Chemical & Biological Engineering and Chemical Engineering

Engineering Technical Electives (including CHEN 3000+ Technical Electives) are listed first, followed by General Technical Electives. (All Engineering Technical Electives can also be used for General Technical Elective credit.)

ENGINEERING TECH ELECTIVES
AREN 1027........Engineering Drawing
AREN 1316........Intro to AREN
AREN 2050........Building Materials and Systems
AREN 3010........Mechanical Systems for Buildings
AREN 3050........Environmental Systems for Buildings 1
AREN 3060........Environmental Systems for Buildings 2
AREN 3140........Illumination Laboratory
AREN 3540........Illumination 1
AREN 4010........HVAC System Controls
AREN 4035........Architectural Structures 1
AREN 4045........Architectural Structures 2
AREN 4110........HVAC Design 1
AREN 4130........Optical Design for Illumination and Solid-State Lighting
AREN 4315........Design of Masonry Structures
AREN 4317........Architectural Engineering Design
AREN 4530........Advanced Lighting Design
AREN 4540........Exterior Lighting Systems
AREN 4550........Illuminations 2
AREN 4560........Luminous Radiative Transfer
AREN 4570........Building Electrical Systems Design 1
AREN 4580........Daylighting
AREN 4590........Computer Graphics in Lighting Engineering
AREN 4830........The Future of Solid-State Lighting
AREN 4890........Sustainable Building Design

ASEN 1000........Intro to ASEN
ASEN 1400........Gateway to Space
ASEN 1969........Pathway to Space
ASEN 3112........Structures
ASEN 3116........Introduction to Biomedical Engineering
ASEN 3128........Aircraft Dynamics
ASEN 3200........Orbital Mechanics/Attitude Dynamics and Control
ASEN 3300........Aerospace Electronics and Communications
ASEN 4010........Intro to Space Dynamics
ASEN 4012........Aerospace Materials
ASEN 4013........Foundations of Propulsion
ASEN 4090........Global Positioning Systems Applications
ASEN 4114........Automatic Control Systems
ASEN 4123........Vibration Design
ASEN 4128........Human Factors in Engineering and Design
ASEN 4138........Aircraft Design

Last Revised: 5 Feb 2020
ASEN 4148 ..........Spacecraft Design
ASEN 4215 ..........Descriptive Physical Oceanography
ASEN 4216 ..........Neural Signals and Functional Brain Imaging
ASEN 4218 ..........Large Space Structures Design
ASEN 4222 ..........Materials Science for Composite Manufacturing
ASEN 4238 ..........Computer Aided Control System Design
ASEN 4248 ..........Computer Aided Control System Design 2
ASEN 4255 ..........Environmental Aerodynamics
ASEN 4338 ..........Computer Analysis of Structures
ASEN 4426 ..........Neural Systems and Physiological Control
ASEN 4519 ..........Climate Change and Engineering

CHEN 1300 ........Intro to Chemical Engineering
CHEN 2840 ..........Independent Study
CHEN 3660 ..........Energy Fundamentals
CHEN 3838 ..........Special Topics
CHEN 3840 ..........Independent Study
CHEN 4440 ..........Materials (CBEN only)
CHEN 4450 ..........Polymer Chemistry
CHEN 4460 ..........Polymer Engineering
CHEN 4630 ..........Intellectual Property Law
CHEN 4650 ..........Particle Technology
CHEN 4800 ..........Bioprocess Engineering (Focus TE for CBEN; CHEN 3000+ TE for CHEN)
CHEN 4801 ..........Pharmaceutical Biotechnology (Focus TE for CBEN; CHEN 3000+ TE for CHEN)
CHEN 4802 ..........Tissue Engineering and Medical Devices (Focus TE for CBEN; CHEN 3000+ TE for CHEN)
CHEN 4803 ..........Metabolic Engineering (Focus TE for CBEN; CHEN 3000+ TE for CHEN)
CHEN 4805 ..........Biomaterials (CHEN only)
CHEN 4820 ..........Biochemical Separations (CHEN only)
CHEN 4836 ..........Nanomaterials
CHEN 4838 ..........Electrochemical Engineering
CHEN 4838 ..........Protein and Enzyme Engineering (Focus TE for CBEN; CHEN 3000+ TE for CHEN)
CHEN 4840 ..........Independent Study

COEN 1400 ..........Engineering Projects
COEN 1410 ..........Engineering Projects
COEN 1500 ..........Intro to Engineering
COEN 3210 ..........Climate Change and Engineering

CSCI 1200 ..........The Art of Computational Thinking and Computer Programming (Python)
CSCI 1300 ..........Computer Science1: Starting Computing (C++)
CSCI 2270 ..........Computer Science 2: Data Structures
CSCI 2400 ..........Computer systems
CSCI 2824 ..........Discrete Structures
CSCI 3002 ..........Human-Centered Computing Foundations
CSCI 3104 ..........Algorithms
CSCI 3155 ..........Principles of Programming Languages
CSCI 3202 ..........Introduction to Artificial Intelligence
CSCI 3287 ..........Database and Information Systems

Last Revised: 5 Feb 2020
# Chemical & Biological Engineering and Chemical Engineering

