anatomy and physiology, sensory biology, communication, feeding, ecology aenergetics, social and reproductive behavior, and life history. A laboratory experience is included. S

572 Population Biology of Marine Organisms. (3) Study of the advanced principles of population biology as related to marine organisms emphasizing theoretical and applied aspects of natural population dynamics and regulation and development of skills for modeling and managing coastal marine populations. Specific topics covered include concepts of linear and nonlinear dynamics, demography, life history evolution, density dependence, population interaction models, individual based models, and larval ecology. S

573 Biology of Sharks. (3) (Prereq: permission of instructor) (Coreq: MSCI 573L) An introduction to the biology of sharks. Lecture component covers evolution, anatomy, behavior, natural history, physiology, conservation, and ecology. Classes will be held on campus and/or in the Bahamas. SU

573L Biology of Sharks Laboratory. (1) (Coreq: MSCI 573) Topics will include taxonomy, diversity, anatomy, physiology, capture and identification; telemetry tracking; and observation of shark behavior in both their natural habitat and captivity. SU

576 Marine Plankton. (3) (Coreq: MSCI 576L) Study of the structure and function of planktonic communities. The roles of phytoplankton, zooplankton and bacteria are examined in detail. Concepts such as mineral cycling, energy flow, predatory/prey relationships, trophic interactions as well as spatial and temporal dynamics are investigated in lecture, discussion, and an integrated laboratory setting. A review paper on a selected topic will be assigned. Offered every other year in spring. S

576L Marine Plankton Laboratory. (1) (Coreq: MSCI 576) The laboratory will demonstrate the topics and principles presented in lecture. The laboratory consists of a field or laboratory study dealing with planktonic processes in estuarine or marine environments and may require weekend commitments. Students will be responsible for selecting and moderating the discussion of a series of research papers associated with the research topic of the semester. Offered every other year. S

579 Marine Benthic Ecology. (3) A comprehensive review of the structure and function of soft bottom marine communities. Taxonomic coverage ranges from microbial members (bacteria and microphytobenthos) to megafauna and demersal fishes. Covered topics include: intertidal communities, roles of predation and competition, cryptic coloration, biodiversity, benthic pelagic coupling, landscape ecology, anthropogenic impacts, and more. Three lecture hours per week. Every other year. S

579L Marine Benthic Ecology Laboratory. (1) The lab component of the course involves one or more field studies after description and demonstration of some common methods. Every other year. S

599 Directed Research. (3-6) Structured research project for in-service teachers, conducted with faculty direction and participation. Projects explore marine or related problems using the scientific method. F, S

MATHEMATICS (MATH)

510 Algebraic Thinking for Middle School Teachers. (3) Algebraic expressions, equations and systems of equations, inequalities and systems of inequalities, functions and relations, operations with exponents, problems and applications. Graphing calculators, computer algebra systems, spreadsheets and manipulatives are included. SU

520 Problem Solving Strategies for Middle School Teachers. (3) Methods of problem solving required for middle school students: diagrams, systematic lists, pattern recognition, matrix logic, subproblems, unit analysis, forward-backward methods,
recursive relationships, and various ways of organizing information. Spreadsheets and graphing calculators are included. SU

532 **Modern Geometry.** (3) Synthetic and analytic projective geometry, homothetic transformations, Euclidean geometry, non-Euclidean geometries, and topology. SU

612 **History of Mathematics.** (3) (Prereq: Grade of C or above in MATH 161 or the equivalent) Investigation of the history of mathematics from 3000 B.C. to present time. SU

670 **Number Theory.** (3) (Prereq: Grade of C or above in MATH 161 or the equivalent) Induction, divisibility theory, primes, congruences, Fermat’s Theorem, number theoretic functions, primitive roots and indices, quadratic reciprocity law, perfect numbers, Pythagorean triples, Fibonacci numbers, and continued fractions. SU

675 **Introduction to Graph Theory.** (3) (Prereq: MATH 174, 220 or the equivalent) Graphs, paths, cycles, trees, matchings, cuts and flows, colorings, and planarity Hamiltonian Cycles. SU

**MUSIC EDUCATION (MUED)**

520 **Orchestration and Arranging.** (3) An introduction to the instrument and vocal families and basic arranging and compositional concepts for a variety of ensembles. Both classical orchestration and jazz and commercial arranging are covered as well as the practical rearranging required of school and church music directors. Technology Intensive. As Needed

534A **Advanced Choral Conducting.** (3) (Prereq: Admission to a graduate program and permission of instructor) Study of applied techniques, score study, analysis and interpretation as it relates to conducting a choir. This will be a combination of studio instruction and laboratory experience. As Needed

534B **Advanced Instrumental Conducting.** (3) (Prereq: Admission to a graduate program and permission of instructor) Study of applied techniques, score study, analysis and interpretation as it relates to conducting a wind band. This course will be combination of studio instruction and laboratory experience. As Needed

542 **Foundations of Elementary Music Education.** (3) Principles and practices for teaching music in grades Pre K-6. Emphasis is given to planning, teaching and evaluating general music lessons at different levels based on the National Standards for the Arts and to utilizing techniques and materials from a variety of approaches including Kodaly and Orff Pedagogy. SU

543 **Foundations of Secondary Music Education.** (3) Teaching and organization of music classes in middle and senior high school focusing on state and national standards. Emphasis will be given to the areas of general, instrumental, and vocal music. Includes consideration of performance and non-performance classes and implications of the National Standards for the Arts. As Needed

551 **Principles and Methods of Teaching Music.** (3) An overview of the total music program in a variety of school settings to include the development of artistry in musicianship, and pedagogy. F,S

560 **World Music: Cross-Cultural Communication in Contemporary Education.** (3) Study of important musical genres and practices outside the direct influence of Western practice and history. Some of the world’s great musical and cultural traditions are experienced through performance, analysis, and discussion of the music within the greater context of the society. Ancillary topics include religion, philosophy, language patterns, cultural history and traditional customs. As Needed

561 **Brass Methods.** (3) A course emphasizing development of student performance skills on trumpet, trombone, French horn, and tuba. Embouchure formation, breath support,