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1. **COURSE NUMBER:** CEGR 2102
COURSE NAME Engineering Economic Analysis
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** David Naylor
4. **TEXTBOOK**
Title: Engineering Economic Analysis, 14th ed.
Authors: Newnan, Lavelle, Eschenbach
Year: 2020

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Economic analysis of engineering solutions; present and annual worth analysis; cost benefit analysis; internal rate of return analysis; bonds and cost estimating.
- b. **Pre-Requisites:** ENGR 1201 with grade of C or above
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students will be able to understand and use engineering economic tools to identify, formulate, and solve engineering problems from an economic perspective. Students will be able to demonstrate knowledge of present worth analysis, annual worth analysis, benefit cost analysis, and internal rate of return.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Class topics include investment choice and making economic decisions, engineering costs and cost estimating, interest and equivalence, equivalence for repeated cash flows, present worth analysis and bonds, annual cash flow analysis, engineering economic analysis, rate of return analysis, benefit/cost analysis, risk, depreciations, taxes and inflations, and investing.

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1. **COURSE NUMBER:** CEGR 2103
COURSE NAME Surveying and Technical Drawing
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** David Naylor
4. **TEXTBOOK**
Title: Surveying Fundamentals and Practices, 7th ed.
Authors: Nathanson, Lanzafama, Kissam
Year: 2018
ADDITIONAL
OPTIONAL **Title:** Introduction to AutoCAD for Civil Engineering Applications
Authors: Yasmin
TEXTBOOK **Year:** 2016

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Elements of plane surveying and technical drawing, including taping, use of level, total station, GPS, topographical surveying, mapping, error adjustment, area and volume computations, sketching, principles of Mechanical drawing, and computer aided drawing (CAD). Three hours of lecture and one laboratory period of three hours each week.
- b. **Pre-Requisites:** ENGR 1202 with grade of C or above
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

This course will provide students with an understanding of plane surveying and technical drawing as it relates to civil engineering. During hand-on laboratory exercises, students will learn to collect, analyze, and utilize surveying data, and subsequently gain skills in mechanical drawing and computer aided drawing (CAD).

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b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
3. an ability to communicate effectively with a range of audiences
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Surveying topics include units of measure, error theory and application to measurements, angles, azimuths, bearings, distance measurement, angular measurement, total station surveying, global positioning systems, leveling, traversing, area calculations, volume calculations, mapping horizontal curves, vertical curves, and geographic information systems. Technical drawing skills include hand and computer drawing techniques and tools (AutoCAD Civil 3D), how to prepare isometric and multi-view sketches, sectional views and perspective projections, engineering and architectural scaling, and engineering dimensioning.

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1. **COURSE NUMBER:** CEGR 2154
COURSE NAME Design Project Lab
2. **COURSE CREDITS / HOURS:** 2
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** James Bowen or John Daniels

4. **OPTIONAL TEXTBOOK** **Title:** Energy and the Environment, 2th ed.
Authors: Ristinen, Kraushaar
Year: 2006

- a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Problem definition, evaluation of design alternatives, design concepts, conceptual design. Students work together in teams to find, present, and defend their solutions to real world civil engineering problems. One hour of lecture and 3 hours of laboratory per week.

- b. **Pre-Requisites:** ENGR 2102 with grade of C or above

- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

This course will help students: 1) develop their oral and written communication skills; 2) learn about the challenges and opportunities for Civil and Environmental Engineers in the coming years; 3) develop their ability to work effectively in teams; 4) gain experience working through the engineering design process; and 5) work independently, in a relatively unstructured environment.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

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6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- engineering professional information and licensure; where the Civil Engineering profession is headed (National Academy of Engineering, Grand Challenges of Engineering in the 21st Century, ASCE National and State Report Cards);
- types and methods for giving oral presentations; students give five oral presentations during the semester and get both peer and faculty feedback to improve oral communication skills;
- sustainability; climate change; what is a greenhouse gas (GHG), how do GHGs affect radiative flux and planet temperature, what are the principal GHGs, properties of principal GHGs, CO₂ emission sources, and CO₂ concentration trends;
- energy use in the US, how much energy do we use, trends in energy use, energy use by sector, comparison of energy use in US to other countries, factors affecting energy use;
- fossil fuels and CO₂ emissions, benefits and costs of coal, petroleum, natural gas, relative costs, trends in production, magnitude of reserves relative to production, comparison of CO₂ emissions per unit energy produced;
- greenhouse gas emissions at UNC Charlotte, what is the magnitude of emissions, what is the trend, what are the plans for GHG emission reduction, what are the GHG emissions by scope;
- design and analysis of truss bridges (with hands-on design experience);
- what is the engineering design process, what is conceptual design, why do we do conceptual design, how do we do conceptual design;
- conceptual design group project: a proposed measure to reduce greenhouse gas emissions at UNC Charlotte;
- current conditions and future needs for transportation infrastructure in the US, how does US transportation infrastructure compare to other countries, how is US transportation infrastructure funded, what are the expected trends in infrastructure needs and funding.

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1. **COURSE NUMBER:** CEGR 3111
COURSE NAME Construction Engineering
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Christina Saunders

4. **TEXTBOOK** **Title:** No Text
Authors:
Year:

- a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

The principles and techniques of engineering construction projects from the conceptual phase, through design and construction, to completion and close-out are presented. Students develop the analytical skills and awareness necessary on the design engineering side of construction projects. Topics include: project initiation, estimating, budgeting, allocation of resources, construction equipment, formwork and bracing, temporary structures, erection and assembly methods, application of PCI, ASCE, and AASHTO codes, and value engineering.

a. **Catalog**

Description:

b. **Pre-Requisites:**

ENGR 3122, CEGR 3255, and CEGR 3278 with grades of C or above

c. **Course is:**

Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. **Outcomes of Instruction:**

This course will help students: 1) Identify the roles of the project stakeholders; 2) describe, integrate, and apply the various codes, standards, and sustainable rating systems used by construction engineers; 3) identify, summarize, and explain the standard forms and documents used by a construction engineer including contracts, specifications, addenda, construction plans, and change orders; 4) demonstrate abilities to gather data and information by interpreting construction drawings, preparing quantity and cost estimates, and by making site visits for the allocation of resources and procurement; 5) describe the process of project management, compare various scheduling techniques, and identify construction safety hazards with corresponding solutions; and 6) apply engineering principles to temporary structures and to the selection and productivity calculations of equipment used on construction projects.

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b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- introduction and overview of construction engineering (project stakeholders, industry organizations, types of projects, delivery methods);
- codes (IBC, IRC, NCBC, Fire Codes);
- standards (ASCE/SEI 7-16, AWC, PCI, AISC, NCDEQ, NCDOT, ASTM, ANSI);
- regulations (Zoning, Building, Environmental Health, NCDEQ, NCDOT, OSHA, FEMA);
- sustainability (Envision, Green Globes, LEED, and IgCC);
- legal aspects of construction engineering (engineering design documents and technical specifications, design drawings, construction documents, bid requirements, contracts, addenda, and value engineering);
- process of engineering cost analysis (estimating for labor, material, equipment, earthwork, time);
- engineering control techniques for construction (project management, scheduling, risk management, construction safety); and
- construction engineering means and methods (temporary structures, productivity of equipment, cranes and rigging, deep foundations, earth retaining structures, slope and erosions control, site dewatering and pumping).

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1. **COURSE NUMBER:** CEGR 3122
COURSE NAME Structural Analysis
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** David Weggel

4. **TEXTBOOK** **Title:** Fundamentals of Structural Analysis, 5th Ed.
Authors: Leet, Uang, Lanning
Year: 2017
- REFERENCE** **Title:** Structural Analysis, 8th Ed.
Authors: Hibbeler
Year: 2011

- a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Analysis of statically determinate and indeterminate beams, trusses and frames to include shear and moment diagrams, rough deflected shapes and deflections; influence lines and criteria for moving loads; indeterminate analyses to include methods of consistent deflection, slope deflection, and moment distribution.
- b. **Pre-Requisites:** MATH 2171 and MEGR 2144 with grades of C or above
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

After successfully completing this course, students will: 1) be able to analyze statically determinate structures (trusses, beams, and frames) subjected to external forces; 2) be able to complete analysis of simple indeterminate structures (single degree of indeterminacy); 3) understand structural idealization and load application; 4) understand construction and application of free body diagrams to problem solution; 5) understand determinacy and stability concepts; 6) be able to compute reactions, internal forces/stresses, and deflections of trusses, beams, and frames; 7) be able to sketch qualitative deflected shapes of trusses, beams, and frames; and 8) understand influence lines and criteria for moving loads on structures.

