M E M O R A N D U M

TO: Deans and Chairs

FROM: Becky Bitter, Sr. Assistant Registrar

DATE: November 6, 2018

SUBJECT: Minor Change Bulletin No. 6

The courses listed below reflect the minor curricular changes approved by the catalog editor since approval of the last Minor Change Bulletin. The column to the far right indicates the date each change becomes effective.

Subject	Course Number	Revise Drop	Current	Proposed	Effective Date
BIOLOGY / MATH	**579**	**Revise**	**Mathematical Modeling in the Biological and Health Sciences** 3 Techniques, theory, and current literature in mathematical modeling in the biological and health sciences, including computational simulation. (Course offered as BIOLOGY 579, MATH 579). Typically offered ~~Even~~ Years - Fall.	**Mathematical Modeling in the Biological and Health Sciences** 3 Techniques, theory, and current literature in mathematical modeling in the biological and health sciences, including computational simulation. (Course offered as BIOLOGY 579, MATH 579). Typically offered Odd Years - Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
CPT S	**323**	**Revise**	**Software Design** 3 Course Prerequisite: CPT S 223 with a C or better or CPT S 233 with a C or better; CPT S 322 with a C or better or concurrent enrollment; certified major in Computer Science, Computer Engineering, Electrical Engineering, or Software Engineering. Practical aspects of software design and implementation using object-oriented, aspect-oriented and procedural programming. Typically offered Spring.	**Software Design** 3 Course Prerequisite: CPT S 223 with a C or better or CPT S 233 with a C or better; CPT S 322 with a C or better or concurrent enrollment; certified major in Cpt Sci, Cpt Engr, E E, or Software Engr. Enrollment not allowed if credit earned in CPT S 487. Practical aspects of software design and implementation using object-oriented, aspect-oriented and procedural programming. Credit not granted for both CPT S 323 and 487. Typically offered Spring.	**1-19**
CPT S	**487 / 587**	**Revise**	**Software Design and Architecture** 3 Course Prerequisite: CPT S 321 with a C or better; CPT S 322 with a C or better; certified major in	**Software Design and Architecture** 3 Course Prerequisite: CPT S 321 with a C or better; CPT S 322 with a C or better; certified major in	**1-19**

			Computer Science, Computer Engineering, Electrical Engineering, or Software Engineering. Software design; design principles, patterns, and anti-patterns; design quality attributes and evaluation; architectural styles, architectural patterns and anti-patterns. Credit not granted for both CPT S 487 and CPT S 587. Offered at 400 and 500 level.	Computer Science, Computer Engineering, Electrical Engineering, or Software Engineering. Enrollment not allowed if credit already earned for CPT S 323. Software design; design principles, patterns, and anti-patterns; design quality attributes and evaluation; architectural styles, architectural patterns and anti-patterns. Credit not granted for both CPT S 487 and CPT S 587, or for both CPT S 487 and CPT S 323. Offered at 400 and 500 level.	
MATH	**431 / 531**	**Revise**	**Intersections of Culture and Mathematics** 3 Gender/race/ethnicity differences; social consequences; cultural influences on development and learning of mathematics; role of women, people of color in mathematics. Credit not granted for both MATH 431 and 531. Offered at 400 and 500 level. Typically offered Fall.	**Intersections of Culture and Mathematics** 3 Gender/race/ethnicity differences; social consequences; cultural influences on development and learning of mathematics; role of women, people of color in mathematics. Credit not granted for both MATH 431 and 531. Offered at 400 and 500 level. Typically offered Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH / CPT S	**453 / 553**	**Revise**	**Graph Theory** 3 Graphs and their applications, directed graphs, trees, networks, Eulerian and Hamiltonian paths, matrix representations, construction of algorithms. (Crosslisted course offered as MATH 453, MATH 553, CPT S 453, CPT S 553). Required preparation must include linear algebra. Required preparation must include linear algebra. Offered at 400 and 500 level. Typically offered Fall.	**Graph Theory** 3 Graphs and their applications, directed graphs, trees, networks, Eulerian and Hamiltonian paths, matrix representations, construction of algorithms. (Crosslisted course offered as MATH 453, MATH 553, CPT S 453, CPT S 553). Required preparation must include linear algebra. Required preparation must include linear algebra. Offered at 400 and 500 level. Typically offered Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**466 / 566**	**Revise**	**Optimization in Networks** 3 Formulation and solution of network optimization problems including shortest path, maximal flow, minimum cost flow,	**Optimization in Networks** 3 Formulation and solution of network optimization problems including shortest path, maximal flow, minimum cost flow,	**1-19**

