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## Mechanical Engineering

Larry L. Howell, Chair  
435-A CTB, (801) 422-2625

Ira A. Fulton College of Engineering and Technology Advisement Center  
264 CB, (801) 422-4325

### Admission to Degree Program

The degree program in the Department of Mechanical Engineering carries special enrollment limitations at the junior level. Please see Professional Program Acceptance below and the college advisement center for specific details.

### Graduation Requirements

To receive a BYU bachelor's degree a student must complete, in addition to all requirements for a specific major, the following university requirements:

- The university core, consisting of requirements in general and religious education (See the University Core section of this catalog for details. For a complete listing of courses that meet university core requirements, see the current class schedule.)
- A minimum of 30 credit hours in residence
- A minimum of 120 credit hours
- A cumulative GPA of at least 2.0

### Undergraduate Programs and Degrees

BS Mechanical Engineering

Students should see their college advisement center or a faculty member for help or information concerning the undergraduate programs.

### Graduate Programs and Degrees

MS Mechanical Engineering

PhD Mechanical Engineering

For more information see the BYU 2006–2007 Graduate Catalog.

### The Discipline

Mechanical engineers work with concepts, ideas, and products that are primarily mechanical or energy related. Mechanical engineering is a broad discipline that prepares a person to contribute in a wide range of fields such as aerospace, computer graphics, power generation, machine tools, petroleum, agricultural and construction equipment, medicine, government, and all types of transportation. A mechanical engineer may work in research, design, analysis, manufacturing, testing, operations, sales, or management. Engineers use critical problem-solving methods and basic principles of mathematics and science to creatively solve problems.

### Educational Objectives

The objective of the program is to produce graduates who:

1. Eagerly pursue lifelong learning through study and faith in professional, religious, and personal aspects of life.
2. Understand the fundamental concepts of math, science, and engineering, particularly as they apply to thermal and mechanical systems.
3. Implement the fundamental principles of engineering through hands-on design and analysis, using modern engineering tools and practices to solve real-world engineering problems with high standards of personal and professional ethics.
4. Express faith in God and desire to serve Him through lifelong service to family, church, profession, and community.

### Program Outcomes

To assure that this objective is reached, the department has articulated twelve outcomes of the BS program. Each student graduating from this program is expected to have:

1. A basic understanding of fundamental physical phenomena and governing principles.
2. An ability to develop and solve mathematical models of fundamental physical phenomena.
3. An ability to design a system, component, or process to meet desired needs.
4. The expertise to plan and conduct an experimental program and evaluate the results.
5. An ability to use modern engineering tools and techniques in engineering practice.
6. An understanding of manufacturing processes and planning.
7. Effective oral and written communication skills.
8. An ability to work with others to accomplish common goals.
9. An appreciation of history, philosophy, literature, science, and the fine arts.
10. Personal behavior consistent with high moral and ethical standards.
11. An understanding of engineering in a global, societal context.
12. A desire for and commitment to lifelong learning and service.

All courses in the curriculum are designed to help achieve these outcomes.

The curriculum in mechanical engineering is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (ABET).

### Career Opportunities

A bachelor of science degree in mechanical engineering provides widely recognized professional training for careers in industry, government, and other areas. Most industrial companies hire some mechanical engineers. Companies that make mechanical or energy-related products may hire mostly mechanical engineers. As a result, many mechanical engineering positions are available worldwide. Mechanical engineers have job opportunities in companies involved in such areas as aircraft and spacecraft design; manufacturing processes; product safety and reliability; solar energy; electronic equipment packaging and cooling; power plant design; jet, train, truck, and automobile engines; environmental protection; artificial intelligence; robotics; medical and hospital equipment; new material development and applications; and technical writing. Increasing numbers of positions utilize foreign language experience.

A graduate in mechanical engineering is prepared for advanced studies in the field as well as in a variety of other disciplines, including law, medicine, and business administration. Perhaps most important to graduates are the problem-solving strategies and thinking processes acquired in the study of mechanical engineering that help one to succeed in any area of endeavor.

### General Information

Any student may choose to major in mechanical engineering and to enroll in all classes in the preprofessional program (items 1 and 2 under BS Mechanical Engineering Major Requirements).

### Professional Program Acceptance

Students must be accepted into the professional program before they may take the professional Me En core or technical electives (items 4 and 5 in the major requirements). To apply, students must have completed the following four courses at a college or university (neither AP nor concurrent enrollment credit meet this requirement):

1. One course from the basic science core (item 1 in the major requirements).
2. One course from the mathematics core (item 2 in the major requirements).
3. Me En 172.
4. CE En 103.

Only one repeat is allowed in any of these courses for purposes of determining professional program acceptance. If a student has taken more than four professional application courses or has repeated any of these courses, all grades received in the professional application courses will be considered in determining professional program acceptance.

A fixed number of students is granted acceptance to the professional program each year. Acceptance is based primarily upon the grade point average for the professional application courses. Because the class size is fixed, the GPA necessary for admission varies from year to year. Historically, students with a GPA of 2.9 or above in the professional application courses have been admitted to the professional program.

Normal application deadlines are June 12, October 1, and February 1. Applications from transfer students who have been admitted to the university may be considered at other times.

Professional program application forms are available in the college advisement center.

### Academic Standards and Continuance

On gaining acceptance into the professional program, students must maintain a minimum university cumulative grade point average of 2.0. No more than 6 credit hours of grades below C– in major courses may be applied toward graduation. A professional program course may not be retaken more than once.

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## BS Mechanical Engineering (88.5–92.5 hours\*)

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*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center or the department office for information regarding requirements for admission to this major.*

### Major Requirements

- Complete the following basic science core:
  - Chem 105.
  - Phscs 123, 220.

**Note:** Students without high school physics should start with Phscs 121.
- Complete one of the following mathematics core sequences:
  - Math 112, 113, 302, 303.
  - Math 112, 113, 214, 334, 343.
- Complete the following preprofessional engineering courses:
  - CE En 103, 203, 204.
  - EC En 301.
  - Me En 172, 191, 250, 282.
- Complete the following professional mechanical engineering core:
  - Me En 312, 321, 335, 340, 363, 372, 373, 475, 476.
- Complete 15 hours (five courses) of technical electives. The purpose of these courses is to strengthen the engineering education of the student by
  - deepening the student's understanding of engineering and/or science fundamentals,
  - helping the student learn to apply engineering fundamentals in specific areas of interest, and
  - helping the student to develop critical skills related to engineering practice.

The technical electives are normally 400-level or higher mechanical engineering courses, but other courses may be used as long as the following requirements are met:

- At least three courses must be in mechanical engineering.
- No courses may be below the 300 level.
- A maximum of 3 credit hours in Me En 595R or other independent project courses may be applied to meet technical elective requirements.

- All courses must be of an acceptable level from mechanical engineering, civil engineering, chemical engineering, computer engineering, electrical engineering, mathematics, statistics, physics, chemistry, or computer science; or they must be on the approved elective list in the department office.

If a student wishes to count a course outside these areas as an elective, approval must be granted *before* the course is taken. Approval is requested by submitting to the department undergraduate committee a one-page petition that lists all of the proposed electives and demonstrates how the proposed exception meets the purposes described above.

- No course used to satisfy other major requirements for graduation may be used as an elective.

### Manufacturing Option

The Society of Manufacturing Engineers has identified four areas of competency for manufacturing engineering as follows: (1) materials and manufacturing processes; (2) process, assembly and product engineering; (3) manufacturing competitiveness; and (4) manufacturing systems design.

An option in manufacturing engineering is available for mechanical engineering majors. It may be completed by taking 12 hours of technical electives from the following three areas (which may be counted against the 9 hours of mechanical engineering electives) according to the following requirements:

- Complete the following:
  - Me En 585.
- Complete one or more courses from the following:
  - Me En 482, 486, 537.
- Complete the 12-hour requirement with courses from the following:
  - Me En 452, 456, 477, 558, 584.

When combined with required courses for all mechanical engineering majors related to manufacturing, namely Me En 250, 282, 475/476, and Stat 361, this option provides a strong foundation in manufacturing engineering.

\*Hours include courses that may fulfill university core requirements.

## Mechanical Engineering (Me En)

### Undergraduate Courses

**172. Engineering Graphics—Principles and Applications.** (3:3:0) F, W, Sp Prerequisite: engineering and technology major status.

Comprehensive applications of CAD-based national (ANSI) and international (ISO) graphics standards, including coordinate and geometric dimensioning and tolerancing practices, manufacturing, and product verification procedures.

**191. New Student Seminar.** (.5:1:0) F, W

Topics of special interest to new mechanical engineering majors. Required of all first-semester freshman and transfer students.

**199R. Academic Internship.** (1–3:Arr.:Arr. ea.) F, W, Sp or Su Prerequisite: consent of both department chair and cooperative education coordinator.

Work experience evaluated by supervisor and posted on student's transcript.

**250. Science of Engineering Materials.** (3:3:0) F, W, Sp or Su Prerequisite: Chem 105.

Principles and properties of solid materials and their behavior as applied to engineering.

**282. Manufacturing Processes.** (3:2:3) F, W, Sp or Su Prerequisite: CE En 203, Me En 250.

Common manufacturing processes, including technological limitations and economic considerations. Influence of product design on process selection and manufacturing efficiency.

**312. Fluid Mechanics.** (3:3:1) F, W, Sp or Su Prerequisite: Me En 321, 363; 373 or concurrent enrollment.

Physics and modeling of fluid flow; fluid statics, dimensional analysis, momentum, internal and external viscous flow, compressible flow, and fluid machinery.

**321. Thermodynamics.** (3:3:0) F, W, Sp or Su Prerequisite: Phcs 123; Math 303 or 334.

Fundamentals of thermal energy and work; principle of state, conservation of mass, conservation of energy, increase of entropy principle; application to thermal and mechanical processes.

**335. Dynamic System Modeling and Analysis.** (3:3:1) F, W, Sp or Su Prerequisite: Math 303 or 334; Me En 363, 373, CE En 204.

Formulating mathematical models for mechanical, electrical, fluid, and combined systems; numerical solution of motion equations; first- and second-order systems, frequency response, and transfer functions.

**340. Heat Transfer.** (3:3:1) F, W, Sp or Su Prerequisite: Me En 312.

Fundamentals of heat transfer; basics of conduction, convection, and radiation; mass transfer by analogy; heat exchangers; computer applications to practical design and analysis problems.

**363. Elementary Instrumentation.** (3:2:3) F, W, Sp or Su Prerequisite: Math 303 or 334; EC En 301; Engl 316 or concurrent enrollment.

Fundamentals of mechanical measuring systems; sensors, signal conditioning, statistical error analysis, dynamic response, standards.

**372. Mechanical System Design Fundamentals.** (3:2:3) F, W, Sp or Su Prerequisite: CE En 203, Me En 172, 250, 282; Me En 373 or concurrent enrollment.

Static and dynamic stress and failure analysis for mechanical systems.

**373. Introduction to Scientific Computing and Computer-Aided Engineering.** (3:2:3) F, W, Sp or Su Prerequisite: Math 113; concurrent enrollment in Math 214 or 302.

Computer programming for engineers taught in context of solving physical systems using numerical methods. Student will program solutions using the C++ language, spreadsheets, symbolic solvers, etc.

**412. Applications of Fluid Dynamics.** (3:3:0) Prerequisite: Me En 312.

One-dimensional compressible flow, shocks, expansions, nozzles; turbomachinery design and performance; pumps, compressors, fans, and turbines; introduction to CFD with applications.

**415. Applied Aerodynamics and Flight Mechanics.** (3:3:0) Sp or Su Prerequisite: Me En 312.

Modern applied aerodynamics, including performance, stability, and control of aerospace vehicles.

**422. Applied Thermodynamics.** (3:3:1) F, W, Sp or Su Prerequisite: Me En 321, 363, 373.

Applied engineering thermodynamics including air and steam power cycles, thermodynamic relations, and introduction to combustion and equilibrium chemical reactions.

**425. Internal Combustion Engines.** (3:2:3) F Prerequisite: Me En 321 or equivalent.

Fundamental operating characteristics of internal combustion engines, spark and compression ignition. Thermodynamic cycle analysis, performance and emissions characterization, and dynamometer testing on CFR and production engines.

**426. Gas Turbine and Jet Engine Design.** (3:3:0) W Prerequisite: Me En 312, 321; or equivalents.

Design and synthesis of land-based and aircraft gas turbines utilizing fluid flow and thermodynamic fundamentals. Extensive discussion of turbojet, turbofan, and turboprop engines.

**431. Design of Control Systems.** (3:3:0) W Prerequisite: Me En 335.

Classical frequency response and time domain design of control systems. State variable control and computer simulation of control systems.

**437. Kinematics.** (3:3:0) F, W, Sp or Su Prerequisite: CE En 204; Math 303 or 334; Me En 373.

Relative motion of links in mechanisms; velocities and accelerations of machine parts; rolling contact; cams; synthesis of mechanisms. Includes computer-aided engineering techniques.

**452. Intermediate Materials.** (3:3:0) Sp or Su Prerequisite: Me En 250, 372; or equivalent.

Mechanical behavior of engineering materials including metals, plastics, ceramics, and composites.

**456. Composite Material Design.** (3:3:0) W Prerequisite: Me En 250.

Macro- and micro-mechanical analysis and design of uni- and multidirectional composite materials.

**471. Computer-Aided Engineering Applications.** (3:3:0) F, Sp or Su Prerequisite: Me En 172, 373, CE En 203, 204.

Application of computer-aided engineering tools to design; 3-D geometry and solid modeling; applying finite element analysis, kinematic analysis, and other software to engineering analysis.

**472. Mechanical Systems Design Applications.** (3:3:0) Prerequisite: Me En 372.

Theory, analysis, and design of mechanical systems and components.

**475, 476. Integrated Product and Process Design 1, 2.** (3:2:3 ea.) F, W Prerequisite: Me En 321, 363, 372, 373; senior standing (fewer than 30 hours remaining in the program) in mechanical engineering, manufacturing engineering technology, industrial design, or related disciplines with instructor's consent.

Comprehensive two-semester design experience from conception to manufacturing planning and prototype. Product development process. Economic and manufacturing considerations. Intellectual property assignment agreement required. Must be taken in consecutive fall and winter semesters.

**477. Design for Manufacture and Assembly.** (3:3:0) W Prerequisite: Me En 282, 372; or equivalent.

Design practice for manufacturing considerations. Surface finish, tolerances, GD&T, and inspection and gaging principles. Application of computer-aided tolerancing and inspection.

**482. Manufacturing Systems Analysis and Design.** (3:3:0) F Prerequisite: Me En 250, 282; or equivalents.

Analysis, synthesis, and control of processing and assembly operations; mathematical modeling of manufacturing processes; systems integration; applying conservation principles to processing and assembly operations.

**486. Automation.** (3:3:0) F

Determining appropriate levels of manufacturing automation based on economics and productivity. Elements of automation, including sensors, robots, conveyors, and part feeders.

**499R. Honors Thesis.** (1–6:0:0 ea.) F, W, Sp or Su

## 500-Level Graduate Courses (available to advanced undergraduates)

**500. (Me En-CE En) Design and Materials Applications.** (3:3:0) W Prerequisite: CE En 203; Me En 372 or CE En 321; or equivalent.

Applied and residual stress; materials selection; static, impact, and fatigue strength; fatigue damage; surface treatments; elastic deflection and stability—all as applied to mechanical design.

**501. (Me En-CE En) Stress Analysis and Design of Mechanical Structures.** (3:3:0) Sp or Su Prerequisite: CE En 321 or Me En 372; or equivalent.

Stress analysis and deflection of structures; general bending and torsion, with computer applications to mechanical and aerospace structure design.

**503. (Me En-CE En) Plasticity and Fracture.** (3:3:0) F Prerequisite: CE En 203; Me En 250; Math 303; senior standing or instructor's consent.

Tensor algebra; stress and deformation tensors; relationships between dislocation slip, yielding, plastic constitutive behavior, and microstructure development; cracks and linear elastic fracture mechanics.

**504. (Me En-CE En) Computer Structural Analysis and Optimization.** (3:3:0) F Prerequisite: background in linear algebra; CE En 321 or Me En 372; or equivalents.

Matrix analysis of rods, shafts, beams, trusses, frames, and grids using the generalized stiffness method. Optimization methods for these structures. Organizing computer programs for structural analysis and structural optimization.

**506. (Me En-CE En) Continuum Mechanics and Finite Elements.** (3:3:0) W Prerequisite: background in linear algebra; CE En 321 or Me En 372; or equivalents.

Equilibrium, constitutive, and compatibility equations; closed-form solutions from elasticity; finite element theory, programming, and usage; membrane, axisymmetric, and solid elements. Application to heat transfer, fluid mechanics, and seepage.

**508. (Me En-CE En) Structural Dynamics.** (3:3:0) F Prerequisite: CE En 321 or Me En 372; or equivalents.

Dynamic analysis of single degree-of-freedom, discrete multi-degree-of-freedom, and continuous systems. Static and dynamic stability of structures.

**510. Compressible Fluid Flow.** (3:3:1) F Prerequisite: Me En 312.

One-dimensional analysis of compressible flow with area change, friction, heat transfer, shock waves, and combined effects, including experimental methods.

**512. Intermediate Fluid Dynamics.** (3:3:0) W Prerequisite: Me En 312 or instructor's consent.

Review of fluid properties, Navier-Stokes equations, exact and similarity solutions, introduction to potential flows, stream functions, lift and drag, boundary layers, vorticity, and turbulence.

**521. Intermediate Thermodynamics.** (3:3:0) F Prerequisite: Me En 322 or instructor's consent.

Equations of state, thermodynamic relations, Maxwell's equations, equilibrium of single and multiphase mixtures, chemical reactions, and product equilibrium.

**522. Combustion.** (3:3:0) F Prerequisite: Chem 105, Me En 322, or instructor's consent.

Introduction to first- and second-law ideal gas combustion systems along with elementary models of homogeneous and heterogeneous premixed and/or diffusion flames.

**523. (Me En-CE En) Aircraft Structures.** (3:3:0) W Prerequisite: CE En 321 or Me En 372; or equivalent.

Requirements, objectives, loads, materials, and tools for design of airframe structures; static behavior of thin-wall structures; durability and damage tolerance; certification and testing. Airframe component team design project.

**533. Digital Control Systems.** (3:3:0) Sp Prerequisite: Me En 531.

Design of digital controllers for mechanical systems, analysis using the z-transform, digital filter implementation, application of transform-based classical design methods, and modern state-space techniques.

**534. Dynamics of Mechanical Systems.** (3:3:0) F Prerequisite: Me En 435 or equivalent.

Hamiltonian and Lagrangian dynamics, generalized coordinates, linear and angular momentum, Euler angles, rigid-body motions, and gyroscopic effects. Theory taught with applications integrated.

**535. Mechanical Vibrations.** (3:3:0) Su Prerequisite: Me En 435 or equivalent.

Introduction to energy methods for system modeling, eigenvalues and mode shapes, frequency response, and spectral characterization of vibrations.

**537. Advanced Mechanisms, Robotics.** (3:3:0) W Prerequisite: Me En 337 or equivalent.

Kinematics and dynamics of advanced mechanisms, such as robots, with computer simulation of mechanism motion.

**538. Compliant Mechanisms.** (3:3:0) Sp or Su Prerequisite: Me En 337, 372; or instructor's consent.

Design and analysis of compliant mechanisms and compliant structures. Large-deflection analysis/force displacement relationships; mechanisms synthesis.

**540. Intermediate Heat and Mass Transfer.** (3:3:0) W Prerequisite: Me En 440 or equivalent.

Analytical approaches to conduction, convection, and radiation heat transfer. Introduction to mass transfer.

**541. Numerical Heat Transfer.** (3:3:0) W Prerequisite: Me En 440 or instructor's consent.

Heat transfer analysis by numerical methods. Finite difference and finite element methods, stability, and error analysis.

**557. Corrosion.** (3:3:0) F odd yr. Prerequisite: Chem 105 or equivalent.

Basic principles, eight common forms of corrosion, testing, materials, applications, modern theory, and high temperature metal-gas reactions.

**558. Metallurgy.** (3:3:0) F even yr. Prerequisite: Me En 250 or instructor's consent.

Fundamental principles of physical metallurgy and their application to design.

**564. Digital Instrumentation and Mechatronic Systems.** (3:2:3) F Prerequisite: Me En 363 or equivalent.

Design and analysis of instrumentation systems, fundamental sensor characteristics, and computer data acquisition; time and frequency domain modeling with analog and digital components.

**570. (Me En-CE En) Computer-Aided Engineering Software Development.** (3:3:0) F Prerequisite: Me En 273 or C programming.

Programming methods for development of engineering software. Data structures, architecture, libraries, and graphical user interfaces, with applications to CAD systems.

**572. (Me En-CE En-C S 557) Computer-Aided Geometric Design.** (3:3:0) F Prerequisite: proficiency in C programming.

Mathematical theory of free-form curves and surfaces and solid geometric modeling. Bezier and B-spline curve and surface theory, parametric and implicit forms, intersection algorithms, topics in computer algebra, free-form deformation. Several programming projects.

**575. (Me En-CE En) Optimization Techniques in Engineering.** (3:3:0) W Prerequisite: Math 302 and FORTRAN, C, or similar computer language.

Application of computer optimization techniques to constrained engineering design. Theory and use of state-of-the-art computer routines. Robust design methods.

**576. Product Design.** (3:3:0) F Prerequisite: Me En 475 or instructor's consent.

Emerging design methodology and design strategies for complex systems, including decomposition methods and sensitivity analysis. Advanced CAD/CAE/CAM technologies applied to design.

**578. CAD/Cam Applications.** (3:3:0) W Prerequisite: advanced FORTRAN, C, or C++.

Principles and practices involved in parametric surface and solid modeling, associativity, NC tool path generation, etc. Construction of complete CAD models for design, analysis, and manufacture.

## Mechanical Engineering

### 584. Manufacturing Process Machine Design. (3:3:0) W

Prerequisite: Me En 372 or equivalent.

Applying machine design principles to manufacturing process machines and tooling; integrating machine elements; precision machine design. Designing and analyzing the effects of loading, combined stresses, and deflections on machine process capability. Sensors applied to process machines.

### 585. Manufacturing Competitiveness: Quality and Productivity. (3:3:0) F

Prerequisite: Stat 361, Me En 282; or equivalents.

Production strategies to improve quality, decrease cost, and increase throughput to create market advantage; effective production management systems; applying quality improvement tools to process data; theory of constraints and lean production.

### 595R. Special Topics in Mechanical Engineering. (1–18:2:0 ea.) F, W, Sp, Su

Prerequisite: department chair's consent.

## Graduate Courses

For 600- and 700-level courses, see the BYU 2006–2007 Graduate Catalog.

## Mechanical Engineering Faculty

### Professors

- Adams, Brent L. (1999) BES, U. of Utah, 1974; MS, PhD, Ohio State U., 1976, 1979.
- Chase, Kenneth W. (1968) BES, MS, Brigham Young U., 1962, 1964; PhD, U. of California, Berkeley, 1972.
- Howell, Larry L. (1994) BS, Brigham Young U., 1987; MS, PhD, Purdue U., 1991, 1993.
- Magleby, Spencer P. (1989) BS, MS, Brigham Young U., 1983, 1983; PhD, U. of Wisconsin, Madison, 1988.
- Parkinson, Alan R. (1982) BS, Brigham Young U., 1977; MS, PhD, U. of Illinois, 1979, 1982.
- Red, W. Edward (1983) BA, BSME, Rice U., 1965; PhD, Arizona State U., 1972.
- Smith, Craig C. (1980) BES, MS, Brigham Young U., 1969, 1970; PhD, Massachusetts Inst. of Technology, 1973.
- Todd, Robert H. (1989) BS, California State U., Northridge, 1964; MS, PhD, Stanford U., 1965, 1971.
- Webb, Brent W. (1986) BS, MS, Brigham Young U., 1981, 1982; PhD, Purdue U., 1986.

