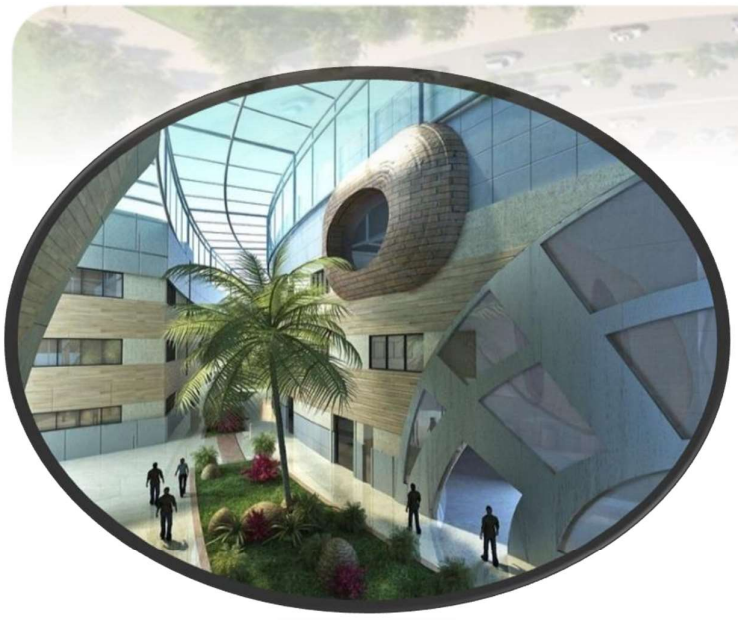
الهيئة العامة للتعليم التطبيقي والتدريب
The Public Authority for Applied Education & Training

The Public Authority for Applied Education and Training
College of Technological Studies

College Catalogue 2024/2025



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Department of Civil Engineering Technology

Overview:

The Civil Engineering Technology curriculum prepares the graduates to work in coordination with civil engineers. It aims to provide the industry with assistant engineers capable of aiding engineers in executing and supervising civil engineering projects with the ability to continue their studies towards a higher degree.

Majors:

The department offers a set of courses through which the student may specialize in one of the following fields:

- Building Construction Technology
- Highways Engineering Technology
- Surveying Engineering Technology

Laboratories

Laboratories and workshops of the department of Civil Engineering Technology are equipped with testing machines, instruments, and tools including the following:

- Soil Mechanics and Foundation Laboratory
- Highway Testing Laboratory
- Concrete and Material Testing Laboratory
- Surveying Laboratory
- Sanitary Works Workshop

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Head of the Department of the
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Department of Civil Engineering Technology

Program: Building Construction Technology

1. Major Core Courses (42 Credits)

Code	No.	Course Name	Cr.	Hrs.	Prerequisite
54	107	Surveying	3	6	76/105
57	170	Statics	3	4	76/105
57	175	Computer Aided Drawing (CAD)	2	6	
57	177	Construction Materials	3	4	57/170
57	260	Building Construction	3	4	57/175
57	266	Building Services	3	4	57/175
57	270	Strength of Materials	3	4	57/170
57	277	Quantity Surveying	3	3	57/175, 54/107
57	278	Structural Analysis	3	5	57/170
57	280	Reinforced Concrete (I)	3	5	57/177, 57/278
57	399	Field Training	4	16	30/162
58	127	Fluid Mechanics	3	4	56/113
58	228	Transportation Engineering	3	3	54/107
58	271	Soil Mechanics	3	4	57/270

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2. Major Elective Courses (6 Credits)

Code	No.	Course Name	Cr.	Hrs.	Prerequisite
54	206	Surveying Works	3	4	54/107
57	275	Building Working Drawings	3	4	57/175
57	279	Steel Structures	3	3	57/270, 57/278
57	350	Computer Applications in Civil Engineering	3	4	57/175
57	360	Proper Execution of Buildings	3	3	57/260
57	369	Marine Structures	3	3	58/127
57	380	Reinforced Concrete (II)	3	3	57/280
57	381	Building Project	3	4	57/280
58	227	Water and Sanitary Engineering	3	4	58/127
58	230	Road Safety	3	3	58/228

