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## DEPARTMENT OF PHYSIOLOGY AND HEALTH

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### FACULTY

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- Robert Schneider, M.D., FACC, FABMR, Dean of the College of Maharishi College of Perfect Health, Professor of Physiology and Health, Director of the Institute for Natural Medicine and Prevention
- Robert Keith Wallace, Ph.D., Chairman, Professor of Physiology, Director of Research, Founding President of Maharishi University of Management. Trustee
- Paul Morehead, Ph.D., DWP, Assistant Professor of Physiology and Health, Associate Chairman, Department of Physiology and Health, Associate Dean of the Maharishi College of Perfect Health
- Sanford I. Nidich, Ed.D., Professor of Physiology and Health and Education, Associate Director of the Institute for Natural Medicine and Prevention
- Richard Averbach, M.D., Adjunct Professor of Physiology and Health
- Frederick Travis, Ph.D., Dean of the Graduate School, Chairman of the Department of Maharishi Vedic Science, Professor of Maharishi Vedic Science
- Nancy Lonsdorf, M.D., Adjunct Professor of Research
- Maxwell Rainforth, Ph.D., Assistant Professor of Physiology and Health and Statistics
- John Salerno, Ph.D., Assistant Research Professor, Assistant Director of the Institute for Natural Medicine and Prevention
- Hari Sharma, M.D., Clinical Professor of Physiology and Health
- Stuart Rothenberg, M.D., Clinical Associate Professor of Physiology and Health
- Veronica Butler, M.D., Clinical Associate Professor of Physiology and Health
- David Lovell-Smith, MBChB, M.S., Adjunct Instructor of Physiology and Health
- Helen Nelson, Ph.D., Adjunct Professor of Physics

### INTRODUCTION

The mission of the undergraduate major in Physiology and Health is to create graduates who understand the scientific foundation of holistic health, both from the latest knowledge of modern science and from ancient Vedic science. Not only will students be exposed to the scientific principles of health from physics, chemistry, biology, anatomy and physiology, but also they will understand the essential role of consciousness — the inner Intelligence of the body — in promoting health and longevity. Graduates of the Pre-Medicine track in Physiology and Health will be well prepared to apply to any medical school.

Maharishi Ayurveda® is Maharishi Mahesh Yogi's revival of the world's most ancient system of health from the Vedic tradition. Students will understand that consciousness is the field of perfect balance and can be located at the source of thought through the Transcendental Meditation technique. The repeated enlivenment of that field of balanced intelligence enlivens balance in every cell, tissue, and organ in the physiology. Students will understand and experience that this enlivenment of the inner intelligence results from developing the latent potential of the brain. The experience of pure consciousness during Transcendental Meditation has been scientifically demonstrated to increase EEG coherence, or order, in all parts of the brain. As a result the orderly functioning of the brain gives rise to increased intelligence, memory, problem-solving ability, and balanced autonomic functioning. As a further result, deep rest dissolves physiological, psychological and emotional stress, which is at the basis of many diseases.

The students will find that increased orderliness of the central nervous system and reduced stress enhances the balanced functioning of the autonomic nervous system, the endocrine and hormonal systems, and results in overall balance and vitality in the physiology. They will find that Maharishi Ayurveda is prevention-oriented, natural, and free from the harmful side effects of modern, chemical-based medicine.

A strong foundation in the basic sciences will give a strong foundation for understanding the scientific nature and application of Maharishi Ayurveda. Over 650 research studies conducted all over the world since the late 1960s have confirmed that this knowledge of natural health care is consistently effective in improving all areas of health: physical, mental, behavioral, and environmental.

## SPECIAL FEATURES

### **Pre-Medicine Program**

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Students in the Pre-Med bachelor's degree will study all of the traditional scientific disciplines necessary to enter medical school, including physics, general and organic chemistry, biochemistry, biology, anatomy and physiology. The focus of this study will be the knowledge and application of the sciences that are relevant for a health care professional. The course sequence will lead to a foundational understanding of human biology, human anatomy and physiology and organic and biochemistry that will be applied in health care practice. Students will be prepared to perform well on the Medical College Admission Test (MCAT), which is required by all medical schools: osteopathic, naturopathic, chiropractic and allopathic.