### Associate Professors

- Blotter, Jonathan D. (2002) BS, MS, Utah State U., 1991, 1993; PhD, Virginia Polytechnic Institute and State U., 1996.
- Bons, Jeffrey P. (2002) BS, MS, PhD, Massachusetts Inst. of Technology, 1988, 1990, 1997.
- Bowman, W. Jerry (1997) BS, Brigham Young U., 1977; MSE, U. of Central Florida, 1982; PhD, Air Force Inst. of Technology, 1987.
- Cox, Jordan (1986) BA, MS, Brigham Young U., 1983, 1984; PhD, Purdue U., 1991.
- Eastman, Paul F. (1985) BA, PhD, U. of Utah, 1960, 1965.
- Jensen, C. Gregory (1983) BS, MS, Brigham Young U., 1979, 1982; PhD, Purdue U., 1993.
- Jones, Matthew R. (2001) BS, Brigham Young U., 1988; MS, PhD, U. of Illinois, 1990, 1993.
- Maynes, R. Daniel (1997) BS, MS, Utah State U., 1992, 1993; PhD, U. of Utah, 1997.
- McLain, Timothy W. (1995) BS, MS, Brigham Young U., 1986, 1987; PhD, Stanford U., 1995.
- Nelson, Tracy W. (1994) BS, MS, PhD, Ohio State U., 1991, 1993, 1998.
- Sorensen, Carl D. (1987) BS, Brigham Young U., 1981; PhD, Massachusetts Inst. of Technology, 1985.
- Tree, Dale R. (1994) BS, Brigham Young U., 1986; MS, Purdue U., 1988; PhD, U. of Wisconsin, Madison, 1992.

### Assistant Professors

- Jensen, Brian D. (2005) BS, MS, Brigham Young U., 1996, 1998; MS, PhD, U. of Michigan, 2004, 2004.
- Snyder, Deryl D. (2004) BS, MS, PhD, Utah State U., 1998, 1999, 2002.
- Thomson, Scott L. (2004) BS, MS, Brigham Young U., 1999, 2000; PhD, Purdue U., 2004.

### Adjunct Faculty

- Beckwith, Scott W. (1990) BS, Texas A & M U., 1964; MS, California Inst. of Technology, 1965; PhD, Texas A & M U., 1974.
- Germane, Geoffrey J. (1979) BS, MS, Rose-Hulman Inst. of Technology, 1972, 1975; PhD, Brigham Young U., 1978.
- Simonsen, John M. (1954) BSME, U. of Utah, 1950; PhD, Purdue U., 1952, 1955.
- Warner, Charles Y. (1966) BES, MS, Brigham Young U., 1957, 1963; PhD, U. of Michigan, 1966.
- Woolley, Ronald L. (1983) BES, MS, Brigham Young U., 1966, 1968; PhD, Stanford U., 1974.

### Emeriti

- Andersen, Blaine W. (1970) BS, U. of Utah, 1949; MS, PhD, U. of Illinois, 1951, 1953.
- Cannon, John N. (1957) BS, MS, U. of Utah, 1952, 1955; PhD, Stanford U., 1965.
- Free, Joseph C. (1961) BES, Brigham Young U., 1958; MS, California Inst. of Technology, 1961; PhD, Massachusetts Inst. of Technology, 1967.
- Heaton, Howard S. (1963) BES, U. of Southern California, 1957; MS, PhD, Stanford U., 1959, 1963.
- Mortensen, Kay S. (1968) BS, MS, Utah State U., 1962, 1963; PhD, U. of Utah, 1967.
- Polve, James H. (1969) BS, U. of Utah, 1948; MS, Princeton U., 1951; PhD, U. of Arizona, 1966; ME, U. of Utah, 1954.
- Raisor, E. Max (1968) BS, MS, Brigham Young U., 1968, 1975.
- Simmons, Val E. (1969) BS, U. of Utah, 1964; MS, Brigham Young U., 1967; PhD, Utah State U., 1970.
- Tolman, Wilford J. (1960) BS, MS, Brigham Young U., 1960, 1964.
- Ulrich, Richard D. (1968) BS, MS, PhD, Purdue U., 1954, 1955, 1959.
- Wilkes, Doran F. (1958) BS, MS, Utah State U., 1951, 1955; EdD, U. of Missouri, Columbia, 1966.
- Wille, Milton G. (1958) BA, BES, Brigham Young U., 1957, 1957; MS, California Inst. of Technology, 1958; PhD, U. of Michigan, 1964.

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## Maya

See Center for Language Studies.

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## Media Arts

See Theatre and Media Arts section of this catalog.

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## Microbiology and Molecular Biology

Brent L. Nielsen, Chair  
775 WIDB, (801) 422-1102  
Internet: <http://mmbio.byu.edu>

Department Advisement  
Elaine Rotz  
767 WIDB, (801) 422-4293

College of Biology and Agriculture Advisement Center  
380 WIDB, (801) 422-3042

### Admission to Degree Program

All degree programs in the Department of Microbiology and Molecular Biology are open enrollment. However, special limitations apply for clinical laboratory science.

### The Discipline

The Microbiology and Molecular Biology Department offers programs leading to specialization in immunology, virology, parasitology, medical microbiology, microbial genetics, microbial physiology, clinical laboratory science, environmental and industrial microbiology, general microbiology, molecular biology, forensic science, molecular cytogenetics, and diagnostic molecular genetics.

### Career Opportunities

Graduates are employed in a wide variety of positions in industry, hospitals, government agencies, and universities. Majors from this department are an excellent preprofessional course of study for those interested in medicine, dentistry, law, or business.

The following courses are recommended for those students interested in graduate and professional programs:

Chem 351, 352, 353, 481.  
Math 119 or higher.  
Phscs 105, 106, 107, 108.

### Graduation Requirements

To receive a BYU bachelor's degree a student must complete, in addition to all requirements for a specific major, the following university requirements:

- The university core, consisting of requirements in general and religious education (See the University Core section of this catalog for details. For a complete listing of courses that meet university core requirements, see the current class schedule.)
- A minimum of 30 credit hours in residence
- A minimum of 120 credit hours
- A cumulative GPA of at least 2.0

### Undergraduate Programs and Degrees

BS	Clinical Laboratory Science
BS	Microbiology
BS	Molecular Biology
Minors	Microbiology
	Molecular Biology

Students should see their advisor for help or information concerning the undergraduate programs.

### Graduate Programs and Degrees

MS	Microbiology
MS	Molecular Biology
PhD	Microbiology
PhD	Molecular Biology

For more information see the BYU 2006–2007 Graduate Catalog.

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## BS Clinical Laboratory Science (65 hours\*)

*This is a limited-enrollment program requiring departmental admissions approval. Please see the department office for information regarding requirements for admission to this major.*

Students who want to practice clinical laboratory science/medical technology in diagnostic laboratories or pursue related options choose this degree. The program in clinical laboratory science is accredited by the National Accrediting Agency for Clinical Laboratory Sciences (8410 West Bryn Mawr Avenue, Suite 670, Chicago, IL 60631, [773] 714-8880).

### Major Requirements

1. Complete the following biology core requirements:  
Biol 120, 220, 240, 241, 340, 360.
2. Complete the following microbiology core requirements:  
MMBio 165, 352, 353, 354.
3. Complete the following:  
MMBio 102, 392, 393, 394, 395, 407, 417, 420, 421, 453, 491.
4. During one semester and one term, complete at least 2 hours from the following:  
MMBio 399R.
5. Complete the following:  
Chem 105, 106, 107, 152, 281.

**Note:** Students must have completed or be enrolled in all major requirements with the exception of MMBio 392, 393, 394, 395, 407, 417, 420, 421, and 491 before entering the program.

### Recommended Courses

Engl 316.  
PDBio 220, 305.  
Stat 221.

\*Hours include courses that may fulfill university core requirements.

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## BS Microbiology (57–60 hours\*)

This is the preferred degree for microbiology majors who desire an advanced degree (master's or doctorate) in microbiology.

### Major Requirements

1. Complete the following biology core requirements:  
Biol 120, 240, 241, 340, 360, 420.
2. Complete the following microbiology core requirements:  
MMBio 165, 350, 351, 352, 353, 354, 355, 365.
3. Complete at least 12 hours from the following:  
Biol 350, 421.  
Chem 481, 482.  
MMBio 399R, 407, 417, 430, 441, 442, 451, 452, 453, 454, 494R.  
NDFS 361.  
PAS 514.

**Note:** Only 3 hours of MMBio 399R and 494R combined will count toward major hours.

4. Complete the following:  
Chem 105, 106, 107, 351, 352.
5. Complete at least 1 hour of the following:  
Chem 353.
6. Complete one of the following options:  
**Either** Phscs 105, 106.  
**Or** Stat 221.

**Recommended Course**

Engl 316.

\*Hours include courses that may fulfill university core requirements.

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**BS Molecular Biology** (59–66 hours\*)

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**Major Requirements**

1. Complete the following biology core requirements:  
Biol 120, 240, 241, 340, 360, 420.
2. Complete the following molecular biology core requirements:  
MMBio 165, 390R, 430, 441, 442, 490R.
3. Complete two registrations of the following (not same semester or term) of 1–3 hours each as approved by mentor:  
MMBio 494R.
4. Complete at least 12 hours from the following:  
Chem 461, 462, 468, 482, 581, 584, 586.  
MMBio 350, 351, 352, 354, 399R, 451, 452, 454.  
PDBio 482, 582.  
**Note:** Only 3 hours of MMBio 399R will count toward major hours.
5. Complete the following:  
Chem 105, 106, 107, 351, 352, 481.
6. Complete at least one hour from the following:  
Chem 353.
7. Complete one of the following options:  
**Either** Phscs 105, 106.  
**Or** Stat 221.

**Recommended Courses**

Engl 316.  
Phscs 107, 108.

\*Hours include courses that may fulfill university core requirements.

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**Minor Microbiology** (15 hours, plus prerequisites in coupled major)

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**Minor Requirements**

Complete the following:  
Biol 241.  
MMBio 165, 350, 351, 352, 353, 354, 355, 365.

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**Minor Molecular Biology** (14 hours, plus prerequisites in coupled major)

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**Minor Requirements**

1. Complete the following:  
Chem 481.  
MMBio 430, 441, 442.
2. Complete at least 3 hours from the following:  
Biol 494R.  
Chem 461, 468, 482, 581, 584, 586.  
InBio 494R.  
MMBio 350, 351, 352, 354, 390R, 451, 452, 454, 490R, 494R.  
NDFS 494R.  
PAS 494R.  
PDBio 482, 494R, 582.

**Note:** Be aware of prerequisites for the above courses (usually filled in a coupled major).

**Microbiology and Molecular Biology (MMBio)**

**Undergraduate Courses**

**102. Introduction to Clinical Laboratory Techniques.** (1:0:3) F, W  
Hospital laboratory techniques.

**165. Introductory Laboratory Methods.** (1:0:3) F, W  
Introduction to laboratory techniques.

**221. General Microbiology.** (3:3:0) F, W, Sp Independent Study also. Honors also. Prerequisite: any chemistry course and any biology course.  
Microbial world, emphasizing communicable diseases, their causes, and control. Recommended for students seeking a liberal education in microbiology who do not have the prerequisites to take the more advanced courses.

**222. General Microbiology Laboratory.** (1:0:2) Prerequisite: MMBio 221 or concurrent enrollment.

**350. Microbial Genetics.** (2:2:0) F, W Prerequisite: Biol 240.  
General genetics of cell structure and function.

**351. Microbial Physiology 1.** (2:2:0) F, W Prerequisite: Biol 240.  
Introduction to the principles of bacterial physiology.

**352. Immunology 1.** (2:2:0) F, W Prerequisite: Biol 240.  
Introduction to fundamentals of immunology.

**353. Medical Microbiology 1.** (2:2:0) F, W Prerequisite: Biol 240.  
Introduction to infectious diseases concentrating principally on the basic mechanisms of pathogenesis for bacterial, viral, parasitic, and fungal diseases.

**354. Virology 1.** (2:2:0) F, W Prerequisite: Biol 360.  
Basic principles of virology emphasizing animal virus replication and human infections.

**355. Microbial Ecology.** (2:2:0) F Prerequisite: Biol 240.  
Principles of prokaryotic ecology; microbial communities in their natural habitats; role of microorganisms in biogeochemical cycling.

**362R. Survey of Careers in Microbiology.** (1:Arr.:Arr. ea.) F, W  
Lectures and field trips surveying career choices.

**365. Advanced Laboratory Methods.** (1:0:3) F, W Prerequisite: MMBio 265.  
Advanced laboratory techniques.

**390R. Readings in Molecular Biology.** (1:1:0 ea.) F, W  
Prerequisite: Biol 360.  
Selected readings in molecular biology.

**392. Hematology.** (2.5:2.5:1) W Prerequisite: clinical laboratory science program acceptance.  
Normal and abnormal hematology.

**393. Immunohematology and Coagulation Theory.** (2.5:2.5:1) W Prerequisite: clinical laboratory science program acceptance.  
Theory and practice of bloodbanking and coagulation theory.

**394. Practical Hematology.** (2:0:7) W Prerequisite: MMBio 392 or concurrent enrollment.  
Laboratory to accompany MMBio 392; medical laboratory techniques in hematology.

**395. Practical Immunohematology and Coagulation Theory.** (2:0:7) W Prerequisite: MMBio 393 or concurrent enrollment.  
Laboratory to accompany MMBio 393; medical laboratory techniques in immunohematology and coagulation theory.

**399R. Academic Internship.** (1–9:0:40 ea.) F, W, Sp, Su Prerequisite: mentor's consent.  
Approved experiential learning.

**407. Clinical Microbiology.** (4:2:6) W Prerequisite: MMBio 453.  
Approaches to laboratory diagnosis of infectious diseases.

**417. Medical Parasitology.** (3:2:3) F Prerequisite: Biol 100 or equivalent.  
Pathogenesis, diagnosis, and epidemiology of human parasitic diseases. Laboratory included.

**420. Pathophysiology and Laboratory Diagnosis in Clinical Chemistry.** (5:4:2) F Prerequisite: clinical laboratory science program acceptance.

Laboratory diagnosis of disorders involving the major systems of the human body.

**421. Laboratory Techniques in Clinical Chemistry and Diagnostic Molecular Biology.** (4:0:14) F Prerequisite: concurrent enrollment in MMBio 420.

Medical laboratory techniques in urinalysis, clinical chemistry, and diagnostic molecular genetics.

**430. Advanced Cell Biology.** (3:3:0) F Prerequisite: Biol 360; bioscience major status.

Molecular genetics, cell biology, and developmental biology.

**441. Advanced Molecular Biology.** (3:3:0) W Prerequisite: Biol 240, Chem 352.

Molecular biology of gene structure and expression in prokaryotic and eukaryotic organisms.

**442. Advanced Molecular Biology Laboratory.** (2:0:6) W Prerequisite: Biol 241; MMBio 441 or concurrent enrollment.

Laboratory to accompany MMBio 441.

**451. Microbial Physiology 2.** (3:3:0) W Prerequisite: MMBio 351.

Principles of bacterial physiology, including structure-function relationships, gene regulation, and biochemical processes. Unique aspects of prokaryotic metabolism.

**452. Immunology 2.** (3:3:0) F Prerequisite: MMBio 352.

Advanced concepts of immunological processes.

**453. Medical Microbiology 2.** (3:3:0) W Prerequisite: MMBio 353.

Pathogenesis of diseases in humans caused by bacteria.

**454. Virology 2.** (3:3:0) F Prerequisite: MMBio 354.

Selected molecular aspects of virus life cycles and disease processes.

**490R. Molecular Biology Seminar.** (1:1:0 ea.) F, W Prerequisite: MMBio 441; senior status.

Critical examination of current literature and research in molecular biology.

**491. Concept Applications in Laboratory Medicine.** (1:1:0) F Prerequisite: acceptance into clinical laboratory science program.

Case presentations of various medical disorders.

**494R. Mentored Research.** (1–3:Arr.:Arr. ea.) F, W, Sp, Su Prerequisite: mentor's consent.

Mentored research.

**499R. Senior Honors Thesis.** (1–3:Arr.:Arr. ea.) F, W, Sp, Su Prerequisite: topic to be cleared with Honors Program and Department of Microbiology and Molecular Biology.

## 500-Level Graduate Courses (available to advanced undergraduates)

**518. Select Pathogens.** (2:2:0) F odd yr. Prerequisite: MMBio 453 or equivalent.

Current literature in special pathogens.

**551R. Current Topics in Microbiology and Molecular Biology.** (1–3:Arr.:0 ea.) On dem.

Readings from current literature on a specific topic; student presentations and discussion.

**554. Molecular Virology.** (2:2:0) Prerequisite: MMBio 354, 454; or equivalents.

Molecular mechanisms of virus architecture, attachment and entry pathways, replication strategies, oncogenesis, evolution, and mechanisms of pathogenesis.

**557. Genes and Cancer.** (2:2:0) W odd yr. Prerequisite: MMBio 441 or equivalent.

Molecular basis of human cancers, emphasizing oncogenes, tumor suppressor genes, chromosomal instability, hereditary cancers, chemical and physical carcinogens, and viral carcinogenesis.

## Graduate Courses

For 600- and 700-level courses, see the BYU 2006–2007 Graduate Catalog.

## Microbiology and Molecular Biology Faculty

### Professors

Anderson, Shauna C. (1974) AS, Ricks Coll., 1965; BS, Brigham Young U., 1967; MS, U. of Utah, 1973; PhD, U. of Washington, 1984.

Bradshaw, William S. (1970) BA, Harvard U., 1963; PhD, U. of Illinois, 1968.

Harker, Alan R. (1994) BS, PhD, U. of Utah, 1976, 1982.

Johnson, F. Brent (1972) BS, MS, PhD, Brigham Young U., 1966, 1967, 1970.

Murray, Byron K. (1983) AS, Ricks Coll., 1964; BS, MS, PhD, Brigham Young U., 1966, 1969, 1971.

Nielsen, Brent L. (2000) BS, Brigham Young U., 1980; PhD, Oregon State U., 1985.

O'Neill, Kim L. (1992) BSc, DPhil, New U. of Ulster, Northern Ireland, 1984, 1986.

Robison, Richard A. (1991) BS, MS, PhD, Brigham Young U., 1978, 1980, 1988.

### Associate Professors

Bridgewater, Laura C. (1999) BS, Brigham Young U., 1989; PhD, George Washington U., 1995.

Crandall, Keith A. (1995) BA, Kalamazoo Coll., 1987; AM, PhD, Washington U., 1993.

McCleary, William R. (1995) BS, Brigham Young U., 1982; PhD, U. of California, Berkeley, 1990.

### Assistant Professors

Adams, Byron J. (2003) BS, Brigham Young U., 1993; PhD, U. of Nebraska, 1998.

Evans, R. Paul (1987) BS, Brigham Young U., 1995; PhD, Medical Coll. of Virginia, 1983.

Lin, Chin-Yo (2005) BS, Brigham Young U., 1995; PhD, Harvard U., 2001.

Wilson, Eric (2004) BS, MS, Utah State U., 1990, 1994; PhD, Montana State U., 2000.

### Teaching Professor

Cockayne, Susan (1982) BS, MS, U. of Utah, 1972, 1979; PhD, Brigham Young U., 1990.

### Associate Teaching Professor

Breakwell, Donald P. (2001) BS, Brigham Young U., 1986; MS, PhD, Purdue U., 1988, 1992.

### Assistant Teaching Professor

Burnett, Sandra (2004) BA, MS, Utah State U., 1992, 1993; PhD, U. of Kentucky, 2000.

### Part-time Faculty

Gordon, Jan	Poulsen, Keila
Hodson, Kristine	Seeley, Deborah

### Adjunct Assistant Professors

Jackson, Paul	Nelson, Jerry
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### Adjunct Clinical Professors

Freestone, Steven	Thorn, Willes
Lovell, Robert	Urie, Paul

### Adjunct Clinical Instructors

Cram, Kelly  
 Jackson, Patricia  
 Lindsley, Sherilyn  
 McMullin, Vivian

### Laboratory Support Services

Lee, John D. (1972) BS, MS, Brigham Young U., 1972, 1976.

### Emeriti

Beck, Jay V. (1951) BA, MA, Brigham Young U., 1933, 1936; PhD, U. of California, Berkeley, 1940.

Bradshaw, Willard H. (1961) BS, MS, Brigham Young U., 1952, 1953; PhD, U. of California, Berkeley, 1957.

Donaldson, David M. (1955) BS, MS, PhD, U. of Utah, 1950, 1952, 1954.

Jensen, Marcus M. (1969) BS, MS, Utah State U., 1952, 1954; PhD, U. of California, Los Angeles, 1961.

North, James A. (1965) BS, MS, Brigham Young U., 1958, 1960; PhD, U. of Utah, 1964.

Sagers, Richard D. (1958) BS, MS, Brigham Young U., 1954, 1955; PhD, U. of Illinois, 1958.

Wright, Donald N. (1969) BS, U. of Utah, 1958; PhD, Iowa State U. of Science and Technology, 1964.

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## Military Science (Army ROTC)

Major Theodore M. Leblow, Chair  
320 ROTC, (801) 422-3601

### Admission to Program

Students must be accepted by the Department of Military Science into the program.

### The Discipline

The Army Reserve Office Training Corps (ROTC) Leadership Excellence Program is designed to produce highly qualified commissioned officers in the U.S. Regular Army, the U.S. Army Reserve, or the U.S. Army National Guard. Students specialize in the major field of their choice and graduate with the ability to function as a junior executive.

### Career Opportunities

Officer in the U.S. Army in the career field of:

- Adjutant General's Corps
- Air Defense Artillery
- Armor
- Aviation
- Chemical Corps
- Engineers
- Field Artillery
- Finance Corps
- Infantry
- Judge Advocate General's Corps
- Medical Service Corps
- Nurses, doctors, and administrators
- Military Intelligence
- Military Police
- Ordnance Corps
- Quartermaster Corps
- Signal Corps
- Transportation Corps

### General Information

**Textbooks, Uniforms, and Allowances.** All textbooks, uniforms, and training materials are furnished by the U.S. Army. Those in the advanced course receive a \$350 to \$400 monthly allowance and approximately \$800 for participation in the national Leadership Development and Assessment Course for five weeks during the summer between the junior and senior year.

**Army ROTC Scholarship Program.** Tuition assistance is available on a competitive basis. Senior students in high school may qualify for a four-year scholarship. College students may also qualify for a four-, three-, or two-year scholarship. The scholarship provides for tuition, fees, a textbook allowance, and from \$250 to \$400 per month (up to ten months per year) for the period of the scholarship. Students who qualify must complete their degree program prior to their twenty-seventh birthday. Contact the Military Science Department for application procedures and specifics.

**SMP Program** (Simultaneous Membership Program). Students already members of the Army Reserve or National Guard may concurrently participate in ROTC and qualify for additional pay and benefits.

**Extracurricular Activities.** Army ROTC cadets extend academic and laboratory associations into a variety of extracurricular ROTC activities. Among these are the Ranger Challenge, Army Color Guard, Cannon Crew, annual Military Ball, and many school service projects performed by the corps of cadets.

**LDS Missions.** Students, including scholarship recipients, who wish to serve a two-year LDS mission may do so most

conveniently between their freshman and sophomore years. This allows students to be on campus during the spring of their sophomore year to facilitate their selection for the advanced course. Interruptions of the program at other times for a mission may be arranged by obtaining individual approval from the professor of military science.

**Leadership Laboratory and Course Fee.** Each course requires a corresponding leadership lab, which meets on Thursdays for three hours. The labs require physical activity, including: land navigation, mountaineering, rope bridging, marksmanship, and tactical training. Students are also expected to attend physical fitness training and one field training exercise per semester. A course fee of \$40 is required of each participating student to cover cadet activity expenses.

**Graduation Requirements in Wellness.** Students in the Army ROTC Program may complete the Wellness requirement listed in the University Core Summary section of this catalog by participating in the leadership laboratory for eight semesters. Physical education credit may be received for participation in the ROTC Physical Training Program if the student concurrently enrolls in ExSc 143R.