3. General Compulsory Courses (6 Credits)

Code	No.	Course Name	Cr.	Hrs.	Prerequisite
1	101	Islamic Culture	2	2	
57	100	Introduction to Civil Engineering Technology	2	2	
57	101	Construction Site Safety and Health	2	2	

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Program: Transportation Technology

1. Major Core Courses (42 Credits)

Code	No.	Course Name	Cr.	Hrs.	Prerequisite
54	107	Surveying	3	6	76/105
57	170	Statics	3	4	76/105
57	175	Computer Aided Drawing (CAD)	2	6	
57	177	Construction Materials	3	4	57/170
57	270	Strength of Materials	3	4	57/170
57	278	Structural Analysis	3	5	57/170
57	280	Reinforced Concrete (I)	3	5	57/177, 57/278
58	127	Fluid Mechanics	3	4	56/113
58	228	Transportation Engineering	3	3	54/107
58	271	Soil Mechanics	3	4	57/270
58	274	Road Pavement	3	4	58/271
58	276	Traffic Engineering	3	4	58/228
58	328	Fundamentals of Roads Construction	3	3	58/228
58	399	Field Training	4	16	30/162

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2. Major Elective Courses (6 Credits)

Code	No.	Course Name	Cr.	Hrs.	Prerequisite
54	206	Surveying Works	3	4	54/107
57	277	Quantity Surveying	3	3	57/175, 54/107
57	350	Computer Applications in Civil Engineering	3	4	57/175
58	227	Water and Sanitary Engineering	3	4	58/127
58	230	Road Safety	3	3	58/228
58	327	Highway Design	3	3	58/228
58	329	Quality Control for Roads	3	4	58/271
58	356	Transportation Project	3	3	58/228
58	375	Traffic Analysis	3	4	58/276

3. General Compulsory Courses (6 Credits)

Code	No.	Course Name	Cr.	Hrs.	Prerequisite
1	101	Islamic Culture	2	2	
57	100	Introduction to Civil Engineering Technology	2	2	
57	101	Construction Site Safety and Health	2	2	

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Program: Surveying Technology

1. Major Core Courses (42 Credits)

Code	No.	Course Name	Cr.	Hrs.	Prerequisite
54	107	Surveying	3	6	76/105
54	206	Surveying Works	3	4	54/107
54	207	Fundamentals of Global Positioning System	3	3	54/107
54	210	Surveying Planning	3	4	54/206
54	399	Field Training	4	16	30/162
57	170	Statics	3	4	76/105
57	175	Computer Aided Drawing (CAD)	2	6	
57	177	Construction Materials	3	4	57/170
57	270	Strength of Materials	3	4	57/170
57	278	Structural Analysis	3	5	57/170
57	280	Reinforced Concrete (I)	3	5	57/177, 57/278
58	127	Fluid Mechanics	3	4	56/113
58	228	Transportation Engineering	3	3	54/107
58	271	Soil Mechanics	3	4	57/270

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2. Major Elective Courses (6 Credits)

Code	No.	Course Name	Cr.	Hrs.	Prerequisite
54	208	Geodesy	3	3	54/206
54	209	Aerial Surveying	3	4	54/107
54	306	Fundamentals of Global Information Systems	3	4	54/107
54	307	Map Projection and Drawings	3	4	54/206
54	320	Surveying Project	3	3	54/206
57	260	Building Construction	3	4	57/175
57	277	Quantity Surveying	3	3	57/175, 54/107
57	350	Computer Applications in Civil Engineering	3	4	57/175
58	227	Water and Sanitary Engineering	3	4	58/127
58	327	Highway Design	3	3	58/228

3. General Compulsory Courses (6 Credits)

Code	No.	Course Name	Cr.	Hrs.	Prerequisite
1	101	Islamic Culture	2	2	
57	100	Introduction to Civil Engineering Technology	2	2	
57	101	Construction Site Safety and Health	2	2	

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Department of Civil Engineering Technology

COURSE DESCRIPTION

57-100 Introduction to Civil Engineering Tech.
Credits: **2**
Hours: **2**
Pre-requisite: **None**
Introduction to selected subfields in the discipline such as building construction technology, transportation engineering, surveying. Problem-solving exercises applying fundamental steps of analysis, synthesis, discussion of issues related to engineering practice, working in teams, scheduling, evaluating risk, and making ethical decisions.

