Summary of Approved CCN Courses, Fall 2024

The following provides a summary of the CCN courses approved by the Transfer Council as of November 21, 2024. These courses should appear in academic catalogs beginning 2025-26. For more detailed information, see CCN Reports & Memos on the Educator Resources—Common Course Numbering webpage.

CCN Course/Course Information
Business
Course Number and Prefix: BA 169Z **Course Title:** Data Analysis Using Microsoft Excel **Course Credits:** 4 **Course Description:** Covers Microsoft Excel software skills necessary for evidence-based problem-solving, including workbook editing, formula creation, charting, and pivot tables. Emphasizes hands-on learning using Excel functions to perform data analysis to enhance decision-making. **Course Learning Outcomes:** 1. Create and manage worksheets using appropriate data formatting. 2. Construct formulas with relative, absolute, and mixed cell references. 3. Analyze data using logical, lookup, mathematical, statistical, and text functions. 4. Manipulate large volumes of data using datasets and tables. 5. Interpret data using data visualization tools, including pivot tables and charts.
Course Number and Prefix: BA 226Z **Course Title:** Introduction to Business Law **Course Credits:** 4 **Course Description:** Provides a comprehensive overview of U.S. business law, including the legal system, contracts, torts, intellectual property, agency, employment, and business organization forms. Emphasizes practical legal knowledge and explores how laws impact business operations, with a focus on risk management, contract disputes, business formation, and compliance with government regulation. Introduces legal challenges in business through real cases and legal terminology. **Course Learning Outcomes:** 1. Describe the U.S. legal system as applied to business including sources of law, the judicial system, and alternative forms of dispute resolution. 2. Explain the applicability of tort, criminal, and intellectual property law to business. 3. Identify business organization forms and the responsibilities and liabilities of principals and agents. 4. Describe the legal requirements for contract formation, enforcement, and defenses, as well as application of the Uniform Commercial Code.

5. Explain the basic tenets of employment, labor and wage laws related to business.

Biology

Course Number and Subject Codes: BI, BIO, or BIOL 221Z

Course Title: Principles of Biology: Cells

Course Credits: 5 (The course must include both lecture and lab components. Both of these components are embedded under the same course number and appearing as a single grade item on transcripts.)

Course Description: Explores fundamental biological concepts and theories about the cellular and molecular basis of life including cell structure and function, metabolism, genetic basis of inheritance and how information flows from DNA to proteins, with a focus on the iterative process of science. Intended for science majors.

Course Learning Outcome Introductory Statement:

This work is based on the national 2011 American Association of Advancement of Science (AAAS) report "Vision and Change in Undergraduate Biology Education" that recommended 5 overarching Core Concepts and 6 Core Competencies for biology majors. For details about implementation refer to:

For Core Concepts see BioCore Guide (see Supplement 2 from Brownell et al., 2017)

For Core Competencies see BioSkills Guide (see Supplement from Clemmons et al., 2020)

Course Learning Outcomes:

1. Apply the iterative process of science to generate and answer biological questions by analyzing data and drawing conclusions that are based on empirical evidence and current scientific understanding.
2. Use evidence to develop informed opinions on contemporary biological issues and explain the implications of those issues on society.
3. Describe the structure and related functions of major classes of biomolecules.
4. Differentiate cell components and their functions, emphasizing them as a system of interacting parts.
5. Compare and contrast anabolic (photosynthesis) and catabolic (respiration and fermentation) pathways emphasizing the transformation of energy and matter.
6. Articulate how cells store, use, and transmit genetic information.
7. Explain how mutation and genetic recombination contribute to phenotypic variation and evolution.

Course Number and Subject Codes: BI, BIO, or BIOL 222Z

Course Title: Principles of Biology: Organisms

Course Credits: 5 (The course must include both lecture and lab components. Both of these components are embedded under the same course number and appearing as a single grade item on transcripts.)

Course Description: Explores fundamental biological concepts and theories about the structure and function of diverse organisms (including plants and animals), evolution and development, transformation of energy and matter, and body systems at a multicellular organismal level. Intended for science majors.