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 3302</td>
<td>Intro to Robotics</td>
</tr>
<tr>
<td>CSCI 3308</td>
<td>Software Engineering Methods and Tools</td>
</tr>
<tr>
<td>CSCI 3434</td>
<td>Theory of Computation</td>
</tr>
<tr>
<td>CSCI 3656</td>
<td>Numerical Computation</td>
</tr>
<tr>
<td>CSCI 3702</td>
<td>Cognitive Science</td>
</tr>
<tr>
<td>CSCI 3753</td>
<td>Operating Systems</td>
</tr>
<tr>
<td>CSCI 4000</td>
<td>Entrepreneurship in Computing</td>
</tr>
<tr>
<td>CSCI 4113</td>
<td>UNIX System Administration</td>
</tr>
<tr>
<td>CSCI 4229</td>
<td>Computer Graphics</td>
</tr>
<tr>
<td>CSCI 4239</td>
<td>Advanced Computer Graphics</td>
</tr>
<tr>
<td>CSCI 4273</td>
<td>Network Systems</td>
</tr>
<tr>
<td>CSCI 4302</td>
<td>Advanced Robotics</td>
</tr>
<tr>
<td>CSCI 4308</td>
<td>Software Engineering project 1</td>
</tr>
<tr>
<td>CSCI 4314</td>
<td>Algorithms for Modern Biology</td>
</tr>
<tr>
<td>CSCI 4318</td>
<td>Software Engineering Project 2</td>
</tr>
<tr>
<td>CSCI 4446</td>
<td>Chaotic Dynamics</td>
</tr>
<tr>
<td>CSCI 4448</td>
<td>Object Oriented Analysis and Design</td>
</tr>
<tr>
<td>CSCI 4555</td>
<td>Compiler Construction</td>
</tr>
<tr>
<td>CSCI 4576</td>
<td>High Performance Scientific Computing</td>
</tr>
<tr>
<td>CSCI 4586</td>
<td>High Performance Scientific Computing 2</td>
</tr>
<tr>
<td>CSCI 4593</td>
<td>Computer Organization</td>
</tr>
<tr>
<td>CSCI 4753</td>
<td>Computer Performance Modeling</td>
</tr>
<tr>
<td>CSCI 4809</td>
<td>Computer Animation</td>
</tr>
<tr>
<td>CSCI 4830</td>
<td>Special Topics: Sustainable Computing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 1317</td>
<td>Intro to CVEN</td>
</tr>
<tr>
<td>CVEN 2012</td>
<td>Intro to Geomatics</td>
</tr>
<tr>
<td>CVEN 2121</td>
<td>Analytical Mechanics 1</td>
</tr>
<tr>
<td>CVEN 3022</td>
<td>Construction Surveying</td>
</tr>
<tr>
<td>CVEN 3032</td>
<td>Photogrammetry</td>
</tr>
<tr>
<td>CVEN 3111</td>
<td>Analytical Mechanics 2</td>
</tr>
<tr>
<td>CVEN 3246</td>
<td>Introduction to Construction</td>
</tr>
<tr>
<td>CVEN 3256</td>
<td>Construction Equipment and Methods</td>
</tr>
<tr>
<td>CVEN 3323</td>
<td>Hydraulic Engineering</td>
</tr>
<tr>
<td>CVEN 3414</td>
<td>Fundamentals of Environmental Engineering</td>
</tr>
<tr>
<td>CVEN 3424</td>
<td>Water and Waste-Water Treatment</td>
</tr>
<tr>
<td>CVEN 3434</td>
<td>Introduction to Applied Ecology</td>
</tr>
<tr>
<td>CVEN 3525</td>
<td>Structural Analysis</td>
</tr>
<tr>
<td>CVEN 3602</td>
<td>Transportation Systems</td>
</tr>
<tr>
<td>CVEN 3698</td>
<td>Engineering Geology</td>
</tr>
<tr>
<td>CVEN 3708</td>
<td>Geotechnical Engineering 1</td>
</tr>
<tr>
<td>CVEN 3718</td>
<td>Geotechnical Engineering 2</td>
</tr>
<tr>
<td>CVEN 4147</td>
<td>Systems Approach to Global Engineering</td>
</tr>
<tr>
<td>CVEN 4323</td>
<td>Water Resource Engineering Design</td>
</tr>
<tr>
<td>CVEN 4333</td>
<td>Engineering Hydrology</td>
</tr>
<tr>
<td>CVEN 4353</td>
<td>Groundwater Engineering</td>
</tr>
<tr>
<td>CVEN 4383</td>
<td>Groundwater Modeling</td>
</tr>
<tr>
<td>CVEN 4404</td>
<td>Water Chemistry</td>
</tr>
</tbody>
</table>

Last Revised: 5 Feb 2020
Chemical & Biological Engineering and Chemical Engineering

CVEN 4414........Water Chemistry Lab
CVEN 4424.......Environmental Organic Chemistry
CVEN 4434.......Environmental Engineering Design
CVEN 4474.......Hazardous and Industrial Waste Management
CVEN 4484.......Intro to Environmental Microbiology
CVEN 4511.......Finite Element Analysis
CVEN 4525.......Analysis of Framed Structures
CVEN 4535.......Construction Materials
CVEN 4537.......Numerical Methods in Civil Engineering
CVEN 4545.......Steel Design
CVEN 4554.......Fund of Air Quality Mgmt
CVEN 4555.......Reinforced Concrete Design
CVEN 4565.......Timber Design
CVEN 4594.......Water Reuse and Reclamation
CVEN 4700.......Sustainability and the Built Environment
CVEN 4718.......Mechanics and Dynamics of Glaciers
CVEN 4728.......Foundation Engineering