Students in the B.A. in Physiology and Health will gain a foundational overview of biology and physiology, as well as an introduction to Maharishi Ayurveda in the Self-Pulse, Yoga Asana, and Diet, Digestion and Nutrition Courses. They will also enjoy a

flexible, liberal arts based program, in which they may choose from a wide variety of courses from Sustainable Living, the sciences, or Maharishi Vedic Science.

We offer an introduction to uniquely effective knowledge for prevention of disease. This comprehensive range of knowledge, not available in any other system of health education, includes:

- Study of the precise relationship between the structures and functions of human physiology, and the fundamental structures of Natural Law contained in Veda and the Vedic Literature — and the application of this knowledge to maintain health;
- Maharishi Self-Pulse diagnosis — to detect balance and imbalance in the body by feeling the pulse and restoring balance before disease arises, through diet, daily and seasonal routines, and herbal preparations;
- The Transcendental Meditation and TM-Sidhi programs, including Yogic Flying — to give direct experience of the total field of intelligence and to promote deep rest, release of stress, and integrated functioning of body and mind; and
- Practice of this technology in large groups to purify collective consciousness and to bring life into harmony with Natural Law, the basis of perfect health for society.
- Several courses in the Physiology and Health program include Sanskrit. Students are sequentially introduced to proper pronunciation and reading of classical Sanskrit, the language of the Vedic Literature. After gaining the ability to read Devanagari text, students conduct research in the Vedic Literature by reading Sanskrit texts, such as the Bhagavad-Gita. Students study the role of Sanskrit as the language of Nature. Reading the Vedic Literature enlivens Natural Law in the brain and whole physiology of the student, thereby enlivening the basis of health from within.

### **Conclusion**

The Bachelor's Degree in Physiology and Health aims to prepare students to care for their own health through regular practice of Maharishi's Transcendental Meditation program, ideal daily and seasonal routine, balanced diet and lifestyle choices, and mutually enriching social behavior. This degree program further aims to build a strong scientific understanding of health from the modern and Vedic perspectives.

## DEPARTMENTAL REQUIREMENTS

### **Entrance Requirements for the B.A. in Physiology and Health**

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Before entering either the B.A. or Pre-Medicine track in Physiology and Health, students must successfully complete the following:

- PH 101 Physiology Is Consciousness: Awakening the Cosmic Potentiality of the Human Brain (Students entering Spring semester can take this course before graduation)
- MVS 102 Sanskrit
- MATH 153 Intermediate Algebra
- PHYS 110 Foundations of Physics and Cosmology

For the Pre-Med track, students will need to complete MATH 162 Functions and Graphs 2 as a prerequisite to the Physics and Chemistry modules.

### **Graduation Requirements for the B.A. in Physiology and Health Pre-Medicine Track**

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The Pre-Med track in Physiology and Health requires 64 credits, including the following Core Courses totaling 28 credits.

#### **PH Core Courses**

- PH 260 *Maharishi Self-Pulse* Diagnosis
- PH 262 Diet, Digestion and Nutrition
- PH 263 *Maharishi Yoga*<sup>SM</sup> Asanas
- BIO 260 Biology I: Living Systems
- BIO 263 Biology II: Molecular and Cell Biology (*Prerequisite:* BIO 260)
- BIO 264 Biology III: Human Anatomy and Physiology (*Prerequisite:* BIO 263)
- PH 380 Biostatistics and Medical Research Methods (prerequisite MATH 153)

#### **Additional courses required for completion of the Pre-Med track (40 credits):**

- PHYS 207 Classical Physics (prerequisite MATH 162 Functions & Graphs II)
- PHYS 208 Thermodynamics, Harmonics, Waves, Electricity and Magnetism (prerequisite PHYS 207)
- PHYS 209 Optics, Quantum Physics, Nuclear Physics, and Elementary Particles (prerequisite PHYS 208)
- CHM 201 General Chemistry I (prerequisite MATH 162)
- CHM 202 General Chemistry II (prerequisite CHM 201)
- CHM 203 General Chemistry III (prerequisite CHM 202)
- CHM 311 Organic Chemistry I (prerequisite CHM 203)
- CHM 312 Organic Chemistry II (prerequisite CHM 311)
- CHM 313 Organic Chemistry III (prerequisite CHM 312)
- CHM 350 General Biochemistry (prerequisite CHM 313)

Recommended electives:

- PH 311 Fieldwork
- PH 382 MCAT Preparation

- MATH 281 Calculus 1

### **Graduation Requirements for the B.A. in Physiology and Health**

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The B.A. in Physiology and Health requires 56 credits, including the following Core Courses totaling 28 credits.