**Program of Instruction.** The ROTC Leadership Excellence Program is designed to produce commissioned officers for the United States Army. It has been described as the best leadership program in the nation. Training is experiential and demands that students practice leadership skills while completing their baccalaureate degree in their chosen course of study. Ultimately, students become qualified to serve as commissioned officers in the Regular Army, National Guard, or Army Reserve. Upon graduation and follow-on training, these officers immediately become the leaders of soldiers deployed abroad or at home in defense of the United States and her values. After graduation it is possible for Reserve or Guard officers to fulfill their military obligation and pursue a civilian career simultaneously. Following the completion of service, BYU ROTC graduates often become effective leaders in their community, business, and church endeavors for the balance of their lives.

## Program Requirements

1. The traditional Army ROTC Leadership Excellence Program extends over a four-year period compatible with normal progression through four years of college. It consists of two phases: a two-year basic course during the freshman and sophomore years and an advanced course designed for completion during the normal junior and senior years. Also included is a five-week Leadership Development and Assessment Course normally attended in the summer before the senior year. Students may receive academic credit for the first two years of ROTC by attending the month-long Leaders' Training Course (LTC) during the summer before the start of their junior year.  
Scholarship students and students wishing to participate in the advanced course must pass the Army Physical Fitness Test with a score of 60 points in each event. See an Army ROTC faculty member for more information.
2. Non-scholarship freshman and sophomore students incur no military obligation until such time as students sign their advanced course contract at the beginning of the junior year. Upon entering the advanced course, students agree to enlist in the U.S. Army Reserve Control Group for a period of eight years; they are then sworn into the reserve and begin to receive the monthly \$300 to \$400 subsistence allowance.
3. Non-U.S. citizens may participate in the basic course provided they obtain approval from their consulate and the BYU international student division and their travel documents are in order. International students apply for enrollment on a case-by-case basis but cannot participate in the advanced course unless they are pending citizenship. They may not be commissioned as officers until they are U.S. citizens.
4. To receive a commission as a second lieutenant in the U.S. Army, students must earn a baccalaureate degree and be commissioned before their thirty-first birthday. Waivers of age may be approved by the Department of the Army under special circumstances. Those who are in a five-year academic program, such as engineering, may complete their Army ROTC courses at any point before graduation.
5. Upon commissioning, the new second lieutenant incurs an eight-year obligation to the U.S. Army, which may be filled by serving on Active Duty, in the U.S. Army Reserve, National Guard, Individual Ready Reserve (IRR), or various combinations of the above.
6. Complete the following basic courses:  
Mil S 120, 121, 220, 221.
7. Complete the following advanced courses:  
Mil S 320, 321, 420, 421.
8. Professional Military Education (PME): Before being commissioned, each cadet must complete one of the following military history courses during their course of study at BYU:  
Hist 220, 221, 371, 372, 373, 374, 375, 376, 398R.  
If a student's ACT score is under 21 in mathematics or English skills, the cadet must enroll in and complete a distance learning program freely offered by the U.S. Army in the area of weakness.

**Note:** Courses not specified above may satisfy the requirement but must be approved by the professor of military science.

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## Minor Military Science (16 hours)

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### Minor Requirements

Complete the following:  
Mil S 320, 321, 420, 421.

## Military Science (Army ROTC) (Mil S)

### Undergraduate Courses

#### 120. Foundations of Officership. (2:1:3) F

Competencies central to a commissioned officer's responsibilities, emphasizing basic soldier skills, fitness, and time management. Insight into the U.S. Army profession and the officer's role within the army. Lab included. Fee.

#### 121. Basic Leadership. (2:1:3) W

Fundamentals focusing on military life, leadership, and problem solving. "Life skills" lessons include: communications, goal setting, personal fitness, and assertiveness skills. Practical focus on endurance and confidence building. Lab included. Fee.

## School of Music

### 220. Individual Leadership Studies/Leadership and Teamwork 1. (3:2:3) F

Direct leadership experience at the individual and small-unit level. Communication through briefings; learning to influence, plan, and organize on an individual and fire-team level. Lab included. Fee.

### 221. Individual Leadership Studies/Leadership and Teamwork 2. (3:2:3) W

Theoretical and actual leadership experience involving understanding how to build teams, influence, communicate, make decisions, solve problems, plan, and organize. Strong focus on building character. Lab included. Fee.

### 320. Adaptive Team Leadership. (4:3:3) F

Adaptive leadership skills as presented with the demands of leadership rolls in simulated tactical and garrison situations. Cadets receive feedback on leadership abilities. Lab included. Fee.

### 321. Leadership Under Fire. (4:3:3) W

Using intense real-world leadership situations to build skills in leading small units, decision making, persuasion, and motivation when "under fire." Final preparation and evaluation prior to attendance at Leader Development and Assessment Course (LDAC). Lab included. Fee.

### 325R. Staff Organization and Operations. (1-2:0:Arr. ea.) F, W, Sp

Prerequisite: enrollment in military science.  
Special project staff work for joint Army/Air Force campus ceremonies, leadership labs, field training exercises, and training camps. Lab. Fee.

### 420. Developing Adaptive Leaders. (4:3:3) F

Developing proficiency in planning, executing, and assessing operations; functioning on a staff; and providing feedback to subordinates with situational real-world opportunities to assess risk, make decisions, and coach others. Emphasizes leadership ethics. Lab included. Fee.

### 421. Leadership in a Complex World. (4:3:3) W

Dynamics of leading military operations. Subjects include military law, principles of war, operations, training, and logistics. Presented in context of modern battlefield. Culminates with commission as an officer in the U.S. Army. Lab included. Fee.

### 425R. Ranger Preparation. (2:1:5) F

Participation in Army ROTC Ranger Challenge program. Advanced military training with practical application of skills taught in Mil S 120-421.

## Military Science Faculty

### Professor of Military Science

Leblow, Theodore M., MAJ (2006) BS, U. of Oregon, 1992; MBA, Touro U., 2004.

### Assistant Professors of Military Science

Austin, Daniel J., MAJ (2005) BS, Brigham Young U., 1988.  
Weisler, Gregory A., MAJ (2001) BBA, Prairie View A&M U., 1987; MA, Baylor U., 1994.

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## Modern Near Eastern Studies

See International and Area Studies.

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## Mongolian

See Center for Language Studies.

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## School of Music

Dale E. Monson, Director  
C-550 HFAC, (801) 422-3083  
www.byu.edu/music/

College of Fine Arts and Communications Advisement Center  
D-444 HFAC, (801) 422-3777  
www.byu.edu/cfac/advisement/

### Admission to Degree Program

Enrollment in the School of Music's degree programs is limited. Prospective majors must pass an audition and aural skills exam. Please consult the General Information section below and visit the college advisement center for details.

### The Discipline

The School of Music respects and celebrates the historic position of music at the heart of a liberal education and the gospel. From ancient times, music has proven its power to enlighten the understanding, strengthen the spirit, and shape character. With this power music civilizes and invigorates any society in which it is cultivated.

In the School of Music the student learns self-discipline through rigorous practice in pursuit of accurate and passionate performance. The student also learns cooperation and mutual sensitivity through ensemble work. In the study of music theory and history, the student comes to hear and appreciate the grammar and syntax of various musical languages, to distinguish nuances of style, and to grasp the ways in which styles intertwine with ideas.

Students learn in a variety of situations: private lessons, small seminars, multimedia labs, and large lectures. These are offered with a holistic approach that embraces academic rigor, intuitive insight, physical grace, and spiritual eloquence.

### Career Opportunities

The School of Music leads its students toward careers in performance, studio teaching, music education, media music production, recording and sound technology, arts management, music journalism, composition, music therapy, and other music-related professions. Because the music curriculum is rigorous, it is also an excellent pre-professional course of study for those interested in fields as diverse as law, business, library science, or medicine. Whatever degrees one obtains, however, an education in music pertains not only to earning a living through the art but also using the art to enhance one's satisfaction and joy in living.

### Graduation Requirements

To receive a BYU bachelor's degree a student must complete, in addition to all requirements for a specific major, the following university requirements:

- The university core, consisting of requirements in general and religious education (See the University Core section of this catalog for details. For a complete listing of courses that meet university core requirements, see the current class schedule.)
- A minimum of 30 credit hours in residence
- A minimum of 120 credit hours
- A cumulative GPA of at least 2.0

### Undergraduate Programs and Degrees

BA	Music
BFA	Music Dance Theatre
BM	Jazz Studies
BM	Media Music Studies
BM	Music Composition

BM	Music Education
	Emphases:
	K–12 Choral
	K–12 Instrumental
	Elementary Music Specialist
BM	Music Performance
	Emphases:
	Brass
	Combined Piano and Organ
	Organ
	Percussion
	Piano
	String
	Vocal
	Woodwind
BM	Sound Recording Technology
Minor	Music

Students should see their college advisement center for help or information concerning the undergraduate programs.

## Graduate Programs and Degrees

MA	Music
MM	Music

For more information see the BYU 2006–2007 Graduate Catalog.

## General Information

- Admission applications to the School of Music must be received by January 15.
- All entering students (including transfer students) must pass a performance audition on their major instrument (or voice). Live auditions are held on the last Saturday of January. Students who cannot attend the live audition must submit an audio or VHS videotape for consideration; these tapes must be received by January 15. See the School of Music office (C-550 HFAC) for further details regarding the audition process and requirements, or call (801) 422-3083.
- All entering students must also pass an aural skills examination. They may take this examination in one of three ways: (1) in a group, at admissions auditions on the last Saturday of January; (2) individually, at the BYU Testing Center (call (801) 422-6129 to schedule times), or (3) individually by proctor at other locations (call the School of Music office to arrange). Students may take the exam as many times as desired to improve their score.
- All entering students must take a piano diagnostic examination to determine their keyboard skills. The exam, which is administered individually, may be taken at admissions auditions in January or during fall semester New Student Orientation. If deficiencies are found, students can fulfill the piano proficiency requirement either by (1) taking one or both of Music 221, 222 as indicated by the diagnostic examination, or, in a few cases, by (2) retaking the diagnostic examination after skills have improved. Piano and organ performance majors fulfill this requirement by taking Music 264, 265. The piano proficiency requirement must be passed by the end of the sophomore year. (Call the School of Music office for more details.)
- Upon acceptance as a music major, each student must establish a file in the college advisement center.
- Students who pass either part of the AP Music Test with at least a score of 4 should check with the college advisement center before registering for core courses.
- All major performance instruction must be in the same instrument (or voice).
- All students registered in Music 161, 260R, 360R, or 460R must complete an examination before a faculty jury on their major instrument (or voice) near the end of each semester of performance study. (With the approval of the faculty, students may elect to substitute a juried public recital for a jury examination.) Students wanting to enter Music 360R or 460R (normally after the sophomore year) must first be granted approval to do so by a faculty jury.
- All students must fulfill the ensemble requirements of their degree programs (as described below). Students may not, however, enroll in more than two conducted or directed ensembles per semester. (Chamber music and jazz combos are coached, not directed, and therefore are exempt from this limitation.) Large ensemble requirements may be filled by enrolling in the following as appropriate for the instrument or voice: Music 312R, 313R, 314R, 315R, 317R, 325R, 326R, 337R, or 338R. In addition, the following may count, with restrictions: Music 343R for guitarists only; 331R, 332R, 333R, 334R for rhythm section players only; or Music 344R for keyboardists only.
- All transfer students must have their previous university work in music evaluated by the appropriate BYU School of Music faculty members to determine what credits will be accepted in the transfer (see the college advisement center for referrals). We subscribe to the policy of the National Association of Schools of Music and carry no obligation to accept upper-division music credits from other member schools.
- If any course in the School of Music is failed twice, the student is dropped from the major.
- Students temporarily leaving the School of Music or private studio instruction (for a mission, Study Abroad, etc.) for one or more semesters before their major requirement is completed are required to file a deferment form with the School of Music office (C-550 HFAC). Failure to do so may result in the loss of any music scholarship as well as private studio instruction in the semester or two following the student's return to BYU.
- It is expected that School of Music students attend at least eight concerts and two School of Music–sponsored lectures each semester, in the process seeking greater exposure to a more diverse variety of music literature and thought. For more information see the “Undergraduate Handbook” published by the School of Music.

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## BA Music (57–76 hours\*)

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*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this major.*

The bachelor of arts degree offers a broad liberal arts education with a concentration in music. It also provides excellent preparation for a variety of professional music careers or graduate work in theory or musicology.

### Major Requirements

- See the college advisement center to obtain information concerning official acceptance into a specific degree program.
- Complete the following lower-division music core courses: Music 193, 194, 195, 196, 197, 198, 221, 222, 235, 293, 294, 295, 296, 297, 298.
- Complete one of the following options:
  - Instrumentalists complete the following: Music 260R (8 hours).
  - Vocalists complete the following: Music 161, 260R (6 hours).
- Complete at least 1 hour of large ensemble each semester for four semesters.

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- Complete the following upper-division music core courses:  
Music 301, 302, 303, 304, 395.
- Complete 3–20 prerequisite hours in foreign language studies as required to meet the GE Languages of Learning requirement. (Prerequisite courses may be waived for those students who have equivalent language experience.)
- Complete one upper-division literature course in a foreign language (320 or higher).
- Complete one course from a GE Arts or Letters requirement outside music (in addition to the foreign-language literature course and to the GE requirement) or one humanities course outside music, approved by faculty advisor.
- Complete two of the following music elective courses:  
Music 203, 204, 206, 481, 483, 500, 503, 581, 583, 595, 596.

\*Hours include courses that may fulfill university core requirements.

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### BFA Music Dance Theatre (76.5 hours\*)

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*This is a limited-enrollment program requiring program admissions approval. Please see the College of Fine Arts and Communications Advisement Center for information regarding requirements for admission to this major.*

The BFA in music dance theatre (MDT) is an interdisciplinary degree offered by the College of Fine Arts and Communications through the cooperative involvement of its School of Music and Department of Theatre and Media Arts and the College of Health and Human Performance's Department of Dance.

#### Major Requirements

- Live and taped auditions for entrance into the MDT major are held in the January preceding fall registration. Students may begin the MDT major in the fall only.
- Pass a proficiency examination in each of the three areas at the end of each semester.
- Complete at least 40 hours in residence at BYU.
- Dance technique courses require a grade of B– for advancement to the next level.
- Complete the following:  
Music 113, 161, 261, 290.
- Complete 4 hours of the following:  
Music 260R.
- Complete 4 hours of the following:  
Music 360R.
- Complete the following:  
Dance 131, 135, 231, 235, 241R, 243R, 244R, 290, 291R, 331, 361, 363, 390R.
- Complete the following:  
TMA 114, 121, 123, 124, 229, 267, 421, 427.
- Complete the following MDT Seminar courses:  
Music 328.  
Dance 328.  
TMA 328.
- Complete the following History of Music Dance Theatre courses:  
Music 300.  
Dance 300.  
TMA 300.
- Complete the following Senior Performance Project courses:  
Music 426.  
Dance 426.  
TMA 426.
- Complete 10.5 hours of electives from the following music, dance, or theatre courses:  
Music 186, 319R, 360R, 363, 386R, 399R, 402A,B, 472.  
Dance 335, 340R, 362, 368R, 390R, 391R, 393R, 399R, 429R, 440R, 462, 468R, 490R, 494R, 495R, 498R, 540R, 562R, 563R.  
TMA 100, 215R, 223, 224, 225, 236, 322, 324, 325, 329, 336, 399R, 420R, 422, 424, 425, 429, 443R, 515R.

\*Hours include courses that may fulfill university core requirements.

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### BM Jazz Studies (79 hours)

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*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this major.*

The bachelor of music degree in jazz studies prepares the student with a broadbased music preparation and specialized course work leading to graduate studies in jazz or a career in jazz-related performing, arranging, or studio teaching.

#### Major Requirements

- See the college advisement center for the application procedure for official acceptance into a specific degree program.
- Present two recitals: Music 249R should be the culmination to Music 260R, and Music 349R should be taken concurrently with the second semester of Music 360R. A prerecital hearing is required at least three weeks before juried recitals. Contact the Harris Fine Arts Center Scheduling Office (C-358, south lobby of de Jong Concert Hall) for further information.
- Complete the following lower-division music core courses:  
Music 193, 194, 195, 196, 197, 198, 221, 222, 235, 293, 294, 295, 296, 297, 298.
- Complete one of the following options:  
Instrumentalists complete the following:  
Music 260R (8 hours).  
Vocalists complete the following:  
Music 161, 260R (6 hours).
- Complete 4 hours of the following:  
Music 360R.
- Complete at least 1 hour of large ensemble each semester for four semesters.
- Complete 4 hours of the following:  
Music 333R, 334R; 347R (up to one semester).
- Complete four semesters of the following:  
Music 331R, 335R.
- Complete the following upper-division music core courses:  
Music 301, 302, 303, 304, 395.
- Complete the following:  
Music 186, 284, 384, 391, 394, 468, 485.
- Complete 5 hours of music electives. Music 203, 210R (finale section), and 286 are recommended. See faculty advisor.

#### Recommended Courses

The following are recommended jazz-related GE courses:  
Music 204.  
Phscs 167.

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## BM Media Music Studies (75 hours\*)

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*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this major.*

A major in media music studies prepares the student for music industry opportunities in creating and managing music for the media (radio, TV, records, film). The program combines rigorous grounding in traditional repertoires with preprofessional course work and project experience in current industry models and musical styles.

### Major Requirements

1. See the college advisement center for the application procedure for official acceptance into the degree program.
2. Present a juried recital (Music 349R) during the junior year.  
**Recital:** Enroll in 349R (0.0 credit hours) for the semester during which a recital is to be presented. Consultation with the division coordinator is required. A prerecital hearing is required at least three weeks before juried recitals. Contact the Harris Fine Arts Center Scheduling Office (C-358, south lobby of de Jong Concert Hall) for further information.
3. Complete the following lower-division music core courses:  
Music 193, 194, 195, 196, 197, 198, 221, 222, 235, 293, 294, 295, 296, 297, 298.
4. Complete one of the following options:  
*Instrumentalists*  
Music 260R (8 hours).  
*Vocalists*  
Music 161, 260R (6 hours).
5. Complete at least 1 hour of large ensemble each semester for four semesters.
6. Complete the following upper-division music core courses:  
Music 301, 302, 303, 304, 395.
7. Complete the following specialized courses:  
Music 186, 286, 386R, 389.
8. Complete 4 hours of the following:  
Music 399R.
9. Complete 8 hours from the following:  
Music 188, 251, 284, 287, 351, 352, 355R, 391, 489.  
TMA 102.  
**Note:** Music 251, 355R, 489, and TMA 102 are strongly recommended.
10. Complete 2 hours from the following preprofessional instruction:  
Music 360R—songwriting  
Music 360R—synthesizer
11. Complete 6 hours from the following:  
Music 203, 204, 210R (finale section), 288, 481, 482, 483, 485.

\*Hours include courses that may fulfill university core requirements.

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## BM Music Composition (78 hours)

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*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this major.*

The music composition major prepares the student for graduate study in composition and theory or may lead to a professional career in composing, arranging, or related fields.

### Major Requirements

1. See the college advisement center for the application procedure for official acceptance into a specific degree program.
2. Present a juried composition recital (Music 449R) during the senior year.  
**Recital:** Enroll in 449R (1 credit hour) for the semester during which a recital is to be presented. A prerecital hearing is required at least three weeks before juried recitals. Contact the Harris Fine Arts Center Scheduling Office (C-358, south lobby of de Jong Concert Hall) for further information.
3. Complete the following lower-division music core courses:  
Music 193, 194, 195, 196, 197, 198, 221, 222, 235, 293, 294, 295, 296, 297, 298.
4. Complete one of the following options:
  - a. Instrumentalists complete the following:  
Music 260R (8 hours).
  - b. Vocalists complete the following:  
Music 161, 260R (6 hours).
5. Complete at least 1 hour of large ensemble each semester for four semesters.
6. Complete the following upper-division music core courses:  
Music 301, 302, 303, 304, 395.
7. Complete the following lower-division composition courses:  
Music 188, 287, 288.
8. Complete 8 hours of the following upper-division composition seminar:  
Music 387R.
9. Complete the following:  
Music 481, 483, 581, 583.
10. After consulting with faculty advisor, complete 4 hours of music electives.

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## BM Music Education: K–12 Choral Emphasis

(87 hours, including licensure hours)

*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this emphasis.*

A degree in music education prepares the student for K–12 licensure as a public school music teacher with a choral emphasis. The degree program is a composite of music and education. Graduates may obtain a teaching position, pursue graduate work, or use the degree as professional preparation for other fields of endeavor.

### Major Requirements

1. See the college advisement center and enroll in Music 176 winter semester or summer term. This course is prerequisite to official acceptance into music education.
2. Proficiency requirements: All professional education courses (below) and Music 260R, 262, 263, and 363 credits **must be completed before student teaching** (Sc Ed 476R). Twenty minutes of solo performance time and ten minutes of chamber music performance time are required, which may be accomplished through master classes, recitals, juries, or in-class performances in Sc Ed 276R and 476R. Students opting for a juried recital must register for Music 349R.
3. Complete the following lower-division music core courses:  
Music 193, 194, 195, 196, 197, 198, 221, 235, 293, 294, 295, 296, 297, 298.
4. Complete the following:  
Music 161, 260R (6 hours).

## School of Music

5. Music education majors must enroll in at least 1 hour of large ensemble each semester for seven semesters within student's area of specialization. At least 1 hour must be the 311R evening section.
6. Complete the following upper-division music core courses: Music 301, 302, 303, 304, 395.
7. Complete the following:  
Music 176, 276, 363, 374, 376A,B, 482.
8. Complete the Professional Education Component:
  - a. Complete the following:  
Sc Ed 276R, 350, 353, 375.  
**Note:** Fingerprinting and FBI clearance must be completed prior to enrolling in Sc Ed 375.
  - b. Complete 12 hours of student teaching:  
Sc Ed 476R.

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### BM Music Education: K–12 Instrumental Emphasis

(92 hours, including licensure hours)

*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this emphasis.*

A degree in music education prepares the student for K–12 licensure as a public school music teacher with an instrumental emphasis. The degree program is a composite of music and education. Graduates may obtain a teaching position, pursue graduate work, or use the degree as professional preparation for other fields of endeavor.

#### Major Requirements

1. See the college advisement center and enroll in Music 176 winter semester or summer term. This course is prerequisite to official acceptance into music education.
2. Proficiency requirements: All professional education courses (below) and Music 260R and 360R requirements in a woodwind, brass, string, or percussion instrument must be completed before student teaching (Sc Ed 476R). Twenty minutes of solo performance time and ten minutes of chamber music performance time are required, which may be accomplished through master classes, recitals, juries, or in-class performances in Music 276R and 476R. Students opting for a juried recital must register for Music 349R.
3. Complete the following lower-division music core courses: Music 193, 194, 195, 196, 197, 198, 221, 235, 293, 294, 295, 296, 297, 298.
4. Complete 8 hours of the following:  
Music 260R.
5. Complete 4 hours of the following:  
Music 360R.
6. Music education majors must enroll in at least 1 hour of large ensemble each semester for seven semesters. Those who play woodwind, brass, or percussion instruments must enroll in one semester of marching band, which may be counted toward the 7-hour large ensemble requirement if it is completed after the student has been officially accepted as a degree candidate in instrumental music education (after freshman year).
7. Complete the following upper-division music core courses: Music 301, 302, 303, 304, 395.
8. Complete the following:  
Music 176, 276, 372A,B, 373A,B, 374, 375A,B, 377A,B.  
**Note:** Percussionists complete Music 273A,B instead of 374.

9. Complete the Professional Education Component:
  - a. Complete the following:  
Sc Ed 276R, 350, 353, 375.  
**Note:** Fingerprinting and FBI clearance must be completed prior to enrolling in Sc Ed 276R.
  - b. Complete 12 hours of student teaching:  
Sc Ed 476R.

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### BM Music Education: Elementary Music Specialist Emphasis (119.5 hours\*, including licensure hours)

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*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this emphasis.*

A five-year program, the degree offers a dual major in elementary music education and elementary education. It will also prepare the student for dual licensure as an elementary music specialist and as an elementary classroom teacher. Graduates may obtain a teaching position in either area or a combination of both, pursue graduate work, or use the degree as preparation for other fields of endeavor.