ECEN 1100.......Intro to ECEN
ECEN 1400.......Introduction to Digital and Analog Electronics
ECEN 1500.......Sustainable Energy
ECEN 2250.......Circuits/Electronics 1
ECEN 2260.......Circuits/Electronics 2
ECEN 2270.......Electronics Design Lab
ECEN 2350.......Digital Logic
ECEN 2410.......Renewable Sources and Efficient Electrical Energy Systems
ECEN 2420.......Wireless Electronics for Communication
ECEN 2703.......Discrete Mathematics for Computer Engineers
ECEN 3250.......Circuits/Electronics 3
ECEN 3300.......Linear Systems
ECEN 3303.......Intro to Robotics
ECEN 3320.......Semiconductor Devices
ECEN 3350.......Programming Digital Systems
ECEN 3360.......Digital Design Lab
ECEN 3400.......Electromagnetic Fields and Waves
ECEN 3410.......Electromagnetic Waves and Transmission
ECEN 3810.......Introduction to Probability Theory
ECEN 4106.......Photonics
ECEN 4116.......Intro to Optical Communications
ECEN 4120.......Neural Network Design
ECEN 4138.......Control Systems Analysis
ECEN 4167.......Energy Conservation 2
ECEN 4224.......High Speed Digital Design
ECEN 4242.......Communication Theory
ECEN 4324.......Fundamentals of Microsystem Packaging
ECEN 4341.......Bioelectromagnetics
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECEN 4375</td>
<td>Microstructures Laboratory</td>
</tr>
<tr>
<td>ECEN 4423</td>
<td>Chaotic Dynamics</td>
</tr>
<tr>
<td>ECEN 4517</td>
<td>Renewable and Power Electronics Laboratory</td>
</tr>
<tr>
<td>ECEN 4532</td>
<td>Digital Signal Processing Laboratory</td>
</tr>
<tr>
<td>ECEN 4553</td>
<td>Introduction to Compiler Construction</td>
</tr>
<tr>
<td>ECEN 4555</td>
<td>Principles of Energy Systems and Design</td>
</tr>
<tr>
<td>ECEN 4583</td>
<td>Software System Development</td>
</tr>
<tr>
<td>ECEN 4593</td>
<td>Computer Organization</td>
</tr>
<tr>
<td>ECEN 4606</td>
<td>Undergraduate Optics Laboratory</td>
</tr>
<tr>
<td>ECEN 4613</td>
<td>Embedded System Design</td>
</tr>
<tr>
<td>ECEN 4616</td>
<td>Optoelectric System Design</td>
</tr>
<tr>
<td>ECEN 4623</td>
<td>Real Time Embedded Systems</td>
</tr>
<tr>
<td>ECEN 4632</td>
<td>Introduction to Digital Filtering</td>
</tr>
<tr>
<td>ECEN 4633</td>
<td>Hybrid Embedded System</td>
</tr>
<tr>
<td>ECEN 4634</td>
<td>Microwave and RF Lab</td>
</tr>
<tr>
<td>ECEN 4638</td>
<td>Control Systems Lab</td>
</tr>
<tr>
<td>ECEN 4643</td>
<td>SW Engineering Concurrent Systems</td>
</tr>
<tr>
<td>ECEN 4652</td>
<td>Communication Laboratory</td>
</tr>
<tr>
<td>ECEN 4653</td>
<td>Real-Time Digital media</td>
</tr>
<tr>
<td>ECEN 4743</td>
<td>SW Engineering of Distributed Systems</td>
</tr>
<tr>
<td>ECEN 4753</td>
<td>Computer Performance Modeling</td>
</tr>
<tr>
<td>ECEN 4797</td>
<td>Introduction to Power Electronics</td>
</tr>
<tr>
<td>ECEN 4811</td>
<td>Neural Signals and Functional Brain Imaging</td>
</tr>
<tr>
<td>ECEN 4821</td>
<td>Neural Systems and Physiological Control</td>
</tr>
<tr>
<td>ECEN 4827</td>
<td>Analog IC Design</td>
</tr>
<tr>
<td>ECEN 4831</td>
<td>Brains, Minds, Computers</td>
</tr>
<tr>
<td>ECEN 5017</td>
<td>Special Topics: Power Electronics for Electric Vehicles</td>
</tr>
<tr>
<td>ECEN 5107</td>
<td>Electric Power Grid</td>
</tr>
<tr>
<td>INFO 1201</td>
<td>Computational Reasoning 1</td>
</tr>
<tr>
<td>EMEN 4405</td>
<td>Systems Engineering</td>
</tr>
<tr>
<td>ENEN 4321</td>
<td>Oil and Gas Processing</td>
</tr>
<tr>
<td>ENEN 4405</td>
<td>Systems Engineering</td>
</tr>
<tr>
<td>ENEN 4600</td>
<td>Energy Engineering Projects</td>
</tr>
<tr>
<td>EVEN 1000</td>
<td>Intro to EVEN</td>
</tr>
<tr>
<td>EVEN 4100</td>
<td>Environmental Sampling and Analysis</td>
</tr>
<tr>
<td>EVEN 4404</td>
<td>Water Chemistry</td>
</tr>
<tr>
<td>EVEN 4414</td>
<td>Water Chemistry Lab</td>
</tr>
<tr>
<td>EVEN 4434</td>
<td>Environmental Engineering Design</td>
</tr>
<tr>
<td>EVEN 4464</td>
<td>Environmental Engineering Process</td>
</tr>
<tr>
<td>EVEN 4484</td>
<td>Intro to Environmental Microbiology</td>
</tr>
<tr>
<td>GEEN 1017</td>
<td>CAD</td>
</tr>
<tr>
<td>GEEN 1400</td>
<td>Engineering Projects</td>
</tr>
<tr>
<td>GEEN 2400</td>
<td>Engineering Projects for the Community</td>
</tr>
</tbody>
</table>

Last Revised: 5 Feb 2020
GEEN 2851.......Statics for Engineers
MCEN 1025.......CAD
MCEN 2023.......Statics and Structures
MCEN 2063.......Mechanics of Solids
MCEN 3017.......Circuits
MCEN 3023.......Component Design
MCEN 3030.......Computational methods
MCEN 3032.......Thermodynamics 2
MCEN 4026.......Manufacturing processes and Systems
MCEN 4032 ......Sustainable Energy
MCEN 4043.......System Dynamics
MCEN 4115......Mechatronics and Robotics 1
MCEN 4117......Anatomy and Physiology for Engineers
MCEN 4123.......Vibration Analysis
MCEN 4124......Mechanical Behavior of Materials
MCEN 4127 ......Biomedical Ultrasound
MCEN 4131.......Air Pollution Control Engineering
MCEN 4135 ......Wind Energy and Wind Turbine Design
MCEN 4137 ......Anatomy and Physiology 2
MCEN 4141 ......Indoor Air Pollution
MCEN 4151 ......Flow Visualization
MCEN 4152 ......Intro to Combustion
MCEN 4154 ......Biocolloids and Biomembranes
MCEN 4173 ......Finite Element Analysis
MCEN 4194 ......Electrochemical Energy Conversion and Storage
MCEN 4228 ......Design of Coffee
MCEN 4228 ...... Intro of Microfluidics