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b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include structural idealization, codes and design loads, determinacy and stability, classification of structures, analysis of trusses (method of joints, method of sections), zero-force members, shear and moment equations/diagrams for beams, linearity and superposition, sketching deflected shapes, axial, shear, and moment diagrams for frames, deflections of beams/frames (double integration method, conjugate beam method, influence lines for determinate structures, use of influence lines, Muller-Breslau Principle, influence lines for trusses and highway/railway bridges, increase-decrease method, absolute maximum shear and moment, deflections by work-energy methods, method of virtual work (trusses, beams and frames), statically indeterminate structures, concept of redundant, and flexibility method (fundamentals, indeterminate beam, indeterminate frame).

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1. **COURSE NUMBER:** CEGR 3141
COURSE NAME Introduction to Environmental Engineering
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Mei Sun

4. **TEXTBOOK**
Title: Introduction to Environmental Engineering, 5th Ed.
Authors: Davis, Cornwell
Year: 2013

- a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Environmental engineering concepts, including stream pollution analysis, water and wastewater treatment processes; solid and hazardous waste management practices; pollution problems and controls; mass balance analyses, and review of pertinent legislation.

- b. **Pre-Requisites:** MATH 2171, CHEM 1251, CHEM 1251L, and MEGR 2141 with grades of C or above

- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students will learn to use unit conversions accurately and efficiently, be able to apply mass balance principles to real-world systems, be able to analyze and break down common environmental problems in our world, expand their knowledge of contemporary environmental problems and look at ways to solve these problems, and learn to think and design with sustainable principles.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

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7. LIST OF TOPICS TO BE COVERED

Course topics include the nature of environmental problems, a review of chemistry and unit conversions, an introduction to mass balances, reactions and reactors, water chemistry, water pollution, water treatment overview, hardness and softening, coagulation and flocculation, sedimentation, filtration, disinfection, risk assessment, air pollution and treatment, wastewater treatment overview, activated sludge, sludge management, other treatment, solid waste and hazardous waste, and contaminant transfer.

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1. **COURSE NUMBER:** CEGR 3143
COURSE NAME Hydraulics and Hydrology
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** James Bowen
4. **TEXTBOOK**
Title: Munson, Young and Okiishi's Fundamentals of Fluid Mechanics, 9th Ed.
Authors: Gerhart, Hochstein, Gerhart
Year: 2021

a. **Other Supplemental Materials:** WileyPlus, Handouts, and Canvas Site

5. SPECIFIC COURSE INFORMATION

a. **Catalog Description:** Fluid properties, pressure, closed-conduit flow, pipe network, pumps, open channel flow, weirs, orifices, flumes; precipitation, runoff, groundwater flow, stream flow, flow measurement.

b. **Pre-Requisites:** MATH 2171 and MEGR 2141 with grades of C or above

c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students will develop an understanding of fluid mechanics as it applies to the environment and to civil engineering works. By the end of the course, students will be able to:

- give a definition of fluid properties such as viscosity, surface tension, and bulk modulus of elasticity, and solve equations using these properties;
- solve equations using Newton's law of viscosity;
- calculate the fluid pressure at any point in a fluid;
- be able to use information on barometers and manometers to calculate pressures within a fluid;
- calculate the hydrostatic force on flat and curved surfaces;
- calculate the center of pressure of hydrostatic forces;
- calculate buoyancy forces on objects;
- understand the differences between types of fluid flow (e.g. laminar vs. turbulent, steady vs. unsteady, 1, 2, or 3-dimensional);
- use momentum and energy equation to solve fluid flow problems;
- understand the factors affecting fluid flows in pipes and open channels;
- be able to use the Moody diagram to calculate friction factors in pipe flow;
- be able to use the Bernoulli equation and the Moody diagram to solve pipe flow problems;

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- understand the difference between sub and super critical open channel flows;
- be able to calculate the critical flow depth in open channels;
- be able to use information on channel slope, roughness, and geometry to calculate open channel flow velocities and flow rates;
- understand the conditions that produce a hydraulic jump;
- calculate conjugate depths and energy losses in a hydraulic jump;
- understand how to use a pump performance curve to calculate head added and efficiency given pump flow rate;
- calculate power requirements for operating a pump given a flow rate and a pump performance curve;
- understand the operation of pumps in parallel and serial configurations; and
- calculate stormwater runoff given watershed and rainfall information.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

- Course Introduction: fluid mechanics vs. hydraulics vs. hydrology, units and dimensions;
- Fluid properties: mass density, specific weight, specific gravity, specific volume, compressibility of liquids and solids, perfect gases, viscosity, surface tension, vapor pressure;
- Fluid Statics: Force balances in static fluids, hydrostatics equation, absolute and gage pressures, piezometers, manometers, barometers, magnitude and location of hydrostatic forces on plane surfaces, pressure forces on curved surfaces, buoyancy forces for submerged and floating bodies;
- Basics of Fluid Flow: fluid flow terms (steady, uniform, three-dimensional), laminar vs. turbulent flow, discharge, mean velocity, volume, mass, weight flow rates, steady and unsteady mass balances, velocity and acceleration in three-dimensional steady and unsteady flow;
- Energy in Steady Flow: Bernoulli equation for ideal fluid, stagnation pressure, pitot tubes, venturimeter, Bernoulli equation for real fluid, head, fluid power, hydraulic and energy grade line, head loss at submerged discharges;
- Momentum and Forces in Fluid Flow: Forces on pressure conduits, forces of free jets, reaction forces of jets, jet propulsion;
- Steady Incompressible Flow in Pipes;
- Steady Flow in Open Channels;
- Hydraulic Machinery; and
- Hydrology: Hydrologic cycle, hydrologic equation, runoff prediction, rational formula, estimating runoff coefficients and concentration time.

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1. **COURSE NUMBER:** CEGR 3153
COURSE NAME Transportation Laboratory
2. **COURSE CREDITS / HOURS:** 2
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Dave Naylor
4. **TEXTBOOK**
Title: Introduction to Traffic Engineering-A Manual for Data Collection and Analysis, 2nd Ed.
Authors: Currin
Year: 2013

a. Other Supplemental Materials: Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- Design of transportation systems, including highways, airports, pipelines, and mass transit; route layout, geometric design and earthwork calculations; computer-aided system simulation and evaluation. Technical report writing and evaluation of components of written technical communication. One and a half hours of lecture and three hours of laboratory per week.
- a. Catalog Description:**
 - b. Pre- or Corequisite:** CEGR 3161 with grade of C or above
 - c. Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

At the completion of this course, students should be able to:

- Understand the components of a Traffic Impact Study
- Identify the components of highway layout.
- Compute the design aspects of horizontal and vertical curves.
- Calculate cut and fill sections for highway construction.
- Understand the basic types of traffic studies and how to apply the studies.

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b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Topics include traffic compliance studies (stop sign compliance spot speed studies, turning movement counts, and safety), stop sign compliance, spot speed study, traffic impact analysis, turning movement study, trip generation and growth rates, parking lot design, and roadway design.

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1. **COURSE NUMBER:** CEGR 3155
COURSE NAME Environmental Laboratory
2. **COURSE CREDITS / HOURS:** 2
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Mariya Munir
4. **TEXTBOOK**
Title: Environmental Engineering Laboratory Manual (3rd ed.)
Authors: Hilger
Year: 2005

a. **Other Supplemental Materials:** Handouts, and Canvas Site

5. SPECIFIC COURSE INFORMATION

a. **Catalog Description:** Laboratory problems in environmental engineering. Emphasis on analysis and presentation of results as well as on the significance of results as they affect theory and/or practice. Technical report writing and evaluation of different forms of written communication. One and a half hours of lecture and three hours of laboratory per week.

b. **Pre-Requisites:** CHEM 1251 and CHEM 1251L with grades of C or above

Pre- or Corequisite CEGR 3141 with grade of C or above

c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

The objectives of this course are to (1) provide the students hands-on experience with some of the most common laboratory test procedures related to environmental engineering; (2) acquaint students with the applications and interpretations of the laboratory test procedures in the context of environmental engineering practice; and (3) provide students with opportunities to apply and improve their technical writing skills by providing examples of typical engineering report formats and feedback on report content and presentation.

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b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
3. an ability to communicate effectively with a range of audiences
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Students complete a series of environmental laboratory tests associated with the Water Quality Index (WQI) including: pH, Dissolved Oxygen, Suspended Solids, TOC, Nitrate Nitrogen, Total Phosphorus, Chlorophyll a, Hardness, and Fecal Coliform.