#### Major Requirements

1. See the college advisement center for the application procedure for official acceptance into a specific degree program.
2. Complete the following lower-division music core courses: Music 193, 194, 195, 196, 197, 198, 221, 235, 293, 294, 295, 296, 297, 298.  
**Note:** Music 235 must be a choral section.
3. Complete one of the following options:  
*Instrumentalists*  
Music 111R.  
*Vocalists*  
Music 161.
4. Complete 6 hours of the following in your major instrument or voice:  
Music 260R.
5. Complete at least 1 hour of large ensemble each semester for four semesters. Piano and vocal emphasis majors should participate in choral ensembles. At least one choral ensemble experience is recommended for instrumental emphasis majors.
6. Complete the following upper-division music core courses: Music 301, 302, 303, 304, 395.
7. Complete the following:  
Music 271, 272, 371, 471.
8. See the Education Advisement and Certification Office for the application procedure for official acceptance into elementary education and complete the professional education component.

\*Hours include courses that may fulfill university core requirements.

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### BM Music Performance: Brass Emphasis (77 hours)

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*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this emphasis.*

The bachelor of music degree in performance prepares the student for professional work as a performer, a studio teacher, or a combination of both. Some will pursue advanced work on the graduate level to prepare for a performance career or college teaching.

**Major Requirements**

1. See the college advisement center for the application procedure for official acceptance into a specific degree program.
2. Present a juried recital (Music 349R) during the junior year. A juried senior recital (Music 449R) is also required.  
**Recital:** Enroll in 349R (0.0 credit hours) or 449R (1.0 credit hour) for the semester during which a recital is to be presented. Concurrent enrollment in appropriate performance instruction is required. A prerecital hearing is required at least three weeks before juried recitals. Contact the Harris Fine Arts Center Scheduling Office (C-358, south lobby of de Jong Concert Hall) for further information.
3. Complete the following lower-division music core courses: Music 193, 194, 195, 196, 197, 198, 221, 222, 235, 293, 294, 295, 296, 297, 298.
4. Complete 8 hours of the following: Music 260R.
5. Complete 12 hours of the following: Music 460R.
6. Complete at least 1 hour of large ensemble within student's area of specialization each semester for eight semesters.
7. Complete the following upper-division music core courses: Music 301, 302, 303, 304, 395.
8. Complete the following: Music 368, 405.
9. Complete 4 hours from the following: Music 331R, 341R.
10. Complete 5 hours of music electives (Music 407 is recommended). See faculty advisor.

**BM Music Performance: Combined Piano and Organ Emphasis** (77 hours)

*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this emphasis.*

The bachelor of music degree in performance prepares the student for professional work as a performer, a studio teacher, or a combination of both. Some will pursue advanced work on the graduate level to prepare for a performance career or college teaching.

**Major Requirements**

1. See the college advisement center for the application procedure for official acceptance into a specific degree program.
2. Present a juried recital (Music 249R) during the sophomore year. A juried senior recital (Music 449R) is also required.  
**Recital:** Enroll in 249R (0.0 credit hours) or 449R (1.0 credit hour) for the semester during which a recital is to be presented. Concurrent enrollment in appropriate performance instruction is required. A prerecital hearing is required at least three weeks before juried recitals. Contact the Harris Fine Arts Center Scheduling Office (C-358, south lobby of de Jong Concert Hall) for further information.
3. Complete the following lower-division music core courses: Music 193, 194, 195, 196, 197, 198, 235, 293, 294, 295, 296, 297, 298.
4. Complete 8 hours of the following: Music 260R.
5. Complete 4 hours of the following: Music 360R.
6. Complete 6 hours of the following: Music 460R.
7. Complete at least 1 hour of large ensemble or Music 344R each semester for four semesters. Music 344R may be taken for two of the four semesters but must be in consecutive fall and winter semesters.
8. Complete the following upper-division music core courses: Music 301, 302, 303, 304, 395.
9. Complete the following: Music 166, 264, 265, 364, 366, 404A,B, 466R (twice).  
**Note:** Two semesters of Music 466R must be taken in consecutive winter and fall semesters.

5. Complete 8 hours of the following divided between piano and organ: Music 360R.
6. Complete at least 1 hour of large ensemble or Music 344R each semester for six semesters. Take either four semesters of large ensemble and two semesters of Music 344R or two semesters of large ensemble and four semesters of Music 344R. Two semesters of 344R must be taken in consecutive fall and winter semesters.
7. Complete the following upper-division music core courses: Music 301, 302, 303, 304, 395.
8. Complete the following: Music 166, 264, 265, 364, 365, 366, 466R.
9. Complete 2 hours of the following: Music 470R.
10. Complete the following: Music 469.
11. Complete three courses from the following: Music 403A,B, 404A,B.

**BM Music Performance: Organ Emphasis** (78 hours)

*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this emphasis.*

The bachelor of music degree in performance prepares the student for professional work as a performer, a studio teacher, or a combination of both. Some will pursue advanced work on the graduate level to prepare for a performance career or college teaching.

**Major Requirements**

1. See the college advisement center for the application procedure for official acceptance into a specific degree program.
2. Present a juried recital (Music 249R) during the sophomore year. A juried senior recital (Music 449R) is also required.  
**Recital:** Enroll in 249R (0.0 credit hours) or 449R (1.0 credit hour) for the semester during which a recital is to be presented. Concurrent enrollment in appropriate performance instruction is required. A prerecital hearing is required at least three weeks before juried recitals. Contact the Harris Fine Arts Center Scheduling Office (C-358, south lobby of de Jong Concert Hall) for further information.
3. Complete the following lower-division music core courses: Music 193, 194, 195, 196, 197, 198, 235, 293, 294, 295, 296, 297, 298.
4. Complete 8 hours of the following: Music 260R.
5. Complete 4 hours of the following: Music 360R.
6. Complete 6 hours of the following: Music 460R.
7. Complete at least 1 hour of large ensemble or Music 344R each semester for four semesters. Music 344R may be taken for two of the four semesters but must be in consecutive fall and winter semesters.
8. Complete the following upper-division music core courses: Music 301, 302, 303, 304, 395.
9. Complete the following: Music 166, 264, 265, 364, 366, 404A,B, 466R (twice).  
**Note:** Two semesters of Music 466R must be taken in consecutive winter and fall semesters.

## School of Music

10. Complete 2 hours of the following:  
Music 470R.
11. Complete the following:  
Music 469.
12. Complete one course from the following:  
Music 481, 483.

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### **BM Music Performance: Percussion Emphasis**

(76 hours)

*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this emphasis.*

The bachelor of music degree in performance prepares the student for professional work as a performer, a studio teacher, or a combination of both. Some will pursue advanced work on the graduate level to prepare for a performance career or college teaching.

#### **Major Requirements**

1. See the college advisement center for the application procedure for official acceptance into a specific degree program.
2. Present a juried recital (Music 349R) during the junior year. A juried senior recital (Music 449R) is also required.  
**Recital:** Enroll in 349R (0.0 credit hours) or 449R (1.0 credit hour) for the semester during which a recital is to be presented. Concurrent enrollment in appropriate performance instruction is required. A prerecital hearing is required at least three weeks before juried recitals. Contact the Harris Fine Arts Center Scheduling Office (C-358, south lobby of de Jong Concert Hall) for further information.
3. Complete the following lower-division music core courses:  
Music 193, 194, 195, 196, 197, 198, 221, 222, 235, 293, 294, 295, 296, 297, 298.
4. Complete 8 hours of the following:  
Music 260R.
5. Complete 12 hours of the following:  
Music 460R.
6. Complete at least 1 hour of large ensemble within student's area of specialization each semester for eight semesters (not spring or summer).
7. Complete the following upper-division music core courses:  
Music 301, 302, 303, 304, 395.
8. Complete the following:  
Music 273A,B, 405.
9. Complete 5 hours from the following:  
Music 330R, 331R, 345R.
10. Complete 5 hours of music electives. See faculty advisor.

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### **BM Music Performance: Piano Emphasis** (78 hours)

*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this emphasis.*

The keyboard performance degree prepares students for professional work as performers and studio teachers. The degree includes a strong pedagogy emphasis, including supervised teaching. Many performance majors continue their studies on the graduate level to further prepare for a performance career or college teaching.

#### **Major Requirements**

1. See the college advisement center for the application procedure for official acceptance into a specific degree program.
2. Present a juried recital (Music 249R) during the sophomore year. A juried senior recital (Music 449R) is also required.  
**Recital:** Enroll in 249R (0.0 credit hours) or 449R (1.0 credit hour) for the semester during which a recital is to be presented. Concurrent enrollment in appropriate performance instruction is required. A prerecital hearing is required at least three weeks before juried recitals. Contact the Harris Fine Arts Center Scheduling Office (C-358, south lobby of de Jong Concert Hall) for further information.
3. Complete the following lower-division music core courses:  
Music 193, 194, 195, 196, 197, 198, 235, 293, 294, 295, 296, 297, 298.
4. Complete 8 hours of the following:  
Music 260R.
5. Complete 4 hours of the following:  
Music 360R.
6. Complete 6 hours of the following:  
Music 460R.
7. Complete at least 1 hour of large ensemble or Music 344R each semester for six semesters. Take either four semesters of large ensemble and two semesters of Music 344R or two semesters of large ensemble and four semesters of Music 344R. Two semesters of 344R must be taken in consecutive fall and winter semesters.
8. Complete the following upper-division music core courses:  
Music 301, 302, 303, 304, 395.
9. Complete the following:  
Music 264, 265, 364, 365, 403A,B.
10. Complete 2 hours of the following:  
Music 470R.
11. Complete the following:  
Music 469.
12. Complete 4 hours of the following:  
Music 115, 116R, 260R (organ).
13. Complete one course from the following:  
Music 481, 483.

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### **BM Music Performance: String Emphasis** (77 hours)

*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this emphasis.*

The bachelor of music degree in performance prepares the student for professional work as a performer, a studio teacher, or a combination of both. Some will pursue advanced work on the graduate level to prepare for a performance career or college teaching.

#### **Major Requirements**

1. See the college advisement center for the application procedure for official acceptance into a specific degree program.
2. Present a juried recital (Music 349R) during the junior year. A juried senior recital (Music 449R) is also required.  
**Recital:** Enroll in 349R (0.0 credit hours) or 449R (1.0 credit hour) for the semester during which a recital is to be presented. Concurrent enrollment in appropriate performance instruction is required. A prerecital hearing is required at least three weeks before juried recitals. Contact the Harris Fine Arts

Center Scheduling Office (C-358, south lobby of de Jong Concert Hall) for further information.

3. Complete the following lower-division music core courses:  
Music 193, 194, 195, 196, 197, 198, 221, 222, 235, 293, 294, 295, 296, 297, 298.
4. Complete 8 hours of the following:  
Music 260R.
5. Complete 12 hours of the following:  
Music 460R.
6. Complete at least 1 hour of the following each semester for eight semesters (not spring or summer):  
Music 337R, 338R.
7. Complete the following upper-division music core courses:  
Music 301, 302, 303, 304, 395.
8. Complete the following:  
Music 369 (A, B, or C depending on instrument), 406, 469.
9. Complete one course from the following:  
Music 405, 407.
10. Complete 2 hours of the following:  
Music 470R.
11. Complete 4 hours from the following:  
Music 331R, 343R, 346R.

#### Recommended Electives

Music 462R, 473.

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### BM Music Performance: Vocal Emphasis (76 hours)

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*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this emphasis.*

The vocal performance degree program prepares students for professional work as performers and studio teachers. The degree includes a strong pedagogy emphasis, including supervised teaching. Many students in this program continue their studies on the graduate level to further prepare for a performing career or college teaching.

#### Major Requirements

1. See the college advisement center for the application procedure for official acceptance into a specific degree program.
2. Complete the following lower-division music core courses:  
Music 193, 194, 195, 196, 197, 198, 221, 222, 235, 293, 294, 295, 296, 297, 298.
3. Complete the following:  
Music 161, 260R (6 hours).
4. Complete 8 hours of the following:  
Music 360R.
5. Perform a juried junior recital (Music 349R) and a juried senior recital (Music 449R).  
**Recital:** Enroll in 349R (0.0 credit hours) or 449R (1.0 credit hour) for the semester during which a recital is to be presented. Concurrent enrollment in Music 360R is required. A prerecital hearing is required at least three weeks before juried recitals. Contact the Harris Fine Arts Center Scheduling Office (C-358, south lobby of de Jong Concert Hall) for further information.
6. Complete at least 1 hour of large ensemble or a major opera production within student's area of specialization each semester for eight semesters.
7. Complete the following upper-division music core courses:  
Music 301, 302, 303, 304, 395.

8. Complete the following:  
Music 363, 402A, 472.
9. Complete 8 hours from the following:  
Fren 101, 102.  
Germ 101, 102.  
Ital 101, 102.

#### Recommended Electives

Dance 164.  
Music 259, 261.  
Phcs 167.

Students intending to enter graduate school in voice should complete:

Fren 101  
Germ 101.  
Ital 101.

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### BM Music Performance: Woodwind Emphasis (77 hours)

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*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this emphasis.*

The bachelor of music degree in performance prepares the student for professional work as a performer, a studio teacher, or a combination of both. Some will pursue advanced work on the graduate level to prepare for a performance career or college teaching.

#### Major Requirements

1. See the college advisement center for the application procedure for official acceptance into a specific degree program.
2. Present a juried recital (Music 349R) during the junior year. A juried senior recital (Music 449R) is also required.  
**Recital:** Enroll in 349R (0.0 credit hours) or 449R (1.0 credit hour) for the semester during which a recital is to be presented. Concurrent enrollment in appropriate performance instruction is required. A prerecital hearing is required at least three weeks before juried recitals. Contact the Harris Fine Arts Center Scheduling Office (C-358, south lobby of de Jong Concert Hall) for further information.
3. Complete the following lower-division music core courses:  
Music 193, 194, 195, 196, 197, 198, 221, 222, 235, 293, 294, 295, 296, 297, 298.
4. Complete 8 hours of the following:  
Music 260R.
5. Complete 12 hours of the following:  
Music 460R.
6. Complete at least 1 hour of large ensemble within student's area of specialization each semester for eight semesters.
7. Complete the following upper-division music core courses:  
Music 301, 302, 303, 304, 395.
8. Complete the following:  
Music 367, 405.
9. Complete 4 hours from the following:  
Music 331R (saxophone only), 348R.
10. Complete 5 hours of music electives (Music 407 is recommended). See faculty advisor.

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## BM Sound Recording Technology (75 hours\*)

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*This is a limited-enrollment program requiring departmental admissions approval. Please see the college advisement center for information regarding requirements for admission to this major.*

Students majoring in sound recording technology prepare for engineering opportunities in the recording industry and related fields such as broadcasting and video sweetening. This degree gives students theoretical and practical experience in the recording of music in an acoustical environment and also includes course work in the digital recording and digital editing procedures that characterize the recording field today. The program combines rigorous grounding in traditional repertoires with preprofessional course work and project experience in recording.

### Major Requirements

1. See the college advisement center for the application procedure for official acceptance into the degree program.
2. Complete the following lower-division music core courses:  
Music 193, 194, 195, 196, 197, 198, 221, 222, 235, 293, 294, 295, 296, 297, 298.
3. Complete one of the following options:  
*Instrumentalists*  
Music 260R (8 hours).  
*Vocalists*  
Music 161, 260R (6 hours).
4. Complete at least 1 hour of large ensemble each semester for four semesters.
5. Complete the following upper-division music core courses:  
Music 301, 302, 303, 304, 395.
6. Complete the following specialized courses:  
Music 251, 256, 257, 286, 351, 352.  
Phscs 167.
7. Complete three sections of the following:  
Music 355R (stereo mixing projects, surround mixing projects, sound design).
8. Complete 4 hours of the following:  
Music 399R.
9. Complete 6 hours from the following:  
Music 186, 203, 204, 360R (synthesizer), 386R, 389.  
TMA 102, 568.

\*Hours include courses that may fulfill university core requirements.

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## Minor Music (18 hours)

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### Minor Requirements

1. Complete the following:  
Music 101, 135, 190.
2. Complete 2 hours of the following:  
Music 160R.
3. Complete 4 hours of performance ensemble.
4. Complete 5 hours of music electives.

**Note:** Transfer students should see the college advisement center for transferring classes for a minor.

## Music (Music)

### Undergraduate Courses

*A course without the R suffix may not be repeated more than one time to improve a grade. (Repeating a course with the R suffix does not change the original grade.)*

**101. Introduction to Music.** (3:3:0) F, W, Sp, Su Honors also.  
Prerequisite: nonmusic major status.

Designed to aid nonmusic majors in developing skills needed for listening to music creatively. Emphasis on masterworks of Western music from major style periods.

**111R. Basic Vocal Skills.** (2:2:0 ea.) F, W, Sp  
Class instruction in voice for nonmusic majors.

**113. Basic Piano Skills.** (2:2:0) F, W, Sp  
Class instruction in piano for nonmusic majors.

**114R. Piano Techniques and Literature.** (2:2:0 ea.) F, W, Sp  
Prerequisite: Music 113 or instructor's consent.  
Continuation of Music 113.

**115. Basic Organ Skills.** (2:2:0) F, W, Sp  
Class instruction in organ for nonmusic majors.

**116R. Organ Techniques and Literature.** (2:2:0 ea.) F, W  
Prerequisite: Music 115 or instructor's consent.  
Continuation of Music 115.

**117. Basic Guitar Skills.** (2:2:0) F, W, Sp, Su  
Class instruction in guitar for nonmusic majors.

**118R. Guitar Techniques and Literature.** (2:2:0 ea.) F, W  
Prerequisite: Music 117 or instructor's consent.  
Continuation of Music 117.

**135. Basic Conducting.** (2:2:0) F, W, Sp  
Fundamental concepts and skills for nonmusic majors.

**160R. Performance Study.** (0.5-1:0.5:0 ea.) F, W, Sp Prerequisite: nonmusic major status. Audition may be required.  
Private or semiprivate instruction. One to two hours of daily practice. Fee.

**161. Voice Technique.** (2:2:0) F, W Prerequisite: acceptance by audition to the School of Music.  
Class instruction in voice technique.

**166. Organ Registration.** (2:2:0) F Prerequisite: concurrent private or group instruction in organ or instructor's consent.  
Organ stops and their application to various performance styles.

**176. Careers in Music Education.** (1:1:1) W, Su  
Examining preschool through college teaching career options in music; seeking a good fit between personal aspirations, attributes, skills, and job requirements. Open to both music majors and nonmajors.

**186. Songwriting 1.** (2:2:0) F, W Prerequisite: basic music reading and keyboard skills.  
Songwriting for present-day music publishing industry; basic songwriting theory; form, content, and style.

**188. Composition 1.** (2:2:0) W Prerequisite: Music 196 or instructor's consent.  
Introduction to principles of recent art music; composition and performance of student works for one to five instruments.

**189. Introduction to Music Instrument Digital Interface (MIDI).** (2:2:0) Prerequisite: acceptance as a music major.  
Overview of computer programs in all aspects of music composition, production; familiarity with worldwide music sites on the network; demonstrations of samplers and electronic sound sources.

**190. Music Fundamentals.** (2:2:0) F, W, Sp or Su Prerequisite: nonmusic major status. Required for music minor.  
Organizational systems of music, their notation and aural patterns.

**193. Dictation 1.** (1:0:2) F, Sp Prerequisite: acceptance as a music major; concurrent enrollment in Music 197 and *same* section of 195.

Development of aural skills through melodic, rhythmic, and harmonic dictation.

**194. Dictation 2.** (1:0:2) W, Su Prerequisite: C– or higher in Music 193, 195, 197; concurrent enrollment in Music 198 and *same* section of 196.

Continuation of Music 193.

**195. Music Theory 1.** (3:3:0) F, Sp Prerequisite: acceptance as a music major; concurrent enrollment in Music 197 and *same* section of 193.

Writing and analysis in diatonic harmony.

**196. Music Theory 2.** (3:3:0) W, Su Prerequisite: C– or higher in Music 193, 195, 197; concurrent enrollment in 198 and *same* section of 194.

Writing and analysis in diatonic and chromatic harmony.

**197. Sight Singing 1.** (0.5:0:1) F, Sp Prerequisite: acceptance as a music major; concurrent enrollment in Music 193, 195.

Rhythm and pitch-reading skills using two systems of counting and melodic solfeggio singing with hand signs.

**198. Sight Singing 2.** (0.5:0:1) W, Su Prerequisite: C– or higher in Music 193, 195, 197; concurrent enrollment in Music 194, 196.

Continuation of Music 197.

**200. Elements of Music.** (1:1:0) F, W, Sp Prerequisite: nonmusic major status and concurrent ensemble enrollment.

Exploration of basic musical processes, structures, styles, and common principles of music literature through lectures, demonstrations, and analytical experiences.

**201. Civilization: Music 1.** (3:3:0) F, Sp or Su on dem. Honors also. Prerequisite: ability to read musical notation.

History of Civilization from Greek antiquity to Renaissance, primarily from perspective of musical literature and the arts; exploring fundamental questions in human experience; examining formative events in history; understanding value of important texts.

**202. Civilization: Music 2.** (3:3:0) W, Sp or Su on dem. Honors also. Prerequisite: ability to read musical notation.

History of Civilization from baroque to present, primarily from perspective of musical literature and the arts; exploring fundamental questions in human experience; examining formative events in history; understanding value of important texts.

**203. World Music Cultures.** (3:3:0) F, W

Traditional music of selected cultures of Asia, Oceania, Africa, Europe, and the Americas, including both folk and art music traditions.

**204. History of Jazz.** (3:3:0) F, W, Sp, Su

Fostering an understanding and appreciation of jazz, America's unique contribution to the world's music.

**206. Survey of Latin American Music.** (3:3:0) Sp

Historical survey of folk music and art music indigenous to countries of the Caribbean and Central and South America.

**210R. Topics in Music.** (1–3:Arr.:Arr. ea.) On dem.

Topics vary.

**221. Functional Piano Skills 1.** (2:2:0) F, Sp Prerequisite: piano skills determined by entrance diagnostic exam; music major status.

Provides music majors with basic keyboarding ability in such areas as sight reading, technique, harmonization, and score reading.

**222. Functional Piano Skills 2.** (2:2:0) W, Su Prerequisite: Music 221; music major status.

Continuation of Music 221.

**235. Conducting Techniques.** (2:2:0) F, W, Sp Prerequisite: music major status, C– or higher in Music 194, 196, 198.

Physical techniques and musical understanding required to conduct a performance ensemble.

**236. Fundamentals for Choir Directors.** (2:2:0) W Prerequisite: Music 135 or 235 with grade of B– or better; concurrent enrollment in Music 135 or 235 with instructor's consent.

Choral repertoire, score preparation, vocal production, vowels, consonants, intonation, blend, balance, warm-up, rehearsal techniques, and teaching basic music skills.

**249R. Sophomore Recital.** (0:Arr.:Arr. ea.) F, W, Sp Prerequisite: concurrent enrollment in Music 260R and instructor's consent.

Prerecital hearing required at least three weeks before juried recitals. Fee.

**251. Audio: Basic Principles.** (2:2:2) F, W Prerequisite: music major status or instructor's consent.

Basic recording studio procedures and principles. Intended as overview of the field, course is not for those seeking emphasis in sound recording technology.

**256. Recording Studio 1.** (2:2:2) F Prerequisite: Math 110 or equivalent, Phscs 167, Music 251, and music major status or instructor's consent.

Basic recording theory, operational techniques, and procedures.

**257. Recording Studio 2.** (2:2:2) W Prerequisite: Music 256.

Continuation of Music 256.

**259. Psychology of Performance.** (2:2:0) F, W

Psychological skills for performers. Topics include audition preparation, conquering stage fright, preventing overuse injury, attention control, creativity. Skills applicable to any performance situation.

**260R. Performance Study.** (1–2:1:1 ea.) F, W, Sp

Private instruction and studio class. From one to four hours of daily practice. Fee.

**261. Contemporary Vocal Techniques.** (2:2:1) W Prerequisite: Music 161 or instructor's consent.

Contemporary vocal styles and techniques, including pop/belt, stage, and studio singing.

**264. Keyboard Foundations 1.** (2:2:0) F Prerequisite: Music 194, 196, 198, 260R.

Sight-reading, harmonization, improvisation, and technique at the keyboard.