GENERAL (NON-ENGINEERING) TECH ELECTIVES
ACCT 3220 ........Corporate Financial Reporting 1
ACCT 3230 ........Corporate Financial Reporting 2
ACCT 3320 ........Cost Management
ACCT 4240 ........Advanced Financial Accounting
ACCT 4250 ........Financial Statement Analysis
ACCT 4330 ........Advanced Cost Management
ACCT 4540 ........Accounting Information Systems
ACCT 4620 ........Auditing and Assurance Services
ACCT 4800 ........Accounting for Gov and Nonprofit Orgs

ANTH 2010 ......Introduction to Physical Anthropology
ANTH 2020 ......Introduction to Physical Anthropology 2
ANTH 2030 ......Lab in Physical Anthropology 1
ANTH 2040 ......Lab in Physical Anthropology 2
ANTH 2070 ......Bones, Bodies, and Disease
ANTH 2210 ......Lab in Archaeological Methods
ANTH 3000 ......Primate Behavior
ANTH 3010 .......The Human Animal
ANTH 4000 .......Quantitative Methods
ANTH 4060 .......Nutrition and Anthropology
ANTH 4070 .......Methods in Biological Anthropology
ANTH 4110 .......Human Evolutionary Biology
ANTH 4120 .......Advanced Physical Anthropology
ANTH 4130 .......Advanced Osteology
ANTH 4150 .......Human Ecology: Biological Aspects
ANTH 4170 .......Primate Evolutionary Biology
ANTH 4240 .......Geoarchaeology
ANTH 4330 .......Human Ecology: Archaeological Aspects
ANTH 4380 .......Lithic Analysis and Replication
ANTH 4610 .......Medical Anthropology

APPM 1710 ......Application to games Development 1
APPM 2750 ......Java: Training, Mathematical Algorithms, and Mobile Apps
APPM 3010 ......An Introduction to Nonlinear Systems: Chaos
APPM 3050 .....Scientific Computing in Matlab
APPM 3170 .....Discrete Applied Mathematics
APPM 3310 .....Matrix Methods and Applications
APPM 3350 .....Advanced Engineering Calc
APPM 3570 .....Applied Probability
APPM 4120 ......Introduction to Operations Research
APPM 4350 ......Methods in Applied Math: Fourier Series
APPM 4360 ......Methods in Applied Math: Complex Variables
APPM 4380 .....Modeling in Applied Mathematics
APPM 4390 .....Modeling in Mathematical Biolog
APPM 4440 ......Undergraduate Applied Analysis 1
APPM 4450 ......Undergraduate Applied Analysis 2
APPM 4520 ......Introduction to Mathematical Statistics
APPM 4540 ......Introduction to Time Series
APPM 4560 ......Markov Processes, Queues & Monte Carlo Sim
APPM 4570 .....Statistical Methods
APPM 4580 .....Statistical Applications: Software and Methods
APPM 4590 .....Statistical Modeling
APPM 4650 ......Intermediate Numerical Analysis 1
APPM 4660 ......Intermediate Numerical Analysis 2
APPM 4720 ......Open Topics in Applied Mathematics

ASEN 3519 .......The Politics of Space

ASTR 1000 .......General Astronomy - the Solar System (was ASTR 1110)
ASTR 1010 .......Intro to Astronomy 1
ASTR 1020 .......Intro to Astronomy 2
ASTR 1030 .......Accelerated Introduction Astronomy 1
ASTR 1040 .......Accelerated Introduction Astronomy 2
ASTR 1200 ....... General Astronomy - Stars and Galaxies (was ASTR 1120)
ASTR 1400 .......Gateway to Space
ASTR 2010 ......Modern Cosmology
ASTR 2020 ......Space Astronomy and Exploration
ASTR 2030 ......Black Holes
ASTR 2600 ......Computational techniques
ASTR 3300 ......Extraterrestrial Life
ASTR 3510 ......Observations and Instrumentation 1
ASTR 3520 ......Observations and Instrumentation 2
ASTR 3560 ......Astronomical Instrumentation Lab
ASTR 3710 ......Formation and Dynamics of Planetary Systems
ASTR 3720 ......Plants and Their Atmospheres
ASTR 3730 ......Astrophysics 1 - Stellar and Interstellar
ASTR 3740 ......Cosmology and Relativity
ASTR 3750 ......Planets, Moons, and Rings
ASTR 3760 ......Solar and Space Physics
ASTR 3800 ......Introduction to Scientific Data Analysis and Computing
ASTR 3830 ......Astrophysics 2 - Galactic and Extragalactic
ASTR 4330 ......Cosmochemistry
ASTR 4800 ......Space Science: Practice and Policy

ATOC 3050 ......Principles of Weather
ATOC 3070 ......Introduction to Oceanography
ATOC 3180 ......Aviation Metrology
ATOC 3300 ......Analysis of Climate and Weather Observation
ATOC 3500 ......Air Chemistry and Pollution
ATOC 3600 ......Principles of Climate
ATOC 3720 ......Planets and Their Atmospheres
ATOC 4200 ......Biogeochemical Oceanography
ATOC 4215 ......Oceanography
ATOC 4500 ......Special Topics in Atmospheric and Oceanic Sciences
ATOC 4455 ......Mountain Meteorology
ATOC 4720 ......Intro to Atmospheric Physics and Dynamics
ATOC 4750 ......Desert Meteorology and Climate
ATOC 4770 ......Wind Energy Meteorology

BCOR 2000 ......Accounting and Financial Analysis
BCOR 2200 ......Introductory Finance
BCOR 2300 ......Adding Value with Management
BCOR 2400 ......Fundamentals of Marketing
BCOR 2500 ......Introduction to Operations and Information Management