#### **PH Core Courses**

- PH 260 *Maharishi Self-Pulse* Diagnosis
- PH 262 Diet, Digestion and Nutrition
- PH 263 *Maharishi Yoga*<sup>SM</sup> Asanas
- BIO 260 Biology I: Living Systems
- BIO 263 Biology II: Molecular and Cell Biology (*Prerequisite:* BIO 260)
- BIO 264 Biology III: Human Anatomy and Physiology (*Prerequisite:* BIO 263)
- PH 380 Biostatistics and Medical Research Methods (*Prerequisite:* MATH 153)

**Additional Courses for the B.A. in Physiology and Health:** Students may choose 28 credits from among the following courses to complete the B.A. degree:

- SL—G350 Plant Biology
- SL—G280 Ethnobotany
- SL—A101 Organic Agriculture
- SL—G101 Permaculture Design
- CHM 201 General Chemistry I (*prerequisite:* MATH 162)
- CHM 202 General Chemistry II (*prerequisite:* CHEM 201)
- CHM 203 General Chemistry III (*prerequisite:* CHEM 202)
- CHM 311 Organic Chemistry I (*prerequisite:* CHEM 203)
- CHM 312 Organic Chemistry II (*prerequisite:* CHEM 311)
- CHM 313 Organic Chemistry III (*prerequisite:* CHM 312)
- CHM 350 General Biochemistry (*prerequisite:* CHEM 313)
- PHYS 207 Classical Physics (*prerequisite:* MATH 162)
- PHYS 208 Thermodynamics, Harmonics, Waves, Electricity and Magnetism (*prerequisite:* PHYS 207)
- PHYS 209 Optics, Quantum Physics, Nuclear Physics, and Elementary Particles (*prerequisite:* PHYS 208)
- MVS 208 Fundamentals of Maharishi Vedic Science
- MVS 240 EEG, Brain, and Enlightenment
- MVS 302 Bhagavad Gita — Chapters 1–3
- MVS 321 Reading the Vedic Literature I
- SL—G150 Ideal Human Relationships
- SL—B101 Sustainability, Buildings, and the Built Environment

- SL—G200 Building Biology
- ESS 336 Movement Science

Course offerings may vary each year.

### **Requirements for the Minor in Physiology and Health**

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The minor in Physiology and Health consists of any 5 of the core courses above.

The two prerequisite courses for entering the minor are as follows:

- PH 101 Physiology Is Consciousness: Awakening the Cosmic Potentiality of the Human Brain
- MVS 102 Sanskrit

### **Special Option: Maharishi Transcendental Meditation program Teacher Training Course**

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Students may apply to become a Teacher of the Transcendental Meditation program.

Teacher Training is a professional training program for which students apply to Maharishi Vedic Education Development Corporation (MVED). Acceptance to this special course is given by MVED, not Maharishi University of Management. This course carries 20 credits of distribution credits. It does not replace any of the core curricula in the major.

### **Special Advanced Standing for the Ph.D. in Physiology Degree**

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Students who already have attained an M.D. degree or M.S. or Ph.D. in Physiology may request special advanced standing toward the Maharishi University of Management Ph.D. in Physiology degree. Transcripts of previous graduate course work will be reviewed and credits will be applied where appropriate among the following areas: Maharishi Ayurveda, cell biology, molecular biology, biochemistry, general physiology, neurophysiology, anatomy, pathology, research methods, and statistics.

