Science, Technology, Engineering, and Mathematics Career Cluster

The Science, Technology, Engineering, and Mathematics (STEM) Career Cluster focuses on planning, managing, and providing, scientific research and professional and technical services, including laboratory and testing services, and research and development services.

Engineering
Statewide Program of Study

The Engineering program of study focuses on the design, development, and use of engines, machines, and structures. CTE learners will learn how to apply science, mathematical methods, and empirical evidence to the innovation, design, construction, operation, and maintenance of different manufacturing systems.

Secondary Courses for High School Credit

Grade 9
- Engineering Design and Presentation I

Grade 10
- Engineering Design and Problem Solving

Grade 11
- Practicum in STEM (2 or 3 credits)
- Applied Math for Technical Professionals (not included in POS)

Grade 12
- Practicum in STEM (2 or 3 credits) (2nd time taken)

Postsecondary Opportunities

Level 1 Certificate
- Electronic Engineering Technology
- Robotics and Automation
- Computer-Aided Drafting and Design

Level 2 Certificate
- Robotics and Automation

Associates Degrees
- Electrical and Electronics Engineering
- Drafting and Design Technology/ Technician, General
- Engineering Technology

Bachelor's Degrees
- Electrical and Electronics Engineering
- CAD/CADD Drafting and/or Design Technology/ Technician
- Bioengineering and Biomedical Engineering
- Construction Engineering Technology/ Technician

Master's, Doctoral, and Professional Degrees
- Electrical and Electronics Engineering
- Mechanical Engineering
- Bioengineering and Biomedical Engineering

Work-Based Learning and Expanded Learning Opportunities

Exploration Activities	Work-Based Learning Activities
• Participate in Skills USA competitions • Compete in VEX and FIRST Robotics • Participate in Team America Rocketry Challenge (TARC)	• Intern at an engineering firm • Work part-time at local industry in CAD • Shadow a machinist

Industry-Based Certifications

- Autodesk Associate (Certified User) AutoCAD
- **Autodesk Associate (Certified User) Fusion 360***
- Autodesk Associate (Certified User) Inventor for Mechanical Design
- Autodesk Associate (Certified User) Revit Architecture
- Autodesk Associate (Certified User) Revit for Electrical
- Autodesk Associate (Certified User) Revit for Structural Design
- **Autodesk Certified Professional Fusion 360***
- Autodesk Certified Professional in AutoCAD for Design and Drafting
- Autodesk Certified Professional in Civil 3D for Infrastructure Design
- Autodesk Certified Professional in Inventor for Mechanical Design
- Autodesk Certified Professional in Revit for Architectural Design
- Autodesk Certified Professional in Revit for Electrical Design
- Autodesk Certified Professional in Revit for Structural Design
- C-103 Certified Industry 4.0 Associate - Robot System Operations
- Engineering Technology Foundations
- Lean Six Sigma Green Belt Certification
- Pre-Engineering/Engineering Technology - Job Ready

*** Offered at Farmersville High School**

Aligned Occupations

Occupations	Median Wage	Annual Openings	% Growth
Aerospace Engineers	$110,843	481	9%
Industrial Engineers	$97,074	1,263	10%
Mechanical Engineers	$91,107	1,535	11%
Chemical Engineers	$112,819	474	9%
Electrical Engineers	$98,405	1,137	105

Successful completion of the Engineering program of study will fulfill requirements of the Business and Industry or STEM endorsement if the math and science requirements are met. Revised – August 2022

Engineering
Course Information

Level 1

COURSE NAME	SERVICE ID	PREREQUISITES	COREQUISITES
N/A			

Level 2

COURSE NAME	SERVICE ID	PREREQUISITES	COREQUISITES
N/A			

Level 3

COURSE NAME	SERVICE ID	PREREQUISITES	COREQUISITES
Engineering Design and Presentation I	13036500 (1 credit)	Algebra I	None

Level 4

COURSE NAME	SERVICE ID	PREREQUISITES	COREQUISITES
Engineering Design & Problem Solving	13037300 (1 credit)	Algebra I and Geometry	None
Practicum in Science, Technology, Engineering, and Mathematics	13037400 (2 credits) 13037405 (3 credits) 13037410 (2 credits) 13037415 (2 credits)	Algebra I and Geometry	None

FOR ADDITIONAL INFORMATION ON THE SCIENCE, TECHNOLOGY, ENGINEERING AND MATH CAREER CLUSTER, GO TO: https://tea.texas.gov/cte

Farmersville ISD does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs or activities and provides equal access to the Boy Scouts and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: Wayne Callaway, Executive Director of Human Resources and Student Services, 501A Hwy 78N, Farmersville, TX 75442, 972-782-6601, wcallaway@farmersvilleisd.org.

Farmersville ISD no discrimina por motivos de raza, color, origen nacional, sexo, discapacidad o edad en sus programas o actividades y brinda igualdad de acceso a los Boy Scouts y otros grupos juveniles designados. La siguiente persona ha sido designada para manejar consultas sobre las políticas de no discriminación: Wayne Callaway, Executive Director of Human Resources and Student Services, 501A Hwy 78N, Farmersville, TX 75442, 972-782-6601, wcallaway@farmersvilleisd.org.

Further nondiscrimination information can be found at Notification of Nondiscrimination in Career and Technical Education Programs.