BSLW 4120 ......Advanced Business Law

BUSM 2001 ......Principles of Marketing and Management (OLD COURSE)
BUSM 2010 ......Principles of Marketing
BUSM 2011 ......Principles of Management
BUSM 2002 ......Principles of Accounting and Finance (OLD COURSE)
BUSM 2020 ......Principles of Accounting
BUSM 2021 ......Principles of Finance
BUSM 3001.......Management and Innovation (OLD COURSE)
BUSM 3010.......Managing Innovation I
BUSM 3011.......Managing Innovation II
BUSM 3002.......Business & Financial Analytics (OLD COURSE)
BUSM 3020.......Business & Financial Analytics I
BUSM 3021.......Business & Financial Analytics II
BUSM 3003.......Introduction to Entrepreneurship (OLD COURSE)
BUSM 3030.......Introduction to Entrepreneurship
BUSM 4001....... Professional Business Plan Development (OLD COURSE)
BUSM 4010.......Professional Business Plan Development

CHEM 4011.......Modern Inorganic Chemistry
CHEM 4021.......Inorganic Laboratory
CHEM 4141 .....Environmental Water and Soil Chemistry
CHEM 4171.......Instrumental Analysis
CHEM 4181.......Instrumental Anal Lab 2
CHEM 4251 .........Materials Chemistry and Properties
CHEM 4261 .........Organic Materials: Structures and Functions
CHEM 4271 .........Chemistry of Solar Energy
CHEM 4431.......Physical Chem with Biochem Applications 2
CHEM 4531.......Physical Chemistry 2
CHEM 4581.......Physical Chemistry Lab 1
CHEM 4591.......Physical Chemistry Lab 2
CHEM 4611.......Survey of Biochemistry
CHEM 4621.......Genome Databases
CHEM 4700 .....Foundations of Biochem
CHEM 4720 .....Metabolic Pathways and Human Disease
CHEM 4740 .....Expression and Transmission of Genetic Information
CHEM 4751.......Current Topics in Biochemical Research
CHEM 4761.......Biochem Lab
CHEM 4791.......Bioorganic Chem in Biotech

CSCI 3352 ........Biological Networks

CVEN 5834 .........International Environmental Impact Assessment

EBIO 1230 .........Lab
EBIO 1240 .........Lab
EBIO 2040 .........Ecology
EBIO 2070 .........Genetics
EBIO 2090........Tropical Island and marine Ecology
EBIO 3040 .........Conservation Biology
EBIO 3080 .........Evolutionary Biology
EBIO 3170.........Arctic and Alpine Ecology
EBIO 3175 ........Arctic and Alpine Ecology Lab
EBIO 3190 .........Tropical marine Ecology
EBIO 3240........Animal behavior
EBIO 3270 .........Ecosystem Ecology
Chemical & Biological Engineering and Chemical Engineering

EBIO 3400 ..........Microbiology
EBIO 3630 ..........Parasitology
EBIO 3770 ..........Animal Diversity - vert
EBIO 3850 ..........Animal Diversity – Invert
EBIO 4020 ..........Stream Biology
EBIO 4030 ..........Limnology
EBIO 4060 ..........Landscape Ecology
EBIO 4080 ..........Freshwater Phycology
EBIO 4090 ..........Coral Reef Ecology
EBIO 4100 ..........Advanced Ecology
EBIO 4110 ..........Advanced Ecology
EBIO 4140 ..........Plant Ecology
EBIO 4160 ..........Intro to Biogeochemistry
EBIO 4290 ..........Molecular systematics
EBIO 4410 ..........Biometry
EBIO 4440 ..........Animal Developmental Diversity
EBIO 4500 ..........Plant diversity and evolution
EBIO 4510 ..........Plant anatomy and development
EBIO 4520 ..........Plant Systematics
EBIO 4530 ..........Plant Biology
EBIO 4550 ..........Plant Eco-Evo devo
EBIO 4660 ..........Insect Biology
EBIO 4740 ..........Bio of Amphibians and Reptiles
EBIO 4750 ..........Ornithology
EBIO 4760 ..........Mammalogy

ECON 3818 ..........Intro to Statistics with computer applications
ECON 4231 ..........Applied Economic Analysis and Public Policy
ECON 4697 ..........Industrial Organization and Regulation
ECON 4808 ..........Introduction to Mathematical Economics
ECON 4818 ..........Intro to Econometrics
ECON 4838 ..........Microcomputer applications in Economics
ECON 4848 ..........Applied Econometrics
ECON 4858 ..........Financial Econometrics
ECON 4868 ..........Simulation Modeling in Microeconomics

EMEN 4030 .......... Project Management System
EMEN 4050 ..........Leadership and professional Skills
EMEN 4100 ..........Business Methods and Economics
EMEN 4110 ..........Supply Chain Management
EMEN 4120 ..........Managing Business Processes
EMEN 4400 ..........Quality Management
EMEN 4800 ..........Entrepreneurial Marketing
EMEN 4820 ..........Entrepreneurial Product Design
EMEN 4825 ..........Entrepreneurial Business Plan Preparation
EMEN 4830 ..........Ventures for Civic Innovation