57-101 Construction Site Safety and Health
Credits: **2**
Hours: **2**
Pre-requisite: **None**
Falls in Construction Guardrails and Safety Nets Skylights and Other Openings Roofs Training Stairs Dangers Ladder Safety Safe Scaffold Construction Types of Scaffolds Inspections/Training Excavations safety Safe Working Conditions Protective System Design Electricity safety: Injuries Hazards Power Tools Fire Protection Emergency Action Plans Exits Fire Prevention Hazard Communication Labeling Material Safety Data Sheets Material Disposal Tool Safety Materials Handling Manual Material Handling Mechanical Handling (Cranes) Stacking and Storing.

57-102 Introduction to Contracts and Specifications
Credits: **3**
Hours: **3**
Pre-requisite: **None**
The basic knowledge of construction contracts and specifications will be presented. In addition some aspects of construction management directly relevant to legal systems in Kuwait.

57-170 Engineering Statics
Credits: **3**
Hours: **4**
Pre-requisite: **76-105**
Fundamental concepts of mechanics units of measurements force vectors: scalars and vectors vector operations equilibrium of a particle the free body diagram force systems equilibrium of a rigid body; moment formulation support reactions simple trusses: method of joints method of sections internal loadings in beams introduction to shear force and bending moment.

57-175 Computer Aided Drawing (CAD)
Credits: **3**
Hours: **6**
Pre-requisite: **None**
Computer-Aided Design (CAD) and modeling with a focus on construction and architecture specific applications setting up a drawing electronically; defining coordinate systems drawing and editing; construction techniques; display commands; effective layering; dimensioning and detailing plotting.

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57-177 Construction Materials
Credits: **3**
Hours: **4**
Pre-requisite: **57-170**
Aggregates: basic characteristics of aggregates physical properties types of aggregates (normal and manufactured); cement: manufacturing Portland cement chemical composition of cement properties of cement types of Portland cement and their properties other types of cement; introduction to concrete: materials properties of fresh concrete production of concrete strength properties of hardened concrete. Metals type of steel and their uses. Types of timber and their properties defects in timber durability and treatment of timber.

57-260 Building Construction
Credits: **3**
Hours: **4**
Pre-requisite: **57-175**
An introduction to the processes by which construction materials and systems are evaluated selected incorporated and detailed in building design. Both measurable and immeasurable design responses to environmental energies are explored in soils concrete masonry and metals. In addition concrete construction will be studied in some detail because of its predominance in our building culture. This emphasis on· a single system will establish a foundation for further study of larger scale systems in subsequent courses. Issues of sustainability in building system design and construction process will be engaged throughout.

57-266 Building Services
Credits: **3**
Hours: **4**
Pre-requisite: **57-175**
Firefighting protection and safety design and practice thermal and water insulation materials and their properties fundamental mechanism of heat transfer air-conditioning system principles equipment types and applications in buildings principle of elevators 'Lifts' and escalators and applications in buildings.

57-270 Strength of Materials
Credits: **3**
Hours: **4**
Pre-requisite: **57-170**
Section properties centroid and moment of inertia stress and strain: axial stress axial strain Poison's ratio stress-strain relationship shear stress and shear strain combined stresses oblique planes and general two-dimensional stress system principal planes and principal stresses temperature stress and strain torsional stress bending stress column loading.

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57-275 Building Working Drawings
Credits: **3**
Hours: **4**
Pre-requisite: **57-175**
Introduction basic design elements circulation areas different functions of spaces stairs lifts escalators and utility rooms building materials structural systems and technicality versus form recognized legends in various drawings data assigned to all drawings match concept with architecture and structure manual drawing of basic architecture computer aided drawing of basic architecture project initial drawings site plan layout block plans mass plans and areas plans for different floors elevations and final presentation of the project.