Course Learning Outcome Introductory Statement:

This work is based on the national 2011 American Association of Advancement of Science (AAAS) report "Vision and Change in Undergraduate Biology Education" that recommended 5 overarching Core Concepts and 6 Core Competencies for biology majors. For details about implementation refer to:

For Core Concepts see BioCore Guide (see Supplement 2 from Brownell et al., 2017)

For Core Competencies see BioSkills Guide (see Supplement from Clemmons et al., 2020)

Course Learning Outcomes:

1. Apply the iterative process of science to generate and answer biological questions by analyzing data and drawing conclusions that are based on empirical evidence and current scientific understanding.
2. Use evidence to develop informed opinions on contemporary biological issues and explain the implications of those issues on society.
3. Explain how morphology relates to physiology across diverse organisms.
4. Describe how biological systems detect and respond to different internal/external environmental conditions through feedback.
5. Compare and contrast strategies for achieving homeostasis.
6. Explain how developmental and environmental processes influence the evolution of structures, functions, and life cycles across diverse organisms.

Course Number and Subject Codes: BI, BIO, or BIOL 223Z

Course Title: Principles of Biology: Ecology and Evolution

Course Credits: 5 (The course must include both lecture and lab components. Both of these components are embedded under the same course number and appearing as a single grade item on transcripts.)

Course Description: Explores the unity and diversity of life through evolutionary mechanisms and relationships, and adaptation to the environment. Examines population, community, and ecosystem ecology. Intended for science majors.

Course Learning Outcome Introductory Statement:

This work is based on the national 2011 American Association of Advancement of Science (AAAS) report "Vision and Change in Undergraduate Biology Education" that recommended 5 overarching Core Concepts and 6 Core Competencies for biology majors. For details about implementation refer to:

For Core Concepts see BioCore Guide (see Supplement 2 from Brownell et al., 2017)

For Core Competencies see BioSkills Guide (see Supplement from Clemmons et al., 2020)

Course Learning Outcomes:

1. Apply the iterative process of science to generate and answer biological questions by analyzing data and drawing conclusions that are based on empirical evidence and current scientific understanding.
2. Use evidence to develop informed opinions on contemporary biological issues and explain the implications of those issues on society.
3. Provide evidence for phylogenetic relationships which illustrate the unity and diversity of life.
4. Describe how adaptation, development, mutation, and the environment affect organismal evolution.
5. Apply mathematical models to describe how populations change through time in relation to biotic and abiotic factors.
6. Explain how organisms and their environments affect each other across different temporal and spatial scales.
7. Interpret models explaining the flow of energy and cycling of matter in ecosystems.

Chemistry

Course Number and Prefix: CH/CHE/CHEM 221Z

Course Title: General Chemistry I

Course Credits: 5 for lecture and lab. (Institutions will divide these credits between lecture and lab so that the total credits for both courses equals 5 credits.)

Course Description: Explores and applies principles and applications of chemistry. Emphasis on measurement, components of matter, atomic and molecular structure, quantitative relationships including foundational stoichiometry, and major classes of chemical reactions. CH/CHE/CHEM 221Z is a lecture course; CH/CHE/CHEM 227Z is the laboratory component.

Course Learning Outcomes:

Students will be able to

1. Describe the phases and classifications of matter and differentiate between physical and chemical properties.
2. Represent physical measurements using SI and derived units and demonstrate systematic problem-solving including unit conversion.
3. Use the periodic table to solve problems in chemistry.
4. Describe the principles of electromagnetic energy, the Bohr model and quantum theory, and use electron configurations to identify periodic variations in chemical properties.
5. Interpret and apply ionic and covalent bonding theories including Lewis structures, formal charges, resonance, molecular structure, and polarity.
6. Quantify the composition of substances and solutions.
7. Identify and name a variety of elements, ions, ionic compounds, and covalent compounds.
8. Write, balance, and classify chemical reactions and solve foundational stoichiometry calculations.

Course Number and Prefix: CH/CHE/CHEM 222Z

Course Title: General Chemistry II

Course Credits: 5 for lecture and lab. (Institutions will divide these credits between lecture and lab so that the total credits for both courses equals 5 credits.)