ENVD 1004 ..........Intro to Environmental Design Theory
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVD 1052</td>
<td>Design and Communication I</td>
</tr>
<tr>
<td>ENVS 3001</td>
<td>Sustainable Solutions</td>
</tr>
<tr>
<td>ENVS 3040</td>
<td>Conservation Biology</td>
</tr>
<tr>
<td>ENVS 3434</td>
<td>Intro to Applied Ecology</td>
</tr>
<tr>
<td>ENVS 3600</td>
<td>Principles of Climate</td>
</tr>
<tr>
<td>ENVS 4160</td>
<td>Intro to Biogeochemistry</td>
</tr>
<tr>
<td>ENVS 4201</td>
<td>Biometeorology</td>
</tr>
<tr>
<td>ESBM 3700</td>
<td>Entrepreneurial Environments</td>
</tr>
<tr>
<td>ESBM 4570</td>
<td>Entrepreneurial Finance</td>
</tr>
<tr>
<td>ESBM 4820</td>
<td>Engineering Entrepreneurship</td>
</tr>
<tr>
<td>ESBM 4826</td>
<td>Exp. Sem-social Entrepreneurship: Designing a Better World</td>
</tr>
<tr>
<td>EVEN 5834</td>
<td>International Environmental Impact Assessment</td>
</tr>
<tr>
<td>FNCE 3010</td>
<td>Corporate Finance</td>
</tr>
<tr>
<td>FNCE 4000</td>
<td>Financial Institutions Management</td>
</tr>
<tr>
<td>FNCE 4030</td>
<td>Investment and Portfolio Management</td>
</tr>
<tr>
<td>FNCE 4040</td>
<td>Derivative Securities</td>
</tr>
<tr>
<td>FNCE 4050</td>
<td>Capital Investment Analysis</td>
</tr>
<tr>
<td>FNCE 4832</td>
<td>Microfinance</td>
</tr>
<tr>
<td>GEEN 3830</td>
<td>Engineering Math</td>
</tr>
<tr>
<td>GEOG 1001</td>
<td>Environ Systems 1- Climate and Vegetation</td>
</tr>
<tr>
<td>GEOG 1011</td>
<td>Environ Systems 2 - Landscapes and Water</td>
</tr>
<tr>
<td>GEOG 2053</td>
<td>Mapping a Changing World</td>
</tr>
<tr>
<td>GEOG 3053</td>
<td>Cartography: Visualization and Information Design</td>
</tr>
<tr>
<td>GEOG 3251</td>
<td>Mountain Geography</td>
</tr>
<tr>
<td>GEOG 3301</td>
<td>Analysis of Climate and Weather Observation</td>
</tr>
<tr>
<td>GEOG 3351</td>
<td>Biogeography</td>
</tr>
<tr>
<td>GEOG 3511</td>
<td>Introduction to Hydrology</td>
</tr>
<tr>
<td>GEOG 3601</td>
<td>Principles of Climate</td>
</tr>
<tr>
<td>GEOG 3692</td>
<td>Introduction to Global Public Health</td>
</tr>
<tr>
<td>GEOG 4023</td>
<td>Introduction to Quantitative Methods in Human Geography</td>
</tr>
<tr>
<td>GEOG 4043</td>
<td>Cartography 2: Interactive and Multimedia Mapping</td>
</tr>
<tr>
<td>GEOG 4093</td>
<td>Remote Sensing of the Environment</td>
</tr>
<tr>
<td>GEOG 4103</td>
<td>Introduction to Geographic Information Science</td>
</tr>
<tr>
<td>GEOG 4201</td>
<td>Biometeorology</td>
</tr>
<tr>
<td>GEOG 4203</td>
<td>Geographic Information Science: Modeling Applications</td>
</tr>
<tr>
<td>GEOG 4241</td>
<td>Principles of Geomorphology</td>
</tr>
<tr>
<td>GEOG 4251</td>
<td>Fluvial Geomorphology</td>
</tr>
<tr>
<td>GEOG 4261</td>
<td>Glaciers and Permafrost</td>
</tr>
<tr>
<td>GEOG 4271</td>
<td>The Arctic Climate System</td>
</tr>
<tr>
<td>GEOG 4303</td>
<td>GIS Programming for Spatial Analysis</td>
</tr>
<tr>
<td>GEOG 4311</td>
<td>Watershed Biogeochemistry</td>
</tr>
<tr>
<td>GEOG 4321</td>
<td>Hydrology</td>
</tr>
<tr>
<td>GEOG 4331</td>
<td>Mountain Snow Climatology</td>
</tr>
</tbody>
</table>
Chemical & Biological Engineering and Chemical Engineering

GEOG 4371 ......Forest Geography: Principles and Dynamics
GEOG 4401 ......Soils Geography
GEOG 4501 ......Water Res and Water Man of Western U

GEOL 1010 ........Introduction to Geology 1
GEOL 1012 ........Exploring Earth for Scientists
GEOL 1020 ........Introduction to Geology 2
GEOL 1030 ........Introduction to Geology Laboratory 1
GEOL 1040 ........Geology of Colorado
GEOL 1060 ........Global Change an Earth Science Perspective
GEOL 1150 ......Water, Energy and the Environment
GEOL 1170 ......Our Deadly Planet
GEOL 1180 ......Our Microbial Planet
GEOL 2001 ......Planet Earth
GEOL 2005 ...... Intro to Earth Materials
GEOL 2100 ......Environmental Geology
GEOL 2700 ......Introduction to Field Geography
GEOL 3010 ......Introduction to Mineralogy
GEOL 3020 ......Petrology
GEOL 3023 ......Statistics for Earth Sciences
GEOL 3030 ......Introduction to Hydrogeology
GEOL 3040 ......Global Change: The Recent Geological Record
GEOL 3050 ......GIS for Geologists
GEOL 3070 ......Introduction to Oceanography
GEOL 3120 ......Structural Geology
GEOL 3130 ......Global Warming
GEOL 3300 ......Extraterrestrial Life
GEOL 3320 ......Introduction to Geochemistry
GEOL 3410 ......Paleobiology
GEOL 3430 ......Sedimentology and Stratigraphy
GEOL 3500 ......Earth Resources and the Environment
GEOL 3540 ......Intro to Hydrocarbon Geology
GEOL 3720 ......Evolution of Life: The Geological Record
GEOL 3820 ......The Fluid Earth
GEOL 3950 ......Natural Catastrophes and Geologic Hazards
GEOL 4060 ......Oceanography
GEOL 4070 ......Paleoclimatology
GEOL 4093 ......Remote Sensing of the Environment
GEOL 4130 ......Principals of Geophysics
GEOL 4160 ......Introduction to Biogeochmistry
GEOL 4215 ......Geochonoloty and Thermochronology
GEOL 4241 ......Principles of Geomorphology
GEOL 4270 ......Marine Chemistry
GEOL 4330 ......Cosmochemistry
GEOL 4474 ......Vertebrate paleontology
GEOL 4550 ......Petroleum Reservoir modeling
GEOL 4670 ......Isotope Geology
GEOL 4711 ......Igneous and Metamorphic Field Geology
Chemical & Biological Engineering and Chemical Engineering