57-277 Quantity Surveying
Credits: **3**
Hours: **3**
Pre-requisite: **54-107 and 57-175**
Specification excavation and filling plain concrete and reinforced concrete measurements masonry metals wood finishes bills of quantities and total estimation.

57-278 Structural Analysis
Credits: **3**
Hours: **5**
Pre-requisite: **57-170**
Classification of structures loading types loading methods load distribution in structures principle of superposition equations of equilibrium determinacy and stability coplanar trusses the method of joints the method of sections zero-force members internal loadings for beams and frames shear and moment diagrams for a beams and frames shear and moment functions introduction to deflection and the elastic curve.

57-279 Steel Structures
Credits: **3**
Hours: **3**
Pre-requisite: **57-270 and 57-278**
Steel as structural material; types of steel and their uses; mechanical and physical properties of steel; tension members compression members structural steel beams and connections.

57-280 Reinforced Concrete (I)
Credits: **3**
Hours: **5**
Pre-requisite: **57-177 and 57-278**
Mechanical properties of concrete loads on beams analysis and design of reinforced concrete beams rectangular and T-sections compression reinforcement development length and bond reinforcement shear in beams short and long-term deflections short columns one-way slabs isolated footing.

57-350 Computer Applications in Civil Engineering
Credits: **3**
Hours: **4**
Pre-requisite: **57-175**
Operational features programming and their use in engineering computations user-defined functions in Excel and Matlab Performing mathematical operations to solve Civil Engineering problems in MS Excel and Matlab simple optimization problems in MS Excel Develop and program engineering analyses using Matlab and Excel producing plots and graphs relating to programming outputs formatting technical reports in MS word and incorporating results within Presenting results in a PowerPoint presentation.

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57-360 Proper Execution of Buildings
Credits: **3**
Hours: **3**
Pre-requisite: **57-260**
Gain the capability of managing the project on site. Accomplish the main constraint of a project: Time Cost and Quality. A detailed study for each of these constraints with explanations on how it is affected by local industry.

57-369 Marine Structures
Credits: **3**
Hours: **3**
Pre-requisite: **58-127**
Coastal engineering development of near shore wave currents and tides harbor structure and facilities classification of ports according to functions and location two-dimensional linear wave theory and its application for the estimation of different wave characteristics (length depth and height) the effect of shoaling on waves wind-generated waves tsunamis basin oscillations and storm surge harbor planning and construction types of breakwaters and factors determining their selection piers bulk heads dolphins and moorings.

57-380 Reinforced Concrete (II)
Credits: **3**
Hours: **3**
Pre-requisite: **57-280**
Analysis and design of one-way and two-way slabs short and long columns analysis and design isolated footing combined footing retaining walls introduction to Prestressed concrete technology.

57-381 Building Project
Credits: **3**
Hours: **4**
Pre-requisite: **57-280**
Excavation and leveling works planning of site works concreting and curing masonry sanitary and plumbing works electric mechanical installations plastering and painting false ceiling and interior decorations doors and windows carpentry and joinery damp proofing and heat insulation miniature representation and final presentation systems hot water supply systems service ducts drainage fire protections design and installation of wet risers dry risers and sprinklers mechanical services lifts and escalators.

57-399 Field Training
Credits: **4**
Hours: **16**
Pre-requisite: **30-162**
In this course the students are trained on job sites. Building sites introduces students to the many aspects of construction starting with acquiring the site from the municipality office all the way to finishing.

58-127 Fluid Mechanics
Credits: **3**
Hours: **4**
Pre-requisite: **56-113**
Properties of fluids: units mass density and specific weight fluid static; fluid flow concepts and measurements: kinematics of fluids steady and unsteady flows flow measurement through pipes flow of incompressible fluids in pipes resistance in circular pipelines flowing full resistance of flow in non-circular sections local losses pipe network analysis hydraulic structures spillways energy dissipaters and downstream.