Course Description: Explores and applies principles presented in CH/CHE/CHEM 221Z to the study of the solid, liquid, and gaseous states of matter. Principles of stoichiometry, thermochemistry, kinetics, and foundational equilibrium are explored and applied to the study of aqueous and gas-phase chemical reactions. CH/CHE/CHEM 222Z is a lecture course; CH/CHE/CHEM 228Z is the laboratory component.

Course Learning Outcomes:

Students will be able to

1. Apply stoichiometry to a variety of problems involving reactions, gases, liquids, solutions, thermochemistry, kinetics, and equilibrium expressions.
2. Apply kinetic molecular theory and gas laws to predict the behavior of gases at various conditions.
3. Identify types of intermolecular forces and apply them to physical properties of solids, liquids, and solutions.
4. Describe solution concepts and factors affecting solution properties.
5. Determine the effects of different factors on chemical reaction rates and examine the role of catalysis in modifying these rates.
6. Apply concepts of thermochemistry to explain thermal energy transfer and the energy changes that accompany chemical

and physical changes.

7. Identify and apply appropriate equations related to gas laws, solutions, colligative properties, thermochemistry, kinetics, and equilibrium expressions.

Course Number and Prefix: CH/CHE/CHEM 223Z

Course Title: General Chemistry III

Course Credits: 5 for lecture and lab. (Institutions will divide these credits between lecture and lab so that the total credits for both courses equals 5 credits.)

Course Description: Builds upon the principles presented in CH/CHE/CHEM 222Z, explores thermodynamics and chemical equilibrium, and applies them to the study of aqueous acid-base reactions, solubility, and electrochemistry. CH/CHE/CHEM 223Z is a lecture course; CH/CHE/CHEM 229Z is the laboratory component.

Course Learning Outcomes:

Students will be able to

1. Apply concepts of thermodynamics to explain the favorability of chemical reactions.
2. Apply the principles of spontaneity, entropy, free energy, and the laws of thermodynamics to predict and rationalize the behavior of chemical reactions.
3. Interpret the behavior and relative strengths of acids and bases, buffers, and the hydrolysis of salts.
4. Analyze and evaluate equilibrium reactions including solubility, acids and bases, and other equilibria.
5. Predict responses of various chemical systems to changing conditions using equilibrium calculations and Le Chatelier's Principle.
6. Use redox reactions and electrochemical principles to determine cell potentials and to analyze the relationship between voltage, free energy, and equilibrium.
7. Identify or formulate and apply the appropriate equations related to electrochemistry, thermodynamics, equilibrium reactions, acids, bases, and buffers.

Course Number and Prefix: CH/CHE/CHEM 227Z

Course Title: General Chemistry I Laboratory

Course Credits: 5 for lecture and lab. (Institutions will divide these credits between lecture and lab so that the total credits for both courses equals 5 credits.)

Course Description: Experiments correspond to the topics covered in CH/CHE/CHEM 221Z including the fundamentals of chemical measurements, quantitative relationships in chemical analysis, and understanding atomic and molecular structure. CH/CHE/CHEM 227Z is the laboratory component; CH/CHE/CHEM 221Z is the lecture course.

Course Learning Outcomes:

Students will be able to

1. Follow standard safety procedures while working with chemicals and equipment in a laboratory setting.
2. Keep an accurate and detailed laboratory record.
3. Measure, calculate, and report data and results using proper units and appropriate measures of uncertainty.
4. Analyze experimental results qualitatively and quantitatively with measures of accuracy and precision.

5. Interpret and communicate the results of experiments applying chemical concepts in CH/CHE/CHEM 221Z in a clear and concise manner.
6. Investigate chemical concepts in CH/CHE/CHEM 221Z qualitatively and quantitatively using scientific methods.

Course Number and Prefix: CH/CHE/CHEM 228Z

Course Title: General Chemistry II Laboratory

Course Credits: 5 for lecture and lab. (Institutions will divide these credits between lecture and lab so that the total credits for both courses equals 5 credits.)

Course Description: Experiments correspond to the topics covered in CH/CHE/CHEM 222Z including the fundamentals of intermolecular interactions, stoichiometric relationships, chemical equilibria and their application to the synthesis, identification, and analysis of chemical compounds. CH/CHE/CHEM 228Z is the laboratory component; CH/CHE/CHEM 222Z is the lecture course.

