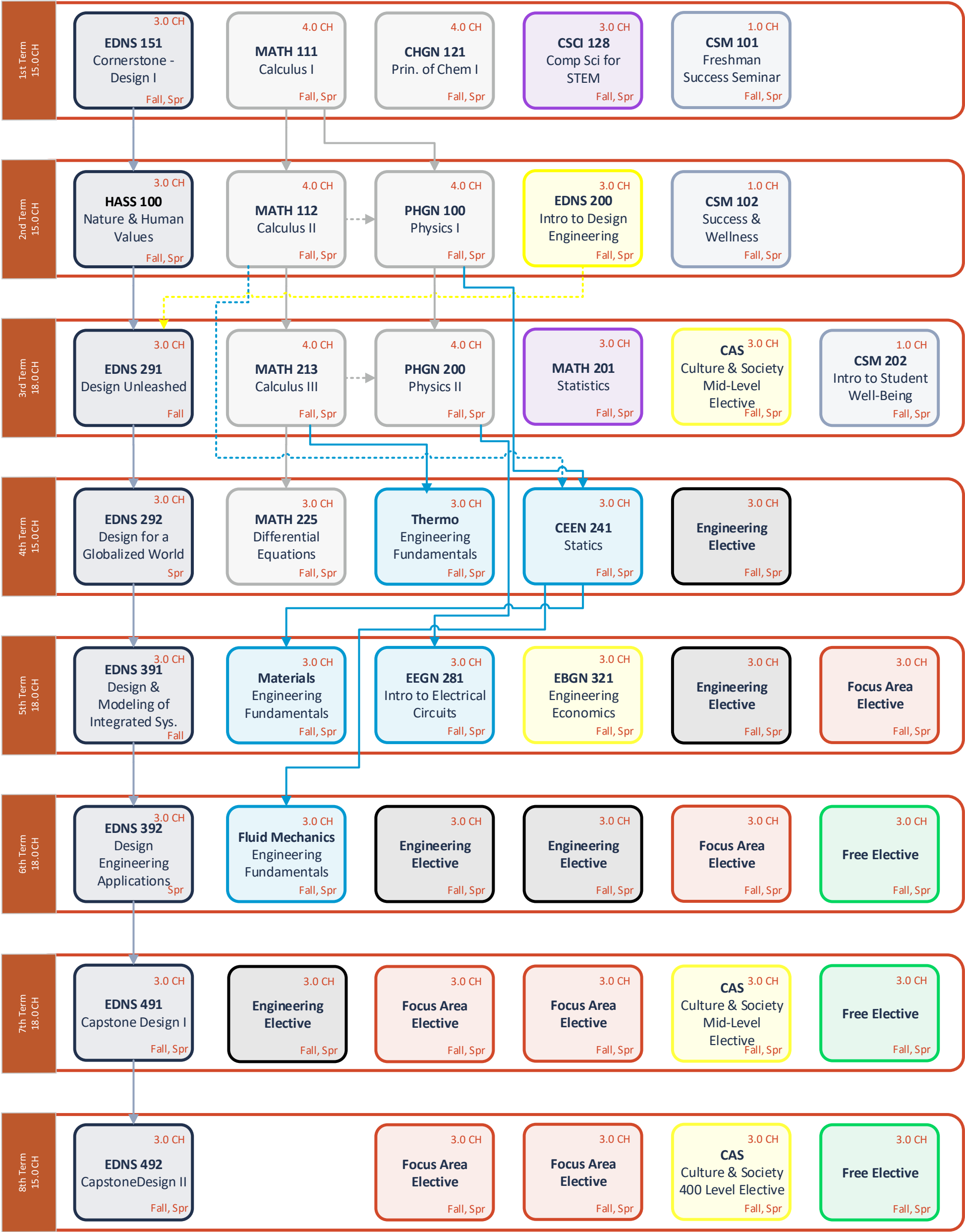


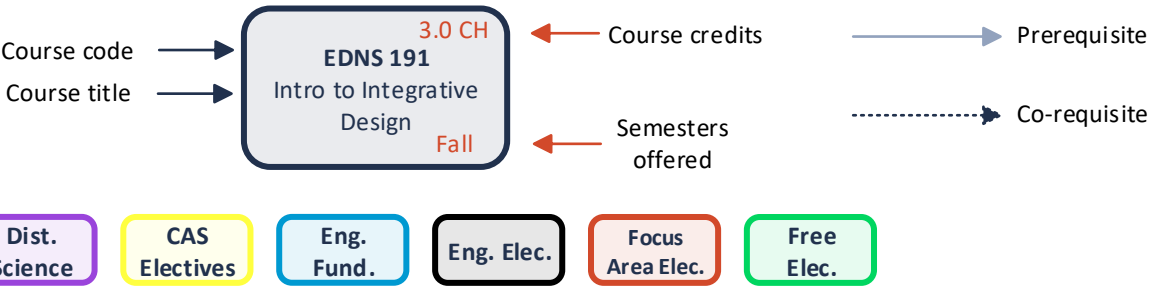
Undergraduate Program Flowchart

DESIGN ENGINEERING

Recommended Sequence of Required Courses for the Bachelor of Science in Design Engineering:
(2024-2025)



Total Credit Hours = 132.0
Prerequisite courses required a passing grade of C- or better



Undergraduate Program Flowchart in ENGINEERING, DESIGN, & SOCIETY

Bachelor of Science in Design Engineering Electives (2023-2024)

DISTRIBUTED SCIENCES

(Must take ONE course to fulfill degree)

CBEN 110	Fundamentals of Biology I - 3.0 CH
CHGN 122	Principles of Chemistry IIdynamics - 4.0 CH <i>(prereqs: CHGN 121)</i>
CHGN 125	Molecular Engr. & Materials Chemistry - 4.0 CH <i>(prereqs: CHGN 121)</i>
GEEN 101	Earth and Enviornmental Systems - 4.0 CH
Math 201	Intro to Statistics - 3.0 CH <i>(prereqs: Math 112)</i>

ENGINEERING FUNDAMENTALS

(Must take ONE course from each category to fulfill degree)

Thermo:

CBEN 210	Intro to Thermodynamics - 3.0 CH <i>(prereqs: CHGN 121, CHGN 122, Math 111)</i> <i>(coreqs: Math 112, PHGN 100)</i>
CHGN 209	Intro. to Chemical Thermodynamics - 3.0 CH <i>(prereqs: CHGN 121, CHGN 122, Math 112, PHGN 100)</i>
MEGN 361	Thermodynamics I - 3.0 CH <i>(prereqs: Math 213)</i>

Statics:

CEEN 241	Statics - 3.0 CH <i>(prereqs: Math 112)</i>
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Electrical Circuits:

EENG 281	Intro to Electrical Circuits - 3.0 CH <i>(prereqs: PHGN 200)</i>
EENG 282	Electrical Circuits - 4.0 CH <i>(prereqs: PHGN 200)</i>

Materials:

CEEN 311	Mechanics of Materials - 3.0 CH <i>(prereqs: CEEN 241)</i>
MEGN 212	Intro. to Solid Mechanics - 3.0 CH <i>(prereqs: CEEN 241)</i>