			assignment, covering, postman, and salesman. Credit not granted for both MATH 466 and MATH 566. Required preparation must include linear programming. Offered at 400 and 500 level. Typically offered Fall.	assignment, covering, postman, and salesman. Credit not granted for both MATH 466 and MATH 566. Required preparation must include linear programming. Offered at 400 and 500 level. Typically offered Even Years - Fall. Cooperative: Open to UI degree-seeking students.	
MATH	**504**	**Revise**	**Measure and Integration** 3 Course Prerequisite: MATH 501. Lebesque measure, Lebesque integration, differentiation, L spaces, general measure and integration, Radon-Nikodym Theorem, outer measure and product measures. Typically offered Fall ~~and Spring~~.	**Measure and Integration** 3 Course Prerequisite: MATH 501. Lebesque measure, Lebesque integration, differentiation, L spaces, general measure and integration, Radon-Nikodym Theorem, outer measure and product measures. Typically offered Odd Years - Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**505**	**Revise**	**Abstract Algebra** 3 Groups, rings, fields, and homological algebra. Required preparation must include abstract algebra. Typically offered Fall.	**Abstract Algebra** 3 Groups, rings, fields, and homological algebra. Required preparation must include abstract algebra. Typically offered Odd Years - Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**507**	**Revise**	**Advanced Theory of Numbers** 3 May be repeated for credit; cumulative maximum 6 hours. Analytic and algebraic number theory. Typically offered Spring.	**Advanced Theory of Numbers** 3 May be repeated for credit; cumulative maximum 6 hours. Analytic and algebraic number theory. Typically offered Spring. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**512**	**Revise**	**Ordinary Differential Equations** 3 Existence of solutions; linear systems; qualitative behavior, especially stability; periodic solutions. Required preparation must include a year-long sequence in advanced calculus or real analysis. Typically offered Fall. Cooperative: Open to UI degree-seeking students.	**Ordinary Differential Equations** 3 Existence of solutions; linear systems; qualitative behavior, especially stability; periodic solutions. Required preparation must include a year-long sequence in advanced calculus or real analysis. Typically offered Even Years - Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**525**	**Revise**	**General Topology** 3 Sets, metric spaces, topological spaces; continuous mappings,	**General Topology** 3 Sets, metric spaces, topological spaces; continuous mappings,	**1-19**

			compactness, connectedness, local properties, function spaces, and fundamental groups. Required preparation must include a year-long sequence in advanced calculus or real analysis. Typically offered Fall. Cooperative: Open to UI degree-seeking students.	compactness, connectedness, local properties, function spaces, and fundamental groups. Required preparation must include a year-long sequence in advanced calculus or real analysis. Typically offered Even Years - Fall. Cooperative: Open to UI degree-seeking students.	
MATH	**532**	**Revise**	**Advanced Mathematical Thinking** 3 Course Prerequisite: Graduate standing in mathematics. Current theories about how humans learn to think mathematically at the advanced level. Typically offered Spring.	**Advanced Mathematical Thinking** 3 Course Prerequisite: Graduate standing in mathematics. Current theories about how humans learn to think mathematically at the advanced level. Typically offered Even Years - Spring. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**534**	**Revise**	**Theories of Learning in Mathematics** 3 Math learning theories, including behaviorism, information processing, constructivism, situated cognition, communities of practice; influence on teaching and learning mathematics. Typically offered ~~Spring~~.	**Theories of Learning in Mathematics** 3 Math learning theories, including behaviorism, information processing, constructivism, situated cognition, communities of practice; influence on teaching and learning mathematics. Typically offered Odd Years - Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**535**	**Revise**	**Research Paradigms in Mathematics Education** 3 Course Prerequisite: MATH 534. Current research paradigms in math education research; critique research designs used in current mathematics education research article; design and carry out a research project. Typically offered Spring.	**Research Paradigms in Mathematics Education** 3 Course Prerequisite: MATH 534. Current research paradigms in math education research; critique research designs used in current mathematics education research article; design and carry out a research project. Typically offered Odd Years - Spring. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**555**	**Revise**	**Topics in Combinatorics** 3 May be repeated for credit; cumulative maximum 6 hours. Combinatorics, generating functions, recurrence relations, inclusion-exclusion, coding	**Topics in Combinatorics** 3 May be repeated for credit; cumulative maximum 6 hours. Combinatorics, generating functions, recurrence relations, inclusion-exclusion, coding	**1-19**