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1. **COURSE NUMBER:** CEGR 3161
COURSE NAME Transportation Engineering I
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Dave Naylor
4. **TEXTBOOK**
Title: Transportation Engineering: A Practical Approach to Highway Design, Traffic Analysis, and Systems Operations, 1st Ed.
Authors: Kuhn
Year: 2019

a. Other Supplemental Materials: Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. Catalog Description:** Analysis of transportation facilities; planning, location, economic considerations, safety analysis, and Intelligent Transportation components, with special emphasis on land transportation.
- b. Pre-Requisites:** MATH 2241, CEGR 2102, CEGR 2103, and MEGR 2141, all with grades of C or above
- c. Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

At the end of the semester, the students in this class should be able to:

- Understand the characteristics of the different transportation modes.
- Understand the important transportation legislation that has impacted our transportation system.
- Understand impacts of governmental regulation on different transportation modes.
- Understand how different transportation modes are primarily financed for construction and operation.
- Understand the components of transportation planning.
- Explain impacts of changes in the supply of transportation facilities.
- Explain the impacts of changes in travel behavior.
- Explain the overall impact of transportation on society.
- Identify the components of highway layout.
- Compute the design aspects of horizontal and vertical curves.
- Understand design speed.
- Understand design volumes.
- Understand sight distances.

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- Correctly apply the minimum and maximum design criteria.
- Calculate cut and fill sections for highway construction.
- Understand the importance of traffic control devices.
- Understand the concept of Positive Guidance.
- Understand the basic human interactions with the transportation system.
- Understand the impacts of human aging on the transportation system.
- Understand the importance and application of safety and safety programs.
- Identify different categories and applications of highway barriers.
- Identify different crash types.
- Identify different ways to classify crash locations.
- Compute crash rates.
- Identify basic remedies for crash locations.
- Identify components of the Intelligent Transportation System.
- Identify barriers to introduction and implementation of ITS strategies.
- Identify the components of an airport.
- Understand orientation of runways
- Calculate runway capacity.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include careers in transportation, transportation legislation, transportation modes, human factors, sight distance, cross sections, horizontal curves, vertical curves, earthwork, mass haul diagrams, airport design, pavement design, intersection design, traffic flow theory, freeway capacity, traffic control devices, traffic signals, traffic signal controller, transportation safety, crash rates, transportation planning, TSM's and operations, and ITS.

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1. **COURSE NUMBER:** CEGR 3201
COURSE NAME Systems and Design
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Lead Instructor: Dave Naylor
Faculty Mentors:
Bill Saunders, Erika Weber, Milind Khire
4. **TEXTBOOK** **Title:**
Authors: Course materials from all pre-requisite courses.
Year:

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Systems engineering techniques applied to civil engineering problems emphasizing methodological considerations, evaluating alternatives and developing engineering plans carried out by small groups of students.
- b. **Pre-Requisites:** CEGR 2154, CEGR 3161, CEGR 3143, CEGR 3141, CEGR 3278, CEGR 3122, Approved CEGR Design Elective, all with grades of C or above
Pre- or Corequisite: CEGR 3111 with grade of C or above
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

At the end of the semester, the students in this class should be able to:

- Design a Civil Engineering system for a problem that is not completely defined, and often multi-disciplinary, using and applying engineering design principles and applicable engineering standards and codes, while challenged with multiple constraints;
- Emphasize teamwork, leadership, and constructive peer evaluation;
- Discuss issues regarding sustainability, ethics, and professional responsibility;
- Incorporate aspect of sustainability in their design;
- Require students to interact and seek feedback or input from the local design community;
- Expose students to current engineering design codes, guidelines, and other regulatory requirements;
- Improves students' abilities to make decisions by deepening their understanding of decision theory;
- Introduce students to the elements of engineering design specifications and allow them to utilize their engineering drafting skills (automated and manual);

APPENDIX A: COURSE SYLLABI

- Prepare design proposals, project budgets, progress reports, and final reports;
- Communicate (orally and in writing) about various aspects of their projects, and to defend their designs to peers, faculty, and industry professionals;
- Discuss project scheduling and project management;
- Expose students to impacts of their designs on/from public policy administration; and
- Highlight the need for and the impacts of effective leadership.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include project management, multidisciplinary engineering design and documentation, systems engineering, team management, project planning and administration, exposure and application of specifications in addition to building, design and safety codes, exposure to and use of blue prints and project plans, oral and written technical communications, peer evaluations and communication, engineering ethics, leadership, and professional responsibility.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** CEGR 3221
COURSE NAME Structural Steel Design I
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Janos Gergely

4. **TEXTBOOK** **Title:** Steel Construction Manual, 15th Ed.
Authors: American Institute of Steel Construction
Year: 2017
- OPTIONAL** **Title:** Steel Design, 6th Ed.
TEXTBOOK **Authors:** Segui
Year: 2018

- a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

Analysis and design of structural steel components with emphasis on theories necessary for a thorough understanding of the design procedure.

- a. **Catalog** Design philosophies and types of steel structures. Columns, tension
Description: members and laterally supported beams are considered. General Flexural theory, including bending of unsymmetrical sections. Current AISC Specifications used.

- b. **Pre-Requisites:** CEGR 3122 and CEGR 3255 with grades of C or above

- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

The course will provide information on the analysis and design of structural steel components with emphasis on theories necessary for a thorough understanding of the design procedure. Students will learn the basic design of tension, compression, and flexural members. They will have a solid understanding of lateral torsional buckling and its potential for structural failures if overlooked in a design, and an appreciation of the importance of the presentation of their work and the ethical responsibilities of the structural engineer. Students will learn and utilize the current AISC specifications.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Topics include an introduction to steel design and construction, design philosophies, loads and load combinations, structural steel properties and shapes, tension members (section yielding and rupture, block shear rupture, bolt spacing and bearing), compression members (elastic and inelastic instability, buckling analysis, column bracing), flexural members (yield and plastic moment strength, beam lateral support, serviceability), introduction to combined axial and flexural design.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** CEGR 3225
COURSE NAME Reinforced Concrete Design I
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Janos Gergely
4. **TEXTBOOK**
Title: Reinforced Concrete – Mechanics and Design, 7th Ed.
Authors: Wright
Year: 2016

a. Other Supplemental Materials: Handouts and Canvas Site
Building Code Requirements for Structural Concrete (318-319) and Commentary (318R-19)

5. SPECIFIC COURSE INFORMATION

- Analysis and design of reinforced concrete components with emphasis on fundamental theories. Mechanics and behavior of reinforced concrete.
- a. Catalog Description:** Flexural members to include singly and doubly-reinforced beams of various cross sections (rectangular, T-beams, joists, one-way slabs, and others). Shear in beams and columns. Short columns to include uniaxial and biaxial bending. Construction of short column interaction diagrams. Introduction to footings. Current ACI Specifications.
 - b. Pre-Requisites:** CEGR 3122 and CEGR 3255 with grades of C or above
 - c. Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

The course will provide information on the analysis and design of reinforced concrete components with emphasis on fundamental theories, and on the mechanics and behavior of reinforced concrete. The students will have an opportunity to learn about the flexural and shear design and analysis of beams, short columns, and foundations using the latest ACI 318 code.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Topics include an introduction to concrete members and codes, loads, load combinations, envelopes, reinforced concrete materials and properties, flexure, reinforced concrete beams (tension reinforcement, tension and compression reinforcement), T-beams, shear, development, anchorage, serviceability, short columns, continuous beams, and one-way slabs.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** CEGR 3255
COURSE NAME Structural Materials I Laboratory
2. **COURSE CREDITS / HOURS:** 2
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Timothy Kernicky

4. **TEXTBOOK** **Title:** Civil Engineering Materials, 2nd Ed.
 Authors: Somavaii
 Year: 2001

- a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Composition, properties, and testing of: wood, natural and artificial aggregates, bitumins, Portland cement concrete, pozzolans, and structural metals. Experiments in solid mechanics. Data analysis, presentation, and report writing. One and a half hours of lecture and three hours of laboratory per week.
- b. **Pre-Requisites:** MEGR 2141 with grade of C or above
Pre- or Corequisite: MEGR 2144 with grade of C or above
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

The goal of structural materials lab is to prepare civil engineering students for jobs in the civil engineering industry and introduce students to data analysis, material properties, and technical writing. By the end of the class, students should be able to:

- explain, calculate, and apply key material properties of structural materials;
- perform standard ASTM laboratory tests on typical construction materials, including: aggregates, concrete, steel, timber, and masonry;
- critically analyze results from lab tests to give appropriate material specific conclusions and recommendations; and
- write Civil Engineering appropriate technical memos to clearly present results and recommendations.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
3. an ability to communicate effectively with a range of audiences
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Topics for this physical laboratory include an introduction to basic materials, experimental techniques, aggregates, fresh concrete, concrete mixing hardened concrete, masonry, timber, steel, and instrumentation. Professional writing skills are emphasized.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** CEGR 3258
COURSE NAME Geotechnical Laboratory
2. **COURSE CREDITS / HOURS:** 2
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Michael Uduebor
4. **RECOMMENDED TEXTBOOK**
Title: Soil Properties: Testing, Measurement and Evaluation, 6th Ed.
Authors: Liu, Evett
Year: 2008

a. Other Supplemental Materials: Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. Catalog Description:** Test to determine engineering properties of soils; consistency, permeability, shear strength, and consolidation. Data analysis, presentation, and report writing. One and a half hours of lecture and three hours of laboratory per week.
- b. Pre- or Corequisite:** CEGR 3278 with grade of C or above
- c. Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students determine the characteristics, behaviors, and properties of soils through ASTM and AASHTO experimental geotechnical tests. Through hands-on laboratory work and report preparation, students gain and display an understanding of soil character and behavior, while learning to work in teams and prepare individual technical reports. During this course, students will have specific opportunities to acquire the abilities and the skills to design and conduct experiments and analysis data.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
3. an ability to communicate effectively with a range of audiences
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Topics for this physical laboratory include visual identification, specific gravity, moisture content, grain size distribution using sieve analysis and hydrometer analysis, consistency limits, moisture density relationships, soil classification, permeability, compaction and field density, consolidation, unconfined compression, and direct shear.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** CEGR 3278
COURSE NAME Geotechnical Engineering
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Kimberly Warren
4. **TEXTBOOK**
Title: Geotechnical Engineering: Principles and Practices, 2nd Ed.
Authors: Coduto, Yeung, Kitch
Year: 2011
- a. **Other Supplemental Materials:** Course Notes and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Soil origin, formation, composition, and classification; permeability; seepage; soil mechanics principles, including stresses, shear strength, and consolidation; foundations, retaining structures, and slope stability. Integration of design and technical reporting.
- b. **Prerequisite:** MATH 2171 and MEGR 2144 with grades of C or above
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

In Geotechnical Engineering, students are introduced to the fundamental concepts of soil mechanics, and will be expected to:

- Describe Basic Sampling and Subsurface Exploration Techniques;
- Solve Phase Diagram Problems using Weight-Volume Relationships;
- Describe the Soil Structure and Index Properties of Fine- and Coarse-Grained Materials;
- Develop and Evaluate a Particle Size Distribution Curve;
- Classify Soils using USCS and AASHTO Procedures;
- Evaluate a Compaction Curve and Determine the Range of Acceptable Field Conditions;
- Analyze One Dimensional and Two-Dimensional Flow Systems;
- Calculate Pore Pressure, Total Stress, and Effective Stress in Soil;
- Evaluate Soil Stress Conditions using the Pole Method;
- Evaluate Changes in Total Stress with Depth Resulting from Induced Loads;
- Describe the Fundamentals of Consolidation and Calculate Consolidation Settlement;
- Analyze the Time Rate of Consolidation;
- Evaluate Data from Direct Shear, Triaxial, and Unconfined Compression Tests;
- Calculate the Shear Strength of Soil Under Drained and Undrained Conditions;
- Evaluate Lateral Earth Pressure Diagrams for Simple Earth Retaining Structures; and
- Analyze Simple Bearing Capacity Problems.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Topics for this course include phase diagram relationships, particle size distribution curves, D-sizes, Atterberg limits, soil classification (USCS and AASHTO), compaction fundamentals, site investigations, 1D seepage fundamentals and applications, 2D seepage fundamentals and applications, Pole Method, induced stresses and superposition concepts, geostatic stresses, total and effective stresses, consolidation fundamentals, consolidation testing and analysis, time rate of consolidation, shear strength fundamentals, shear strength testing (direct shear, triaxial, and unconfined compression), lateral earth pressures, and bearing capacity.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** CHEM 1251
COURSE NAME General Chemistry I
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** Susan Michael

4. **TEXTBOOK** **Title:** Chemistry: Structure and Properties, 2nd Ed.
 Authors: Tro
 Year: 2018

- a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

A principles-oriented course for science and engineering majors.

- a. **Catalog Description:** Fundamental principles and laws of chemistry; the relationship of atomic structure to physical and chemical properties of the elements. Topics include: measurements, chemical nomenclature, reactions and stoichiometry, thermochemistry, atomic structure, periodicity, bonding, and molecular structure.
- b. **Prerequisite:** MATH 1100 with grade of C or above (or equivalent test score) or CHEM 1200 (which is recommended for students who have not had chemistry in high school) with grade of C or above.
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students will develop knowledge of fundamental principles and laws of chemistry, and the relationship of atomic structure to physical and chemical properties of the elements. Students will learn to:

- use key concepts in chemistry to solve problems;
- analyze the subatomic structure of matter and connect this structure to macroscopic properties of matter including chemical reactions;
- work in groups developing problem solving skills and evaluating information;
- value Chemistry as it applies to their chosen field of study and everyday phenomena; and
- create an individual plan for successful learning in a science course.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Topics for this course include:

- Units, Properties of Matter, Density, Dimensional Analysis, Significant Figures
- Atomic Theory, Subatomic particles, Average Atomic Mass, Moles of atoms
- Waves, Photons & Photoelectric Effect, Bohr Model, Quantum numbers, Orbitals
- Effective Nuclear Charge, Atomic/ionic radius, Ionization energy, Electron affinity
- Ionic & covalent bonding, Formulas and names of compounds, Moles of compounds
- Electronegativity and Bonding, Lewis structures, Octet exceptions, VESPR, Polarity
- Hybridization, Sigma and pi bonding
- Chemical equations, Stoichiometry, Limiting & excess reagents
- Electrolytes, Concentration, Precipitation/redox/acid-base reactions, Titrations
- Heat and work, Enthalpy, Calorimetry

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** CHEM 1251L
COURSE NAME General Chemistry I Laboratory
2. **COURSE CREDITS / HOURS:** 1
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** Miryam Rabinovich
4. **TEXTBOOK** **Title:** General Chemistry Laboratory I
Authors: Hayden-McNeil Publishing
Year: 2021

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

a. **Catalog Description:** Experimental investigations involving the fundamental principles and laws of chemistry.

b. **Pre- or Corequisite:** CHEM 1251

c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students will gain knowledge of the skills and techniques used in chemical investigations. These skills and techniques include thinking, reasoning, rationalization, manual proficiency, and communication techniques. Students should become comfortable in the laboratory environment as well as develop a better understanding of the way scientific and chemical investigations are accomplished.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

APPENDIX A: COURSE SYLLABI

7. LIST OF TOPICS TO BE COVERED

Topics for this course include:

- Lab policies, Lab safety, Lab glassware;
- Introduction to Measurements and Techniques;
- Density of Pure Liquids and Irregular Solids. Graph Fundamentals;
- Light Speed Marshmallow;
- Color is Exciting (for Electrons);
- Trends in the Periodic Table: Flame Test;
- Identification of a Hydrate by Water Content. Mol. Molar mass;
- Molecular Geometry and Polarity. Lewis Structures. VSEPR Theory;
- Gravimetric Determination of Phosphorus from Plant Food;
- Creating Solutions of Standard Molarity;
- Importance of Precipitation Reactions. Limiting Reagents; and
- Titration of Acids and Bases.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** CHEM 1252
COURSE NAME General Chemistry II
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** Jessica White
4. **TEXTBOOK** **Title:** Chemistry 2e
Authors: Flowers, Theopold, Langley, Robinson
Year: 2019

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

a. **Catalog Description:** Continuation of CHEM 1251. Topics include: gas laws, liquids and solids, solutions, chemical kinetics, chemical equilibrium, thermodynamics, and electrochemistry.

b. **Prerequisite:** CHEM 1251 with grade of C or above

c. **Course is:** Selected Elective (SE)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students will be able to:

- explain the structure and properties of pure solids, liquids, and gases;
- apply knowledge of the structure and properties of solids, liquids, and gases to solve quantitative problems;
- differentiate the composition and properties of solutions from pure substances;
- specify which method to use for determining the rate law of a chemical reaction; and
- evaluate the extent or spontaneity of a chemical reaction given experimental data.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Topics for this course include gases, liquids, solids, solutions and colloids, kinetics, fundamental equilibrium concepts, acid-base equilibria, equilibria of other reaction classes, thermodynamics, and electrochemistry.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** CHEM 1252L
COURSE NAME General Chemistry II Laboratory
2. **COURSE CREDITS / HOURS:** 1
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** Pranamita Chakraborti

4. **TEXTBOOK** **Title:** Labflow
 Authors: Catalyst Education
 ISBN: 9780960062706 (Virtual Access)

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

a. **Catalog Description:** Continuation of CHEM 1251L.

b. **Prerequisite:** CHEM 1251 and CHEM 1251L with grades of C or above

Pre- or Corequisite: CHEM 1252

c. **Course is:** Selected Elective (SE)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

This course is an introduction to the major concepts of chemical investigation, general chemistry, and chemistry techniques. The goal of this course is to provide students with knowledge of the skills and techniques used in chemical investigations. These skills and techniques include thinking, reasoning, rationalization, manual proficiency, and communication techniques. Students will become comfortable in the laboratory environment, acquire skills in the use of chemical equipment, learn the terms and language used in the laboratory, and develop a better understanding the way scientific and chemical investigations are accomplished.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

APPENDIX A: COURSE SYLLABI

7. LIST OF TOPICS TO BE COVERED

Topics for this physical laboratory course include:

- determining the molar mass of a volatile liquid;
- physical properties of pure liquids (boiling points and viscosity)
- colligative properties
- rate of decomposition for hydrogen peroxide
- concentration dependence of reaction rates
- temperature dependence of reaction rates
- determining equilibrium position
- Le Chatelier's Principle
- Bronsted acid-base reactions
- buffers and buffer capacity
- thermodynamic analysis of chemical equilibria and check out

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** ECGR 2161
COURSE NAME Basic Electrical Engineering I
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Bienvenido Rodriguez-Medina

4. **TEXTBOOK**
Title:
Authors: None
Year:

- a. **Other Supplemental Materials:** National Instrument's NI myDAQ - Student with NI LabVIEW, and Multisim, Lab Notebook

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Fundamental concepts and methods of analysis of D.C. and A.C. circuits, elementary operation of electronic devices. Not open to Electrical and Computer Engineering majors.
- b. **Prerequisite:** PHYS 2102 with grade of C or above
- c. **Course is:** Selected Elective (SE)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students will have a basic understanding of:

- electrical and electronic component properties and functions;
- AC and DC network analysis;
- electrical power generation and distribution;
- fundamental electronics;
- frequency response characteristics; and
- electrical safety considerations.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Topics for this physical laboratory course include circuit terminology, resistive circuits, analysis techniques, operational amplifiers, RC and RL first order circuits, AC analysis, AC power, motors, and power sources. Seven hands-on laboratory experiments cover: 1) Instruments & Basic Circuit Elements, 2) Circuit Characteristics, 3) Network Analysis, 4) Time constant of and RC network, 5) Active Components, 6) Motors, 7) Power Sources. Students are required to use and maintain laboratory notebooks.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** ENGR 1201
COURSE NAME Introduction to Engineering Practices and Principles I
2. **COURSE CREDITS / HOURS:** 2
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** OSDS Faculty
4. **TEXTBOOK**
Title:
Authors: None
Year:

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** An introduction to the different disciplines within engineering; the college's computing system; academic, personal and professional development; teamwork; project planning; engineering design; engineering calculations; and oral and written communication skills within a multi-disciplinary format.
- b. **Pre- or Corequisite:** MATH 1241
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

This course is designed to introduce first year engineering students to the various disciplines and practices in the profession, encourage and excite them about their opportunities to make an impact in society, and provide them with a glimpse of some of the tools, techniques, and skills of the profession. This course is also part of the college's Prospect for Success (PFS) freshman curriculum.

Prospect for Success Learning Outcomes:

- identify specific and realistic goals for their collegiate experience, develop or exhibit strategies for achieving those goals, and recognize the need to make change in light of experience;
- understand or experience inquiry as an open-ended process that explores evidence and/or approaches to generate ideas/conclusions; and
- demonstrate an understanding of themselves, and of others, as individuals whose worldview and capacities are shaped by culture and experience and a willingness to take the worldview and capacities of others into consideration.

APPENDIX A: COURSE SYLLABI

Course-specific Learning Outcomes:

- apply research skills to identify career paths within available engineering majors (individual);
- apply the engineering design process by successfully designing, constructing, and testing a solution that meets specific requirements and performance specifications (individual and team);
- apply basic engineering knowledge to solve closed-ended engineering problems and document closed-ended problem solutions using the given/find/solution format (individual);
- productively contribute as a member of a multi-disciplinary team to successfully accomplish project goals (individual and team);
- demonstrate the ability to effectively communicate in writing through the development of an engineering laboratory report (individual); and
- demonstrate the ability to communicate orally through the development and delivery of a presentation (team).

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Topics covered in this course include:

- engineering disciplines
- engineering design process
- problem solving techniques, including problem set-up and documentation
- multidisciplinary teamwork skills
- academic success and professional development
- oral and written communications

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** ENGR 1202
COURSE NAME Introduction to Engineering Practices and Principles II
2. **COURSE CREDITS / HOURS:** 2
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** William Saunders

4. **TEXTBOOK** **Title:**
Authors: None
Year:

- a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Applications in the discipline of civil engineering using tools and techniques specific to the major and discipline. Emphasis is on analytical and problem-solving skills and understanding of the profession/curriculum. Each course is restricted to a specific engineering major discipline.
- b. **Prerequisite** ENGR 1201 and MATH 1241 with grades of C or above
Pre- or Corequisite: ENGR 1201 and permission of Department
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. **Outcomes of Instruction:**

Students will become proficient in the use of Excel and Excel Macros to the extent that these tools can be used to solve quantitative problems in future classes. Students will learn to convert between physical properties expressed in the English or SI unit systems, be able to apply the concept of dimensional consistency in engineering equations, be able to explain what Civil Engineers do, and be able to explain the sub-disciplines within Civil Engineering.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include professional organizations, professional licensing, different unit systems, unit conversions, dimensional consistency, significant digits, rounding, civil engineering disciplines, EXCEL formulas, graphing, absolute and relative referencing, solver function, VBA programming logic using flow charts, IF Statements, computations, FOR Statements, DO Loops, sub programs and variable dimensioning.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** ENGR 3295
COURSE NAME Multidisciplinary Professional Development

2. **COURSE CREDITS / HOURS:** 1
CATEGORIZATION OF CREDITS: Engineering Topic

3. **INSTRUCTOR:** Lead Instructor: Linda Thurman
CEE Instructor: John Daniels

4. **TEXTBOOK** **Title:**
Authors: None
Year:

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

a. **Catalog**
Description: A series of multidisciplinary and disciplinary seminars and activities designed to introduce students to basic concepts of professionalism in engineering. Topics include: global, societal, and contemporary issues of current interest such as leadership, entrepreneurship, ethics, cultural diversity, and professional licensure. Each course section is restricted to a specific engineering major discipline.

b. **Prerequisite**
No formal prerequisites, but the CEE Department requires that all students successfully complete CEGR 3141, CEGR 3143, CEGR 3258, and CEGR 3161 prior to taking this course, and be taking at least one Design Elective pre- or co-requisite so that the required FE Exam Review will be useful to the CEE students.

c. **Course is:** Required (R)

APPENDIX A: COURSE SYLLABI

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

This course is designed to prepare students for a successful transition into the workplace and/or graduate school by enhancing non-technical professional skills. By the end of this course, students will be able to:

- Identify ethical dilemmas and professional responsibilities associated with the engineering profession, and articulate appropriate solutions to those dilemmas.
- Identify critical steps and resources necessary to becoming an innovator, entrepreneur, project manager or in seeking a leadership position.
- Evaluate opportunities and have the ability to create strategies for acquiring professional development and continuous learning (e.g. graduate school or professional licensure) consistent with career goals.
- Have an awareness of global, environmental, societal, and economic issues facing the engineering profession.
- Understand the importance of proper career preparation, interview readiness, and job search methods.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include an introduction to professional development, project management, communication skills for engineers, career development and management, business start-up and entrepreneurship, leadership, mentoring, addressing a growing city's problems and opportunities, ethics case study and report, technical communication, interview preparation and skills, cultural diversity/equity/inclusion, and the importance of professional licensure.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** MATH 1241
COURSE NAME Calculus I
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** John Taylor
4. **TEXTBOOK**
Title: Calculus I Guided Notebook
Authors: Taylor, Taylor
Year: 2022
 - a. **Other Supplemental Materials:** Handouts and Canvas Site
 - James Stewart. Essential Calculus – Early Transcendentals (2nd Ed). ISBN: 978-1-133-11228-0
 - Student Solutions Manual for Stewart's Essential Calculus: Early Transcendentals, 2nd. ISBN-13: 978-1133490975
 - MATH 1241 Common Final Exam Booklet

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Designed for students majoring in Mathematics, Science, or Engineering. Elementary functions, derivatives and their applications, introduction to definite integrals.
- b. **Prerequisite** Appropriate eligibility level of math placement; MATH 1103 with grade of C or above, or placement by the department
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

- a. **Outcomes of Instruction:**

Students develop basic knowledge of the fundamentals of Calculus including elementary functions, derivatives and their applications, and an introduction to definite integrals. Students:

 - identify different types of limits and calculate limits of functions;
 - define and calculate the derivative of functions (from a variety of types of functions);
 - apply the techniques of limits and differentiation to set up and solve physical problems; and
 - develop techniques of antidifferentiation by applying the techniques of limits and differentiation.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Review of Algebra and Trigonometry
- The Limit of a Function
- Calculating Limits
- Continuity Limits Involving Infinity
- Derivatives and Rates of Change
- The Derivative of a Function
- Basic Differentiation
- Product and Quotient Rules
- Chain Rule
- Differentiation of Implicit Functions
- Related Rates
- Linear Approximation and Differentials
- Exponential Functions
- Logarithmic Functions
- Derivatives of Exponential and Logarithmic Functions
- Exponential Growth and Decay
- Inverse Trigonometric Functions
- Indeterminate Forms and L'Hopital's Rule
- Maximum and Minimum Values
- The Mean Value Theorem
- Derivatives and the Shape of Graphs
- Curve Sketching
- Optimization
- Newton's Method
- Antiderivatives

