

Civil Engineering (CIVE)

CIVE 140 Engineering Measurements 1 Credit (1,0)

Data collection and analysis; principles of surveying and mapping; emphasis on modern methods; laboratory methods.

Course Offered at: Daytona Beach

CIVE 140L Engineering Measurements Laboratory 1 Credit (0,1)

Field practice in surveying and mapping; use of modern measurement instrumentation; development of teamwork and project management skills.

Course Offered at: Daytona Beach

CIVE 199 Special Topics in Civil Engineering 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in civil engineering.

Course Offered at: Daytona Beach, Prescott

CIVE 222 Introduction to Environmental Engineering 3 Credits (3,0)

Environmental engineering issues in aviation and aerospace facilities; hazardous materials handling; environmental impact; laws and regulations; professional ethics; identification of environmental hazards; understanding impacts of releases on the environment.

Prerequisites: CHEM 110

Course Offered at: Daytona Beach

CIVE 299 Special Topics in Civil Engineering 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in civil engineering.

Course Offered at: Daytona Beach, Prescott

CIVE 304 Structural Analysis 3 Credits (3,0)

Analysis of statically determinate and indeterminate structures; statics; kinematics; virtual work; strain energy; force and displacement methods; structural laboratory testing.

Prerequisites: ESCI 201

Course Offered at: Daytona Beach

CIVE 307 Civil Engineering Materials I 3 Credits (3,0)

Properties of engineering materials; steel; concrete; soil; asphalt; polymers; composites; structure-behavior relationship; standard testing and inspection methods; laboratory methods.

Prerequisites: ESCI 202 and COMM 221

Corequisites: CIVE 307L

Course Offered at: Daytona Beach

CIVE 307L Civil Engineering Materials I Laboratory 1 Credit (0,1)

Testing methods for determining engineering properties of steel, concrete, asphalt, polymers, and composites; laboratory report development.

Prerequisites: CIVE 307

Course Offered at: Daytona Beach

CIVE 311 Introduction to Transportation Engineering 3 Credits (3,0)

Fundamentals of transportation engineering; planning; design; construction; maintenance; operation; economics; role of transportation facilities in society; underlying theory; design issues.

Prerequisites: PHYS 150

Course Offered at: Daytona Beach

CIVE 316 Hydraulics 3 Credits (3,0)

Open channel and pipe flows; hydraulic structures; groundwater hydrology; stormwater management.

Prerequisites: ESCI 201

Course Offered at: Daytona Beach

CIVE 320 Soil Mechanics 3 Credits (3,0)

Engineering behavior of soils including origin, classification, and identification; soil structure and permeability; one-dimensional seepage; time-dependent consolidation and settlement; shear strength and Mohr-Coulomb failure theory; slope stability; lateral earth pressures; bearing capacity.

Prerequisites: ESCI 202 and COMM 221

Corequisites: CIVE 320L

Course Offered at: Daytona Beach

CIVE 320L Soil Mechanics Laboratory 1 Credit (0,3)

Modern soil testing and analysis methods; soil identification and sample preparation; physical property testing including sieve analysis and Atterberg limits; engineering property testing including permeability, consolidation, compaction, unconfined compression, direct shear, and triaxial shear.

Prerequisites: ESCI 202 and COMM 221

Corequisites: CIVE 320

Course Offered at: Daytona Beach

CIVE 330 Computer Applications in Transportation 2 Credits (1,3)

Application of computer software in transportation planning and design; solutions to problems in airport and intermodal transportation systems.

Course Offered at: Daytona Beach

CIVE 340 Construction Engineering 3 Credits (3,0)

Delivery of construction projects; construction equipment; production rates; methods for concrete, asphalt, steel, wood, masonry; planning and scheduling; safety; construction economics.

Course Offered at: Daytona Beach

CIVE 362 Engineering and Construction Operations in Space 3 Credits (3,0)

U.S. space exploration policies; construction in zero or low-weight environments; lunar and planetary resource development; controlled ecological life support systems; lunar concrete.

Course Offered at: Daytona Beach

CIVE 370 Computational Methods in Civil Engineering 3 Credits (3,0)

Numerical techniques for solving civil engineering problems; statistical methods; matrix operations; spreadsheet development.

Prerequisites: ENGR 115

Course Offered at: Daytona Beach

CIVE 399 Special Topics in Civil Engineering 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in civil engineering.

Course Offered at: Daytona Beach, Prescott

CIVE 415 Sustainable Food Production and Aquaponics 3 Credits (3,0)

Principles of sustainable engineering; stability of biological systems; mass and energy balances; nutrient cycling; renewable energy; sustainable fish and vegetable production; aquaponic systems; sustainable food supplies in space missions.

Course Offered at: Daytona Beach

CIVE 417 Air Pollution 3 Credits (3,0)

Outdoor and indoor air pollutants; gas and particulate properties; pollutant measurement and monitoring; air quality modeling; technologies for pollution control; nitrogen and sulfur oxides; ozone; VOCs; odors; CO₂.

Course Offered at: Daytona Beach

CIVE 421 Geotechnical and Foundation Engineering 3 Credits (3,0)

Settlement prediction; slope stability analysis; bearing capacity of foundations; earth pressures on retaining structures.

Prerequisites: CIVE 320

Course Offered at: Daytona Beach

CIVE 422 Design of Pavement Structures 3 Credits (3,0)

Pavement design theory and practice; highway and airfield pavements; pavement performance; material characterization; pavement management concepts.