Course Learning Outcomes:

Students will be able to

1. Follow standard safety procedures while working with chemicals and equipment in a laboratory setting.
2. Keep an accurate and detailed laboratory record.
3. Measure, calculate, and report data and results using proper units and appropriate measures of uncertainty.
4. Analyze experimental results qualitatively and quantitatively with measures of accuracy and precision.
5. Interpret and communicate the results of experiments applying chemical concepts in CH/CHE/CHEM 222Z in a clear and concise manner.
6. Investigate chemical concepts in CH/CHE/CHEM 222Z qualitatively and quantitatively using scientific methods.

Course Number and Prefix: CH/CHE/CHEM 229Z

Course Title: General Chemistry III Laboratory

Course Credits: 5 for lecture and lab. (Institutions will divide these credits between lecture and lab so that the total credits for both courses equals 5 credits.)

Course Description: Experiments correspond to the topics covered in CH/CHE/CHEM 223Z including the principles of chemical equilibria and their application to chemical analysis using volumetric and electrochemical methods. CH/CHE/CHEM 229Z is the laboratory component; CH/CHE/CHEM 223Z is the lecture course.

Course Learning Outcomes:

Students will be able to

1. Follow standard safety procedures while working with chemicals and equipment in a laboratory setting.
2. Keep an accurate and detailed laboratory record.
3. Measure, calculate, and report data and results using proper units and appropriate measures of uncertainty
4. Analyze experimental results qualitatively and quantitatively with measures of accuracy and precision.
5. Interpret and communicate the results of experiments applying chemical concepts in CH/CHE/CHEM 223Z in a clear and concise manner.
6. Investigate chemical concepts in CH/CHE/CHEM 223Z qualitatively and quantitatively using scientific methods.

Teachout Recommendation:

The committee recommends that the 2025-2026 academic year be designated as a teachout year for students that began the general chemistry series prior to Fall 2025. As the topics in the newly aligned CH/CHE/CHEM 221Z/227Z, 222Z/228Z, 223Z/229Z differ from those taught in the unaligned courses, students could miss topics by switching mid series. Several institutions currently offer delayed "trailer" sections of each course. This proposed teachout would facilitate completion of the sequence by students already on that schedule.

All schools should be allowed to offer the pre-Z CH 222 and CH 223 alongside the CCN aligned courses for the **first** academic year of offering the newly aligned courses. This minimizes the negative impact on students who need to finish the series if they completed CH 221 before Fall 2025. CH 221 (pre-Z) does not need to be included in the teachout plan as students entering the series would begin in CH/CHE/CHEM 221Z and CH/CHE/CHEM 227Z in the Fall of 2025.

Economics

Course Number and Prefix: EC/ECON 201Z

Course Title: Principles of Microeconomics

Course Credits: 4

Course Description: Examines how consumers and firms make choices when facing scarce resources, and how those choices are related to government policy and market outcomes, such as prices and output.

Course Learning Outcomes:

1. Articulate the concepts of opportunity costs and trade-offs.
2. Explain producer and consumer behavior using economic models.
3. Analyze the relationship between supply and demand and its applications across various economic contexts.
4. Identify the impact of market failures and government policy on efficiency and welfare.

Course Number and Prefix: EC/ECON 202Z

Course Title: Principles of Macroeconomics

Course Credits: 4

Course Description: Examines the aggregate activity of a market economy, economic growth, inflation, unemployment, and the use of fiscal and monetary policy to address macroeconomic problems.

Course Learning Outcomes:

1. Interpret basic macroeconomic indicators including GDP, unemployment, and inflation.
2. Identify the determinants of economic growth.
3. Apply economic models to explain macroeconomic outcomes.
4. Compare fiscal and monetary policy tools, and their uses and economic impacts.

Math

Course Number and Prefix: MTH or MATH 251Z

Course Title: Differential Calculus

Course Credits: 4

Course Description: This course explores limits, continuity, derivatives, and their applications for real-valued functions of a single variable. These topics will be explored graphically, numerically, and symbolically in real-life applications. This course

emphasizes abstraction, problem-solving, modeling, reasoning, communication, connections with other disciplines, and the appropriate use of technology.