GEOL 4712 ..........Structural Field Geology
GEOL 4714 ..........Field Geophysics
GEOL 4715 ..........Field Tech in Surficial Geol and Geohydrology
GEOL 4716 ..........Environmental Field Geochemistry
GEOL 4717 ..........Field Seminar in Geology and Tectonics
GEOL 4721 ..........Field Methods in Active Tectonics

INBU 4200 ..........International Financial management

IPHY 2420 ..........Nutrition for Health and Performance
IPHY 2500 ..........Perspectives in Health
IPHY 3060 ..........Cell Physiology
IPHY 3410 ..........Introduction to Human Anatomy
IPHY 3415 ..........Human Anatomy Laboratory
IPHY 3430 ..........Intro to Human Physiology
IPHY 3435 ..........Human Physiology Laboratory
IPHY 3440 ..........Clinical Nutrition
IPHY 3450 ..........Comparative Animal Physiology
IPHY 3460 ..........Comparative Vertebrate Anatomy
IPHY 3470 ..........Human Phys 1
IPHY 3480 ..........Human Phys 2
IPHY 3490 ..........Intro to Epidemiology
IPHY 3660 ..........Dynamics of Motor Learning
IPHY 3800 ..........Forensic Biology
IPHY 3810 ..........Forensic Biology Laboratory
IPHY 4200 ..........Physiological Genetics and Genomics
IPHY 4440 ..........Endocrinology
IPHY 4470 ..........Biology of Human Reproduction
IPHY 4480 ..........Comparative Reproduction
IPHY 4540 ..........Biomechanics
IPHY 4580 ..........Sleep Physiology
IPHY 4600 ..........Immunology
IPHY 4650 ..........Exercise Physiology
IPHY 4720 ..........Neurophysiology
IPHY 4730 ..........Motor Control

LING 3100 ..........Language Sound Structures
LING 3005 ..........Cognitive Science
LING 4420 ..........Morphology and Syntax

MATH 3001 ..........Analysis
MATH 3110 ..........Introduction to Theory of Numbers
MATH 3120 ..........Functions and Modeling
MATH 3140 ..........Abstract Algebra 1
MATH 3170 ..........Combinatorics 1
MATH 3210 ..........Euclidean and Non-Euclidean Geometries
MATH 4000 ..........Foundations of Mathematics
MATH 4001 ..........Analysis 2
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 4120</td>
<td>Introduction to Operations Research</td>
</tr>
<tr>
<td>MATH 4140</td>
<td>Abstract Algebra 2</td>
</tr>
<tr>
<td>MATH 4200</td>
<td>Intro to Topology</td>
</tr>
<tr>
<td>MATH 4230</td>
<td>Geometry of Curves and Surfaces</td>
</tr>
<tr>
<td>MATH 4330</td>
<td>Fourier Analysis</td>
</tr>
<tr>
<td>MATH 4440</td>
<td>Mathematics and Coding and Cryptography</td>
</tr>
<tr>
<td>MATH 4450</td>
<td>Introduction to Complex Variables</td>
</tr>
<tr>
<td>MATH 4470</td>
<td>Partial Differential Equations 1</td>
</tr>
<tr>
<td>MATH 4510</td>
<td>Introduction to Probability Theory</td>
</tr>
<tr>
<td>MATH 4540</td>
<td>Introduction to Time Series</td>
</tr>
<tr>
<td>MATH 4650</td>
<td>Intermediate Numerical Analysis 1</td>
</tr>
<tr>
<td>MATH 4660</td>
<td>Intermediate Numerical Analysis 2</td>
</tr>
<tr>
<td>MATH 4730</td>
<td>Set Theory</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCDB 1161</td>
<td>From Dirt to DNA: Phage Genomics Laboratory I</td>
</tr>
<tr>
<td>MCDB 2150</td>
<td>Principles of Genetics</td>
</tr>
<tr>
<td>MCDB 2161</td>
<td>From DNA to Genes, Phage Genomics Laboratory II</td>
</tr>
<tr>
<td>MCDB 3135</td>
<td>Cell Biology</td>
</tr>
<tr>
<td>MCDB 3140</td>
<td>Cell Biology Laboratory</td>
</tr>
<tr>
<td>MCDB 3145</td>
<td>Molecular Cell Biology II</td>
</tr>
<tr>
<td>MCDB 3150</td>
<td>Biology of the Cancer Cell</td>
</tr>
<tr>
<td>MCDB 3160</td>
<td>Infectious Disease</td>
</tr>
<tr>
<td>MCDB 3280</td>
<td>Molecular Cell Physiology</td>
</tr>
<tr>
<td>MCDB 3333</td>
<td>Biomedical Innovations and Discoveries</td>
</tr>
<tr>
<td>MCDB 3350</td>
<td>Fertility, Sterility, and Early Mammalian Development</td>
</tr>
<tr>
<td>MCDB 3501</td>
<td>Structural Methods for Biological Macromolecules</td>
</tr>
<tr>
<td>MCDB 3650</td>
<td>The Brain – From Molecules to Behavior</td>
</tr>
<tr>
<td>MCDB 3651</td>
<td>The Brain: Dysfunction to Disease</td>
</tr>
<tr>
<td>MCDB 3700</td>
<td>Poisons in Cell Biology and Society</td>
</tr>
<tr>
<td>MCDB 4101</td>
<td>Editing Genomes with CRISPER-Cas9 Discovering Gene Function</td>
</tr>
<tr>
<td>MCDB 4202</td>
<td>The Python Project</td>
</tr>
<tr>
<td>MCDB 4300</td>
<td>Immunology</td>
</tr>
<tr>
<td>MCDB 4310</td>
<td>Microbial Genetics and Physiology</td>
</tr>
<tr>
<td>MCDB 4314</td>
<td>Algorithms for Molecular Biology</td>
</tr>
<tr>
<td>MCDB 4330</td>
<td>Bacterial Disease Mechanisms</td>
</tr>
<tr>
<td>MCDB 4350</td>
<td>Microbial Diversity and the Biosphere</td>
</tr>
<tr>
<td>MCDB 4361</td>
<td>Evolution and Development</td>
</tr>
<tr>
<td>MCDB 4410</td>
<td>Human Molecular Genetics</td>
</tr>
<tr>
<td>MCDB 4422</td>
<td>Molecular Biology of Free Radicals: Role(s) in Oxidative Stress, Signaling, Disease, Aging</td>
</tr>
<tr>
<td>MCDB 4425</td>
<td>Cellular Stress Responses: Molecular Mechanisms, Physiology, and Human Diseases</td>
</tr>
<tr>
<td>MCDB 4426</td>
<td>Cell Signaling and Developmental Regulation</td>
</tr>
<tr>
<td>MCDB 4427</td>
<td>Biology of the Visual System</td>
</tr>
<tr>
<td>MCDB 4444</td>
<td>The Cellular Basis of Disease</td>
</tr>
<tr>
<td>MCDB 4471</td>
<td>Mechanisms of Gene Regulation in Eukaryotes</td>
</tr>
<tr>
<td>MCDB 4520</td>
<td>Bioinformatics and Genomics</td>
</tr>
<tr>
<td>MCDB 4550</td>
<td>Cellular and Molecular Motion, A Biophysical Approach</td>
</tr>
<tr>
<td>MCDB 4615</td>
<td>Biology of Stem Cells</td>
</tr>
<tr>
<td>MCDB 4621</td>
<td>Genome Databases: Mining and Management</td>
</tr>
</tbody>
</table>
MCDB 4650.......Developmental Biology
MCDB 4680.......Mechanisms of Aging
MCDB 4750.......Animal Virology
MCDB 4777.......Molecular Neurobiology
MCDB 4790.......Experimental Embryology
MCDB 4810.......Insane in the Membrane: The Biology and Biophysics of the Membrane