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** MATH 1242
COURSE NAME Calculus II
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** John Taylor
4. **TEXTBOOK**
 - Title:** Essential Calculus: Early Transcendentals, 2nd Ed.
 - Authors:** Stewart
 - Year:** 2012
 - Title:** Calculus II Guided Notebook
 - Authors:** Taylor, Taylor
 - Year:** 2022
 - a. **Other Supplemental Materials:** Handouts and Canvas Site
 - Student Solutions Manual for Stewart's Essential Calculus: Early Transcendentals, 2nd (ISBN-13: 978-1133490975)
 - MATH 1242 Common Final Exam Booklet.
 - Other OER's:
 - <https://mooculus.osu.edu/textbook/mooculus.pdf>
 - <https://activecalculus.org/single/2017/C-1.html>
 - <https://openstax.org/details/books/calculus-volume-1>
5. **SPECIFIC COURSE INFORMATION**
 - a. **Catalog Description:** Methods for evaluating definite integrals, applications of integration, improper integrals, infinite series, Taylor series, power series, and introduction to differential equations.
 - b. **Prerequisite** MATH 1241 with grade of C or above
 - c. **Course is:** Required (R)
6. **SPECIFIC GOALS FOR THE COURSE**
 - a. **Outcomes of Instruction:**

Students develop basic knowledge of the fundamentals of Calculus including the evaluation of definite integrals, applications of integration, improper integrals, infinite series, Taylor series, and power series. Students:

 - apply techniques of integration to evaluate integrals;
 - evaluate physical problems involving integration;
 - calculate the outcome of different types of sequences and series;
 - model power series representations and use those to create new techniques of integration; and
 - create techniques of integration using sequence and series.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Areas and Distances (Riemann Sums)
- The Definite Integral
- Evaluating Integrals
- The Fundamental Theorem of Calculus
- Integration by U-Substitution
- Integration by Parts
- Partial Fractions and Additional Techniques of Integration
- Integration with Tables
- Approximation
- Improper Integrals
- Area Between Curves
- Volume
- Arc Length
- Work
- Sequence
- Series
- Integral and Comparison Tests
- Alternating Series Test
- Power Series
- Presentation of Functions as a Power Series
- Taylor and MacLauren Series

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** MATH 2171
COURSE NAME Differential Equations
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** Duan Chen
4. **TEXTBOOK**
Title: Fundamentals of Differential Equations, 9th Ed.
Authors: Nagle, Saff, Snider
Year: 2018

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** An introduction to ordinary differential equations including first order equations, general theory of linear equations, series solutions, special solutions, special equations such as Bessel's equation, and applications to physical and geometric problems.
- b. **Prerequisite** MATH 1242 with grade of C or above
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students master fundamental techniques to solve simple differential equations, and are introduced to the applications of differential equations in real-world problems. Students will develop knowledge of ordinary differential equations including first order equations, general theory of linear equations, series solutions, special solutions, special equations, and applications to physical and geometric problems.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

APPENDIX A: COURSE SYLLABI

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Basic concepts (orders, linearity, etc.) of differential equations;
- First-order differential equations;
 - Separable equations
 - Linear equations
 - Exact equations with or without special integrating factors
 - Numerical methods and applications
- Second-order differential equations;
 - Homogeneous equations and its auxiliary equation
 - Undetermined coefficient method for inhomogeneous equation
 - Superposition principle
 - Variation of parameter method
- Laplace transform method to solve differential equation.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** MATH 2241
COURSE NAME Calculus III
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** Scott Wilde
4. **TEXTBOOK**
Title: Essential Calculus: Early Transcendentals, 2nd Ed.
Authors: Stewart
Year: 2012

a. Other Supplemental Materials: Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. Catalog Description:** Functions of two or more variables, vectors in two and three dimensions, partial derivatives, optimization, double and triple integrals and their applications.
- b. Prerequisite** MATH 1242 with grade of C or above
- c. Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students will learn to deal with functions of two or more variables, vectors in two and three dimensions, partial derivatives, optimization issues, and double and triple integrals and their applications. Students will find volumes and surface area, answer multivariable optimization problems, and calculate physical quantities like velocity, work, flux, and potential.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

APPENDIX A: COURSE SYLLABI

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Three-Dimensional Coordinate Systems
- Vectors
- The Dot Product
- The Cross Product
- Equations of Lines and Planes
- Cylinders and Quadratic Surfaces
- Vector Functions and Space Curves
- Arc Length and Curvature
- Motion in Space
- Functions of Several Variables
- Limits and Continuity
- Partial Derivatives
- Tangent Planes and Linear Approximations
- The Chain Rule
- Directional Derivatives and the Gradient Vector
- Maximum and Minimum Values
- Lagrange Multipliers (optional)
- Double Integrals over Rectangles
- Iterated Integrals
- The Notion of Triple Integrals
- Double Integrals over General Regions
- Double Integrals in Polar Coordinates
- Applications of Double Integrals

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** MEGR 2141
COURSE NAME Engineering Mechanics I

2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic

3. **INSTRUCTOR:** Nicole Braxtan

4. **TEXTBOOK** **Title:** Engineering Mechanics – Statics, 9th Ed.
Authors: Meriam, Kraige
Year: 2018

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

a. **Catalog Description:** Introduces the principles of particle and rigid body mechanics with engineering applications; force systems and resultants; the equilibrium of particles and rigid bodies; friction; and properties of areas and volumes.

b. **Prerequisite** PHYS 2101 and MATH 1242 with grades of C or above

c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

At the completion of the course the student should be able to:

- Represent and calculate force and moment vectors and their resultants.
- Draw free-body diagrams for static systems.
- Solve for loads in truss systems using method of joints and method of sections.
- Solve for loads in frame/machine systems.
- Draw the shear and moment diagrams of beams with concentrated forces, distributed forces and couples.
- Analyze loads in static systems involving friction.
- Calculate the first and second moments of area (centroid and area moment of inertia) by integration or method of composites with utilization of the transfer of axis theorem.

Students will be introduced to the use of a mathematical software package for the solution of loads in static systems.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Units and conversions
- Resultants and components (semi-graphical methods and algebraic approach)
- 2D moments
- Couples
- Equivalent systems
- 2D equilibrium (free body diagrams, basic problems, 2 force members, springs, pulleys)
- 3D components and force vectors
- Dot product, cross product
- 3D moments
- 3D particle equilibrium
- 3D rigid body equilibrium (vector and scalar solution)
- Introduction to trusses and zero force members
- Method of joints
- Method sections
- Truss problems and truss constraint
- Pin connected members
- Centroids (integration and composite bodies)
- Distributed forces
- Shear and moment at a point
- Shear and moment diagrams (writing functions, deriving relationships, graphical methods)
- Fluid statics
- Moment of inertia (integration, tables, composite bodies)
- Parallel axis theorem
- friction

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** MEGR 2144
COURSE NAME Introduction to Solid Mechanics
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic
3. **INSTRUCTOR:** Janos Gergely
4. **TEXTBOOK**
Title: Mechanics of Materials, 5th Ed.
Authors: Philpot, Thomas
Year: 2020

a. **Other Supplemental Materials:** Handouts, Canvas Site, WileyPLUS

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Engineering theory of deformable solids and applications. Stress and deformation resulting from axial, torsion and bending loads. Shear and moment diagrams, Mohr's circle for stress and strain and buckling of columns.
- b. **Prerequisite** MEGR 2141 with grade of C or above
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

At the completion of the course the student should be able to:

- apply the principles of equilibrium to the problems of deformable body mechanics, distinguish between statically determinate and indeterminate systems;
- explain the concepts of stress, strain, material behavior and distinguish between linear and nonlinear material behavior;
- describe fundamental principles used in developing equations for stresses in axial loading, pure bending, transverse shear, torsion and thin-walled pressure problems;
- formulate and solve mechanical and structural problems involving tension, torsion and bending.
- formulate and solve for the deflection of a beam subjected to a variety of loading and boundary conditions;
- determine various modes of buckling and determine the critical loads of buckling for various boundary conditions;
- develop a thorough understanding of the stress-state at a point and determine principal stresses and maximum shear-stress at any point in a simple structural problem; and
- select, design and analyze a mechanical part based on stress-based and maximum deflection-based design criteria.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Review of Basic Statics
- Axial Loading of Bars (statically determinate and indeterminate problems, thermal effects)
- Torsion of Shafts
- Shear Force and Bending Moment Diagrams
- Pure Bending
- Transverse Loading of Beams
- Deflections of Beams
- Pressure Vessels
- Stress Transformations
- Combined Loading Problems
- Buckling

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** MEGR 3111
COURSE NAME Thermodynamics I