Course Learning Outcomes:

At the end of the course, students will be able to…

1. Calculate limits graphically, numerically, and symbolically; describe the behavior of functions using limits and continuity; and recognize indeterminate forms.
2. Apply the definition of the derivative and analyze average and instantaneous rates of change.
3. Interpret and apply the concepts of the first and second derivative to describe and illustrate function features including the slopes of tangent lines, locations of extrema and inflection points, and intervals of increase, decrease, and concavity.
4. Apply product, quotient, chain, and function-specific rules to differentiate combinations of power, polynomial, rational, exponential, logarithmic, trigonometric, and inverse trigonometric functions, as well as functions defined implicitly.
5. Apply derivatives to a variety of problems in mathematics and other disciplines, including related rates, optimization, and L'Hôpital's rule.

Required Course Content:
At the end of the course, students will be able to…

1. Calculate limits graphically, numerically, and symbolically; describe the behavior of functions using limits and continuity; and recognize indeterminate forms.
    a. Students will be able to calculate limits graphically, numerically, and algebraically.
    b. Students will be able describe the local and global behavior of functions using limits.
    c. Students will be able to describe the notion of continuity using limits and determine whether a function is continuous.
    d. Students will be able to recognize and evaluate indeterminate forms.
2. Apply the definition of the derivative and analyze average and instantaneous rates of change.
    a. Students will be able to state and use the definition of the derivative to calculate the derivatives of simple functions.
    b. Students will be able to determine whether a function is differentiable using limits.
    c. Students will be able to describe the connection between the definition of the derivative and the average and instantaneous rates of change of a function.
    d. Students will be able to use derivatives in applications using appropriate units.
3. Interpret and apply the concepts of the first and second derivative to describe and illustrate function features including the slopes of tangent lines, locations of extrema and inflection points, and intervals of increase, decrease, and concavity.
    a. Students will recognize and apply the concept of the derivative to describe and find the slopes of tangent lines.
    b. Students will be able to use the derivative to identify the intervals on which a function is increasing or decreasing, and the locations of extreme values.
    c. Students will be able to use the second derivative to identify intervals of concavity and the locations of inflection points.
4. Apply product, quotient, chain, and function-specific rules to differentiate combinations of power, polynomial, rational, exponential, logarithmic, trigonometric, and inverse trigonometric functions, as well as functions defined implicitly.

a. Students will be able to differentiate power, polynomial, rational, exponential, logarithmic, trigonometric, and inverse trigonometric functions algebraically.

b. Students will be able to apply sum, constant multiple, product, quotient, and chain rules to differentiate combinations of functions listed above.

c. Students will be able to differentiate functions defined implicitly.

5. Apply derivatives to a variety of problems in mathematics and other disciplines, including related rates, optimization, and L'Hôpital's rule.

a. Students will be able to recognize when L'Hôpital's rule is appropriate and use it to calculate limits involving indeterminate forms.

b. Students will be able to use the derivative to solve related rates problems.

c. Students will be able to use the derivative to solve optimization problems.

d. Students will be able to interpret and communicate the meaning of the derivative and its application in context, including using appropriate notation.

Course Number and Prefix: MTH or MATH 252Z

Course Title: Integral Calculus

Course Credits: 4

Course Description: This course explores Riemann sums, definite integrals, and indefinite integrals for real-valued functions of a single variable. These topics will be explored graphically, numerically, and symbolically in real-life applications. This course emphasizes abstraction, problem-solving, modeling, reasoning, communication, connections with other disciplines, and the appropriate use of technology.

Course Learning Outcomes:

At the end of the course, students will be able to…

1. Approximate definite integrals using Riemann sums and apply this to the concept of accumulation and the definition of the definite integral.
2. Explain and use both parts of the Fundamental Theorem of Calculus.
3. Choose and apply integration techniques including substitution, integration by parts, basic partial fraction decomposition, and numerical techniques to integrate combinations of power, polynomial, rational, exponential, logarithmic, trigonometric, and inverse trigonometric functions.
4. Use the integral to model and solve problems in mathematics involving area, volume, net change, average value, and improper integration.
5. Apply integration techniques to solve a variety of problems, such as work, force, center of mass, or probability.