MTGN 202	Engineered Materials - 3.0 CH <i>(prereqs: CHGN 122 or 125, Math 112, PHGN 100)</i>

Fluid Mechanics:

CEEN 310	Fluid Mechanics for Civil and EnvE - 3.0 CH <i>(prereqs: PHGN 100, CEEN 241)</i>
MEGN 351	Fluid Mechanics - 3.0 CH <i>(prereqs: CEEN 241)</i>

CAS Electives

(Must take TWO courses at Mid-level or above and ONE course at 400-level to fulfill degree)

HASSXXX	All HASS courses are eligible for Humanities and Social Sciences (H&SS) credit
LIFLXXX	All LIFL courses are eligible for Humanities and Social Sciences (H&SS) credit
HNRSXXX	All HNRS courses are eligible for Humanities and Social Sciences (H&SS) credit
EBGN 301	Intermediate Microeconomics - 3.0 CH
EBGN 302	Intermediate Macroeconomics - 3.0 CH
EBGN 310	Environmental and Resource Economics - 3.0 CH
EBGN 320	Economics and Technology - 3.0 CH
EBGN 330	Energy Economics - 3.0 CH
EBGN 340	Energy and Environmental Policy - 3.0 CH
EBGN 401	Advanced Topics in Economics - 3.0 CH
EBGN 430	Advanced Energy Economics - 3.0 CH
EBGN 434	Property Rights and Natural Resources - 3.0 CH
EBGN 437	Regional Economics - 3.0 CH
EBGN 441	International Economics - 3.0 CH
EBGN 443	Public Economics - 3.0 CH
EBGN 470	Environmental Economics - 3.0 CH
EDNS 315	Engineering for Social and Environmental Responsibility - 3.0 CH
EDNS 375	Engineering Cultures - 3.0 CH
EDNS 430	Corporate Social Responsibility - 3.0 CH
EDNS 475	Engineering Cultures in the Developing World - 3.0 CH
EDNS 477	Engineering and Sustainable Community Development - 3.0 CH
EDNS 478	Engineering and Social Justice - 3.0 CH
EDNS 479	Community-Based Research - 3.0 CH
EDNS 480	Anthropology of Development - 3.0 CH
MNGN 335	Communitites and Natural Resource Development - 3.0 CH
PEGN 430	Environmental Law and Sustainability - 3.0 CH