Prerequisites: CIVE 320

Course Offered at: Daytona Beach

CIVE 424 Rehabilitation of Pavement Structures 3 Credits (3,0)

Pavement distresses; evaluation of roughness, friction, drainage; structural evaluation; material characterization; design of rehabilitation alternatives; economic analysis.

Prerequisites: CIVE 320

Course Offered at: Daytona Beach

CIVE 431 Reinforced Concrete Design 3 Credits (3,0)

Properties of concrete and reinforcement steels; design of beams, columns, slabs; cracking and deterioration; torsion and shear reinforcement; anchorage and bond detailing; concrete design code application.

Prerequisites: CIVE 304 and ESCI 202

Course Offered at: Daytona Beach

CIVE 432 Structural Steel Design 3 Credits (3,0)

Properties of steel; design of tension, column, torsional members, plate girders; welded and bolted connections; steel design specifications and building codes.

Prerequisites: CIVE 304 and ESCI 202

Course Offered at: Daytona Beach

CIVE 435 Introduction to Sustainability 3 Credits (3,0)

Scientific principles of sustainability; human and engineered systems under global change, ecosystem degradation, and resource limitations; sustainability concepts and regulatory strategies for risk assessment and environmental management; applications across engineering domains including the energy-food-water nexus, urban sustainability, and airport systems.

Prerequisites: CIVE 222

Course Offered at: Daytona Beach

CIVE 437 Hydraulics and Hydrology 3 Credits (3,0)

Design and analysis of large-scale hydraulic systems including pipe networks, pumping systems, open channels, culverts, and reservoirs; hydrologic cycle and statistical concepts; rainfall distribution and runoff generation; infiltration and groundwater flow.

Prerequisites: MECH 309

Course Offered at: Daytona Beach

CIVE 440 Drainage Engineering 3 Credits (3,0)

Engineering calculations for drainage, treatment, and attenuation of stormwater runoff from civil infrastructure; permitting issues; engineering report preparation.

Prerequisites: CIVE 437

Course Offered at: Daytona Beach

CIVE 441 Civil Engineering Materials II 3 Credits (3,0)

Physical and mechanical properties of construction materials; portland cement concrete; fiber reinforced concrete design; bituminous materials; pavement surface properties; pavement distress correction.

Prerequisites: CIVE 307

Corequisites: CIVE 441L

Course Offered at: Daytona Beach

CIVE 441L Civil Engineering Materials II Laboratory 1 Credit (0,1)

Advanced testing methods for concrete, concrete mixtures, bituminous materials, and pavements.

Corequisites: CIVE 441L

Course Offered at: Daytona Beach

CIVE 443 Traffic Data Collection Method and Computer Application in Traffic Engineering 3 Credits (3,0)

Traffic data collection and analysis methods; application of computer analysis tools in transportation systems; emphasis on operation and safety performance of transportation networks.

Prerequisites: CIVE 311

Course Offered at: Daytona Beach

CIVE 447 Airport Design I 3 Credits (3,0)

Airport airside planning, operations and design; site selection; runway length and orientation; air traffic control; capacity and delay analysis; obstruction determinations; geometric design of aprons, taxiways and runways.

Prerequisites: CIVE 311

Course Offered at: Daytona Beach

CIVE 457 Airport Design II 3 Credits (3,0)

Airport landside planning, design and operations; terminal passenger requirements; baggage handling, security, check-in, waiting areas, and baggage claims; queueing analysis and service times in terminals. Intermodal connections to airports, roadways, parking, transit, taxi and transportation network companies; noise, air quality and other environmental impacts of aviation and airports.

Prerequisites: CIVE 447

Course Offered at: Daytona Beach

CIVE 460 Applied Data Science and Numerical Methods in Civil Engineering 3 Credits (3,0)

Application of data science and numerical methods to civil engineering analysis and design; data acquisition, cleaning, analysis, and visualization; numerical modeling and simulation of civil engineering systems; optimization techniques; machine learning applications in civil engineering; data ethics and professional responsibility.

Prerequisites: MATH 345

Corequisites: MATH 412

Course Offered at: Daytona Beach

CIVE 470 Senior Project Preliminary Design 1 Credit (1,0)

Preliminary design activities in response to a Request for Bid Document; team formation with corporate structures; development of bid capture plan; creation of Bid Proposal document; formal bid presentations; professionalism and ethical behavior.

Course Offered at: Daytona Beach

CIVE 471 Senior Design I 3 Credits (3,0)

Planning and conceptual design phase for Senior Design; team formation and project management; vision, goals, and objectives; site characteristics and constraints; similar projects research, regulatory requirements; conceptual design alternatives; preliminary construction cost estimation.

Prerequisites: Senior standing and department approval

Course Offered at: Daytona Beach

CIVE 480 Senior Project Final Design 2 Credits (2,0)

Development of preliminary design to project completion; creation of design drawings, construction schedules, cost estimates, final reports; construction and demonstration of design project; Critical Design Reviews; professionalism and ethical conduct.

Course Offered at: Daytona Beach

CIVE 481 Senior Design II 4 Credits (4,0)

Completion of the engineering design process through a team-based project; project management and coordination; development of detailed engineering analysis, plans, specifications, and construction documentation; preparation of cost estimates using industry-standard methods and software; written and oral presentation of a comprehensive design package.

Prerequisites: CIVE 471

Course Offered at: Daytona Beach

CIVE 490 The Civil Engineering Profession 1 Credit (1,0)

Current problems in engineering; professional duties and responsibilities; opportunities for development; ethics; professionalism.

Course Offered at: Daytona Beach

CIVE 499 Special Topics in Civil Engineering 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in civil engineering.

Course Offered at: Daytona Beach, Prescott