Required Course Content:
At the end of the course, students will be able to…

1. Approximate definite integrals using Riemann sums and apply this to the concept of accumulation and the definition of the definite integral.

a. Students will be able to express finite sums using sigma notation.

b. Students will be able to use Riemann sums to describe the process of approximating the net signed area between a curve and an axis.

c. Students will be able to relate the definite integral with the concept of accumulation of area or other infinitesimal quantities, including the use of appropriate units.

2. Explain and use both parts of the Fundamental Theorem of Calculus.
   a. Students will be able to recognize and express the definite integral as a limit of a Riemann sum.
   b. Students will use and compare different methods for calculating definite integrals, such as linear properties of integrals, net-signed area, and graphical approaches.
   c. Students will explain and apply the concept of indefinite integrals and its connection to antidifferentiation.
   d. Students will explain the connection between derivatives and integrals and apply their understanding using the Fundamental Theorem of Calculus.
3. Choose and apply integration techniques including substitution, integration by parts, basic partial fraction decomposition, and numerical techniques to integrate combinations of power, polynomial, rational, exponential, logarithmic, trigonometric, and inverse trigonometric functions.
   a. Students will be able to integrate power, polynomial, rational, exponential, logarithmic, trigonometric, and inverse trigonometric functions using basic rules.
   b. Students will be able to use substitution and integration by parts to algebraically integrate appropriate combinations of functions.
   c. Students will be able to use partial fraction decomposition to evaluate integrals of rational functions whose denominators may be expressed as products of distinct linear factors.
   d. Students will be able to use numerical techniques, such as Midpoint, Trapezoidal, and Simpson's rules, to approximate definite integrals.
4. Use the integral to model and solve problems in mathematics involving area, volume, net change, average value, and improper integration.
   a. Students will be able to use definite integrals to find the area between two curves.
   b. Students will be able to calculate volumes of solids, such as solids of revolution or prisms, using integrals.
   c. Students will be able to apply the integral to find the average value of a function over an interval.
   d. Students will be able to apply the integral to find the net change of a function over an interval.
   e. Students will be able to recognize, describe, and calculate improper integrals.
5. Apply integration techniques to solve a variety of problems, such as work, force, center of mass, or probability.

Students will apply integration to problems in the instructor's choice of context, including but not limited to the possible options above. At least two distinct applications are recommended based on the population of students in the class.

Course Number and Prefix: MTH or MATH 253Z

Course Title: Calculus: Sequences and Series

Course Credits: 4

Course Description: This course explores real-valued sequences and series, including power and Taylor series. Topics include convergence and divergence tests and applications. These topics will be explored graphically, numerically, and symbolically. This course emphasizes abstraction, problem-solving, reasoning, communication, connections with other disciplines, and the appropriate use of technology.

Course Learning Outcomes:

At the end of the course, students will be able to…

1. Recognize and define sequences in a variety of forms and describe their properties, including the concepts of convergence and divergence, boundedness, and monotonicity.
2. Recognize and define series in terms of a sequence of partial sums and describe their properties, including convergence and divergence.
3. Recognize series as harmonic, geometric, telescoping, alternating, or p-series, and demonstrate whether they are absolutely convergent, conditionally convergent, or divergent, and find their sum if applicable.
4. Choose and apply the divergence, integral, comparison, limit comparison, alternating series, and ratio tests to determine the convergence or divergence of a series.
5. Determine the radius and interval of convergence of power series, and use Taylor series to represent, differentiate, and integrate functions.
6. Use techniques and properties of Taylor polynomials to approximate functions and analyze error.