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58-227 Water and Sanitary Engineering
Credits: **3**
Hours: **4**
Pre-requisite: **58-127**
Quantity of water and sewage population forecasting factors affecting consumption *rainfall and runoff hydrology* transpiration ground water occurrence of aquifer water and wastewater quality examination of water and sewage

water treatment removal of dissolved minerals from water ion exchange membrane processes control of corrosiveness odors ion exchange wastewater treatment primary treatment secondary treatment the activated sludge process and advanced waste treatment.

58-228 Transportation Engineering
Credits: **3**
Hours: **3**
Pre-requisite: **54-107**
Vehicle and human characteristics road vehicle performance geometric design of roads traffic flow and queuing theory road capacity and level of service analysis traffic control and analysis at signalized intersections and travel demand and traffic forecasting.

58-230 Road Safety
Credits: **3**
Hours: **3**
Pre-requisite: **58-228**
Accident definitions accident rates accident trends and patterns road surface centrifugal force Safe stopping sight distance Safe passing sight distance street illumination vehicle lights signs and marks Traffic signals side clearances road works signs Traffic signals and lights Temporary cones and barriers through traffic accident causes and factors Road & environment vehicle human error road layout road furniture black sites road user activity (links and junctions) remedial measures change the situation traffic calming and reducing conflict points.

58-271 Soil Mechanics
Credits: **3**
Hours: **4**
Pre-requisite: **57-270**
Nature and characteristics of soils soil classification soil compaction shear strength effective stresses consolidation stress distribution and settlement of structures types of foundations and their bearing capacity on soils site investigation and characterization.

58-274 Road Pavement
Credits: **3**
Hours: **4**
Pre-requisite: **58-271**
Pavement layers pavement life traffic damage estimation soil classifications and characteristics aggregate bitumen Portland cement lime prime coat tack coat soil stabilization and compaction stability tests 'treating road bases graded mixture treating with bitumen treating with cement treating with lime treating with CaCl or NaCl surface flexible rigid thickness design asphalt mix design (super pave design} and concrete mixture.

58-276 Traffic Engineering
Credits: **3**
Hours: **4**
Pre-requisite: **58-228**
Traffic stream components traffic stream parameters–macroscopic traffic stream parameters–microscopic capacity and level of service analysis–uninterrupted flow facilities traffic control devices intersection control–rules of the road intersection control–traffic signs intersection control–islands and roundabouts fundamentals of signalized intersections signalized intersection capacity delay and measures of effectiveness preliminary signal design and timing.

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58-327 Highway Design
Credits: **3**
Hours: **3**
Pre-requisite: **58-228**
Road types–interrupted vs. uninterrupted flow facilities design specifications and control–the driver design specifications and control –the vehicle design specifications and control –design speed design specifications and control –traffic volume and level of service design specifications and control –access control elements of design–safety stopping sight distance elements of design–passing sight distance elements of design–decision sight distance elements of design–horizontal alignment elements of design–vertical alignment interchanges elements of the roadway cross-section.

58-328 Fundamentals of Roads Construction
Credits: **3**
Hours: **3**
Pre-requisite: **58-228**
Basic illustration of the procedures in building road layers for both flexible and rigid pavements. This includes the steps and phases of constructing each layer service lines and utility networks equipment needed and field tests.

58-329 Quality Control for Roads
Credits: **3**
Hours: **4**
Pre-requisite: **58-271**
Materials and standards road construction phases site investigation material quality and quantity aggregates bitumen granular soil fine soil fillings curbstone soil tests relative compaction (%) field density swelling factor (speedy) asphalt asphalt cement liquid asphalt asphalt mix layer check sub grade base layer asphalt surface and concrete surface.

58-375 Traffic Analysis
Credits: **3**
Hours: **4**
Pre-requisite: **58-276**
Analysis of highway merge and diverge sections analysis of weaving sections signal timing and design – pretimed signals fundamentals of actuated signal timing spot speed study vehicle occupancy study assessing signalized intersections I: vehicle delay study assessing signalized intersections II: turning movement study assessing signalized intersections: saturation flow rate study.