To be able to waive all course work for the Ph.D. degree, students must have at least 60 semester credits of graduate course work, including Maharishi Ayurveda courses, approved by the department's graduate faculty, in addition to receiving special approval by the director of the program and the dean of the graduate school. In certain cases, students will be allowed to waive the comprehensive exam and directly register for dissertation proposal guidance.

### **Teaching Majors Available within the Physiology and Health Major**

Students in Physiology and Health may select courses that prepare them to gain an Iowa teaching license when combined with a major in secondary education. Students should consult the Education Department early in their planning to organize their college

sequence of courses. Those wishing to become secondary biology teachers must take a minimum of 24 credits in the Physiology and Health major.

## COURSES

### **Undergraduate Courses**

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#### **PH 101 Physiology Is Consciousness: Awakening the Cosmic Potential of the Human Brain**

The course will explore the new paradigm in science that the “Physiology is Consciousness.” Current concepts of mind and body will be understood in terms of this new paradigm. The human brain is unique in the universe. The unfathomably complex fabric of the brain neuropil rivals the billions of shining galaxies. This course examines the contribution of the Vedic tradition of knowledge to our understanding of brain structure and function, and hence, the potential that lies within every individual. The exponential growth of modern scientific understanding, primarily during the last 50 years, has created a situation in which we have an urgent need to understand the relationship between consciousness and our physiology. This course will present our facts of brain structure and function in light of Maharishi Vedic Science and Raja Raam’s discovery of Veda and Vedic Literature in human physiology. We will examine how our brain constructs reality at every moment and how, from Vedic Science, the transcendental field of life, the home of all the Laws of Nature, is the source of these myriad physiological impulses seamlessly orchestrated to produce what we call human experience. We will study how the experience of unboundedness, the Self of every individual, can transform our physiology and awaken the total creative potential of the brain in enlightenment, the birthright of every human being. (4 credits)

#### **PH 260 Maharishi Self-Pulse Diagnosis: Measuring the Impulses of the Body’s Intelligence and Restoring Balance in the Physiology through the Touch of Three Fingertips**

Self Pulse Diagnosis is the most ancient and most natural means of determining the level of balance or imbalance in the mind and body. This course presents Maharishi’s revival of this ancient technology to determine the state of the inner intelligence of the body. Everyone should learn pulse diagnosis to maintain his or her own health. Pulse diagnosis allows one to detect imbalances early, before they manifest as disease. Pulse allows one to precisely determine where the imbalance is and how to restore balance. Furthermore, pulse is therapeutic in itself. Just taking the pulse increases the balance in the pulse and therefore the balance of the whole mind and body. Taking the pulse enlivens the connection between mind and body, consciousness and matter. (4 credits)

**PH 261 Prevention: Creating Perfection and Avoiding Disorder through the Principles and Practices of Maharishi Consciousness-Based Health Care — The *Transcendental Meditation* Technique, Pulse Diagnosis, Diet, Daily Routine, Seasonal Purification, and Alliance with All the Laws of Nature**

The Prevention course presents an overview of the whole discipline of Maharishi Consciousness-Based Health Care<sup>SM</sup>. In this course one learns how consciousness expresses as physiology, and how enlivening consciousness through all of the 40 approaches of Maharishi Consciousness-Based Health Care is the basis for restoring balance and creating perfect health. Prevention is much better than cure. Living life according to Natural Law is the means to “avert the danger that has not yet come.” This course gives all the principles and many practical points on how to live according to Natural Law. These include diet, daily and seasonal routine, an introduction to self pulse, Maharishi Jyotish<sup>SM</sup> (the Vedic science of prediction), Vedic Architecture or Maharishi Sthapatya Veda<sup>SM</sup>, and collective practice of the Transcendental Meditation and TM-Sidhi programs. (4 credits)

**PH 262 Diet, Digestion, and Nutrition: Imbibing Intelligence from Food and the Environment — Enlivening Strong Digestion and Selecting a Diet Ideally Suited to the Individual**