Required Course Content:

At the end of the course, students will be able to…

1. Recognize and define sequences in a variety of forms and describe their properties, including the concepts of convergence and divergence, boundedness, and monotonicity.
    a. Students will be able to define and recognize sequences given explicitly or recursively.
    b. Students will be able to determine whether a given sequence is convergent or divergent by appropriate use of the limit laws for sequences, the Squeeze Theorem, or L'Hôpital's rule.
    c. Students will be able to determine the monotonicity and boundedness properties of a sequence and use them to draw conclusions about convergence or divergence.
2. Recognize and define series in terms of a sequence of partial sums and describe their properties, including convergence and divergence.
    a. Students will be able to represent a series as a limit of a sequence of partial sums and describe the notions of convergence or divergence of the series.
    b. Students will be able to algebraically manipulate series, and apply series laws to draw conclusions about divergence, convergence, and the value of the limit.
3. Recognize series as harmonic, geometric, telescoping, alternating, or p-series, and demonstrate whether they are absolutely convergent, conditionally convergent, or divergent, and find their sum if applicable.
4. Choose and apply the divergence, integral, comparison, limit comparison, alternating series, and ratio tests to determine the convergence or divergence of a series.
    a. Students will be able to recognize when the divergence, integral, comparison, and limit comparison tests apply to a particular series, and draw conclusions about the convergence or divergence of the series.
    b. Students will be able to recognize when the ratio and alternating series tests apply to a particular series, and draw conclusions about the absolute convergence, conditional convergence, or divergence of a series.
5. Determine the radius and interval of convergence of power series, and use Taylor series to represent, differentiate, and integrate functions.
    a. Students will be able to find the radius and interval of convergence of a given power series.
    b. Students will be able to use power series to represent functions and determine the radius of convergence of the series.

c. Students will be able to differentiate and integrate power series that represent functions.

d. Students will be able to find the Taylor series centered at a point $x=c$ of a given function and determine its radius of convergence.

6. Use techniques and properties of Taylor polynomials to approximate functions and analyze error.

a. Students will be able to approximate a function using a Taylor polynomial.

b. Students will be able to estimate the error in a Taylor polynomial approximation using either Taylor's Inequality or the Alternating Series Estimation Theorem.

c. Students will be able to approximate an alternating series to a desired error by a partial sum of the series.

Sociology

Course Number and Prefix: SOC/SOAN 204Z

Course Title: Introduction to Sociology

Course Credits: 4.

Course Description: Introduces the central concepts, theories, and methods that define the sociological approach to investigating the social forces that shape our lives. Topics may include social structure, culture, socialization, race, class, gender, sexuality, and inequality.

Course Learning Outcomes:

1. Describe the central concepts, theories, and methods that define sociological approaches to social scientific inquiry.
2. Analyze social life using sociological concepts and theories.
3. Explain how the sociological imagination interrelates different levels of analysis such as social structures and individuals.
4. Identify how social factors contribute to inequalities in society.
5. Explain the role of theory and evidence in building sociological knowledge.

Course Number and Prefix: SOC/SOAN 205Z

Course Title: Social Change and Institutions

Course Credits: 4

Course Description: Sociological analysis of social institutions, such as family, education, health care, the economy, and the state. Includes an examination of connections among institutions and their impact on patterns of inequality and individual outcomes. Examines the forces and dynamics behind social change, such as social movements, culture, economic forces, technologies, and the environment.

Course Learning Outcomes:

1. Discuss the history of key social institutions.
2. Analyze major social institutions and change using sociological concepts, theory, and research.
3. Describe how the structure of institutions shapes patterns of social inequality.
4. Discuss diversity of experiences that individuals have with institutions based on group membership, such as race and ethnicity, gender, sexuality, and social class.
5. Describe how and why societies change over time.

Course Number and Prefix: SOC/SOAN 206Z

Course Title: Social Problems

Course Credits: 4

Course Description: Applies the sociological perspective to the study of social problems, including their social construction, causes, and consequences. Explores the complexities surrounding their solutions, such as how solutions are socially constructed and policy proposals from sociologists and social movements. Topics may include poverty, discrimination, interpersonal violence, crime, addiction, ecological crises, war/global conflict, and health inequality.

Course Learning Outcomes:

1. Describe the ways in which social problems are defined and constructed.
2. Apply the sociological perspective to identify and analyze social problems.
3. Distinguish between individual and structural explanations of social problems.
4. Assess the effects of social problems using empirical evidence.
5. Examine the structural, institutional, and cultural roots of social problems.
6. Assess solutions to address social problems.