**265. Keyboard Foundations 2.** (2:2:0) W, Sp Prerequisite: Music 264.

Continuation of Music 264.

**271. Musicality in the Elementary School.** (3:2:1) F Prerequisite: Music 194, 196, 198; or concurrent enrollment.

Survey of authentic folk song and art music tonal systems and structures; their use in developing musical intuition through singing, movement, listening, and playing instruments.

**272. Developing Children's Musicality, Grades K–2.** (3:1:2) W Prerequisite: Music 271.

Literature-based curriculum design and planning, grades K–2. Issues of pure intonation and vocal/aural development. Microteaching in a demonstration school.

**273A. Percussion Techniques.** (0.5:1:0) F Prerequisite: percussion performance major or music education major with percussion emphasis.

Accessory and concert percussion instruments and related performance literature.

**273B. Percussion Techniques.** (0.5:1:0) W Prerequisite: Music 273A or instructor's consent.

Introduction to world percussion, drum set, and marching percussion techniques.

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**276. General Music Methods.** (3:3:0) W Prerequisite: Music 194, 196, 198 or concurrent enrollment; Sc Ed 276R.

Methods and materials for teaching general music, K–12. Cognitive development and learning styles as a basis for instructional strategies. Includes Dalcroze, Orff, and Kodaly.

**284. Jazz Improvisation 1.** (2:2:1) F, W Prerequisite: Music 194, 196, 198, or instructor's consent.

Beginning improvisation: theory and technique.

**286. Introduction to the Music Business.** (2:2:0) W Prerequisite: music major status.

The music business and its models. Guided research topics for all musicians.

**287. Electronic Music Composition.** (2:2:1) F Prerequisite: Music 188 or instructor's consent.

Introduction to composition with digital audio and MIDI synthesis and sequencing.

**288. Composition 2.** (2:1:2) W Prerequisite: Music 287.

Invention and exploration of sound, control of multivoiced textures and larger forms, and recent twentieth-century art music.

**290. Music Theory for MDT Majors.** (4:3:2) W Prerequisite: Music 113 and music dance theatre (MDT) major status.

Music theory, sight singing, aural dictation, and keyboard harmony.

**293. Dictation 3.** (1:0:2) F, Sp Prerequisite: C– or higher in Music 194, 196, and 198; concurrent enrollment in Music 297 and *same* section of 295.

Continuation of Music 194.

**294. Dictation 4.** (1:0:2) W, Su Prerequisite: C– or higher in Music 293, 295, 297; concurrent enrollment in Music 298 and *same* section of Music 296.

Continuation of Music 293.

**295. Music Theory 3.** (3:3:0) F, Sp Prerequisite: C– or higher in Music 194, 196, and 198; concurrent enrollment in Music 297 and *same* section of 293.

Extended chromatic techniques and introduction to twentieth-century concepts.

**296. Music Theory 4.** (3:3:0) W, Su Prerequisite: C– or higher in Music 293, 295, 297; concurrent enrollment in Music 298 and *same* section of 294.

Set theory, serialism, and late twentieth-century concepts.

**297. Sight Singing 3.** (0.5:0:1) F, Sp Prerequisite: C– or higher in Music 194, 196, and 198; concurrent enrollment in Music 293, 295.

Continuation of Music 198.

**298. Sight Singing 4.** (0.5:0:1) W, Su Prerequisite: C– or higher in Music 293, 295, 297; concurrent enrollment in Music 294, 296.

Continuation of Music 297.

**300. History of Music Dance Theatre.** (1:3:0) F Prerequisite: Music 290, Dance 243R, 244R, TMA 114; concurrent enrollment in Dance 300, TMA 300. Recommended: concurrent enrollment in Music 328, Dance 328, TMA 328.

Music in the Western tradition from classical antiquity to present, emphasizing union of music, dance, and theatre.

**301. Survey of Music Literature 1.** (2:2:0) F, Sp Prerequisite: Music 194, 196, 198; 201, 202, or equivalent.

Survey of musical genres, forms, styles, and performance practices from antiquity through the sixteenth century.

**302. Survey of Music Literature 2.** (2:2:0) W, Su Prerequisite: Music 194, 196, 198; 201, 202, or equivalent.

Survey of musical genres, forms, styles, and performance practices from the baroque through the early classic.

**303. Survey of Music Literature 3.** (2:2:0) F, Sp Prerequisite: Music 294, 296, 298; 201, 202, or equivalent.

Survey of music genres, forms, styles, and performance practices from the high classic through the romantic.

**304. Survey of Music Literature 4.** (2:2:0) W, Su Prerequisite: Music 294, 296, 298; 201, 202, or equivalent.

Survey of musical genres, forms, styles, and performance practices of the twentieth century.

**311R. University Chorale.** (1:0:3 ea.) F, W, Sp No audition required.

**312R. Men's Chorus.** (1:0:5 ea.) F, W Prerequisite: audition and director's consent.

**313R. Women's Chorus.** (1:0:5 ea.) F, W Prerequisite: audition and director's consent.

**314R. Concert Choir.** (1:0:5 ea.) F, W Prerequisite: audition and director's consent.

**315R. University Singers.** (1:0:5 ea.) F, W Prerequisite: audition and director's consent.

**316R. Opera Workshop.** (1:6:0 ea.) F Prerequisite: audition; instructor's consent.

Training and experience in operatic choral music and stage movement.

**317R. Opera Ensemble.** (1–3:6:0 ea.) F, W, Sp Prerequisite: audition; instructor's consent.

Training and experience in operatic excerpts, chamber opera, and full productions for operatic soloists.

**318R. Music Theatre Ensemble.** (1:0:5 ea.) F, W Prerequisite: audition and director's consent.

Auditioned chorus or orchestra for opera or music dance theatre productions.

**319R. Music Theatre Performance.** (1–3:0:0 ea.) F, W Prerequisite: audition and director's consent.

Participation as soloists, coaches, or directors in music dance theatre or opera performances.

**321R. University Orchestra.** (1:2:0) F, W

No audition required. Does not satisfy large ensemble requirement for majors.

**322R. University Band.** (1:2:0) W

No audition required. Does not satisfy large ensemble requirement for majors.

**323R. Marching Band.** (1:0:6 ea.) F Prerequisite: audition or director's consent.

**324R. Cougar Band.** (1:0:6 ea.) W Prerequisite: audition or director's consent.

**325R. Symphonic Band.** (1:0:4 ea.) F, W Prerequisite: audition.

**326R. Wind Symphony.** (1:0:4 ea.) F, W Prerequisite: audition.

**328. Junior Music Dance Theatre Seminar.** (1:2:0) F Prerequisite: music dance theatre BFA major status; TMA 114, 229; concurrent enrollment in Dance 328, TMA 328. Recommended: concurrent enrollment in Music 300, Dance 300, TMA 300.

Intensive integration of music, dance, and theatre for the performer.

**329R. Folk Ensemble.** (1:0:4 ea.) F, W, Sp Prerequisite: director's consent.

Traditional bluegrass ensemble. Performs with BYU International Folk Dancers.

**330R. Steel Band.** (1:0:2 ea.) F, W Prerequisite: director's consent.

**331R. Jazz Combos.** (1:1:2 ea.) F, W Prerequisite: audition.

**332R. Show Band.** (1:0:6 ea.) F, W Prerequisite: audition.

Contemporary and traditional show music (Young Ambassadors) and ethnic music (Lamanite Generation).

**333R. Jazz Ensemble.** (1:0:4 ea.) F, W, Sp Prerequisite: audition.

Includes Jazz Ensemble (big band), Jazz Lab Band (entry-level big band), and Vocal Jazz Ensembles.

**334R. Synthesis.** (1:0:4 ea.) F, W Prerequisite: audition.

- 335R. Jazz Legacy Band.** (1:2:0 ea.) F, W Prerequisite: audition. Traditional ensemble specializing in early jazz. Band occasionally tours off campus.
- 337R. Symphony Orchestra.** (1:0:4 ea.) F, W Prerequisite: audition.
- 338R. Philharmonic Orchestra.** (1:0:4 ea.) F, W Prerequisite: audition.
- 339R. Chamber Orchestra.** (1:0:2 ea.) F, W Prerequisite: audition.
- 340R. Harp Ensemble.** (0.5:1:0 ea.) F, W Prerequisite: director's consent.
- 341R. Brass Chamber Music.** (1:1:2 ea.) F, W Prerequisite: director's consent.
- 342R. Early Music Ensemble.** (1:1:3 ea.) F, W Prerequisite: director's consent.
- 343R. Guitar Ensemble.** (1:1:2 ea.) F, W Prerequisite: director's consent.
- 344R. Keyboard in Ensemble.** (1:0:3 ea.) F, W, Sp Prerequisite: Music 260R or instructor's consent. Accompanying and ensemble performance.
- 345R. Percussion Ensemble.** (1:0:2 ea.) F, W Prerequisite: director's consent.
- 346R. String Chamber Music.** (1:1:2 ea.) F, W, Sp Prerequisite: director's consent.
- 347R. Vocal Point.** (1:5:0 ea.) F, W Prerequisite: director's consent.
- 348R. Woodwind Chamber Music.** (1:1:2 ea.) F, W, Sp Prerequisite: director's consent.
- 349R. Junior Recital.** (0:Arr.:Arr. ea.) F, W, Sp Prerequisite: concurrent enrollment in Music 360R or 460R and instructor's consent. Prerecital hearing required at least three weeks before juried recitals. Fee.
- 351. Audio Applications 1.** (2:2:2) F Prerequisite: Music 251, 256, 257, Math 110, Phscs 167. Advanced concepts in digital sound editing.
- 352. Audio Applications 2.** (2:2:0) W Prerequisite: Music 351. Advanced concepts in digital sound editing.
- 355R. Recording Workshop.** (1:1:5 ea.) F, W Prerequisite: Music 251 or 257. Studio projects in multitrack recording for records, broadcast, film, and television.
- 359R. Performance Study.** (1–2:Arr.:Arr. ea.) For those who have completed private instruction requirements for their degree. F, W, Sp Prerequisite: music major status; completion of degree requirements in 260R, 360R, and 460R; instructor's consent. Private instruction and studio class requiring from one to four hours of daily practice. Fee.
- 360R. Performance Study.** (1–2:1:1 ea.) F, W, Sp Prerequisite: music major status; jury approval. Private instruction and studio class. From one to four hours of daily practice. Fee.
- 363. Vocal Pedagogy.** (3:3:0) F Prerequisite: junior standing as vocal performance or choral music education major or instructor's consent. Introduction to physiology, acoustics, and pedagogy of singing.
- 364. Keyboard Pedagogy.** (2:2:1) F Prerequisite: keyboard performance major status or instructor's consent. Basic pedagogical principles as applied to keyboard instruments.
- 365. Piano Pedagogy.** (2:2:1) W Prerequisite: Music 364. Preparation for supervised private or group teaching.
- 366. Organ Pedagogy.** (2:2:1) W even yr. Prerequisite: Music 364. Preparation for supervised private or group teaching.
- 367. Woodwind Pedagogy.** (2:2:1) F odd yr. Prerequisite: woodwind performance major status or instructor's consent.
- 368. Brass Pedagogy.** (2:2:1) F even yr. Prerequisite: brass performance major status or instructor's consent.
- 369A. String Pedagogy.** (2:2:1) F even yr. Prerequisite: instrumental performance major status on violin or viola, or instructor's consent.
- 369B. String Pedagogy.** (2:2:1) On dem. Prerequisite: instrumental performance major status on double bass or instructor's consent.
- 369C. String Pedagogy.** (2:2:1) On dem. Prerequisite: instrumental performance major status on cello or instructor's consent.
- 370. Guitar Pedagogy.** (2:2:1) F odd yr. Prerequisite: instrumental performance major status or instructor's consent.
- 371. Developing Children's Musicality, Grades 3–5.** (3:1:2) F Prerequisite: Music 271, 272. Continuation of Music 272 for grades 3–5, emphasizing the relationship of classroom literature to choral experience and instrumental musicianship. Microteaching in a demonstration school.
- 372A. Woodwind Workshop.** (1:0:3) F Prerequisite: Music 194, 196, 198. Learning to play and to teach woodwind instruments; survey of instructional materials; emphasis on clarinet and saxophone.
- 372B. Woodwind Workshop.** (1:0:3) W Prerequisite: Music 194, 196, 198. Continuation of Music 372A. Emphasis on flute, oboe, and bassoon.
- 373A. Brass Workshop.** (1:0:3) F Prerequisite: Music 194, 196, 198. Learning to play and to teach brass instruments; survey of instructional materials; emphasis on trumpet and French horn.
- 373B. Brass Workshop.** (1:0:3) W Prerequisite: Music 194, 196, 198. Continuation of Music 373A. Emphasis on trombone, baritone, and tuba.
- 374. Percussion Workshop.** (1:0:3) F (instrumental education), W (choral education) Prerequisite: Music 194, 196, 198. Learning to play and to teach percussion instruments; survey of instructional materials.
- 375A. String Workshop.** (1:0:3) F Prerequisite: Music 194, 196, 198. Learning to play and teach string instruments; survey of instructional materials, emphasis on violin and viola.
- 375B. String Workshop.** (1:0:3) W Prerequisite: Music 194, 196, 198. Continuation of Music 375A. Emphasis on cello and bass.
- 376A. Choral Practicum.** (3:3:0) F Prerequisite: Music 221, 235, 276, 294, 296, 298. Applied conducting technique, score analysis and preparation, evaluating solo performance, and application of learning theory.
- 376B. Choral Practicum.** (3:3:0) W Prerequisite: Music 221, 235, 276, 294, 296, 298. Curriculum design, score analysis and preparation, choral arranging, rehearsal techniques, survey of literature, and vocal pedagogy, including treble voice and changing voice; computers and computer-assisted instruction.
- 377A. Instrumental Practicum.** (3:3:0) F Prerequisite: Music 221, 235, 276, 294, 296, 298. Applied conducting technique, score analysis and preparation, evaluating solo performance, and applying learning theory.
- 377B. Instrumental Practicum.** (3:3:0) W Prerequisite: Music 221, 235, 276, 294, 296, 298. Curriculum design, evaluating ensemble performance, advanced rehearsal techniques, administering secondary instrumental music programs; computers and computer-assisted instruction.

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**378. Music for the Elementary Classroom Teacher.** (2:2:0) F, W, Sp, Su

Establishing a classroom environment for musical development; emphasis on appropriate songs, activities, resources, and teaching strategies.

**384. Jazz Improvisation 2.** (2:2:1) W Prerequisite: Music 284 or director's consent.

Intermediate improvisation: theory and technique.

**386R. Songwriting 2.** (2:2:0 ea.) W Prerequisite: music major status; Music 186.

Projects in advanced songwriting.

**387R. Composition 3.** (2:1:2 ea.) F, W Prerequisite: Music 222, 288, 294, 296, 298, and junior-level screening.

Composition lessons and seminars in principles of late twentieth-century music.

**389. Projects in Music for Media.** (2:2:0) F Prerequisite: music major status, Music 186; 295 or instructor's consent.

Introductory projects in scoring for broadcast media, publication, and studio recording.

**391. Jazz Keyboard.** (2:2:0) W Prerequisite: Music 222, 294, 296, 298, or instructor's consent.

Lead sheets, chord voicings, and other aspects of jazz performance practice.

**394. Jazz Styles and Analysis.** (3:3:0) F even yr. Prerequisite: music major status; instructor's consent.

In-depth experience in recognizing and differentiating jazz styles, including analyzing and transcribing solo and ensemble jazz materials.

**395. Form and Analysis.** (3:3:0) F, W, Sp Prerequisite: C– or higher in Music 293, 295, 297.

Analytical study of forms from the common-practice period, including baroque contrapuntal structures and instrumental forms, classical sonata cycle, and romantic part forms.

**399R. Academic Internship.** (1–6:Arr.:Arr. ea.) F, W, Sp Su Prerequisite: instructor's consent.

Internship or externship in creative, performing, producing, or teaching applications of major course work.

**402A. Vocal Literature.** (3:3:0) W Prerequisite: acceptance into 360R or instructor's consent.

Survey of literature with emphasis on art song. Research in area of concentration.

**402B. Vocal Literature.** (2:2:0) On dem. Prerequisite: acceptance into 360R or instructor's consent.

Continuation of Music 402A with emphasis on opera and oratorio.

**403A. Piano Literature.** (2:2:0) F Prerequisite: C– or higher in Music 304; acceptance into 360R or 460R, or instructor's consent.

Survey of literature. Research in area of concentration.

**403B. Piano Literature.** (2:2:0) W Prerequisite: C– or higher in Music 304; acceptance into 360R or 460R, or instructor's consent.

Continuation of Music 403A.

**404A. Organ Literature.** (2:2:0) F odd yr. Prerequisite: C– or higher in Music 304; acceptance into 360R or 460R, or instructor's consent.

Survey of literature. Research in area of concentration.

**404B. Organ Literature.** (2:2:0) W even yr. Prerequisite: C– or higher in Music 304; acceptance into 360R or 460R, or instructor's consent.

Continuation of Music 404A.

**405. Chamber Music Literature.** (2:2:0) W Prerequisite: C– or higher in Music 304; acceptance into 360R or 460R, or instructor's consent.

Survey of literature, including research in field of concentration.

**406. String Literature.** (2:2:0) F odd yr. Prerequisite: C– or higher in Music 304; acceptance into 360R or 460R, or instructor's consent.

Survey of literature, including research in field of concentration.

**407. Symphonic Literature.** (2:2:0) On dem. Prerequisite: C– or higher in Music 304; acceptance into 360R or 460R, or instructor's consent.

Survey of literature, including research in field of concentration.

**410R. Advanced Topics in Music.** (1–3:Arr.:Arr. ea.) On dem. Prerequisite: C– or higher in Music 304; 222, 294, 296, 298, or instructor's consent.

Topics vary.

**426. Music Dance Theatre: Senior Performance Project.** (1:0:3) F, W Prerequisite: TMA 361; concurrent enrollment in Dance 426, TMA 426.

Participation in an MDT performance group culminating in a showcase for agents and directors in New York City during April.

**441R. New Music Ensemble.** (1:0:1 ea.) F, W Prerequisite: instructor's consent.

**449R. Senior Recital.** (1:Arr.:Arr. ea.) F, W, Sp Prerequisite: concurrent enrollment in Music 360R, 387R, or 460R, and instructor's consent. Prerecital hearing required at least three weeks before juried recitals. Fee.

**460R. Performance Study.** (1.5–3:1:1 ea.) F, W, Sp Prerequisite: major in performance; jury approval.

Advanced private instruction and studio class. From three to five hours of daily practice. Fee.

**462R. Orchestral Repertoire.** (1:1:0 ea.) F Prerequisite: concurrent enrollment in Music 460R or instructor's consent.

Performance instruction in standard orchestral repertoire.

**466R. Organ Practicum.** (2:2:1 ea.) W odd yr., F even yr. Prerequisite: Music 166 or organ performance major status. Must be taken in consecutive winter and fall semesters.

Developing various practical skills required of the organist.

**468. Jazz Pedagogy.** (1:2:0) F even yr.

Organizing and teaching jazz in the secondary school. Designed for the music educator.

**469. Theory and Methods of Studio Teaching.** (1:1:0) W Prerequisite: completion of required pedagogy class or instructor's consent.

Applying learning theory and secondary education methods to studio teaching.

**470R. Studio Teaching Practicum.** (1:1:1 ea.) F, W Prerequisite: completion of required pedagogy class or instructor's consent.

Applying pedagogical principles to teaching.

**471. Practicum in Children's Musicality.** (3:1:2) W Prerequisite: Music 271, 272, 371.

Pedagogy for grades 6 and beyond. Children's choir development, including arranging and adapting vocal and instrumental music. Extended pre-student teaching in a demonstration school.

**472. Supervised Teaching in Voice.** (2:1:3) F Prerequisite: Music 363.

Lecture, discussion, and practicum in the methodology of studio voice instruction.

**473. Suzuki Methods.** (1:1:0) F Prerequisite: completion of required pedagogy class or instructor's consent.

Applying the principles of Shinichi Suzuki to teaching. Emphasis on violin.

**481. Orchestration.** (3:3:0) F Prerequisite: C– or higher in Music 294, 296, 298.

Scoring for standard orchestral instruments.

**482. Choral Arranging.** (2:2:0) W Prerequisite: C– or higher in Music 294, 296, 298.

Study of published choral arrangements, as well as techniques for adapting and arranging for choirs.

**483. Counterpoint.** (3:3:0) F Prerequisite: C– or higher in Music 294, 296, 298.

Eighteenth-century contrapuntal styles and techniques, emphasizing those of J. S. Bach.

**485. Jazz Arranging and Composition.** (3:3:0) W Prerequisite: Music 295.

Developing concepts and skills related to the orchestration, arranging, and composition of jazz and related contemporary styles of music.

**489. Film Scoring.** (2:2:0) W Prerequisite: Music 389; instructor's consent.

Introduction to techniques and technology of film scoring.

**494R. Independent Readings.** (1–3:Arr.:Arr. ea.) F, W, Sp, Su Prerequisite: advising professor's consent as certified by completing a contract obtained from undergraduate studies secretary in E-579 HFAC.

**498. Senior Thesis.** (3:Arr.:Arr.) F, W, Sp, Su Prerequisite: senior status and faculty advisor's endorsement.

**499R. Honors Thesis.** (1–6:0:0 ea.) F, W, Sp, Su Prerequisite: senior status.

## 500-Level Graduate Courses (available to advanced undergraduates)

**500. Musical Research Techniques.** (2:2:0) F, W Prerequisite: graduate status.

**501. Music Education Research Techniques.** (2:2:0) Su Prerequisite: graduate status.

**503. Aesthetics.** (3:3:0) F Prerequisite: Music 304 or equivalent.

Fundamental questions of aesthetic theory from classical antiquity to the present, emphasizing musical aesthetics.

**505R. Applied Literature.** (2:2:1 ea.) On dem. Prerequisite: minimum of one enrollment in Music 402–407.

Continuation of Music 402–407.

**506. Choral Literature 1.** (2:2:0) F odd yr. Prerequisite: instructor's consent.

Concentrated analytical study and application of choral literature through Beethoven.

**507. Choral Literature 2.** (2:2:0) F even yr. Prerequisite: instructor's consent.

Concentrated analytical study and application of choral literature from post-Beethoven to the present.

**508. Orchestra Literature 1.** (2:2:0) W even yr. Prerequisite: instructor's consent.

Concentrated analytical study and application of orchestral literature of the baroque and classical eras.

**509. Orchestra Literature 2.** (2:2:0) W odd yr. Prerequisite: instructor's consent.

Concentrated analytical study and application of orchestral literature of the romantic era and the 20th century.

**510. Band Literature.** (2:2:0) W Prerequisite: instructor's consent.

Concentrated study of band literature through analysis and conducting.

**532R. Score Preparation and Conducting: Instrumental.** (2:2:0 ea.) F Prerequisite: instructor's consent.

**533R. Choral Conducting and Development.** (2:2:0 ea.) F, W odd yr., Su

Principles and practices of score preparation, conducting, and choral development as elements of choral artistry.

**534R. Score Preparation and Direction: Jazz.** (2:2:0 ea.) Su odd yr.

**560R. Performance Instruction.** (1–2:1:0 ea.) F, W, Sp, Su Prerequisite: graduate music student status.

Performance instruction for students not specializing in performance, and for performance students wishing to study secondary instruments. Fee.

**570. Music for Elementary School Teachers.** (2:2:0) On dem. Prerequisite: Music 371, 471, or elementary music teaching experience.

Experiences in teaching various music activities in the elementary school.

**571. Elementary Education Music Pedagogy.** (2:2:0) On dem.

Prerequisite: Music 371 and equivalent of elementary education teaching minor in music.

Orff, Dalcroze, and Kodaly materials and techniques.

**575R. Summer Music Workshops and Clinics.** (1–4:Arr.:Arr. ea.)

**576. Fundamentals and Techniques of the Marching Band.** (2:2:2) For music education majors only. On dem. Prerequisite: Music 294, 296.

Planning, charting, and scoring for marching bands.