Undergraduate Program Flowchart in ENGINEERING, DESIGN, & SOCIETY

Bachelor of Science in Design Engineering Electives (2023-2024)

ENGINEERING ELECTIVES

(Must take a TOTAL of 15 CH to fulfill degree)

Chemical Engineering:

- CBEN 308 Heat Transfer - 3.0 CH
- CBEN 310 Intro to Biomedical Engineering - 3.0 CH
- CBEN 312 Unit Operations Lab - 3.0 CH
- CBEN 313 Unit Operations Lab - 3.0 CH
- CBEN 314 Chemical Engineering Heat and Mass Transfer - 4.0 CH
- CBEN 315 Introduction to Electrochemical Engineering - 3.0 CH
- CBEN 357 Chemical Engineering Thermodynamics - 3.0 CH
- CBEN 358 Chemical Engineering Thermodynamics Lab - 1.0 CH
- CBEN 360 Bioprocess Engineering - 3.0 CH
- CBEN 365 Introduction to Chemical Engineering Practice - 3.0 CH
- CBEN 372 Introduction to Bioenergy - 3.0 CH
- CBEN 375 Chemical Engineering Separations - 3.0 CH
- CBEN 401 Process Optimization - 3.0 CH
- CBEN 403 Process Dynamics and Control - 3.0 CH
- CBEN 408 Natural Gas Processing - 3.0 CH
- CBEN 409 Petroleum Processes - 3.0 CH
- CBEN 415 Polymer Science and Technology - 3.0 CH
- CBEN 416 Polymer Engineering and Technology - 3.0 CH
- CBEN 418 Kinetics and Reaction Engineering - 3.0 CH
- CBEN 420 Mathematical Methods in Chemical Engineering - 3.0 CH
- CBEN 422 Chemical Engineering Flow Assurance - 3.0 CH
- CBEN 426 Advanced Functional Porous Materials - 3.0 CH
- CBEN 430 Transport Phenomena - 3.0 CH
- CBEN 432 Transport Phenomena in Biological Systems - 3.0 CH
- CBEN 435 Interdisciplinary Microelectronics - 3.0 CH
- CBEN 440 Molecular Perspectives in Chemical Engineering - 3.0 CH
- CBEN 454 Applied Bioinformatics - 3.0 CH
- CBEN 460 Biochemical Process Engineering - 3.0 CH
- CBEN 461 Biochemical Process Engineering Lab - 1.0 CH
- CBEN 469 Fuel Cell Science and Technology - 3.0 CH
- CBEN 470 Introduction to Microfluidics - 3.0 CH
- CBEN 472 Introduction to Energy Technologies - 3.0 CH
- CBEN 480 Natural Gas Hydrates - 3.0 CH

Civil & Environmental Engineering:

- CEEN 301 Fundamentals of Environmentals Engineering: Water - 3.0 CH
- CEEN 302 Fundamentals of EnvE: Air and Waste Management - 3.0 CH
- CEEN 303 Environmental Engineering Lab - 3.0 CH
- CEEN 312 Soil Mechanics - 3.0 CH
- CEEN 312L Soil Mechanics Lab - 1.0 CH
- CEEN 314 Structural Theory - 3.0 CH
- CEEN 315 Civil and Environmental Engineering Tools - 1.5 CH
- CEEN 330 Engineering Field Session, Environmental - 3.0 CH
- CEEN 331 Engineering Field Session, Civil - 3.0 CH
- CEEN 350 Civil and Construction Engineering Materials - 3.0 CH
- CEEN 360 Introduction to Construction Engineering - 3.0 CH
- CEEN 381 Hydrology and Water Resources Engineering - 3.0 CH
- CEEN 401 Life Cycle Assessment - 3.0 CH
- CEEN 405 Numerical Methods for Engineers - 3.0 CH
- CEEN 406 Finite Element Methods for Engineers - 3.0 CH
- CEEN 410 Advanced Soil Mechanics - 3.0 CH
- CEEN 411 Unsaturated Soil Mechanics - 3.0 CH
- CEEN 415 Foundation Engineering - 3.0 CH
- CEEN 419 Risk Assessment in Geotechnical Engineering - 3.0 CH
- CEEN 421 Highway and Traffic Engineering - 3.0 CH
- CEEN 423 Surveying for Engineering and Infrastructure Design - 3.0 CH
- CEEN 425 Centitious Materials for Construction - 3.0 CH
- CEEN 426 Durability of Concrete - 3.0 CH
- CEEN 430 Advanced Structural Analysis - 3.0 CH
- CEEN 433 Matrix Structual Analysis - 3.0 CH
- CEEN 441 Introduction to the Seismic Design of Structures - 3.0 CH
- CEEN 442 Timber and Masonry Design - 3.0 CH
- CEEN 443 Design of Steel Structures - 3.0 CH
- CEEN 445 Design of Reinforced Concrete Structures - 3.0 CH
- CEEN 446 Structural Loads - 3.0 CH
- CEEN 461 Fundamentals of Ecology - 3.0 CH
- CEEN 470 Water and Wastewater Treatment Processes - 3.0 CH
- CEEN 471 Water and Wastewater Treatment Sys. Design - 3.0 CH
- CEEN 472 Onsite Water Reclamation and Reuse - 3.0 CH
- CEEN 473 Hydraulic Problems - 3.0 CH
- CEEN 475 Site Remediation Engineering - 3.0 CH
- CEEN 477 Sustainable Engineering Design - 3.0 CH
- CEEN 479 Air Pollution - 3.0 CH
- CEEN 480 Chemical Fate and Transport in the Environment - 3.0 CH
- CEEN 482 Hydrology and Water Resources Lab - 3.0 CH

Computer Science:

- CSCI 303 Introcution to Data Science - 3.0 CH
- CSCI 306 Software Engineering - 3.0 CH
- CSCI 341 Computer Organization - 3.0 CH
- CSCI 370 Advanced Software Engineering - 4.5 CH
- CSCI 400 Principles of Programming Languages - 3.0 CH
- CSCI 403 Data Base Management - 3.0 CH
- CSCI 404 Artificial Intelligence - 3.0 CH
- CSCI 410 Elements of Computing Systems - 3.0 CH
- CSCI 422 User Interfaces - 3.0 CH
- CSCI 423 Computer Simulation - 3.0 CH
- CSCI 425 Compiler Design - 3.0 CH
- CSCI 436 Human-Robot Interaction - 3.0 CH
- CSCI 437 Introduction to Computer Vision - 3.0 CH
- CSCI 440 Parallel Computing for Scientists and Engineers - 3.0 CH
- CSCI 442 Operating Systems - 3.0 CH
- CSCI 443 Advanced Programming Concepts Using Java - 3.0 CH
- CSCI 448 Mobile Application Development - 3.0 CH
- CSCI 455 Game Theory and Networks - 3.0 CH
- CSCI 470 Introduction to Machine Learning - 3.0 CH
- CSCI 471 Computer Networks I - 3.0 CH
- CSCI 473 Human-Centered Robotics - 3.0 CH
- CSCI 475 Information Security and Privacy - 3.0 CH
- CSCI 477 Elements of Games and Game Development - 3.0 CH
- CSCI 478 Introducton to Bioinformatics - 3.0 CH

Electrical Engineering & Electronics:

- EENG 307 Introduction to Feedback Control Systems - 3.0 CH
- EENG 310 Information Systems Science I - 4.0 CH
- EENG 311 Information Systems Science II - 3.0 CH
- EENG 350 Systems Exploration and Engineering Design Lab - 2.0 CH
- EENG 383 Embedded Systems - 4.0 CH
- EENG 385 Electronic Devices and Circuits - 4.0 CH
- EENG 386 Fundamentals of Engineering Electromagnetics - 3.0 CH
- EENG 389 Fundamentals of Electric Machinery - 4.0 CH
- EENG 390 Energy, Electricity, Renewable Engy and Elect Pwr Grid - 3.0 CH
- EENG 411 Digital Signal Processing - 3.0 CH
- EENG 413 Analog and Digital Communications Systems - 4.0 CH
- EENG 415 Data Science for Electrical Engineering - 3.0 CH
- EENG 417 Modern Control Design - 3.0 CH
- EENG 423 Introduction to VLSI Design - 3.0 CH
- EENG 425 Introduction to Antennas - 3.0 CH
- EENG 427 Wireless Communications - 3.0 CH
- EENG 428 Computational Electromagnetics - 3.0 CH
- EENG 429 Active RF & Microwave Devices - 3.0 CH
- EENG 430 Passive RF & Microwave Devices - 3.0 CH
- EENG 437 Introduction to Computer Vision - 3.0 CH
- EENG 470 Introduction to High Power Electronics - 3.0 CH
- EENG 475 Interconnection of Renewable Engy, Int Pwr Sys and Pwr Qual - 3.0 CH
- EENG 480 Power Systems Analysis - 3.0 CH
- EENG 481 Analysis and Design of Advanced Energy Systems - 3.0 CH
- EENG 486 Electromagnetic Fields and Waves - 3.0 CH
- EENG 489 Computational Methods in Energy Sys and Power Electronics - 3.0 CH
- PHGN 317 Semiconductor Circuits - Digital - 3.0 CH

Engineering, Design, & Society:

- EDNS 401 Projects for People - 3.0 CH

Geological Engineering:

- GEGN 307 Petrology - 3.0 CH
- GEGN 316 Field Geology - 6.0 CH
- GEGN 342 Engineering Geomorphology - 3.0 CH
- GEGN 466 Groundwater Engineering - 3.0 CH
- GEGN 467 Groundwater Engineering - 4.0 CH
- GEGN 468 Engineering Geology and Geotechnics - 4.0 CH
- GEGN 469 Engineering Geology Design - 3.0 CH
- GEGN 470 Ground-Water Engineering Design - 3.0 CH
- GEGN 475 Applications of Geogrphic Information Systems - 3.0 CH
- GEGN 483 Mathematical Modeling of Groundwater Systems - 3.0 CH

Geology:

- GEOL 308 Introductory Applied Structural Geology - 3.0 CH
- GEOL 310 Earth Materials - 3.0 CH
- GEOL 311 Mining Geology - 3.0 CH
- GEOL 315 Sedimentology and Stratigraphy - 3.0 CH
- GEOL 321 Mineralogy and Mineral Characterization - 3.0 CH
- GEOL 470 Applications of Satellite Remote Sensing - 3.0 CH

Undergraduate Program Flowchart in ENGINEERING, DESIGN, & SOCIETY

Bachelor of Science in Design Engineering Electives (2023-2024)

ENGINEERING ELECTIVES

(Must take a TOTAL of 15 CH to fulfill degree)

Mechanical Engineering:

- MEGN 315 Dynamics - 3.0 CH
- MEGN 324 Introduction to Finite Element Analysis - 3.0 CH
- MEGN 381 Manufacturing Processes - 3.0 CH
- MEGN 391 Automotive Design: SAE Collegiate Design Series - 3.0 CH
- MEGN 412 Advanced Mechancis of Materials - 3.0 CH
- MEGN 414 Mechanics of Composite Materials - 3.0 CH
- MEGN 416 Engineering Vibration - 3.0 CH
- MEGN 417 Vehicle Dynamics & Powertrain Systems - 3.0 CH
- MEGN 430 Musculoskeletal Biomechanics - 3.0 CH
- MEGN 435 Modeling and Simulation of Human Movement - 3.0 CH
- MEGN 436 Computational Biomechanics - 3.0 CH
- MEGN 441 Introduction to Robotics - 3.0 CH
- MEGN 451 Fluid Mechanics II - Aerodynamics - 3.0 CH
- MEGN 461 Thermodynamics II - 3.0 CH
- MEGN 466 Introduction to Internal Combustion Engines - 3.0 CH
- MEGN 467 Principles of Building Science - 3.0 CH
- MEGN 469 Fuel Cell Science and Technology - 3.0 CH
- MEGN 471 Heat Transfer - 3.0 CH
- MEGN 481 Machine Design - 3.0 CH

Metallurgical and Materials Engineering:

- MTGN 334 Chemical Processing of Materials - 3.0 CH
- MTGN 314 Properties and Processing of Ceramics - 2.0 CH
- MTGN 314L Properties and Processing of Ceramics Lab - 1.0 CH
- MTGN 315 Electrical Properties and Application of Materials - 3.0 CH
- MTGN 334L Chemical Processing of Materials Lab - 1.0 CH
- MTGN 348 Microstructural Development - 3.0 CH
- MTGN 348L Microstructural Development Lab - 1.0 CH
- MTGN 350 Statistical Process Control and Design of Experiments - 3.0 CH
- MTGN 352 Metallurgical and Materials Kinetics - 3.0 CH
- MTGN 414 Advanced Processing and Sintering of Ceramics - 3.0 CH
- MTGN 419 Non-Crystalline Materials - 3.0 CH
- MTGN 429 Metallurgical Environment - 3.0 CH
- MTGN 430 Physical Chemistry of Iron and Steelmaking - 3.0 CH
- MTGN 431 Hydro- and Electro-Metallurgy - 3.0 CH
- MTGN 442 Engineering Alloys - 3.0 CH
- MTGN 445 Mechanical Properties of Materials - 3.0 CH
- MTGN 445L Mechanical Properties of Materials Lab - 1.0 CH
- MTGN 451 Corrosion Engineering - 3.0 CH
- MTGN 456 Electron Microscopy - 2.0 CH
- MTGN 456L Electron Microscopy Lab - 1.0 CH
- MTGN 461 Transport Phenomena and Reactor Design - 3.0 CH
- MTGN 465 Mechanical Properties of Ceramics - 3.0 CH
- MTGN 467 Materials Design: Synthesis, Charact., and Selection - 2.0 CH
- MTGN 468 Materials Design: Synthesis, Charact., and Selection - 2.0 CH
- MTGN 469 Fuel Cell Science and Technology - 3.0 CH
- MTGN 472 Biomaterials I - 3.0 CH
- MTGN 473 Computational Materials - 3.0 CH
- MTGN 475 Metallurgy of Welding - 2.0 CH
- MTGN 475L Metallurgy of Welding Lab - 1.0 CH

Mining:

- MNGN 310 Earth Materials - 3.0 CH
- MNGN 311 Mining Geology - 3.0 CH
- MNGN 312 Surface Mine Design - 3.0 CH
- MNGN 314 Underground Mine Design - 3.0 CH
- MNGN 316 Coal Mining Methods - 3.0 CH
- MNGN 317 Dynamics for Mining Engineers - 1.0 CH
- MNGN 321 Introduction to Rock Mechanics - 3.0 CH
- MNGN 333 Explosives Engineering I - 3.0 CH
- MNGN 350 Introduction to Geothermal Energy - 3.0 CH
- MNGN 406 Design and Support of Underground Excavations - 3.0 CH
- MNGN 408 Underground Design and Construction - 2.0 CH
- MNGN 414 Mine Plant Design - 3.0 CH
- MNGN 418 Advanced Rock Mechanics - 3.0 CH
- MNGN 422 Flotation - 2.0 CH
- MNGN 424 Mine Ventilation - 3.0 CH
- MNGN 431 Mining and Metallurgical Environment - 3.0 CH
- MNGN 433 Mine Systems Analysis I - 3.0 CH
- MNGN 436 Underground Coal Mine Design - 3.0 CH
- MNGN 461 Transport Phenomena and Reactor Design - 3.0 CH

Petroleum Engineering:

- PEGN 305 Computational Methods in Petroleum Engineering - 2.0 CH
- PEGN 308 Reservoir Rock Properties - 3.0 CH
- PEGN 311 Drilling Engineering - 3.0 CH
- PEGN 312 Properties of Petroleum Engineering Fluids - 3.0 CH
- PEGN 411 Mechanics of Petroleum Production - 3.0 CH
- PEGN 414 Well Testing and Analysis - 3.0 CH
- PEGN 419 Well Log Analysis and Formation Evaluation - 3.0 CH
- PEGN 423 Petroleum Reservoir Engineering I - 3.0 CH
- PEGN 424 Petroleum Reservoir Engineering II - 3.0 CH
- PEGN 426 Formation Damage and Stimulation - 3.0 CH
- PEGN 438 Petroleum Data Analytics - 3.0 CH
- PEGN 460 Flowe in Pipe Networks - 3.0 CH
- PEGN 461 Surface Facilities Design and Operation - 3.0 CH
- PEGN 490 Reservoir Geomechanics - 3.0 CH

FOCUS AREA ELECTIVES

(Must take a TOTAL of 18 CH to fulfill degree)

Individualized: Speak to your advisor about Focus Area elective plans