Diet, digestion and nutrition are fundamental to health. How we metabolize food and drink directly affects the strength, vitality, immunity, and longevity of the physiology. In this course detailed knowledge of the influences of foods on the physiology is described. Also the influence of consciousness on the process of digestion and nutrition is discussed carefully. Different foods are categorized according to their influence on the three principal governing qualities of intelligence in the body: communication and movement, transformation, and structure. The balance of these three principles determines the balance, strength, immunity and health of the body. And that balance is greatly influenced by the food that is taken, and the state of awareness of the one who is eating. This course provides very practical knowledge of what to eat, when to eat, and how to eat to maintain or restore perfect balance. (4 credits)

**PH 263 *Maharishi Yoga* Asanas: Vedic Exercise to Enliven Mind-Body Coordination to Support Pure Awareness, the State of Yoga**

This practical course presents the knowledge and experience of enlivening the unified state of consciousness, or Yoga, through the physiological approach of Yoga Asanas. Maharishi has revived the essential understanding that Yoga means unified level of consciousness or Transcendental Consciousness, and that Yoga, one of the 40 aspects of the Vedic Literature provides the technologies to unfold that experience. The physical postures of Yoga Asanas are traditional positions that enliven the connection between mind and body, consciousness and physiology. When done properly, Maharishi Yoga

asanas help dissolve stress and give the experience of settledness and expansion in the direction of the experience of pure consciousness, or Yoga. This unique practical course includes regular practice of Maharishi Yoga asanas as well as the understanding of their specific effects on the mind and body. (4 credits)

### **PH 380 Biostatistics and Medical Research Methods**

This course introduces the knowledge and objective skills indispensable to scientific research. Topics include the scientific method, logical and practical considerations in experimental design and data acquisition, procedures for conducting literature reviews, selection of research topics, research ethics, and practical research aids such as computer-assisted data analysis. Particular emphasis is placed on clinical research design, including proper choice of control subjects and the prevention of bias in subject selection. (4 credits) *Prerequisite:* MATH 153

### **BIO 260 Biology I: Living Systems**

How life's dynamic intelligence applies the principles of biochemistry, cell biology, and genetics to uphold self-organization, maintenance, and evolution of life. This course covers aspects of biochemistry, cell biology, genetics, and evolution. Emphasis is placed on the expressions of intelligence, order, and integration found at different levels of biological organization. (Lab fee \$25) (4 credits)

### **BIO 263 Biology II: Molecular and Cell Biology**

This course presents the foundations of Human Biology at the cellular and molecular level. Topics include human DNA and gene expression; enzymes & metabolism; cell components; cell division; and specialized cells and tissues of the body. Students will discover the fundamental themes of natural law in the ordered structures of the cell and the DNA. The DNA is the blueprint of the human physiology. (Lab fee \$25) (4 credits) *Prerequisite:* BIO 260

### **BIO 264 Biology III: Human Anatomy and Physiology**

Human Anatomy and Physiology provides the foundational understanding of how the body's structure and function maintains life in balance and homeostasis. The integrated functioning of trillions of diverse cells, each with a million chemical reactions per second, gives rise to a healthy, vital human being. We will study tissues, organs, and 8 organ systems and their role in maintaining health and balance. The organ systems are the musculoskeletal, cardiovascular, digestive, respiratory, endocrine/reproductive, immune, and nervous systems.

The human physiology is also a replica of Natural Law expressed in the ancient Vedic Literature. Major areas of the physiology are precisely correlated in structure and function, to the 40 aspects of Veda and the Vedic Literature. Professor Tony Nader,

M.D., Ph.D., now Raja Raam, under Maharishi's guidance, has discovered that every aspect of the ancient Vedic Literature is mirrored by the human physiology. This understanding bridges the gap between the ancient, Vedic understanding of Natural Law and the modern understanding of human physiology and health. (4 credits) *Prerequisite:* BIO 263

### **CHEM 201 General Chemistry I**

Topics include atomic and molecular structure, reaction mechanisms, thermochemistry, and the physical behavior of gases, with special emphasis on problem solving and quantitative reasoning. (Lab fee \$25) (4 credits) *Prerequisite:* MATH 162

### **CHEM 202 General Chemistry II**

Topics include covalent bonding, liquids and solids, equilibria, kinetics, and acids and bases. (Lab fee \$25) (4 credits) *Prerequisite:* CHEM 201

