design models using the CAD program provided. Emphasis is placed on scales, coordinates, proper projections and referencing multiple design models together.

EN 185 CIVIL CAD FUNDAMENTALS
2 CR
The student will learn the basics of infrastructure design through the use of civil CAD program provided. The student will use template 3-dimensional infrastructure designs to perform the civil drafting techniques and mathematical concepts previously learned during the manual drafting courses.

EN 190 BASIC SURVEYING WITH MATHEMATICS
3 CR
The manipulations involved in setting up the engineering transit and level are covered in this course. Basics of note-taking and transfer of data to a drawing are stressed. Mathematics includes latitude, departure, azimuth, bearing and length calculations making sure a traversed area will close.

Second Year – Civil Engineering Technology specialization

EN 210A ENGINEERING TECHNOLOGY PROJECTS II
3 CR
Students will lead and/or work with others in preparing working design models and drawings, all research, design sketches, checking, cost analysis and feasibility of marketing is the student's responsibility. Emphasis is on the leadership role and project management.
Students in this phase of study will direct others in preparing working drawings, all research, design sketches, checking, cost analysis and feasibility of marketing is the student's responsibility. Emphasis in PD II is on the leadership role.

EN 235 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)*
2 CR
This course will deal with the practical understanding of GIS concepts, techniques and real world applications This introductory course in Geographic Information Systems is designed to provide basic knowledge of GIS theory and applications using the existing state-of- the-art GIS software.

EN 257 CIVIL DESIGN CAPSTONE
7 CR

The student will apply concepts learned throughout their education in Civil/Surveying to create a basic set of design files and plans for a residential subdivision in accordance with the provided design standards and regulations.

EN 265 CIVIL PLANS AND REGULATIONS
2 CR
This course introduces the components of a subdivision set of plans by means of city, county, and state regulations. Including legal description, horizontal and vertical design.

EN 275 CIVIL CAD ADVANCED PROCEDURES
3 CR
Design models and drawings for land development are prepared using the Civil CAD program provided. Emphasis is on the layout and design of parcels, roadways, residential utilities and surface grading.

EN 280A OCCUPATIONAL WORK EXPERIENCE
5 CR
Students who complete the Capstone project and obtain a job with a company in the field of expertise of the Mechanical Engineering Technology program are eligible for Occupational Work Experience (OWE). Students on OWE shall begin working full-time and coordinate with their supervisor to submit weekly reports of the tasks they were active on with performance scores.

EN 281 SPECIAL PROJECTS
5 CR
Students who complete the capstone project and are awaiting employment or graduation shall complete the special projects course. These special projects will be assigned from faculty to better prepare students for their jobs, post-graduation. Project discipline and deliverables will be considered when assigning to a student to ensure the student has the right skills to complete the project and/or the project aligns with the concentration of the student.

EN 285 GLOBAL POSITIONING SYSTEMS (GPS)
3 CR
This course focuses primarily on the Global Positioning System (GPS) and gives the student hands-on experience with a surveying system. This course examines current and future GPS applications. Students will explore basic navigation, map coordinate systems, and then integrate this knowledge with the GPS satellite navigation system.