			theory; experimental design, graph theory. Typically offered Spring.	theory; experimental design, graph theory. Typically offered Odd Years - Spring. Cooperative: Open to UI degree-seeking students.	
MATH	**560**	**Revise**	**Partial Differential Equations I** 3 Partial differential equations and other functional equations: general theory, methods of solution, applications. Required preparation must include a year-long sequence in advanced calculus or real analysis. Typically offered Fall. Cooperative: Open to UI degree-seeking students.	**Partial Differential Equations I** 3 Partial differential equations and other functional equations: general theory, methods of solution, applications. Required preparation must include a year-long sequence in advanced calculus or real analysis. Typically offered Even Years - Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**561**	**Revise**	**Partial Differential Equations II** 3 Course Prerequisite: MATH 560. Continuation of MATH 560. Typically offered Spring.	**Partial Differential Equations II** 3 Course Prerequisite: MATH 560. Continuation of MATH 560. Typically offered Odd Years - Spring. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH / BIOLOGY	**563 / 566**	**Revise**	**Mathematical Genetics** 3 Mathematical approaches to population genetics and genome analysis; theories and statistical analyses of genetic parameters. (Crosslisted course offered as MATH 563, BIOLOGY 566). Required preparation must include multivariate calculus, genetics, and statistics. Typically offered Fall. Cooperative: Open to UI degree-seeking students.	**Mathematical Genetics** 3 Mathematical approaches to population genetics and genome analysis; theories and statistical analyses of genetic parameters. (Crosslisted course offered as MATH 563, BIOLOGY 566). Required preparation must include multivariate calculus, genetics, and statistics. Typically offered Odd Years - Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**567**	**Revise**	**Integer and Combinatorial Optimization** 3 Theory and applications of integer and combinatorial optimization including enumerative, cutting plane, basis reduction, relaxation and matching methods. Required preparation must include linear optimization. Typically offered Spring.	**Integer and Combinatorial Optimization** 3 Theory and applications of integer and combinatorial optimization including enumerative, cutting plane, basis reduction, relaxation and matching methods. Required preparation must include linear optimization. Typically offered Odd Years - Spring. Cooperative: Open to UI degree-seeking students.	**1-19**

MATH	**570**	**Revise**	**Mathematical Foundations of Continuum Mechanics I** 3 The basic mathematical theory of continuum mechanics and its relation to perturbation techniques and stability methods. Required preparation must include differential equations and advanced calculus or real analysis. Typically offered Fall.	**Mathematical Foundations of Continuum Mechanics I** 3 The basic mathematical theory of continuum mechanics and its relation to perturbation techniques and stability methods. Required preparation must include differential equations and advanced calculus or real analysis. Typically offered Odd Years - Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**571**	**Revise**	**Mathematical Foundations of Continuum Mechanics II** 3 Course Prerequisite: MATH 570. Continuation of MATH 570. Typically offered Spring.	**Mathematical Foundations of Continuum Mechanics II** 3 Course Prerequisite: MATH 570. Continuation of MATH 570. Typically offered Even Years - Spring. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**574**	**Revise**	**Topics in Optimization** 3 May be repeated for credit; cumulative maximum 12 hours. Advanced topics in the theory and computing methodology in optimization with emphasis on real-life algorithmic implementations. Required preparation must include advanced multivariable calculus and a programming language. Typically offered Fall ~~and Spring~~. Cooperative: Open to UI degree-seeking students.	**Topics in Optimization** 3 May be repeated for credit; cumulative maximum 12 hours. Advanced topics in the theory and computing methodology in optimization with emphasis on real-life algorithmic implementations. Required preparation must include advanced multivariable calculus and a programming language. Typically offered Even Years - Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**575**	**Revise**	**Asset Pricing in Financial Engineering** 3 Mathematical methods for various models on valuation of stocks and options, with rigorous mathematical analysis on pricing and hedging techniques. Recommended preparation: Advanced calculus and some knowledge on differential equations. Typically offered Fall.	**Asset Pricing in Financial Engineering** 3 Mathematical methods for various models on valuation of stocks and options, with rigorous mathematical analysis on pricing and hedging techniques. Recommended preparation: Advanced calculus and some knowledge on differential equations. Typically offered Odd Years - Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
MATH	**576**	**Revise**	**Quantitative Risk Management** 3 Fundamental concepts in	**Quantitative Risk Management** 3 Fundamental concepts in	**1-19**