58-356 Transportation Project
Credits: **3**
Hours: **3**
Pre-requisite: **58-228**
Introduction to general road and traffic problems. Case study and introduction problem requirement type of data for study format computer software data collection data retrieval data analysis results and presentation and proper solutions.

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58-399 Field Training
Credits: **4**
Hours: **16**
Pre-requisite: **30-162**
In this course the students are trained on job sites. Transportation students are introduced to the field tests of the base and sub-base courses and the different surface coating materials used in Kuwait.

54-107 Surveying
Credits: **3**
Hours: **6**
Pre-requisite: **76-105**
Surveying branches. Types of Maps and Scales. Distance by chaining or taping. Maps for small areas. Areas of lands and planimeter. Leveling: use of level and adjustment and reasons for errors. Compass and azimuths. Theodolites: use and types.

54-206 Surveying Works
Credits: **3**
Hours: **4**
Pre-requisite: **54-107**
Angular measurements the odolites: uses and adjustments. Tacheometry and its instruments. Traverses: types and corrections. Topographic drawing contour maps sextant and fundamentals of hydrographic surveying. Fundamentals of Aerial surveying.

54-207 Fundamentals of Global Positioning System (GPS)
Credits: **3**
Hours: **3**
Pre-requisite: **54-107**
Overview of the Global Positioning System the NAVSTAR constellation and the various types of augmented GPS systems. Basic GPS components are covered including satellites ground stations antennas and receivers signals timing and false signals spoofing jamming and cryptographic concepts.

54-208 Geodesy
Credits: **3**
Hours: **3**
Pre-requisite: **54-206**
The geoids - Degrees of triangulation networks: specifications shapes observations base lines GPS. Adjustments of the net using: triangle equations local side equations. Height of observation towers indivisibility and types of errors. Standard deviation and probable errors. Strength of figures in the net.

54-209 Aerial Surveying
Credits: **3**
Hours: **4**
Pre-requisite: **54-107**
Photogrammetry photo interpretation remote sensing and GIS. Single vertical photograph. Stereoscopic vision. Measurements from Stereoscopic photo pairs. Flying maps: number of lines and photos. Ground control points and mosaics. Rectification. Fundamentals of Remote Sensing.

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54-210 Surveying Planning
Credits: **3**
Hours: **4**
Pre-requisite: **54-206**
Horizontal curves: types and elements. Alignments using one theodolite two theodolites and chain from tangent - chain from long chord. Vertical curves: types and calculations of reduced levels for all points on the vertical curve. Factors affecting partitions of lands. Partitions of triangles and polygons.

54-306 Fundamentals of Geographic Information System (GIS)
Credits: **3**
Hours: **4**
Pre-requisite: **54-107**
Reviews GIS applications data structures and basic functions methods of data capture and sources of data the nature and characteristics of spatial data and objects identifying GIS hardware components typical operations products/applications and differences between database models and between raster and vector systems.

54-307 Map Projection and Drawings
Credits: **3**
Hours: **4**
Pre-requisite: **54-206**
Enlargement and decrement of maps. How to draw a contour line on leveling net? Drawing of maps. Cartography and reproduction symbols plotting coordinates longitudes latitudes radial equator and central projections. Equal UTM KTM and Conical Projections Calculations of projections.

54-320 Surveying Project
Credits: **3**
Hours: **3**
Pre-requisite: **54-206**
Introduction to general surveying techniques and problems. Case study and introduction problem requirement type of data for study study format computer software data collection data retrieval data analysis results and presentation and proper solutions. Introduction to general road and traffic problems. Case study and introduction problem requirement type of data for study study format computer software data collection data retrieval data analysis results and presentation and proper solutions.

54-399 Field Training
Credits: **4**
Hours: **16**
Pre-requisite: **30-162**
In this course the students are trained on job sites. Surveying students are trained to use survey instruments in the field such as leveling instruments theodolites chains and others. Inspect work site water and electricity supply to the site and other services using several types of maps and drawings.

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