### **CHEM 203 General Chemistry III**

Topics include coordination compounds, the chemistry of oxidation-reduction reactions, chemical thermodynamics, nuclear chemistry, chemistry of selected elements, and atmospheric chemistry. (Lab fee \$25) (4 credits) *Prerequisite:* CHEM 202

### **CHEM 311 Organic Chemistry I *Prerequisite:* CHEM 203**

### **CHEM 312 Organic Chemistry II *Prerequisite:* CHEM 311**

### **CHEM 313 Organic Chemistry III *Prerequisite:* CHEM 312**

These courses, which are taught with an emphasis on unifying principles, explore both structure and reaction mechanisms of organic compounds. Topics include bonding, spectroscopy, structure, physical properties, synthesis, and reactions of the major classes of organic compounds, including biomolecules. (Lab fee \$25 per course) (4 credits each)

### **CHEM 350 General Biochemistry**

This course focuses on the basic chemical structures and chemical transformations that take place in living systems. Topics include the structure, kinetics, and regulation of enzymes; bioenergetics; and intermediary metabolism. (Lab fee \$25 per course) (4 credits) *Prerequisite:* CHEM 313

### **PHYS 207 Classical Physics: Analysis and Synthesis**

The course presents classical physics topics including motion, force, momentum, equilibrium, work, energy, fluids, solids, and heat. Included are laboratory sessions, weekly seminar sessions, and reviews of current scientific papers. Case studies will emphasize applications from the life sciences and medicine. Computational skills relevant to scientific literacy will be emphasized. (Lab fee \$50) (4 credits) *Prerequisite:* MATH 162

**PHYS 208: Thermodynamics, Harmonics, Waves, Electricity and Magnetism: Unity at the Basis of Diversity**

The course presents thermodynamics, periodic motion, waves, sound, light and optics. Emphasis is on application over derivation, development of rapid estimating skills, and real-world problem solving applications relevant to the life sciences. Laboratory sessions, weekly seminar sessions and reviews of current scientific papers help students develop a physics sensibility and scientific literacy. (Lab fee \$50) (4 credits) *Prerequisite:* PHYS 207.

**PHYS 209: Optics, Quantum Physics, Nuclear Physics, and Elementary Particles**

The course presents optics, quantum theory, atomic structure, nuclear structure, and physical chemistry. Laboratory sessions, weekly seminar sessions and reviews of current scientific papers help students develop a physics sensibility and scientific literacy. Real-world problem solving applications relevant to the life sciences will be presented. (Lab fee \$50) (4 credits) *Prerequisite:* PHYS 208

**PH 311 Fieldwork/ Internship: Expanding the Knowledge of Physiology and Health in the Field**

Students observe and work in Maharishi Medical Centers or medical laboratories, schools or health care facilities in various aspects of health care, research, clinical operations patient care, health education, etc. (4 credits — may be repeated) *Prerequisites:* Consent of the department faculty and the Academic Standards Committee

**PH 399 Directed Study: Gaining Total Knowledge through Self-Referral Education** (variable credits) *Prerequisite:* consent of the department faculty.

**PH 382 MCAT Preparation**

The Medical College Admission Test (MCAT) is a standardized national exam required for entrance to medical school. In this course students will have the opportunity to integrate all of their learning in the B.A. in Physiology and Health Pre-Medicine program, and will take practice MCAT exams.

**Graduate Courses**

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**PHYSI 700 Dissertation Proposal Preparation**

For students with an M.D., M.S. or Ph.D. in Physiology only. Each student selects a dissertation committee and submits a dissertation topic to the graduate faculty for approval. Following acceptance of the dissertation topic, the student prepares the dissertation research proposal, which is evaluated by the dissertation committee. (3 credits — may be repeated) *Prerequisites:* Ph.D. candidate status and consent of the dissertation advisor

**PHYSI 701 Dissertation Research**

For students with an M.D., M.S. or Ph.D. in Physiology only. Students conduct original research and prepare their dissertations during their third and fourth years in the program. Any changes in dissertation topic must be approved by the dissertation committee. (0.5–2.5 credits — may be repeated) *Prerequisites:* approval of the dissertation proposal and consent of the dissertation committee