

3/2 MU Physics (PY BS) / UMKC Civil Engineering Major

Fall Semester		1 st year	Spring Semester	
MA 140 Calculus I	4		MA 240 Calculus II	4
IN 140 University Seminar	1		IN 151 CRWRR II	3
IN 150 CRWRR I	3		MA 320 Math History/ICS/Historical Studies	3
CH 121/151 General Chemistry with lab	4		CH 224/152 Inorganic Chemistry with lab	4
PY 151/171 University Physics I	4		PY 152/172 University Physics II	4
	16			18
		2 nd year		
PY 262 Experiential Physics I	4		PY 362 Experiential Physics II	4
AC 230 Accounting 1	3		AC 240 Accounting II	3
MA 340 Calculus III	3		MA 305 Differential Equations	3
MA 208 Discrete Mathematics	3		PY 253 Modern Physics (lecture + lab)	4
IN 251 US Studies	3		CO 200 Public Speaking	3
	16			17
		3 rd year		
MA 303 Linear Algebra	3		EC 100 or EC 110 Economics	3
IN 350/Literature	3		Fine Arts	3
PY 325 Mathematical Physics	3		PY 303 Physical Chemistry I	3
ICS	3		MA 313 Numerical Analysis	3
PY 352 Classical Mechanics	4		DRAFT 103 AutoCAD (RCC)	3
	16		ENGR 211 Statics (RCC)	3
				18
UMKC – Civil Engineering				
		Summer		
ME 219 Computer Programming for Engineers	3			
		4 th year		
CE 276 Strength of Materials	3		CE 323 Steel Design	3
CE 321 Structural Analysis	3		CE 342 Water and Wastewater	3
CE 335 Solid Mechanics	3		CE 357 Engineering Hydraulics	3
CE 351 Fluid Mechanics	3		CE 378WI Civil Engineering Materials	3
CE 467 Construction Management	3		CE 318 GIS for Engineers	3
ME 131 3-D Solidworks	1			
	16			15
		5 th year		
CE 411 System Design I	3		CE 412 Design II (Anchor III)	3
CE 422WI Reinforced Concrete	3		CE 4XX Elective	3
CE 481 Highway & Traffic Engineering	3		CE 4XX Elective	3
CE 497 Engineering Hydrology	3		DISC 300 Discourse III	3
CE 4XX Elective	3			
	15			12

Millikin University will award Mathematics degree upon completion of engineering degree at UMKC

BOLD-required for transfer to UMKC, **BOLD**- prerequisites for required class

UMKC Course Descriptions <https://catalog.umkc.edu/course-offerings/undergraduate/>

CIV-ENGR 276 Strength Of Materials Credits: 3 The course introduces and emphasizes the concepts and analysis methods for stress and strain, torsion, bending and shear stresses in beams, combined stresses, and deflection theory using a calculus based methodology. Introduction to buckling and energy methods may be included.

CIV-ENGR 318 GIS for Engineers Credits: 3 This course covers the fundamental concepts and methods for use of GIS software used to solve engineering applications and problems. The course uses module based practical learning to apply and integrate foundational knowledge, develop the skills required to model various types of imagery data, incorporate this data into projects for management and design, and provide the skills necessary for students to depict ideas and design graphically. A personal computer capable of running the software is required for the course. Non-engineering majors by instructor permission only.

CIV-ENGR 321 Structural Analysis Credits: 4 This course introduces the basic analysis and computer methods that are required to analyze basic structural elements and simple structures. Topics covered in this course include design loads, analysis of statically determinate beams, frames and trusses, shear and moment diagrams, influence diagrams, beam deflections, statically indeterminate structures (beams and frames), displacement methods, introduction to energy and matrix methods.

CIV-ENGR 323 Structural Steel Design Credits: 3 Basic principles of structural steel design. Design of beams, axially loaded members, columns, and bolted and welded connections.

CIV-ENGR 335 Soil Mechanics Credits: 3 Detailed study of physical and mechanical properties of soil governing its behavior as an engineering material.

CIV-ENGR 342 Water and Wastewater Treatment Processes Credits: 3 Methods for determining and characterizing water quality, effects of pollution on streams and lakes, and an introduction to engineering systems for the distribution, collection and treatment of water and wastewater.

CIV-ENGR 351 Fluid Mechanics Credits: 3 Concepts of the statics and dynamics of fluids, with emphasis on principles of continuity, momentum and energy. Boundary layers, dimensional analysis and drag are covered briefly. Thorough treatment of pipe flow.

CIV-ENGR 357 Engineering Hydraulics Credits: 3 Analysis and design of closed conduit systems for water supply; fundamentals of open channel flow; principles of pumping and hydropower generation; transients and control of surge pressures in pipelines.

CIV-ENGR 378WI Civil Engineering Materials Credits: 3 Composition, structure, properties, behavior and selection of civil engineering materials.

CIV-ENGR 411 Civil Engineering Systems Design I Credits: 2 Comprehensive and realistic design project using the systems approach. Design choices and their effect upon the environment. Design constraints include constructability, minimization of environmental impact and cost-effectiveness. Managerial and professional aspects of design practice.

CIV-ENGR 412 Civil Engineering Systems Design II Credits: 3 Continuation of CIV-ENGR 411.

CIV-ENGR 422WI Reinforced Concrete Design Credits: 3 Basic principles of reinforced concrete design. Design of beams for flexure and shear; design of short and slender columns. Bond stress development. Footing design.

CIV-ENGR 481 Highway and Traffic Engineering Credits: 3

Principles of highway engineering and traffic analysis, road/vehicle performance, geometric alignment of highways, traffic analysis and queuing theory, signal design, statistical analysis of traffic data and highway drainage.

CIV-ENGR 497 Engineering Hydrology Credits: 3 Fundamental concepts of hydrology in engineering; computation principles of runoff from rainfall; measurement of hydrologic quantities; quantitative and statistical estimation of design stream-flow magnitude and frequency; principles of unsteady routing of hydrographs.

MEC-ENGR 131 Engineering Graphics-3D design Credit: 1 Introduction to Engineering Graphics using the 3D Computer Aided Design tool SolidWorks. Introduction to 3D design with SolidWorks includes: part modeling, revolved features, sweeps, lofts, assembly modeling, and engineering drawings. Some previous 2D AutoCAD experience is required to take this class. NOTE: This class starts halfway through the semester by joining in with MEC-ENGR 130 when they finish AutoCAD and begin SolidWorks.

MEC-ENGR 219 Computer Programming for Engineers Credits: 3 Analysis and synthesis of structured computer algorithms for solving engineering problems using high level programming tools such as Excel, Matlab, Fortran and/or C++.

DISC 300 Discourse III: Civic and Community Engagement (Speech and Writing) Credits: 3 Students will put the knowledge and skills learned in Discourse I and II into practical use by engaging in a service-learning project that is interdisciplinary and intercultural. Students will use strategies of critical discourse analysis and critical language awareness to target the appropriate audience/recipients for their service project, to develop innovative and rhetorically effective texts, and to reflect on their project's purpose, methods, and consequences. This course is taught in close connection with the anchor course Civic and Community Engagement.