**581. Twentieth-Century Orchestration.** (3:3:0) W Prerequisite: Music 481.

New techniques for standard and new instruments; analysis and listening.

**583. Sixteenth-Century Counterpoint.** (3:3:0) W Prerequisite: Music 483.

Strict modal counterpoint in sixteenth-century style (Palestrina); includes species, text setting, and motet.

**591. Advanced Topics in Keyboard Harmony.** (2:2:0) F Prerequisite: instructor's consent.

Topics vary.

**595. Score Analysis.** (2:2:0) F, Su

Analysis of representative choral and instrumental works from the Renaissance through contemporary styles.

**596. Schenker Analysis.** (3:3:0) W Prerequisite: Music 303, 395; or equivalent.

Schenker's system of tonal analysis.

**599R. Academic Internship.** (1–6:Arr.:Arr. ea.) On dem.

Prerequisite: instructor's consent.

Internship in creative, performing, producing, or teaching applications of major course work.

## Graduate Courses

For 600- and 700-level courses, see the BYU 2006–2007 Graduate Catalog.

## Music Faculty

### Professors

Blackinton, David P. (1980) BM, MM, U. of Michigan, 1964, 1966;

DMA, Catholic U. of America, 1975.

Bush, Douglas E. (1978) BA, MM, Brigham Young U., 1972, 1974; PhD, U. of Texas, 1982.

Dabczynski, Andrew (2001) BM, Eastman School of Music, 1976; MA, U. of Connecticut, 1978; PhD, U. of Michigan, 1994.

Dayley, K. Newell (1970) BS, Brigham Young U., 1964; MM, U. of Southern California, 1966; DA, U. of Northern Colorado, 1986.

Durham, Thomas L. (1978) BM, MM, U. of Utah, 1974, 1975; PhD, U. of Iowa, 1978.

Giovannetti, GERALYN (1990) BM, MM, U. of Western Ontario, 1978, 1980; DMA, U. of Michigan, 1990.

Hicks, Michael D. (1985) BM, Brigham Young U., 1980; MM, DMA, U. of Illinois, 1981, 1984.

Hopkin, J. Arden (1990) BM, Brigham Young U., 1971; MM, North Texas State U., 1974; DMA, U. of Rochester, 1978.

Johnson, Steven P. (1987) BA, MA, California State U., Fullerton; 1976, 1979; PhD, U. of California, Los Angeles, 1989.

Jones, Stephen M. (1991) BM, Brigham Young U., 1983; MM, DMA, U. of Cincinnati, 1986, 1989.

Katseanes, Kory (1999) BA, MM, U. of Utah, 1976, 1979.

Lowe, Laurence (1993) BM, San Francisco Conservatory, 1980; MM, U. of Rochester, 1981.

Monson, Dale E. (1999) BA, MA, Brigham Young U., 1975, 1976; PhD, Columbia U., 1982.

## School of Music

- Peery-Fox, Irene W. (1994) BA, MS, The Juilliard School, 1969, 1972; DMA, Peabody Conservatory of Music, Johns Hopkins U., 1987.
- Powley, E. Harrison (1969) BM, MA, PhD, U. of Rochester, 1965, 1968, 1975.
- Randall, David M. (1970) BS, Brigham Young U., 1965; MM, Indiana U., Bloomington, 1967; DMA, U. of Iowa, 1970.
- Robison, Clayne W. (1973) BA, Brigham Young U., 1962; JD, Harvard U., 1965; BA, Brigham Young U., 1970; MM, DMA, U. of Washington, 1971, 1973.
- Sargent, David H. (1976) BA, MA, Brigham Young U., 1966, 1968; MM, DMA, U. of Illinois, 1969, 1975.
- Shumway, Jeffrey L. (1985) BM, Brigham Young U., 1976; MM, The Juilliard School, 1977; DM, Indiana U., 1982.
- Smith, C. Raymond (1982) BM, Brigham Young U., 1975; MM, DM, Indiana U., 1976, 1982.
- Staheli, Ronald J. (1978) BA, Brigham Young U., 1972; MM, DMA, U. of Southern California, 1973, 1977.
- Vincent, Lawrence P. (1997) BA, Brigham Young U., 1973; MM, Northern Arizona U., 1977; DMA, U. of Michigan, 1981.

### Associate Professors

- Anderson, Richard Paul (1972) BA, Arizona State U., 1968; MM, Northwestern U., 1970; DMA, U. of Colorado, 1986.
- Asplund, Christian (2002) BM, Brigham Young U., 1988; MA, Mills Coll., 1993; DMA, U. of Washington, 1998.
- Belknap, Monte L. (2003) BM, MM, U. of Cincinnati College Conservatory of Music, 1991, 1994.
- Boothe, Randall W. (1982) BA, Brigham Young U.—Hawaii, 1975; MM, Brigham Young U., 1979.
- Boren, Murray E. (1994) BM, MA, Brigham Young U., 1975, 1977; DMA, City U. of New York, 2001.
- Broomhead, Paul G. (1995) BM, MM, Brigham Young U., 1989, 1990.
- Brough, Ronald P. (1984) BM, MM, North Texas State U., 1981, 1983; DA, U. of Northern Colorado, 1997.
- Brown, David C. (1998) BM, Indiana U., 1975; MM, U. of Toledo, 1997.
- Cook, R. Don (1991) BM, MM, Brigham Young U., 1980, 1982; DMA, U. of Kansas, 1987.
- Hansen, Eric (2001) BM, MM, Peabody Conservatory, Johns Hopkins U.
- Harker, Brian C. (1997) BA, MA, Brigham Young U., 1990, 1994; MPhil, PhD, Columbia U., 1995, 1997.
- Howard, Luke (2002) BMusEd, U. of Sydney, Australia, 1991; MA, Brigham Young U., 1994; PhD, U. of Michigan, 1997.
- Jaccard, Jerry (1993) BME, U. of Arizona, 1965; MME, Holy Names Coll., 1976; EdD, U. of Massachusetts, 1995.
- Jessop, Scott Gordon (1980) BS, MS, Utah State U., 1961, 1964; EdS, U. of Utah, 1973; PhD, Brigham Young U., 1980.
- Kenney, Susan Hobson (1977) BS, U. of Utah, 1966; MA, Brigham Young U., 1978.
- Lindeman, Stephan D. (1996) BM, Indiana U., 1977; MA, Queens Coll., City U. of New York, 1984; PhD, Rutgers U., 1995.
- Peterson, Donald L. (1986) BM, MA, Brigham Young U., 1976, 1983; DMA, Arizona State U., 1986.

### Assistant Professors

- Bevan, Julie (2000) BM, Brigham Young U., 1973; MM, U. of Southern California, 1975.
- Bigelow, Anny Claudine (1999) BM, MM, Brigham Young U., 1991, 1994; DMA, U. of Maryland, 2001.
- Call, R. Steven (1991) BM, MM, Utah State U., 1971, 1975; PhD, U. of Utah, 2000.
- Christensen, Ruth (2000) BM, Brigham Young U., 1991; MM, Arizona State U., 1993; DMA, U. of Michigan, 1999.
- Clayton, April (2000) BM, MM, U. of Cincinnati College Conservatory of Music, 1995, 1996; DMA, The Juilliard School, 2001.
- Hall, Rosalind (2000) BM, Royal Academy of Music, London, England, 1977; MM, Brigham Young U., 1992.
- Hinckley, Jaren (2001) BM, U. of Utah, 1993; MM, Indiana U., 1995; DM, Florida State U., 2001.

- Holden, Scott (2002) BM, U. of Michigan, 1992; MM, The Juilliard School, 1995; DMA, Manhattan School of Music, 2002.
- Kimball, Wilford W. (2004) BM, Brigham Young U., 1994; MM, Duquesne U., 1997; DMA, Arizona State U., 2001.
- Lockwood, Gayle (1999) BM, Brigham Young U., 1968; MM, U. of Utah, 1971.
- Ricks, Steven Leon (2002) BM, Brigham Young U., 1993; MM, U. of Illinois, 1995; PhD, U. of Utah, 2001.
- Smith, Christian B. (1997) BM, MM, Brigham Young U., 1991, 1993.

### Emeriti

- Arbizo, Ray L. (1970) BA, MA, Arizona State U., 1952, 1955.
- Bachelor, Daniel F. (1975) BM, U. of Montana, 1961; MM, U. of Idaho, 1965; PhD, Brigham Young U., 1976.
- Belnap, Parley L. (1965) BA, MA, Brigham Young U., 1950, 1956; DMA, U. of Colorado, 1975.
- Curtis, Brandt B. (1955) BA, Brigham Young U., 1953; MM, DMA, Indiana U., Bloomington, 1955, 1978.
- Dalton, David (1963) BM, MM, U. of Rochester, 1959, 1961; DM, Indiana U., Bloomington, 1970.
- Downs, Robert H. (1966) BM, MM, U. of Missouri, Kansas City, 1957, 1957.
- Gibbons, Rendol L. (1964) BA, MA, Arizona State Coll., 1947, 1954; PhD, U. of Colorado, 1969.
- Goodman, A. Harold (1960) BA, U. of Arizona, 1947; MM, EdD, U. of Southern California, 1951, 1960.
- Harris, H. Jarolde (1970) BM, Bethany Coll., 1950; MM, Northwestern U., 1954.
- Hatton, Gaylen A. (1979) BA, MA, Brigham Young U., 1951, 1954; PhD, U. of Utah, 1964.
- Laycock, Ralph G. (1953) BA, Brigham Young U., 1941; MS, The Juilliard School, 1948; DMA, U. of Southern California, 1970.
- Mason, James A. (1957) BA, MA, Brigham Young U., 1955, 1957; EdD, Arizona State U., 1970.
- Nibley, Reid N. (1969) BFA, MA, U. of Utah, 1950, 1953; DMA, U. of Michigan, 1964.
- Pollei, Paul C. (1963) BM, U. of Utah, 1961; MM, U. of Rochester, 1962; PhD, Florida State U., 1975.
- Pratt, Rosalie Rebollo (1979) BM, Manhattanville Coll., 1954; MM, Rosary Coll., 1955; EdD, Columbia U., 1976.
- Ripplinger, Donald H. (1975) BA, Brigham Young U., 1954; MS, PhD, U. of Utah, 1965, 1968.
- Smith, Robert Baily (1967) BA, MA, Brigham Young U., 1957, 1967.
- Stuart-Bachelor, Lila R. (1986) BM, U. of Utah, 1964; MM, DMA, Indiana U., 1968, 1993.
- Stubbs, Darrel W. (1962) BM, U. of Rochester, 1949; MM, Indiana U., Bloomington, 1952; DMA, U. of Southern California, 1966.
- Terry, Elvis B. (1957).

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## Native American Studies

See History.

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## Navajo

See Center for Language Studies.

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## Norse

See Center for Language Studies.

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## Norwegian

See Center for Language Studies.

## Neuroscience Center

Neuroscience Center Office  
1055 SWKT, (801) 422-1218

College of Family, Home, and Social Sciences Advisement Center  
151 SWKT, (801) 422-3541

College of Biology and Agriculture Advisement Center  
380 WIDB, (801) 422-3042

The neuroscience undergraduate program is an interdisciplinary program that allows students to seek advisement at the College of Biology and Agriculture Advisement Center or the College of Family, Home, and Social Sciences Advisement Center.

### Admission to Degree Program

The degree program in the Neuroscience Center carries special enrollment limitations. Please see the college advisement center for specific details.

### The Discipline

Neuroscience is the field of study covering the development and function of the central nervous system and its connection to influencing/regulating behavior. The study of neuroscience examines topics such as neuroanatomy, neuropsychopharmacology, neurophysiology, molecular neurobiology, and neuroendocrinology. The interdisciplinary nature of neuroscience requires the tools provided by experience and training in calculus, general biology, genetics, physiology, molecular biology, chemistry (general, organic, and biochemistry), physics, psychology (hormones and behavior, memory, cognition, sensation, and perception), and research design and analysis.

The objectives for students pursuing a major in neuroscience are to (1) establish and promote an interdisciplinary education in neuroscience, (2) produce scientifically literate individuals having the ability to design, conduct, and analyze research activities, and (3) have students think critically in an integrative fashion based upon research-rich and inquiry-based academic curricula.

### Career Opportunities

Neuroscience prepares students to pursue advanced degrees in graduate school or to enter into the pharmaceutical and biotechnology workforce. Neuroscience is an excellent preprofessional field of study for those interested in health professions, law, or business.

### Graduation Requirements

To receive a BYU bachelor's degree a student must complete, in addition to all requirements for a specific major, the following university requirements:

- The university core, consisting of requirements in general and religious education (See the University Core section of this catalog for details. For a complete listing of courses that meet university core requirements, see the current class schedule.)
- A minimum of 30 credit hours in residence
- A minimum of 120 credit hours
- A cumulative GPA of at least 2.0

### Undergraduate Programs and Degrees

BS Neuroscience

Students should see their college advisement center for help or information concerning the undergraduate programs.

## BS Neuroscience (66–67 hours\*)

*This is a limited-enrollment program requiring departmental admissions approval. Please see the Family, Home, and Social Sciences College Advisement Center for information regarding requirements for admission to this major.*

### Major Requirements

1. Complete the following prerequisite courses:  
Biol 120, 220.  
Chem 105.
2. Students must have a minimum grade of C+ for each of the above courses before being accepted to the major. Grades will be accepted from transfer students for chemistry and introductory biology. Information regarding the average grades earned in prerequisite courses by students accepted into the major can be obtained from the College of Family, Home, and Social Sciences Advisement Center.
3. Complete the following:  
Biol 240, 340, 360.  
Neuro 205, 360, 460, 480, 481.  
PDBio 362, 363.  
Psych 370.
4. Complete the following:  
Chem 106, 107, 351, 352, 481.
5. Complete one of the following options:  
**Either** Phscs 105, 106, 107, 108  
**Or** Phscs 121, 123, 220.
6. Complete the following:  
Engl 316.  
Math 119.  
Stat 221.

\*Hours include courses that may fulfill university core requirements.

### Neuroscience (Neuro)

#### Undergraduate Courses

**205. Neurobiology.** (3:3:0) F, W Prerequisite: neuroscience majors or pre-neuroscience majors.

The nervous system; cellular communication, neural basis of behavior, and hormonal influences.

**360. Neuroanatomy.** (2:2:0) F, W, Sp Prerequisite: Neuro 205.

Functional anatomy of the human brain and spinal cord, including surface and cross-sectional gross anatomy, microscopic anatomy, and sensory, motor, and integrative systems' circuitry.

**449R. Undergraduate Research Experience.** (1–3:0:0 ea.) F, W, Sp, Su

Undergraduate research experience in neuroscience.

**460. Behavioral Neuroscience.** (3:3:0) F, W Prerequisite: Neuro 205; neuroscience major status.

Critical examination of anatomical, physiological, and chemical bases of behavioral expression.

**480. Advanced Neuroscience.** (3:3:0) F, W Prerequisite: Neuro 205, Biol 360; neuroscience major status.

Principles of neural science. Structure-function relationships and integration of the nervous system.

**481. Neuroscience Laboratory.** (1:0:3) F, W Prerequisite: Neuro 480 or concurrent enrollment; neuroscience majors only.

Exposure to classical/modern experiments in neuroscience.

### Graduate Courses

For 600- and 700-level courses, see the BYU 2006–2007 Graduate Catalog.

## Neuroscience Faculty

### Professors

Bigler, Erin D. (1990) BS, PhD, Brigham Young U., 1971, 1974.  
Bloch, George J. (1989) BS, Brandeis U., 1962; MA, Claremont Graduate School, 1965; PhD, Stanford U., 1968.  
Busath, David D. (1995) BA, MD, U. of Utah, 1974, 1978.  
Lephart, Edwin D. (1994) BS, MS, Brigham Young U., 1979, 1982; PhD, U. of Texas Southwestern Medical Center, Dallas, 1989.  
McPherson, David (1991) BS, Brigham Young U., 1967; MA, George Washington U., 1969; PhD, U. of Washington, 1972.  
Porter, James P. (1998) BS, MS, Brigham Young U., 1976, 1978; PhD, U. of California, San Francisco, 1982.  
Woodbury, Dixon J. (2001) BS, U. of Utah, 1980; PhD, U. of California, Irvine, 1986.

### Associate Professors

Hedges, Dawson W. (2000) BS, Weber State Coll., 1984; MD, U. of Utah, 1988.  
Hopkins, Ramona O. (1999) BS, Westminster Coll., 1998; MS, PhD, U. of Utah, 1992, 1996.  
Judd, Allan M. (1991) BS, MS, Brigham Young U., 1973, 1978; PhD, West Virginia U., 1982.  
Steffensen, Scott C. (2000) BS, PhD, U. of Utah, 1980, 1986.

### Assistant Professors

Brown, Michael D. (2003) BS, Brigham Young U., 1993; MS, PhD, Colorado State U., 1998, 1999.  
Flom, Ross A. (2001) BS, U. of Minnesota, 1992; MEd, Idaho State U., 1993; PhD, U. of Minnesota, 1999.  
Stark, Michael R. (2001) BS, Brigham Young U., 1992; MS, Idaho State U., 1994; PhD, U. of California, Irvine, 1998.  
Sudweeks, Sterling N. (2001) BS, Brigham Young U., 1992; PhD, U. of Utah, 1997.

### Emeriti

Fleming, Donovan E. (1971) BS, MS, Brigham Young U., 1956, 1957; PhD, Washington State U., 1962.

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## Niuean

See Center for Language Studies.

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## Nursing

Elaine Sorensen Marshall, Dean  
500A SWKT, (801) 422-2747

Catherine Coverston, Associate Dean  
500D SWKT, (801) 422-5613

Mary Williams, Associate Dean  
444 SWKT, (801) 422-5626

College of Nursing Advisement Center  
551 SWKT, (801) 422-4173

### Admission to Degree Program

The degree programs in the College of Nursing carry special enrollment limitations. Please see the college advisement center for specific details.

### The Discipline

Brigham Young University's baccalaureate nursing program prepares general clinicians with the knowledge, skills, leadership abilities, and values commensurate with professional nursing practice. Nursing education builds on the sciences, humanities, and religious studies to develop the strong theoretical and practical base necessary to understand and meet the needs of people in various health care settings.

Learning comes alive as students move from the classroom through the clinical simulation laboratory to actual patient care. Students assess, diagnose, and treat actual and potential human responses in an effort to promote, restore, or maintain health. Baccalaureate graduates develop their ability to be sensitive to the welfare of others, communicate effectively, evaluate research findings, think critically, solve problems, and utilize appropriate technology as they provide quality nursing care to people of all ages and from diverse backgrounds.

### Career Opportunities

Career positions are available in various health care settings.

### Graduation Requirements

To receive a BYU bachelor's degree a student must complete, in addition to all requirements for a specific major, the following university requirements:

- The university core, consisting of requirements in general and religious education (See the University Core section of this catalog for details. For a complete listing of courses that meet university core requirements, see the current class schedule.)
- A minimum of 30 credit hours in residence
- A minimum of 120 credit hours
- A cumulative GPA of at least 2.0

### Undergraduate Programs and Degrees

BS Nursing

Students should see the college advisement center for help or information concerning the undergraduate program.

### Graduate Programs and Degrees

MS Nursing

For more information see the BYU 2006–2007 Graduate Catalog.

### Undergraduate Admittance Requirements

The following criteria have been established for acceptance and progression in the baccalaureate program.

1. Be fully matriculated at BYU.
2. Acceptance into the nursing major is competitive and restricted to a limited number of openings each year. Not all

students who meet the minimum requirements are guaranteed acceptance into the program.

Applicants are evaluated on a variety of criteria using a point system. Half of those points are awarded based on GPA. In the last three years, the average GPA of students accepted into the program was 3.61 to 3.85 with a range of 3.16 to 4.0. Other admission criteria included academic progression; written communication skills; community, school, and church service; and recommendations from employers and/or educators.

- Complete the following before beginning nursing courses:
  - Engl 150 or equivalent.
  - Chem 152, 281.
  - MFHD 210 or Psych 220.
  - NDFS 100.
  - MMBio 221, 222.
  - Nurs 180.
  - PDBio 220, 305, 365.
  - Stat 221.

**Note:** Students may apply to the baccalaureate program during the semester they are completing prerequisite courses.

- Students with English as a second language: Take the English Proficiency Examination offered by the Linguistics and English Language Department plus all ESL service courses as recommended by the examination outcome. Successfully complete Nurs 102. The college requires a TOEFL score of at least 580 (paper based) or 237 (computer based).
- Maintain a C grade or above in all nursing courses, including prerequisite and supporting courses. A grade of C- does not allow advancement to the next course in the sequence.

**Note 1:** Notify the college advisement center before dropping or interrupting course work.

**Note 2:** Transfer credit older than seven years will not apply to the major without prior approval of the associate dean of undergraduate affairs.

**Note 3:** Students may repeat only one prerequisite course one time.

Applicants who meet the above criteria are eligible for consideration for acceptance. Students who have been admitted to BYU must apply for the nursing program through the college advisement center (551 SWKT). Students are accepted fall and winter semesters. Application deadlines and requirements are available from the advisement center and online. Nursing students are required to have a physical examination, recent CPR and first aid certification, and a background check and to submit immunization records to the Nursing Advisement Center. Students are responsible for the cost of these required elements.

Computers are used in all health care facilities; and students are expected to be computer literate when accepted into the College of Nursing.

## General Information

The college nursing program is accredited by the Commission on Collegiate Nursing Education.

### Clinical Assignments and Transportation.

Educational experiences are located in Utah, Salt Lake, and Davis counties. Didactic courses are taught in Provo. Clinical experiences are in agencies throughout the Wasatch Front. Visits to agencies and client homes are also required. To achieve the best possible clinical education, students will need to travel throughout their course work. Access to a car is highly recommended. Students are responsible for their own transportation. Transcultural rural and international clinical experiences are also available.

## BS Nursing (95 hours\*)

*This is a limited-enrollment program requiring college admissions approval. Please see the college advisement center office for information regarding requirements for admission to this major.*

### Major Requirements

- A C grade or above must be maintained in all required courses.
- Acceptance into the program.
- Complete the following:
  - Chem 152.
  - NDFS 100.
  - PDBio 220.

**Note:** Chem 101 is needed prior to Chem 152 if you have had no previous chemistry experience.
- Complete the following:
  - Chem 281.
  - Nurs 180.
  - PDBio 305.
  - Stat 221.

**Note:** Math 110 (or equivalent) may need to be taken prior to Stat 221.
- Complete one course from the following:
  - MFHD 210.
  - Psych 220.
- Complete the following:
  - MMBio 221, 222.
  - PDBio 365.
- Complete one course from the following:
  - Anthr 101.
  - Soc 112, 323.
- Complete the following:
  - Nurs 294, 296, 298.
- Complete the following:
  - Nurs 300, 318, 330.
- Complete the following:
  - Nurs 320, 340, 360.
  - Psych 342.
- Complete the following:
  - Nurs 400, 460, 470.
- Complete the following:
  - Nurs 480, 490.

\*Hours include courses that may fulfill university core requirements.

## Nursing (Nurs)

### Undergraduate Courses

**102. Nursing and Medical Terminology.** (2:2:0) Independent Study only.

Nursing and medical terminology for prenursing and beginning nursing students or those interested in health occupations.

**180. Preview of Nursing.** (1:2:0) On blk.

Development of nursing as a profession; issues and trends evident throughout nursing history and their impact on nursing today.

**288. Family Health Management.** (2:2:0) Prerequisite: non-nursing major status.

Promotion and maintenance of health over the life span, emphasizing current issues affecting family health.

**294. Health Assessment and Health Promotion.** (3.5:2.5:3) F, W Prerequisite: admission to College of Nursing; Nurs 180; concurrent enrollment in Nurs 296, 298.

Acquiring and applying health assessment knowledge and skills. Health promotion, health maintenance, and therapeutic communication.

**296. Introduction to Community Health Nursing.** (3.5:2:4.5) F, W Prerequisite: admission to College of Nursing; Nurs 180; concurrent enrollment in Nurs 294, 298.

Acquiring and applying basic community health nursing concepts in a variety of settings. Health of groups and/or populations.