			modern risk theory and mathematical methods in quantitative risk management; coherent risk measures, volatility modeling, multivariate dependence analysis using copulas, risk aggregation and allocation, and extreme value theory. Typically offered Spring.	modern risk theory and mathematical methods in quantitative risk management; coherent risk measures, volatility modeling, multivariate dependence analysis using copulas, risk aggregation and allocation, and extreme value theory. Typically offered Even Years - Spring. Cooperative: Open to UI degree-seeking students.	
PL P	**511**	**Revise**	**Viruses and Virus Diseases of Plants** 3 ~~Course Prerequisite: MBIOS 503 or 504.~~ Nature of plant viruses, vector-virus relationships and virus diseases of plants. Typically offered Odd Years - Spring. Cooperative: Open to UI degree-seeking students.	**Viruses and Virus Diseases of Plants** 3 Nature of plant viruses, vector-virus relationships and virus diseases of plants. Recommended Preparation: MBIOS 503 or equivalent coursework providing a basic understanding of molecular biology. Typically offered Odd Years - Spring. Cooperative: Open to UI degree-seeking students.	**1-19**
SOE	**340**	**Revise**	**[M] Structural Geology** 4 (3-3) Course Prerequisite: MATH 106; ~~MATH 108;~~ SOE 210. Basic understanding and techniques of working in deformed rocks in mountain belts. Field trip required. (Formerly GEOLOGY 340). Typically offered Spring.	**[M] Structural Geology and Plate Tectonics** 4 (3-3) Course Prerequisite: MATH 106; SOE 210. Basic understanding and techniques of working in deformed rocks in mountain belts. Field trip required. (Formerly GEOLOGY 340). Typically offered Spring.	**8-19**
SOE	**350**	**Revise**	~~**Mineralogy and Crystallography**~~ 4 (2-6) Course Prerequisite: CHEM 101 or 105; SOE 101, 102, ~~or~~ 210. Composition, physical properties, structure, crystallography, identification, and origin of minerals. Field trip required. (Formerly GEOLOGY 350). Typically offered Fall.	**Earth Materials** 4 (2-6) Course Prerequisite: CHEM 101 or 105; SOE 101, 102, 210,or 230. Composition, physical properties, structure, crystallography, identification, and origin of minerals. Field trip required. (Formerly GEOLOGY 350). Typically offered Fall.	**8-19**
SOE	**474**	**Revise**	**Physics and Chemistry of the Earth** 4 (3-3) Course Prerequisite: ~~MATH 171;~~ CHEM 101 or 105; CHEM 102 or 106; PHYSICS ~~102~~ or 201; SOE 101,	**Physics and Chemistry of the Earth** 4 (3-3) Course Prerequisite: CHEM 101 or 105; CHEM 102 or 106; MATH 171; PHYSICS 101 or 201; SOE 101,	**1-19**

			102, or 210; junior standing. Earth's operations as described by sub-disciplines of geology, chemistry, physics, and mathematics; earth's composition as related to solar system formation. Typically offered Spring.	102, or 210; junior standing. Earth's operations as described by sub-disciplines of geology, chemistry, physics, and mathematics; earth's composition as related to solar system formation. Typically offered Spring.	
STAT / MATH	**536**	**Revise**	**Statistical Computing** 3 (2-3) Generation of random variables, Monte Carlo simulation, bootstrap and jackknife methods, EM algorithm, Markov chain Monte Carlo methods. (Crosslisted course offered as STAT 536, MATH 536). Recommended preparation: One 3-hour 400-level probability or STAT course. Typically offered Fall. Cooperative: Open to UI degree-seeking students.	**Statistical Computing** 3 (2-3) Generation of random variables, Monte Carlo simulation, bootstrap and jackknife methods, EM algorithm, Markov chain Monte Carlo methods. (Crosslisted course offered as STAT 536, MATH 536). Recommended preparation: One 3-hour 400-level probability or STAT course. Typically offered Odd Years - Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
STAT / MATH	**548 / 568**	**Revise**	**Statistical Theory I** 3 Probability spaces, combinatorics, multidimensional random variables, characteristic function, special distributions, limit theorems, stochastic processes, order statistics. (Crosslisted course offered as STAT 548, MATH 568). Recommended preparation: Calculus III and one 3-hour 400-level probability course.	**Statistical Theory I** 3 Probability spaces, combinatorics, multidimensional random variables, characteristic function, special distributions, limit theorems, stochastic processes, order statistics. (Crosslisted course offered as STAT 548, MATH 568). Recommended preparation: Calculus III and one 3-hour 400-level probability course. Typically offered Fall. Cooperative: Open to UI degree-seeking students.	**1-19**
STAT / MATH	**549 / 569**	**Revise**	**Statistical Theory II** 3 Continuation of STAT 548. Statistical inferences; estimation and testing hypotheses; regression analysis; sequential analysis and nonparametric methods. (Crosslisted course offered as STAT 549, MATH 569). Recommended preparation: STAT 548.	**Statistical Theory II** 3 Continuation of STAT 548. Statistical inferences; estimation and testing hypotheses; regression analysis; sequential analysis and nonparametric methods. (Crosslisted course offered as STAT 549, MATH 569). Recommended preparation: STAT 548. Typically offered	**1-19**

				Spring. Cooperative: Open to UI degree-seeking students.	