2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic

3. **INSTRUCTOR:** Regina Vrikkis

4. **TEXTBOOK** **Title:** Fundamentals of Engineering Thermodynamics
Authors: Moran, Shapiro, Boettner, Bailey
Year: 2018

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

a. **Catalog Description:** First and second laws of thermodynamics. Work and heat carnot cycle. Ideal and real gases. Non-reactive mixture of gases. Availability and irreversibility.

b. **Prerequisite** MATH 2171 and PHYS 2101 with grades of C or above

c. **Course is:** Selected Elective (SE)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

At the completion of the course the student should be able to:

- determine the thermodynamic properties and property changes of pure simple compressible substances from either tabular data or equations of state including IG equation of state. Apply specific heat relationships for gases, liquids, and solids. Use appropriate forms of the polytropic relation;
- develop and apply appropriate forms of the first law of thermodynamics to closed system processes;
- develop and apply appropriate forms of continuity and the first law of thermodynamics to open system steady flow processes;
- apply the second law of thermodynamics to determine the limitations on power, refrigeration, and heat pump cycles;
- calculate entropy generation for open and closed systems;
- using device efficiency, analyze the operation of pumps, compressors, turbines, and nozzles; and
- sketch P-v, T-v, and T-s diagrams for processes and cycles.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Conservation of Energy (1st Law of Thermodynamics)
- Application to Closed Systems
- Concepts of Internal Energy and Enthalpy
- Ideal and Real Gases
- Polytropic Processes
- Application to Control Volume Systems
- Transient Control Volume Analysis
- Second Law of Thermodynamics
- Maximum Performance of Cycles
- Carnot Cycle
- Entropy and the 2nd Law of Thermodynamics
- Entropy Balance in Internally Reversible Processes
- Entropy Balance for Closed System
- Entropy Balance for Control Volume Systems
- Isentropic Processes and Efficiencies\
- Heat Transfer and Work in Internally Reversible Control Volume Systems

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** MEGR 3121
COURSE NAME Dynamics Systems I

2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Engineering Topic

3. **INSTRUCTOR:** Stuart Smith

4. **TEXTBOOK** **Title:** Engineering Mechanics: Dynamics, 9th Ed.
Authors: Meriam, Kraige, Bolton
Year: 2018

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

a. **Catalog Description:** The kinematics and kinetics of rigid bodies. Work-energy and impulse-momentum principles and conservation laws. Introduction to the kinematics of mechanisms.

b. **Prerequisite** MATH 2141 and MATH 1242 with grades of C or above

c. **Course is:** Selected Elective (SE)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

At the completion of the course the student should be able to:

- model systems of particles for dynamic analyses;
- represent dynamic systems in different coordinate systems for dynamic analyses;
- identify appropriate solution techniques for systems with various constraints;
- model systems of rigid bodies for dynamic analyses; and
- apply work-energy and impulse-momentum methods to determine the dynamic behavior of systems of interacting components.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

APPENDIX A: COURSE SYLLABI

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Particle kinematics
- Relative motion and acceleration
- Particle kinetics
- Analysis of systems of particles, fluid flow
- Work-energy methods
- Impulse-momentum methods, impact
- Plane kinematics, instant center
- Fixed axis rotation and general motion in the plane
- Angular acceleration
- Plane kinetics
- Gear and pulley systems
- Four-bar linkages

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** PHYS 2101
COURSE NAME Physics for Science and Engineering I
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** Susan Trammell
4. **TEXTBOOK**
Title: Physics for Scientists and Engineers: A Strategic Approach, 4th Ed.
Authors: Knight
Year: 2017

a. Other Supplemental Materials: Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. Catalog**
Description: First semester of a two-semester calculus-based introductory sequence in general physics. Topics include: kinematics and dynamics of particles, momentum, work, energy, conservation laws, simple harmonic motion, and mechanics of rigid bodies.
- b. Prerequisite** MATH 1241 with grade of C or above
- c. Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students gain a conceptual understanding of the physics of motion, develop the critical thinking skills required for solving physics and engineering problems, and apply mathematics to the analysis of physics and engineering problems. Upon completion of this course, students should be able to 1) identify and use the preferred SI units in estimates and calculations involving mechanical quantities, 2) distinguish between scalar and vector quantities when describing the motion of an object, 3) calculate position, velocity and acceleration of objects in 1-D and 2-D motion using the kinematic equations, 4) identify all forces acting on an object, draw a free-body diagram illustrating the magnitude and direction of these forces and apply Newton's three laws to describe the effects of the forces on the motion of objects, 5) apply the conservation of energy and work-energy theorems to describe the motion of point masses and rigid objects, 6) apply the impulse-momentum theorem and conservation of momentum to describe interactions between objects and the resulting motion of these objects, 7) calculate moment of inertia and center of mass of rigid objects, and 8) calculate the net torque and net force acting on an object and determine if the object is in static equilibrium.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Concepts of motion;
- Kinematics in one dimension
- Vectors;;
- Kinematics in two dimensions;
- Force and motion;
- Dynamics;
- Newton's Third Law;
- Work and Kinetic energy;
- Interactions and potential energy;
- Impulse and momentum;
- Circular motion and dynamics; and
- Rotation of a rigid body.

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** PHYS 2101L
COURSE NAME Physics for Science and Engineering I Laboratory
2. **COURSE CREDITS / HOURS:** 1
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** Shree Bhattarai

4. **TEXTBOOK** **Title:** Mechanics - Lab Manual, 5th Ed.
Authors: Bhattarai
Year: 2017

- a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** Experiments selected from motion on an inclined plane, circular motion, momentum and energy in collisions, torques, and conservation laws. Use of the computer for organizing, graphing and analyzing data.

- b. **Pre- or Corequisite** PHYS 2101

- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. **Outcomes of Instruction:**

Physics 2101 laboratory is a course in experimental physics which must be taken concurrently with the lecture course, PHYS 2101. The laboratories are chosen to coincide with topical coverage in the lecture as much as possible. Experiments selected from motion on an inclined plane, circular motion, momentum and energy in collisions, torques, and conservation laws. Students will conduct an organized and scientific investigation in order to experimentally verify the theoretical concepts introduced in the lectures, become familiar with the experimental apparatus and scientific method of data collection and analysis, derive conclusions from the results based on their understanding of the relevant physics, and study and understand introductory physics concepts via computer simulation experiments and exercises.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Uncertainty in Measurement
- Motion of Objects in One Dimension
- Composition and Resolution of Vectors
- Projectile Motion
- Newton's Law
- Friction
- Conservation of Energy during Simple Harmonic Motion
- Static Equilibrium
- Critical Thinking and Designing an Experiment

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** PHYS 2102
COURSE NAME Physics for Science and Engineering II
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** Pedram Leilabady
4. **TEXTBOOK**
Title: Physics for Scientists and Engineers: A Strategic Approach, 4th Ed.
Authors: Knight
Year: 2017

a. Other Supplemental Materials: Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. Catalog Description:** Second semester of the calculus-based introductory sequence in general physics. Topics include: electric charge, electric fields, and magnetic fields.
- b. Prerequisite** PHYS 2101 and MATH 1242 with grades of C or above
- c. Course is:** Selected Elective (SE)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

This is the second course of the calculus-based introductory physics sequence. The course covers concepts of electric charges and forces, electric field and potential, electric circuits, magnetic field and electromagnetic induction, and electromagnetic field and waves. This course is required for most science and engineering majors. Upon the completion of this course, students should be able to 1) evaluate electrostatic forces in a system of multiple point charges or continuous charge distributions, 2) evaluate electric field due to a system of multiple point charges or continuous charge distributions, 3) calculate electric flux and apply Gauss' law; 4) calculate conductivity, charge and current densities in conductors, 5) apply Kirchhoff's and Ohm's laws in circuit analysis, 6) evaluate capacitance for various geometries, 7) apply Ampere's and Biot-Savart laws to evaluate magnetic forces and magnetic field due to a system of moving charges and current paths, 8) calculate magnetic flux and apply Faraday's and Lenz's laws to current loops, 9) conduct steady-state and transient circuit analysis involving combinations of inductors, capacitors and resistors, and 10) solve problems involving motion of charged particles in electric and magnetic fields.