**298. Nursing Care of Older Adults.** (5:3:5) F, W Prerequisite: admission to College of Nursing; Nurs 180; concurrent enrollment in Nurs 294, 296.

Acquiring basic nursing skills and applying them to older adults in residential and inpatient settings.

**300. Pharmacology in Nursing.** (3:3:0) F, W Prerequisite: Nurs 294, 296, 298; concurrent enrollment in Nurs 330.

Common categories of drugs: their action, use, and desired and undesired effects; implications for nursing care.

**318. Ethics in Nursing.** (2:2:0) F, W Prerequisite: Nurs 294, 296, 298, 300, 320, 330; concurrent enrollment in Nurs 340, 360.

Overview of ethical principles and theories, emphasizing role of ethics in nursing; instruction and practice in advanced writing skills for professional nursing practice.

**320. Nursing Research.** (3:3:0) F, W Prerequisite: Nurs 294, 296, 298; Stat 221 or comparable statistics course.

Analysis and critique of research in nursing practice; instruction and practice in advanced writing skills for professional nursing practice.

**330. Nursing Care of Adults with Acute and Chronic Illnesses.** (8:3:14) F, W Prerequisite: concurrent enrollment in Nurs 300.

Care of acutely/chronically ill adults in inpatient settings; professional behavior; illness implications for patients/families; proficiency in technical skills.

**340. Nursing Care of the Childbearing Family.** (4:2:6) F, W Prerequisite: Nurs 300, 318, 330; concurrent enrollment in Nurs 320, 360.

Care of childbearing families from diverse backgrounds. Health promotion, assessment, and interventions related to complicated and uncomplicated pregnancy and birth.

**360. Nursing Care of the Child-Rearing Family.** (4:2:6) F, W Prerequisite: Nurs 300, 318, 330; concurrent enrollment in Nurs 320, 340.

Care of children, and their families, from diverse backgrounds. Health promotion, disease prevention, care of acute and chronic illness, and growth development.

**390R. Independent Study in the Practice of Nursing.** (1–9:Arr.:Arr. ea.) Prerequisite: instructor's consent.

**400. Global Health and Human Diversity.** (4:1.5:7) Sp Prerequisite: Nurs 300, 330.

Theory and practice of nursing in diverse populations within a global context. Clinical experiences for some sections include costs for travel, housing, meals, and incidental expenses.

**450R. Special Topics in Clinical Nursing.** (4:4:12 ea.) On blk. Prerequisite: Nurs 300, 318, 330.

Experience in clinical nursing specialties.

**460. Psychiatric Nursing.** (3:1.5:4.5) F, W Prerequisite: Nurs 320, 340, 360, 400; concurrent enrollment in Nurs 470.

Nursing care for clients with complex psychiatric disorders.

**470. Nursing Care of Adults in Crisis.** (7:3:11) F, W Prerequisite: Nurs 320, 340, 360, 400; concurrent enrollment in Nurs 460.

Nursing intervention for individuals and families in crisis.

**480. Nursing Senior Seminar.** (1:2:0) F, W Prerequisite: concurrent enrollment in Nurs 490; completion of all other courses in nursing major.

Characteristics of the nursing profession; professional behaviors and values. Review of nursing history.

**490. Nursing Capstone.** (8:4:18) F, W Prerequisite: Nurs 460, 470; concurrent enrollment in Nurs 480.

Clinical synthesis experience with focus on planning, delivering, and managing patient care in complex environments. Leadership components incorporated into clinical experiences and practices.

**499R. Honors Thesis.** (1–3:0:0 ea.)

Honors thesis preparation.

## 500-Level Graduate Courses (available to advanced undergraduates)

**555. Pharmacology in Advanced Practice.** (3:3:0)

Principles of pharmacology and drug therapy for advanced-practice nurses.

**590R. Independent Study.** (1–4:Arr.:Arr. ea.) Prerequisite: instructor's consent.

Individualized study.

## Graduate Courses

For 600- and 700-level courses, see the BYU 2006–2007 Graduate Catalog.

## Nursing Faculty

### Professors

Callister, Lynn Clark (1988) BS, Brigham Young U., 1964; MN, Wichita State U., 1988; PhD, U. of Utah, 1993.

Mandleco, Barbara L. (1977) BSN, U. of Wisconsin, 1967; MN, U. of Florida, 1968; PhD, Brigham Young U., 1991.

Marshall, Elaine S. Sorensen (1987) BS, MS, PhD, U. of Utah, 1972, 1979, 1988.

### Associate Professors

Beckstrand, Renea L. (1987) AS, Ricks Coll., 1979; AS, BS, MS, Brigham Young U., 1981, 1983, 1987; PhD, U. of Utah, 2001.

Bond, Elaine (1991) BS, MS, U. of Utah, 1989, 1990; DNSc, U. of San Diego, 1997.

Cornell, Gretchen (2002) BS, Fort Hays State U., 1968; MSN, U. of Illinois, Chicago, 1971; PhD, U. of Missouri, 1984.

Coverston, Catherine R. (1989) AS, Brigham Young U., 1969; BS, U. of the State of New York, Albany, 1987; MS, Medical Coll. of Georgia, 1989; PhD, U. of Utah, 2001.

Memmott, Rae Jeanne (1992) BS, Brigham Young U., 1965; MS, U. of Colorado, 1967.

Rogers, Sandra (1980) BS, Brigham Young U., 1974; MS, U. of Arizona, 1980; DNSc, U. of California, San Francisco, 1989.

Rushon, Patricia (1995) BS, U. of Utah, 1971; MS, PhD, Brigham Young U., 1977, 1989.

Schwartz, Rosanne (1981) BS, MS, Brigham Young U., 1978, 1981; PhD, U. of Florida, 1991.

Williams, Mary (1978) BS, Brigham Young U., 1971; MS, U. of Utah, 1979; PhD, U. of Arizona, 1991.

### Associate Teaching Professors

Abegglen, JoAnn (1985) BS, Brigham Young U., 1967; MS, U. of Utah, 1973; MS, Brigham Young U., 1988.

Anderson, Vickie Lane (1980) BS, MS, Brigham Young U., 1975, 1983.

Ellinger, Patricia R. (1996) BS, Brigham Young U., 1970; MS, U. of Utah, 1991.

Mills, Debra Ann (1996) AS, Ricks Coll., 1974; BS, MS, Brigham Young U., 1982, 1989.

Stoneman, Eva (1997) BS, MS, Brigham Young U., 1959, 1997.

### Assistant Professors

Berry, Judith (1997) BS, Brigham Young U., 1969; MS, Catholic U. of America, 1984.

- Dearing, Karen (2003) AD, Weber State Coll., 1975; BS, MS, PhD, U. of Utah, 1976, 1978, 2003.
- Johnson, Mary Jayne (1996) BS, MS, Brigham Young U., 1982, 1996; PhD, U. of Utah, 2001.
- Lassetter, Jane (2002) AS, BS, MS, Brigham Young U., 1981, 1998, 2001.
- Ravert, Patricia (1999) BS, MS, Brigham Young U., 1975, 1999.
- Assistant Teaching Professors**
- Blad, Kent (1999) BS, U. of Utah, 1987; MS, Brigham Young U., 1999.
- Blad, Paul (2001) AA, Snow Coll., 1981; BS, U. of Utah, 1986; MPA, Golden Gate U., 1989.
- Campbell, Lora Jean (1972) BS, Brigham Young U., 1969; MS, U. of Utah, 1972.
- Christiaens, Glenda (2000) BS, MS, U. of Utah, 1994, 1999.
- Cox, Amy (2001) BS, MS, Brigham Young U., 1997, 2000.
- Heaston, Sondra (2005) AD, BS, Weber State U., 1987, 1989; MS, Brigham Young U., 2005.
- Himes, Deborah (2005) BS, Brigham Young U., 1991; MS, U. of Utah, 1996.
- Hubert, Peggy (2004) AD, BS, MS, Brigham Young U., 1983, 1999, 2001.
- Palmer, Sheri (2001) BS, Brigham Young U., 1985; MS, Idaho State U., 1990.
- Reed, Shelly (2005) BS, Brigham Young U., 1984; MSN, U. of Utah, 1992.
- Ulberg, Ronald (2005) AD, Weber State U., 1989; BS, U. of Phoenix, 1992; MN, U. of Phoenix, 2000.
- Instructors**
- Birkhead, Ana (2004) BS, MS, U. of Phoenix, 1997, 1999.
- Carlton, Troy (2000) AS, Weber State U., 1982; BS, U. of Utah, 1987; MS, Brigham Young U., 1996.
- Freeborn, Donna (1999) AS, Brigham Young U., 1974; BS, Chapman U., 1983; MS, U. of California, Los Angeles, 1994.
- Heise, Barbara (2005) AS, BS, Missouri Southern State Coll., 1983, 1986; MS, State U. of New York, 1989.
- Kohl, James (2005) BSN, U. of San Diego, 1989; MS, U. of Maryland, Baltimore, 1996.
- Luthy, Karleen (2005) ADN, Utah Valley State Coll., 2000; BS, MS, Brigham Young U., 2003, 2005.
- Maughan, Erin (2004) BS, Brigham Young U., 1995; MS, U. of Utah, 2000.
- Emeriti**
- Alley, Laura Ellen (1972) BS, MS, U. of Utah, 1966, 1968.
- Andersen, Rayola H. (1971) AD, BS, MS, U. of Utah, 1948, 1949, 1969; MN, Brigham Young U., 1979.
- Bartholomew, Jewel A. (1970) BS, Brigham Young U., 1969, MS, U. of Utah, 1976.
- Bearnson, Carolyn Sutherland (1997) BA, BS, Brigham Young U., 1969; MS, U. of Utah, 1996.
- Chaffin, Beverly H. (1976) BS, MS, U. of Utah, 1965, 1969.
- Cope, Maxine J. (1970) BS, MS, EdD, U. of Utah, 1948, 1957, 1967.
- Drake, Richard (1970) BS, Idaho State U., 1965; MS, Wayne State U., 1966; EdD, Brigham Young U., 1992.
- Dyer, Elaine D. (1975) BS, St. Mary Coll., 1946; MS, PhD, U. of Utah, 1955, 1967.
- Fosbinder, Donna (1991) BS, San Diego State U., 1983; MS, U. of San Diego, 1986; PhD, U. of San Diego, 1990.
- Hammond, Kathleen B. (1964) BS, Brigham Young U., 1960; MS, U. of Utah, 1964.
- Hammond, Marilyn (1985) BS, MS, U. of Utah, 1953, 1969.
- Isaacs, Patricia C. (1977) BS, MS, U. of Utah, 1975, 1977; EdD, Brigham Young U., 1988.
- Jensen, Marian (1970) BS, MS, U. of Utah, 1960, 1968; MS, EdD, Brigham Young U., 1979, 1992.
- Jorgensen, Evelyn P. (1977) BS, MS, U. of Utah, 1947, 1975.
- Leifson, June (1971) BS, Brigham Young U., 1957; MS, Wayne State U., 1964; PhD, Brigham Young U., 1979.
- Mangum, Sandra (1983) BS, BA, Brigham Young U., 1958, 1959; MN, U. of Washington, 1962.
- Murphy, Elaine (1967) BS, MS, U. of Utah, 1959, 1963.
- Riddle, Lana (1971) BS, Brigham Young U., 1969; MS, U. of Utah, 1971; PhD, Texas Women's U., 1984.
- Schmidt, Alice M. (1965) BS, U. of Iowa, 1947; MS, EdD, Brigham Young U., 1964, 1977.
- Talmage, Carol (1985) BS, MS, Brigham Young U., 1950, 1984.
- Tiedeman, Mary E. (1996) BS, Michigan State U., 1964; MN, U. of Florida, 1975; PhD, Wayne State U., 1988.
- Wiker, Kathleen M. (1972) BS, MS, U. of Utah, 1965, 1969.
- Wilson, Mary Louise (1979) BS, U. of Utah, 1953; MPH, U. of California, Berkeley, 1966; MS, U. of California, San Francisco, 1978.

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## Nutrition, Dietetics, and Food Science

Lynn V. Ogden, Chair  
S-221 ESC, (801) 422-3912

College of Biology and Agriculture Advisement Center  
380 WIDB, (801) 422-3042

### Admission to Degree Program

Some degree programs in the Department of Nutrition, Dietetics, and Food Science carry special enrollment limitations. Please see the department for specific details.

### Graduation Requirements

To receive a BYU bachelor's degree a student must complete, in addition to all requirements for a specific major, the following university requirements:

- The university core, consisting of requirements in general and religious education (See the University Core section of this catalog for details. For a complete listing of courses that meet university core requirements, see the current class schedule.)
- A minimum of 30 credit hours in residence
- A minimum of 120 credit hours
- A cumulative GPA of at least 2.0

### Undergraduate Programs and Degrees

BS	Dietetics
BS	Food Industry Management
BS	Food Science
BS	Nutritional Science
Minors	Food Science
	Nutrition

Students should see their college advisement center for help or information concerning the undergraduate programs.

**Note:** For the molecular biology program, see the Microbiology and Molecular Biology section of this catalog.

### Graduate Programs and Degrees

MS	Food Science
MS	Nutritional Science

For more information see the BYU 2006–2007 Graduate Catalog.

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### BS Dietetics (78 hours\*)

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*This is a limited-enrollment program requiring departmental admissions approval. Please see below for information regarding requirements for admission to this major.*

Following prerequisite courses, the Didactic Program in Dietetics (DPD) consists primarily of dietetics course work at the junior and senior level. The Brigham Young University Didactic Program in Dietetics is currently granted accreditation status by the Commission on Accreditation for Dietetics Education of the American Dietetic Association, 120 South Riverside Plaza, Suite 2000, Chicago, IL 60606-6995, (312) 899-4876. Following graduation, students must gain acceptance into and complete a dietetic internship (DI) to qualify for the national examination required for Registered Dietitian (RD) status.

#### Program Acceptance Requirements

1. Students must apply by February 15th for admission into the professional sequence in the fall.
2. Enrollment is limited to 40 students.
3. Four of the following six courses must be completed at the time of application: NDFS 100, 200, 290; PDBio 305; Chem 152, 181.

4. Major GPA and performance in nutrition, dietetics, and food science courses will be considered. Successful applicants typically have a major GPA greater than 3.0 and nutrition, dietetics, and food science course grades greater than B-.
5. Applicants need at least 300 hours of dietetics-related work and/or volunteer experience.

#### Major Requirements

1. Complete the following prerequisite courses (must be completed before professional sequence):  
NDFS 100, 200, 250, 251, 290.
2. Complete the following:  
Chem 152, 281.  
**Note:** Chem 105, 106, 107, 351, 352, 481 are optional and recommended for those planning to attend medical or dental schools.
3. Complete one course from the following:  
Chem 103  
MMBio 222.
4. Complete the following:  
Acc 200.  
MMBio 221.  
PDBio 220, 305.  
Psych 111.  
Stat 221.
5. Be admitted to the dietetics professional program.
6. Complete the following professional sequence courses (after being admitted into the program):  
NDFS 300, 356, 374, 375, 400, 401, 405, 424, 435, 440, 445, 458, 466, 475, 490, 491.  
PDBio 365.

#### Recommended Courses

Bus M 300, 340.  
I Sys 100, 101.  
NDFS 310, 361, 380.

#### Recommended Minors

The following minors are very complementary to a dietetics major, but any area of interest could be considered:

Business  
Communication  
Gerontology (See School of Family Life).  
International Development  
Spanish

\*Hours include courses that may fulfill university core requirements.

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### BS Food Industry Management (63 hours\*)

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#### The Discipline

There is an increasing demand for students graduating with a background in both food science and business. The multibillion dollar food industry continues to expand, both domestically and internationally, as a growing percentage of the population depends on food produced and preserved by that industry. Students wishing to focus on the industry's business aspects will find this emphasis to be excellent preparation for immediate employment as well as a stepping stone to a master of business administration (MBA) degree. With the addition of one course, students graduating with this degree can obtain a business minor in management. (Those wishing to pursue advanced degrees other than the MBA degree or other professional programs should visit with an advisor before selecting this emphasis.)

Valuable experience is gained through numerous opportunities available in the program, including a required internship in the food industry. Students develop a network of

professional contacts through participation in the Food Science Club, professional organizations, and national competitions. Scholarships are available from department, college, university, and professional organizations.

### Career Opportunities

Graduates are prepared for employment in commercial and private food companies ranging from small entrepreneurial businesses to large corporations. Opportunities for business-oriented careers abound in such areas as food production management, food company management, food ingredient technical sales, and other management opportunities that require an understanding of technical and scientific issues.

### Major Requirements

1. Consult with a faculty advisor prior to finalizing your curriculum plan.
2. Complete the following:  
NDFS 100, 191, 250, 251, 350, 355, 361, 362, 462.
3. Complete at least 1 hour of the following:  
NDFS 399R.
4. Complete the following:  
Acc 200.  
Bus M 300, 488, 489.  
Chem 105, 152.  
Econ 110, 210.  
MMBio 221, 222.  
Org B 320.  
Phscs 105.  
Stat 221.
5. Complete one course from the following:  
Bus M 371R, 380, 382.

### Recommended Courses

Consult with a faculty advisor before selecting:

Chem 281.  
Engl 316 or M Com 320.  
IAS 220.  
Math 119.  
Mfg 201, 202, 479.  
NDFS 200, 450, 464, 465.  
PAS 100.  
Phscs 106.  
TMA 150.

\*Hours include courses that may fulfill university core requirements.

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## BS Food Science (63 hours\*)

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### The Discipline

Food science is the multidisciplinary study of food and the application of knowledge thus gained to developing food products and processes, preserving and storing food, and assuring food safety and quality. Food science addresses the conversion of raw agricultural products into a nutritious, convenient, and economical food supply. Most of the food products available in grocery stores were developed and tested by food scientists. Approved by the Institute of Food Technologists, the principal professional organization of food scientists, the curriculum provides excellent preparation as a premedical, predoctoral, or other preprofessional major. With the addition of one course, students graduating with this degree are able to obtain a minor in chemistry.

Valuable experience is gained through numerous opportunities available in the program, including faculty-mentored research, employment within the department, and paid food industry internships. Students also develop a network of professional contacts through participation in the Food Science

Club, professional organizations, and national competitions. Scholarships are available from department, college, university, and professional organizations.

### Career Opportunities

Exciting careers are found in such areas as developing new foods, ensuring food safety and quality, or researching ways to better preserve and store food. Salaries are highly competitive. Typically there are not enough graduates for the unique and challenging opportunities available in the worldwide, multibillion dollar food industry. The many facets of food science provide employment in large and small food companies, food ingredient companies, government agencies, and universities. Graduates are prepared for immediate employment, further study toward advanced degrees, or professional programs such as medicine, dentistry, pharmacy, law, and business.

### Major Requirements

1. Consult with a faculty advisor prior to finalizing your curriculum plan.
2. Complete the following core requirements:  
NDFS 200, 250, 251, 350, 355, 361, 362, 450, 462, 464, 465.
3. Complete 10 hours from the following:  
Chem 105, 106, 107, 152, 351, 352, 353.  
**Note:** Students interested in graduate or professional study should select the Chem 105, 106, 107, 351, 352, 353, 481 sequence.
4. Complete one course from the following:  
Math 112, 113, 119.
5. Complete one course from the following:  
Chem 281, 481.
6. Complete the following:  
MMBio 221, 222.  
Phscs 105, 106.  
Stat 221.  
TMA 150.

7. During the junior year or upon declaring food science as a major, students are strongly encouraged to select one of the following options to enhance career preparation:
  - a. Choose a research topic and faculty mentor. Working in a research laboratory for 10–20 hours per week over the course of eight months, the student has daily contact with graduate students, technicians, and fellow undergraduate colleagues and frequent interactions with a faculty mentor. Student research often leads to participation in a publication and/or a presentation at a professional meeting. NDFS 494R credit is available.
  - b. Produce a senior thesis in collaboration with a faculty mentor, derived primarily from library study that extensively explores the relevant questions. The thesis is written in the format of a scientific review paper. NDFS 494R credit is available.
  - c. Work in an approved, faculty-supervised summer internship with a food company (generally the internship does not include study abroad.) NDFS 399R credit is available.

### Recommended Courses

Consult with a faculty advisor before selecting:

Chem 223.  
Econ 110.  
Engl 316.  
IAS 220.  
Mfg 201, 202, 355.  
NDFS 100, 191, 203.  
PAS 100.  
Phscs 107, 108.

\*Hours include courses that may fulfill university core requirements.

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## BS Nutritional Science (61 hours\*)

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This degree provides excellent preparation for those individuals in preprofessional programs (e.g., premedicine, predentistry, prelaw) or for an advanced degree (MS, PhD) in nutrition or biological sciences.

### Major Requirements

1. Complete the following core requirements:  
NDFS 100, 200, 305, 435, 494R (2 hours).
2. After consulting with a faculty advisor, complete 8 hours from the following:  
Biol 240, 241, 340, 360.  
NDFS 250, 251, 310, 380, 400, 424.
3. Complete the following:  
Biol 120, 220.  
Chem 105, 106, 107, 351, 352, 353 (1 hour), 481.  
PDBio 305.  
Phscs 105, 106, 107, 108.  
Stat 221.

### Recommended Courses

Chem 223.  
Hlth 478.  
MMBio 221.

\*Hours include courses that may fulfill university core requirements.

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## Minor Food Science (16 hours)

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Many of these courses have prerequisites. Most students choosing this minor will have completed the prerequisites as part of their major. Other students will need to complete them.

### Minor Requirements

1. Complete the following:  
NDFS 250, 251.
2. After consulting with a faculty advisor, complete 12 hours from the following:  
NDFS 350, 355, 361, 362, 450, 462, 464.

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## Minor Nutrition (16 hours)

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Many of these courses have prerequisites. Most students choosing this minor will have completed the prerequisites as part of their major. Other students will need to complete them.

### Minor Requirements

1. Complete the following:  
NDFS 100, 200.
2. After consulting with a faculty advisor, complete 10 hours from the following:  
NDFS 201, 305, 310, 380, 400, 424, 435.

## Nutrition, Dietetics, and Food Science (NDFS)

### Undergraduate Courses

**100. Essentials of Human Nutrition.** (3:3:0) F, W; Alt. Sp, Su term  
Food-oriented study of nutrition facts and principles as a basis for dietary choices; consequences of choices; scientifically examining controversial topics.

**191. Introduction to Food Science.** (1:1:0) F, W  
Guest lectures and exposure to vocations in food science.

**200. Nutrient Metabolism.** (3:3:0) F, Sp Prerequisite: NDFS 100 and organic chemistry, or concurrent enrollment.

Chemical structures of nutrients; their food sources, requirements, digestion, absorption, transport, metabolism, functions, storage, and excretion; metabolic consequences of nutrient deficiencies, interactions, imbalances, and toxicities.

**201. Nutrition and Prevention of Chronic Disease.** (2:2:0) W  
Prerequisite: NDFS 100.

Role of dietary choices in preventing or ameliorating chronic diseases. Examples of dietary interventions.

**203. (NDFS-PAS) International Agriculture and Nutrition.** (2:2:0) W

Causes of malnutrition and agricultural solutions.

**250. Essentials of Food Science.** (3:3:0) F, W, Sp Prerequisite: organic chemistry or concurrent enrollment; and concurrent enrollment in NDFS 251.

Overview of food science, including chemical, physical, and microbiological principles related to food processing, storage, and utilization. Current issues in food science.

**251. Essentials of Food Science Laboratory.** (1:0:3) F, W, Sp  
Prerequisite: concurrent enrollment in NDFS 250.

Laboratory experience in the chemistry of changes occurring during food processing, storage, and utilization.

**290. Introduction to Dietetics.** (1:1:0) F

The profession of dietetics; exposure to specialty areas through guest lectures.

**292R. Fieldwork in Dietetics.** (0.5–2:Arr.:Arr. ea.) F, W, Sp, Su  
Prerequisite: instructor's consent.

Fieldwork for international students.

**300. Clinical Nutrition 1.** (4:4:0) F Prerequisite: NDFS 200; physiology, biochemistry; dietetics major status.

Nutritional assessment and medical nutrition therapy across disease states.