MGMT 3030......Critical Leadership Skills
MGMT 4090......IT and Business Strategy
MGMT 4110......Supply Chain Management
MGMT 4120......Managing Business Processes

MKTG 3150.......Sales Management
MKTG 3250.......Buyer Behavior
MKTG 3350.......Marketing Research
MKTG 4250.......Product Strategy
MKTG 4350.......Services Marketing Strategy
MKTG 4500......Advertising Management
MKTG 4550......Advertising and Promotion Management
MKTG 4650.......Institutional Relationships and Strategy
MKTG 4800.......Marketing Policies and Strategies

NAVR 3030 ......Naval Engineering Systems I
NAVR 3040 ......Weapons and Systems Analysis
NAVR 4030 ......Navigation

NRSC 4015 ......Affective Neuroscience
NRSC 4032 ......Neurobiology of Learning and Memory
NRSC 4042 ......Systems of Neuroscience
NRSC 4062 ......The Neurobiology of Stress
NRSC 4072 ......Clinical Neuroscience: A Clinical and Pathological Perspective
NRSC 4082 ......Neural Circuits of Learning and Decision Making
NRSC 4092 ......Behavioral Neuroendocrinology
NRSC 4132 ......Neuropharmacology
NRSC 4155 ......Cognitive Neuroscience/Neuropsychology
NRSC 4542 ......The Neurobiology of Mental Illness
NRSC 4545 ......Neurobiology of Addiction

PHYS 2130 ........General Physics 3
PHYS 2150 ........Experimental Physics
PHYS 2170 .......Foundations of Modern Physics
PHYS 2210........ Classical Mechanics and Math Methods 1
PHYS 3210....... Classical Mechanics and Math Methods 2
PHYS 3220....... Quantum Mechanics and Atomic Physics 1
PHYS 3310....... Principles of Electricity and Magnetism 1
PHYS 3320....... Principles of Electricity and Magnetism 2
PHYS 3330....... Electronics for the Physical Sciences
PHYS 4130 ........Biol Electron Microscopy: Prin & and Recent Adv
PHYS 4150 .......Plasma Physics
PHYS 4230 .......Thermodynamics and Statistical Mechanics
PHYS 4340 .......Introduction to Solid State Physics
PHYS 4410 .......Quantum Mechanics and Atomic Physics 2
PHYS 4420 .......Nuclear and Particle Physics
PHYS 4510 .......Optics

PSYC 2012........Biological Psychology 1
PSYC 2111........Psychological Science 1: Statistics
PSYC 3005........Cognitive Science
PSYC 3102........Behavioral genetics I
PSYC 3112........Behavioral genetics II
PSYC 3303........Abnormal Psychology
PSYC 4021........Psych and Neuroscience of Exercise
PSYC 4052........Behavioral Neuroscience
PSYC 4142........Brain Injury, Plasticity and Recovery: From Neuron to Behavior
PSYC 4145........Advanced Cognitive Psychology
PSYC 4155........Cognitive Neuroscience
PSYC 4175........Computational Cognitive Neuroscience
PSYC 4332........Found in Translation: TBI from Bench to Bedside to Community
PSYC 4543........Clinical Neuropsychological Disorders

STAT 3100 .......Applied Probability
STAT 3400 .......Applied Regression
STAT 4000 .......Statistical Methods and Applications 1 (Replaces APPM 4570)
STAT 4100 .......Markov Processes
STAT 4400 .......Advanced Statistical Modeling
STAT 4430 .......Spatial Statistics
STAT 4520 .......Intro to Mathematical Statistics
STAT 4540 .......Intro to Time Series
STAT 4610 .......Statistical Learning
STAT 4630 .......Computational Bayesian Statistics
STAT 4680 .......Statistical Collaboration
STAT 4690 .......Advanced Statistical Collaboration
STAT 4700 .......Philosophy of Statistics