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Electric Force;
- Gauss' Law;
- Electric Potential and Potential Energy;
- Electric Potential and E-Field;
- Capacitors;
- Current and Resistance;
- Circuits;
- Magnetic Field;
- Ampere's Law;
- Magnetic Force;
- Faraday's Law; and
- Inductors

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** PHYS 2102L
COURSE NAME Physics for Science and Engineering I Laboratory
2. **COURSE CREDITS / HOURS:** 1
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** Shree Bhattarai
4. **TEXTBOOK**
Title: Electricity, Magnetism and Optics, 5th Ed.
Authors: Bhattarai
Year: 2017

a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

a. **Catalog Description:** Experiments selected from motion on an inclined plane, circular motion, momentum and energy in collisions, torques, and conservation laws. Use of the computer for organizing, graphing and analyzing data.

b. **Prerequisite** PHYS 2101L
Pre- or Corequisite PHYS 2102

c. **Course is:** Selected Elective (SE)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Physics 2102 laboratory is a course in experimental physics which must be taken concurrently with the lecture course, PHYS 2102. The laboratories are chosen to coincide with topical coverage in the lecture as much as possible. Experiments selected from series and parallel circuits, RC circuits, EMF and terminal potential difference, electromagnets, and magnetic induction. Students 1) conduct an organized and scientific investigation in order to experimentally verify the theoretical concept introduced in the lecture, 2) become familiar with experimental apparatus and the scientific method of data collection and analysis, 3) derive conclusions from the results based on their understanding of the relevant physics, and 4) study and understand introductory physics concepts via computer simulation experiments and exercises;

APPENDIX A: COURSE SYLLABI

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Electrostatic and Electric Fields
- Electric Fields and Potentials
- Capacitors
- Charging, Discharging and Combination of Capacitors
- Current and Voltage in a DC Circuit (Ohm's Law)
- Current and Magnetism
- Magnetic Force and Electromagnetic Induction
- Faraday's Law of Electromagnetic Induction
- Reflection, Refraction, and Nature of Image Formed by Convex Lens

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** STAT 3128
COURSE NAME Probability and Statistics for Engineers
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: Math and Basic Science
3. **INSTRUCTOR:** Adriana Oceio
4. **TEXTBOOK**
Title: Probability and Statistics for Engineering and the Sciences, 9th Ed.
Authors: Devore
Year: 2016

a. Other Supplemental Materials: Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- An introduction to: probability theory; discrete and continuous random variables and their probability distributions; joint probability distributions; functions of random variables and their probability distributions;
- a. Catalog Description:** descriptive statistics; point and interval estimation; one and two sample hypothesis testing; quality control; one and two factor ANOVA; and regression.
 - b. Prerequisite** MATH 2241
 - c. Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students will develop knowledge of statistics and probability focusing on areas important for engineering students, including probability theory. Students will learn the definition of a random variable, be familiarized with widely used probability distributions, run statistical inference, know the concept of a simple linear regression.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

APPENDIX A: COURSE SYLLABI

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Sample Space, Events, Probability of Events
- Conditional Probability, Independence and Product Rules
- Discrete Random Variables and Their Probability Distributions
- Continuous Random Variables and Their Probability Distributions
- Probability Distributions
- Mean, Variance, and Covariance
- Chebyshev's Theorem
- Functions of Random Variables
- Descriptive Statistics
- Point and Interval Estimation
- Hypothesis Testing: One and Two Sample Hypothesis Testing
- Quality Control
- One and Two Factor ANOVA
- Linear Regression

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** WRDS 1103
COURSE NAME Writing and Inquiry in Academic Contexts I and II
2. **COURSE CREDITS / HOURS:** 3
CATEGORIZATION OF CREDITS: General Education
3. **INSTRUCTOR:** Faculty Rotation

4. **TEXTBOOK** **Title:** Writing About Writing, 4th Ed.
Authors: Wardle, Downs
Year: 2020

- a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

Students write extensively as they explore literacy and writing. They engage critically with the opinions and voices of others while developing an extended inquiry project that integrates materials from varied sources and includes writing in multiple genres. Students write, revise, edit, and reflect on their writing with the support of the teacher and peers. Students also immerse themselves in a conversation about a topic through reading, questioning, and process writing. Students learn to distinguish rhetorical contexts, practice different conventions, and develop positions in relation to research. They also adopt digital technologies to network, compose, and/or critique and disseminate their work.

- a. **Catalog Description:**

- b. **Prerequisite** None

- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

- a. **Outcomes of Instruction:**

Students will enact rhetorical choices, moves, and strategies for effective composing in print and online contexts. Students will be able to use research-based views of writing to explain how texts work and what readers and writers are doing, theorize about the work that language does in the world, demonstrate the ability to meet readers' expectations by being adaptive, flexible writers, demonstrate the ability to shift voice, tone, formality, design, medium, and layout to achieve a specific purpose.

Students will develop the ability to navigate the stages of writing through a variety of composing processes. Students will be able to use multiple strategies to conceptualize, develop, and finalize projects, develop composing processes for different tasks and occasions, create new composing habits for unfamiliar tasks in both print and multimodal projects, and respond to feedback by instructor and peers for effective revision.

APPENDIX A: COURSE SYLLABI

Students will demonstrate the ability to think critically through diverse reading and writing tasks. Students will be able to locate and use a diverse range of digital and print texts as resources for writing, understand the purpose and process of inquiry, and engage critically with a variety of source material to analyze, synthesize, interpret, and evaluate ideas, information, and texts.

Students will identify and navigate new and diverse reading and writing situations and tasks that require their adaptation to shifting expectations and genres. Students will be able to demonstrate understanding that meaning is shaped by readers' and writers' understanding of context and genre, analyze how genres are constructed through various discourse communities, apply the tone, style, organization, graphics, and document design that meets the expectations of the genre, and use citation practices consistent with the genre and demonstrate an understanding of fair-use.

Students will use reflective writing to improve their writing. Students will be able to reflect on deliberate choices made in a piece of writing, learn and apply the language of writing studies and rhetoric by employing key words in their reflective writing, synthesize and integrate insights from one project into another through reflective learning, and reflect on how approaches learned in the course may apply to future writing situations.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

3. an ability to communicate effectively with a range of audiences

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Investigating Writing: Threshold Concepts and Transfer
- Understanding Genre and Rhetorical Reading
- Participating in Conversation: Inquiry About Writing
- Composing
- Literacies
- Rhetoric
- Communities

APPENDIX A: COURSE SYLLABI

1. **COURSE NUMBER:** WRDS 1104
COURSE NAME Writing and Inquiry in Academic Contexts I and II with Studio
2. **COURSE CREDITS / HOURS:** 4
CATEGORIZATION OF CREDITS: General Education
3. **INSTRUCTOR:** Faculty Rotation
4. **TEXTBOOK**
Title: Writing About Writing, 4th Ed.
Authors: Wardle, Downs
Year: 2020
 - a. **Other Supplemental Materials:** Handouts and Canvas Site

5. SPECIFIC COURSE INFORMATION

- a. **Catalog Description:** In this hybrid course, students learn to analyze and compose a variety of texts and use a range of technologies, adapting language and style for particular audiences, contexts, and purposes. They develop flexible composing strategies; locate and evaluate primary and secondary research; and deepen engagement with source material, their own ideas, and the ideas of others in order to strengthen claims and solidify logical arguments.
- b. **Prerequisite** None
- c. **Course is:** Required (R)

6. SPECIFIC GOALS FOR THE COURSE

a. Outcomes of Instruction:

Students will enact rhetorical choices, moves, and strategies for effective composing in print and online contexts. Students will be able to use research-based views of writing to explain how texts work and what readers and writers are doing, theorize about the work that language does in the world, demonstrate the ability to meet readers' expectations by being adaptive, flexible writers, demonstrate the ability to shift voice, tone, formality, design, medium, and layout to achieve a specific purpose.

Students will develop the ability to navigate the stages of writing through a variety of composing processes. Students will be able to use multiple strategies to conceptualize, develop, and finalize projects, develop composing processes for different tasks and occasions, create new composing habits for unfamiliar tasks in both print and multimodal projects, and respond to feedback by instructor and peers for effective revision.

APPENDIX A: COURSE SYLLABI

Students will demonstrate the ability to think critically through diverse reading and writing tasks. Students will be able to locate and use a diverse range of digital and print texts as resources for writing, understand the purpose and process of inquiry, and engage critically with a variety of source material to analyze, synthesize, interpret, and evaluate ideas, information, and texts.

Students will identify and navigate new and diverse reading and writing situations and tasks that require their adaptation to shifting expectations and genres. Students will be able to demonstrate understanding that meaning is shaped by readers' and writers' understanding of context and genre, analyze how genres are constructed through various discourse communities, apply the tone, style, organization, graphics, and document design that meets the expectations of the genre, and use citation practices consistent with the genre and demonstrate an understanding of fair-use.

Students will use reflective writing to improve their writing. Students will be able to reflect on deliberate choices made in a piece of writing, learn and apply the language of writing studies and rhetoric by employing key words in their reflective writing, synthesize and integrate insights from one project into another through reflective learning, and reflect on how approaches learned in the course may apply to future writing situations.

b. ABET Student Outcomes Addressed:

This course specifically addresses the following ABET Student Outcome(s) listed in Criterion 3:

3. an ability to communicate effectively with a range of audiences

7. LIST OF TOPICS TO BE COVERED

Course topics include:

- Investigating Writing: Threshold Concepts and Transfer
- Understanding Genre and Rhetorical Reading
- Participating in Conversation: Inquiry About Writing
- Composing
- Literacies
- Rhetoric
- Communities