**305. Nutritional Implications of Disease.** (4:4:0) For nutritional science majors. W odd yr. Prerequisite: NDFS 200; PDBio 305; Chem 281 or 481 or equivalent; or instructor's consent.

Nutritional assessment and medical nutrition therapy across disease states.

**310. Sports Nutrition.** (2:2:0) F, Sp Prerequisite: NDFS 100, PDBio 305.

Scientific basis for the role of nutrition in human performance. Critical evaluation of popular practices; making optimal food choices for physical activity.

**330. Comparative Animal Nutrition.** (3:3:0) W

Comparative digestion, absorption, and utilization of nutrients and nutritional applications of domestic, pet, and wildlife species.

**350. Food Analysis.** (4:3:3) W Prerequisite: Chem 351, 352, 353; NDFS 250, 251.

Principles, methods, and techniques of qualitative and quantitative physical, chemical, and biological analysis of food and food ingredients.

**355. Food Process Engineering.** (4:3:3) W Prerequisite: Phscs 105 and calculus.

Mass and energy balances, thermodynamics, fluid flow, heat and mass transfer; unit operations in food processing, including thermal processing, frying, irradiation, refrigeration, freezing, and dehydration.

**356. Clinical Nutrition 2.** (3:3:0) W Prerequisite: NDFS 300.

Medical nutrition therapy across disease states; continuation of NDFS 300.

**361. Food Microbiology.** (3:2:3) F Prerequisite: MMBio 221, 222; or equivalents.

Pathogenic and spoilage microorganisms in foods and their control. Beneficial microorganisms in food systems. Influence of the food system on growth and survival of microorganisms.

**362. Food Commodity Processing.** (3:2:3) F Prerequisite: Phcs 105, MMBio 221, 222, Chem 106, 107.

Characteristics of raw food material; principles of food preservation and food processing techniques; packaging materials and methods; sanitation and water and waste management.

**374. Food Production Management.** (2:2:0) F Prerequisite: NDFS 200, 250, 251.

Managing processes and techniques of quantity food production in commercial and institutional food systems.

**375. Food Production Management Laboratory.** (2:0:8) F, W Prerequisite: NDFS 374 or concurrent enrollment.

**380. International Nutrition and Health.** (3:3:0) W even yr. Prerequisite: NDFS 200 or instructor's consent.

Causes and consequences of nutrient deficiencies common in developing countries. Appropriate interventions to prevent or treat malnutrition.

**390R. Special Topics in Food Science and Nutrition.** (1–3:Arr.:0 ea.)

Topics vary.

**399R. Academic Internship.** (1–9:Arr.:Arr. ea.) F, W, Sp, Su Prerequisite: instructor's consent.

Off-campus work experience sponsored by industrial, government, or academic institutions.

**400. Community Nutrition.** (3:3:4) F Prerequisite: dietetics major or NDFS 200 or 201.

Public health nutrition applied to community programs.

**401. Community Nutrition Fieldwork.** (0.5:0:2) F Prerequisite: NDFS 300, concurrent enrollment in NDFS 400, and dietetic major status.

Experience in public health and community nutrition programs.

**405. Nutrition Assessment Lab.** (0.5:0:3) F on blk. Prerequisite: NDFS 300, 356.

Developing skill in anthropometric, biochemical, clinical, and dietary parameters of nutritional assessment.

**424. Nutrition Through the Life Cycle.** (2:2:0) W Prerequisite: NDFS 300 or 305 or instructor's consent.

Dietary recommendations for pregnancy and lactation; infant feeding; nutritional requirements, diet, and health concerns of preschoolers, school-age children, adolescents, and the elderly.

**435. Nutritional Biochemistry.** (4:4:0) F, W Prerequisite: NDFS 200; PDBio 305; biochemistry or equivalent.

Metabolic interrelationships among nutrients.

**440. Teaching Methods in Dietetics.** (3:3:0) F

Learning settings, learning theory; curriculum development and dissemination for dietetics majors.

**445. Food Service Systems.** (3:3:0) W Prerequisite: NDFS 374.

Input, transformation, and output in the food service system; emphasizes procurement, production, service, and sanitation.

**450. Food Chemistry.** (3:3:0) F Prerequisite: NDFS 250, 251.

Structure and properties of food components, including water, carbohydrates, protein, lipids, other nutrients, and food additives. Chemistry of changes occurring during processing, storage, and utilization.

**458. Management in Dietetics.** (3:3:0) F Prerequisite: NDFS 445.

Management cycle and theory applied to clinical and administrative dietetics.

**462. Food Regulations and Quality Assurance.** (2:2:0) F Prerequisite: Stat 221, NDFS 250, 251.

Federal and international food regulations and methods of assuring food quality.

**464. Food Sensory Evaluation.** (1:0:3) W Prerequisite: NDFS 200, 350, 355, 361, 362, 450, 462, or concurrent enrollment; concurrent enrollment in NDFS 465.

Analytical and affective methods of assessing sensory properties of food using statistical methods. Laboratory experience in sensory research and techniques. Integrative capstone course.

**465. Food Product Development.** (3:1:6) W Prerequisite:

NDFS 200, 350, 355, 361, 362, 450, 462, or concurrent enrollment; concurrent enrollment in NDFS 464.

Integration and application of food science principles to develop new food products. Laboratory experience in food product design and development. Integrative capstone course.

**466. Advanced Dietetics Practice.** (3:3:0) W Prerequisite: NDFS 356, 445.

Skill development in specialized topics of medical nutrition therapy and administrative dietetics.

**475. Research Methods in Dietetics.** (2:2:0) W Prerequisite: concurrent enrollment in NDFS 466.

Research techniques in a variety of dietetics practice areas.

**490. Professionalism Seminar.** (2:2:0) W Prerequisite: senior status in dietetics program.

Issues in professional practice.

**491. Internship Preparation.** (1:1:0) F Prerequisite: senior status in dietetics program.

Selecting internship sites and preparing dietetic internship application packet.

**492. Fieldwork in Nutrition, Dietetics, or Food Science.** (1–8:0:24) Sp, Su Prerequisite: 12–15 credit hours in nutrition, dietetics, and food science; instructor's consent.

**494R. Undergraduate Research in Nutrition, Dietetics, or Food Science.** (1–3:0:9 ea.) F, W Prerequisite: instructor's and department chair's consent; 14 hours of nutrition, dietetics, and food science courses.

Mentored research experience or library thesis.

## 500-Level Graduate Course (available to advanced undergraduates)

**520R. Supervised Practice Experience.** (2–4:Arr.:Arr. ea.) F, W, Sp Prerequisite: acceptance into dietetic internship.

Supervised practice experience in clinical, management, and community dietetics settings.

## Graduate Courses

For 600- and 700-level courses, see the BYU 2006–2007 Graduate Catalog.

## Nutrition, Dietetics, and Food Science Faculty

### Professors

Brown, Rodney J. (2005) BS, Brigham Young U., 1972; MS, Utah State U., 1977; PhD, North Carolina State U., 1978.

Christensen, Merrill J. (1982) BS, Brigham Young U., 1977; PhD, Massachusetts Inst. of Technology, 1982.

Johnston, N. Paul (1971) BA, Brigham Young U., 1966; MS, Oregon State U., 1967; MBA, U. of Utah, 1969; PhD, Oregon State U., 1971.

Pike, Oscar A. (1986) BS, MS, Brigham Young U., 1980, 1982; PhD, Purdue U., 1986.

Rowe, Mark J. (1987) BS, PhD, Brigham Young U., 1968, 1972.

### Associate Professors

Brown, Lora Beth (1983) BS, Iowa State U., 1965; MS, Cornell U., 1967; EdD, Brigham Young U., 1982.

Dunn, Michael L. (2003) BS, MS, Brigham Young U., 1987, 1989; PhD, Cornell U., 1996.

Franz, Kay B. (1968) BS, U. of California, Berkeley, 1958; MS, Brigham Young U., 1968; PhD, U. of California, Berkeley, 1978.

Nyland, Nora K. (1982) BS, MS, Brigham Young U., 1974, 1981; PhD, Kansas State U., 1989.

Ogden, Lynn V. (1984) BA, MS, Utah State U., 1966, 1967; PhD, U. of Minnesota, 1973.

### Associate Teaching Professors

Fullmer, Susan (1997) BA, MS, U. of Utah, 1986, 1989; PhD, Brigham Young U., 2004.

McGuire, Diana L. (1988) BS, MS, Brigham Young U., 1974, 1976.

## Philosophy

### Assistant Professors

Campbell, Alison K. (2002) BS, MS, Utah State U., 1993, 1996; PhD, U. of California, Davis, 2003.  
Davidson, Robert T. (2003) BS, MS, Utah State U., 1992, 1994; PhD, U. of Wisconsin, Madison, 1998.  
Steele, Frost M. (1996) BS, MS, Brigham Young U., 1985, 1987; PhD, Purdue U., 1990.

### Part-Time Instructor

Duncan, Julie A. (1999) BS, Brigham Young U., 1993; MPH, U. of Utah, 1998.

### Part-Time Associate Lecturer

Mitchell, Ana W. (1996) BS, MS, Brigham Young U., 1993, 1996.

### Scientist

Hawkins, Ernest W. (1976) BS, MS, Brigham Young U., 1978, 1984; PhD, U. of Wyoming, 1988.

### Adjunct Faculty

Austin, Bishop, Eliason, Heald, Heap, McClellan, Metos, Nielsen, Radford, Robson, Scott, Ware.

### Emeriti

Bates, Winifred W. (1977) BS, Utah State U., 1944; MJ, U. of California, Berkeley, 1965.  
Hill, John M. (1971) BA, PhD, Rice U., 1961, 1965.  
Huber, Clayton S. (1976) BS, MS, Utah State U., 1962, 1963; PhD, Purdue U., 1968.  
Johnson, John Hal (1969) BS, MS, Brigham Young U., 1955, 1957; PhD, Ohio State U., 1963.  
Turner, Lavell G. W. (1963) BS, Brigham Young U., 1954; MS, U. of Wisconsin, Madison, 1959.

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## Philosophy

Dennis F. Rasmussen, Chair  
4086 JFSB, (801) 422-2721

College of Humanities Advisement Center  
1175 JFSB, (801) 422-4789

### Admission to Degree Program

All degree programs in the Department of Philosophy are open enrollment.

### The Discipline

From its first appearance in ancient Greece down to the present, philosophy has sought to understand the world and the place of human beings within it. As it frames ideas by means of which to clarify and explain experience, philosophy discloses its faith in the ultimate lucidity of things. Philosophy's respect for the authority of intelligence fosters a preference for persuasion that is fundamental to personal growth and democratic society.

Students who study philosophy will find that it not only provides insight into life's fundamental concerns, it also helps them develop their capacity for clear thinking and perceptive judgment. Such competence will serve them well as they pursue further education or begin their careers.

### Career Opportunities

Philosophy offers excellent career preparation, but not in the way that, say, accounting does. The value of a major in philosophy resides in the intellectual development it promotes. It lays a foundation on which more specialized study may build. In various standardized tests, philosophy majors tend to do extremely well on the verbal aptitude and on the analytic thinking sections. So philosophy can prepare a student for any type of work that requires highly developed reading and writing skills. Students who elect to major in philosophy should look beyond their bachelor's degree right from the start. For example, philosophy is an excellent background for the study of law or medicine. Those who intend to enter graduate school will need to start early on the foreign-language requirement.

### General Information

The Department of Philosophy strongly recommends that StDev 317, a 1-credit-hour course, be taken at the end of the sophomore year or the beginning of the junior year. Because liberal arts degrees provide preparation in a variety of useful fields rather than a single career track, this course is recommended to help liberal arts students focus on specific educational and occupational goals and to identify the career options or educational opportunities available to them. The course will introduce them to the resources needed for accessing information about graduate schools, internships, careers, and career development. Students will learn basic employment strategies, including the steps necessary for obtaining employment related to their own specialty.

### Graduation Requirements

To receive a BYU bachelor's degree a student must complete, in addition to all requirements for a specific major, the following university requirements:

- The university core, consisting of requirements in general and religious education (See the University Core section of this catalog for details. For a complete listing of courses that meet university core requirements, see the current class schedule.)
- A minimum of 30 credit hours in residence
- A minimum of 120 credit hours
- A cumulative GPA of at least 2.0

## Undergraduate Programs and Degrees

BA	Philosophy
Minors	Philosophy Logic

Students should see their college advisement center for help or information concerning the undergraduate programs.

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### BA Philosophy (42 hours\*)

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#### Major Requirements

1. Complete the following sources and methods courses:  
Phil 201, 202, 205, 300, 305.
2. Complete two of the following historical periods courses (should not be in the same period):  
Phil 320R, 330R, 340R, 350R.
3. Complete one of the following values and conduct courses:  
Phil 213, 214, 215, 218, 413, 414, 416.
4. Complete two of the following knowledge and reality courses:  
Phil 405, 415, 420, 421, 422, 423.
5. Complete 12 additional hours (excluding 499R). Students must have a total of 27 300-level or above hours (with no more than 3 hours of 449R).

\*Hours include courses that may fulfill university core requirements.

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### Minor Philosophy (18 hours\*)

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#### Minor Requirements

1. Complete the following:  
Phil 201, 202, 205.
2. Complete three other philosophy courses.

\*Hours include courses that may fulfill university core requirements.

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### Minor Logic (15 hours\*)

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#### Minor Requirements

1. Complete the following:  
Phil 205, 305, 405.
2. Complete two other approved courses.
3. No more than 9 hours may double-count for the philosophy major and the logic minor.

\*Hours include courses that may fulfill university core requirements.

## Philosophy (Phil)

### Undergraduate Courses

**110. Introduction to Philosophy.** (3:3:0) Honors also.  
Articulating, assessing, and defending fundamental positions on topics such as reason, knowledge, science, education, ethics, politics, and religion.

**150. Reasoning and Writing.** (3:3:0) F, W, Sp, Su Honors also.  
Informal grammar, logic, and rhetoric as tools for reading and writing. Library research. Recommended for philosophy majors and minors. Fulfills GE First-Year Writing requirement. No course challenges accepted.

**201. History of Philosophy 1.** (3:3:0) Honors also.

Western civilization from Greek antiquity to Renaissance, primarily from perspective of philosophy; exploring fundamental questions in human experience; examining formative events in history; understanding value of important texts.

**202. History of Philosophy 2.** (3:3:0) Honors also. Prerequisite: Phil 201.

Western civilization from Renaissance to present, primarily from perspective of philosophy; exploring fundamental questions in human experience; examining formative events in history; understanding value of important texts.

**205. Deductive Logic.** (3:3:0) F, W, Sp, Su

History and use of syllogistic and propositional logic; evaluating arguments with Venn diagrams, truth tables, and Copi-style proofs and proof strategies.

**210. Science and Civilization 1.** (3:3:0) Honors also.

History of Civilization from Greek antiquity to scientific revolution; methods in early science and their philosophical significance; exploring fundamental questions in human experience; examining formative events in history; understanding value of important texts.

**211. Science and Civilization 2.** (3:3:0) Honors also. Prerequisite: Phil 210.

History of Civilization from scientific revolution to present; concepts and methods in modern science and their philosophical significance; exploring fundamental questions in human experience; examining formative events in history; understanding value of important texts.

**213. Introduction to Ethics.** (3:3:0)

Nature and justification of moral standards, beliefs, and decisions.

**214. Introduction to the Philosophy of Art.** (3:3:0)

The experience of beauty in nature, in literature, and in the arts.

**215. Introduction to the Philosophy of Religion.** (3:3:0)

Existence and nature of God, God's foreknowledge and man's free will, faith, immortality, and religious experience and language.

**218. Science and Religion.** (3:3:0) Prerequisite: one philosophy course.

Epistemological and metaphysical similarities and differences undergirding historical problems in science and religion. Nature and effects of past reconciliations; possibility and desirability of current reconciliations.

**300. Philosophical Writing.** (3:3:0) F, W Honors also. Prerequisite: Phil 150, 205; or equivalents.

Writing philosophical papers about philosophical texts or problems. Research methods in philosophy. Library research paper. Fulfills GE Advanced Written and Oral Communication requirement. No course challenges accepted.

**305. Predicate Logic.** (3:3:0) W, Su Prerequisite: Phil 205.

History and use of predicate logic; evaluating arguments with counterexamples and proofs; informal mathematical proofs. Fulfills GE Language/Mathematics requirement.

**320R. Studies in Ancient Philosophy.** (3:3:0 ea.) Prerequisite: Phil 201.

Selected figures or topics.

**330R. Studies in Medieval Philosophy.** (3:3:0 ea.) Prerequisite: Phil 201.

Selected figures or topics.

**340R. Studies in Modern Philosophy.** (3:3:0 ea.) Prerequisite: Phil 202.

Selected figures or topics.

**350R. Studies in Contemporary Philosophy.** (3:3:0 ea.)

Prerequisite: one philosophy course.

Selected figures or topics.

## Philosophy

- 405. Metalogic.** (3:3:0) Alt. yr. Prerequisite: Phil 305.  
Completeness and undecidability of predicate logic; incompleteness of arithmetic and set theory; treatment of related philosophical topics and of nonclassical topics as time permits.
- 413. Ethics.** (3:3:0) Alt. yr. Prerequisite: one philosophy course.  
Selected figures or problems.
- 414. Philosophy of Art.** (3:3:0) Alt. yr. Prerequisite: one philosophy course.  
Selected figures or problems in aesthetics.
- 415. Philosophy of Religion.** (3:3:0) Alt. yr. Prerequisite: one philosophy course.  
Selected figures or problems.
- 416. Philosophy of Law.** (3:3:0) Prerequisite: one philosophy course.  
The relation between natural and enacted law; theories of punishment; utilitarian and nonutilitarian theories of law; liberty.
- 420. Philosophy of Language.** (3:3:0) Prerequisite: one philosophy course.  
Meaning and reference, synonymy, metaphor, exemplification, translation; linguistic, artistic, and perceptual symbol systems.
- 421. Metaphysics.** (3:3:0) Prerequisite: one philosophy course.  
Basic categories of being: appearance and reality, law, causality, space, time, eternity, deity.
- 422. Epistemology.** (3:3:0) Prerequisite: one philosophy course.  
Meaning, limits, and justification of knowledge.
- 423. (Phil 423–Phcs 314) History and Philosophy of Science.** (3:3:0) Honors also. Prerequisite: Phy S 100 or instructor's consent.  
Scientific explanation, concepts, and models. Philosophical assumptions and criteria for theory selection, as exemplified by historical development of basic ideas in science.
- 449R. Philosophical Lecture Series.** (1:1:0 ea.) F, W  
Lectures on philosophical topics by faculty and advanced students.
- 499R. Honors Thesis.** (1–6:Arr.:Arr. ea.) Prerequisite: instructor's consent.  
Selected topic or figure in philosophy.

### 500-Level Graduate Course (available to advanced undergraduates)

- 501R. Graduate Seminar.** (2–5:5:0 ea.) Prerequisite: instructor's consent.  
Selected topic, figure, or movement in philosophy, as announced in current class schedule.

## Philosophy Faculty

### Professors

- Carter, K. Codell (1973) BS, MA, U. of Utah, 1963, 1964; PhD, Cornell U., 1968.
- Faulconer, James E. (1981) BA, Brigham Young U., 1972; MA, PhD, Pennsylvania State U., 1975, 1977.
- Graham, Daniel W. (1986) AB, Davidson Coll., 1970; MA, Brigham Young U., 1975; PhD, U. of Texas, Austin, 1980.
- Packard, Dennis Jay (1974) AA, Miracosta Coll., 1966; BA, PhD, Stanford U., 1968, 1974.
- Paulsen, David L. (1973) BS, Brigham Young U., 1961; JD, U. of Chicago, 1964; PhD, U. of Michigan, 1975.
- Rasmussen, Dennis F. (1970) BS, U. of Utah, 1966; MPhil, PhD, Yale U., 1968, 1970.
- Warner, C. Terry (1967) BA, Brigham Young U., 1963; MA, PhD, Yale U., 1965, 1967.

### Associate Professors

- Anderson, Travis T. (1991) BFA, BA, Brigham Young U., 1985, 1985; MA, PhD, U. of Loyola, Chicago, 1989, 1991.
- Grandy, David A. (1999) BS, Brigham Young U., 1973; MA, PhD, Indiana U., 1990, 1994.

- Siebach, James L. (1994) BA, Brigham Young U., 1982; PhD, U. of Texas, 1994.
- Wrathall, Mark A. (1996) BA, Brigham Young U., 1988; MA, Boston Coll., 1991; JD, Harvard U., 1991; PhD, U. of California, Berkeley, 1996.

### Assistant Professors

- Hedengren, Paul C. (1981) BA, MA, Brown U., 1971, 1973; PhD, U. of Toronto, Canada, 1983.
- Jensen, David A. (2004) BA, Brigham Young U., 1996; MA, PhD, U. of California, Los Angeles, 1998, 2005.

### Emeriti

- Madsen, Truman G. (1957) BS, MS, U. of Utah, 1951, 1952; MA, PhD, Harvard U., 1957, 1960.
- Nielsen, Fred Kent (1956) BA, MA, Harvard U., 1954, 1955.
- Riddle, Chauncey C. (1952) BS, Brigham Young U., 1947; MA, PhD, Columbia U., 1951, 1958.
- Yarn, David H. (1950) BA, Brigham Young U., 1946; MA, EdD, Columbia U., 1949, 1958.

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## Physical Education

See Exercise Sciences.

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## Physical Science

J. Ward Moody, Coordinator  
N-484 ESC, (801) 422-4347

College of Physical and Mathematical Sciences Advisement  
Center  
N-179 ESC, (801) 422-6270

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### BS Teaching Physical Science (77.5–78.5 hours\*, including licensure hours)

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#### Major Requirements

1. Complete the following:
  - Biol 100.
  - Chem 105, 106, 107, 223, 351, 501.
  - Geol 111, 112, 210.
  - Phil 423.
  - Phscs 105, 106, 107, 108, 127, 137.
2. Complete one course from the following:
  - Geol 286, 351, 370, 480.
3. Declare major status by application available online at the Teacher Education Department Web site (<http://education.byu.edu/ted/pdf/physicalscience.pdf>) by January 15 for Fall semester and September 15 for Winter semester.
4. Students must maintain a GPA of 2.85. A grade lower than a C– will not be accepted in any of the professional education courses.
5. Complete the Professional Education Component:
  - a. Complete the following:
    - CPSE 402.
    - IP&T 286.
    - Sc Ed 276R (4 hours), 350, 353, 377R, 378, 379.
  - b. Complete 12 hours from one of the following:
    - Sc Ed 476R or 496R.

\*Hours include courses that may fulfill university core requirements.

## Physical Science (Phy S)

### Undergraduate Courses

**100. Physical Science.** (3:3:0) F, W, Sp, Su Honors also.

Conceptual lectures and demonstrations of the most significant and universal laws and models describing the physical world by faculty from the Physics and Astronomy, Chemistry and Biochemistry, and Geological Sciences departments. Satisfies GE Physical Science requirement.

**110A. Physical Science A.** (4:3:2) For majors in elementary, early childhood, or special education. F, W, Sp

Classical and modern physics and chemistry as they relate to current concepts of the physical world. Lab exercises illustrate many topics with concrete examples. With Phy S 110B satisfies GE Physical Science requirement.

**110B. Physical Science B.** (2:2:1) For majors in elementary, early childhood, or special education. F, W, Su

Concepts and methods used in geology to interpret rock record, protect and make use of earth materials, and better understand natural environment and how to live in it. Lab studies, field trips, home projects. With Phy S 110A satisfies GE Physical Science requirement.

**111A. Physical Science A Laboratory.** (1:0:2) F, W, Sp Prerequisite: Phy S 100; for majors in elementary, early childhood, or special education.

Laboratory exercises that illustrate physics and chemistry principles. To accompany or follow Phy S 100 lecture course. Not for students enrolled in Phy S 110A or 110B.

**111B. Physical Science B Laboratory.** (1:0:2) F, W, Su Prerequisite: Phy S 100; for majors in elementary, early childhood, or special education.

Laboratory exercises that illustrate geology principles. To accompany or follow Phy S 100 lecture course. Not for students enrolled in Phy S 110A or 110B.