Engineering Design & Presentation
Recommended Grade Placement: 9
Credit(s): 1
Prerequisite: None
Students enrolled in Engineering Design and Presentation will demonstrate knowledge and skills of the design process as it applies to engineering fields using multiple software applications and tools necessary to produce and present working drawings, solid model renderings, and prototypes. Students will use a variety of computer hardware and software applications to complete assignments and projects. Through implementation of the design process, students will transfer advanced academic skills to component designs. Additionally, students explore career opportunities in engineering, technology, and drafting and what is required to gain and maintain employment in these areas.

Engineering Design & Problem Solving
Recommended Grade Placement: 10
Credit(s): 1
Prerequisite: Engineering Design & Presentation
The Engineering Design and Problem-Solving course is the creative process of solving problems by identifying needs and then devising solutions. The solution may be a product, technique, structure, or process depending on the problem. Science aims to understand the natural world, while engineering seeks to shape this world to meet human needs and wants. Engineering design takes into consideration limiting factors or "design under constraint." Various engineering disciplines address a broad spectrum of design problems using specific concepts from the sciences and mathematics to derive a solution. **Meets a Science Graduation Requirement.**

Scientific Research & Design
Recommended Grade Placement: 11 (Summer)
Credit(s): .5
Prerequisite: Engineering Design & Presentation
Scientific Research and Design is a broad-based course designed to allow districts and schools considerable flexibility to develop local curriculum to supplement any program of study or coherent sequence. The course has the components of any rigorous scientific or engineering program of study from the problem identification, investigation design, data collection, data analysis, formulation, and presentation of the conclusions. These components are integrated with the career and technical education emphasis of helping students gain entry-level employment in high-skill, high-wage jobs and/or continue their education.

Practicum in STEM
Recommended Grade Placement: 11-12
Credit(s): 3
Prerequisite: Engineering Design & Problem Solving
Practicum in STEM is designed to give students supervised practical application of previously studied knowledge and skills. Practicum experiences can occur in a variety of locations appropriate to the nature and level of experience.

Farmersville ISD and Collin College Engineering Course Crosswalk				
COURSE CODE	**COLLEGE COURSE**	**HIGH SCHOOL COURSE**	**SEMESTER**	**YEAR**
RBTC 1405	Robotic Fundamentals (Articulated Credit)	Engineering Design and Presentation I	Fall/Spring	Freshman
CETT 1307	Fundamentals of Electronics	Engineering Design and Problem Solving	Fall	Sophomore
TECM 1343	Technical Algebra and Trigonometry +	Applied Math for Technical Professionals	Spring	Sophomore
ENTC 1171	Introduction to Engineering Technology	Scientific Research & Design	Summer	Before Junior Year
INTC 1307	Instrumentation Test Equipment	Practicum in STEM	Fall	Junior
CETT 1425	Digital Fundamentals		Spring	Junior
CETT 1409	DC-AC Circuits	Practicum in STEM I (2^{nd} time taken)	Fall	Senior
CETT 1445	Microprocessors		Spring	Senior
CETT 2471	Emerging Topics in Engineering Technology	N/A	Summer or Post-Graduation	
CETT 1457	Linear Integrated Circuits	N/A	Summer or Post-Graduation	
EECT 2439	Communication Circuits	N/A	Summer or Post-Graduation	

+ A score of 3 or higher in AP Precalculus and AP Calculus may substitute for the math requirement.

Dual Credit Robotic Fundamentals (RBTC 1405)
Recommended Grade Placement: 9
Credit(s): see Engineering Design and Presentation
Prerequisite: None
An introduction to flexible automation. Topics include installation, repair, maintenance, and development of flexible robotic manufacturing systems.

Dual Credit Fundamentals of Electronics (CETT 1307)
Recommended Grade Placement: 10
Credit(s): see Engineering Design and Problem Solving
Prerequisite: Collin College Admission Criteria
Applies concepts of electricity, electronics, and digital fundamentals; supports programs requiring a general knowledge of electronics.

Dual Credit Technical Algebra and Trigonometry (TECM 1343)
Recommended Grade Placement: 10
Credit(s): see Applied Math for Technical Professionals
Prerequisite: Collin College Admission Criteria
Algebraic and trigonometric applications used in technical/industrial settings.

Dual Credit Introduction to Engineering Technology (ENTC 1171)
Recommended Grade Placement: 11
Credit(s): see Scientific Research and Design
Prerequisite: Collin College Admission Criteria
Topics address introduction to Electronic Engineering Technology, Robotics, Automation and Biomedical Equipment Technology industries and career pathways.

Dual Credit Instrumentation Test Equipment (INTC 1307)
Recommended Grade Placement: 11
Credit(s): see Practicum in STEM (1st time taken)
Prerequisite: Collin College Admission Criteria
Theory and application of instrumentation test equipment. Emphasizes accuracy, limitations of instruments, and calibration techniques.

Dual Credit Digital Fundamentals (CETT 1425)
Recommended Grade Placement: 11
Credit(s): see Practicum in STEM (1st time taken)
Prerequisite: Collin College Admission Criteria
An entry-level course in digital electronics to include numbering systems, logic gates, Boolean algebra, and combinational logic.

Dual Credit DC-AC Circuits (CETT 1409)
Recommended Grade Placement: 12
Credit(s): see Practicum in STEM (2nd time taken)
Prerequisite: Collin College Admission Criteria
Fundamentals of DC circuits and AC circuits operation including Ohm's law, Kirchhoff's laws, networks, transformers, resonance, phasors, capacitive and inductive circuit analysis techniques.

Dual Credit Microprocessors (CETT 1445)
Recommended Grade Placement: 12
Credit(s): see Practicum in STEM (2nd time taken)
Prerequisite: Collin College Admission Criteria
An intro course in microprocessor software and hardware: architecture, timing sequence, operation, & programming.