

# VTPP - VET PHYSIOLOGY & PHARM (VTPP)

## VTPP 123 Foundations of Physiology

**Credits 3. 3 Lecture Hours.** Introduction to fundamental concepts in physiology and the practice of physiology research through exploration of mathematical models used in physiology research; emphasis on prediction of complex adaptive behavior in health and disease from elementary math, physics, chemistry and biology. **Prerequisite:** Freshman or sophomore classification or approval of instructor.

## VTPP 207 Methodologies of Physiology Education Research

**Credits 3. 3 Lecture Hours.** Creation and practice of physiology education research through quantitative, qualitative and mixed-methodology approaches; preliminary development of team-based research projects; emphasis on production and formal presentation of basic research using human subjects in a variety of physiology education topics.

## VTPP 208 Analysis and Evaluation of Physiology Education

**Credits 3. 3 Lecture Hours.** Analysis and evaluation of research in physiology education; design of proper analytical techniques in quantitative, qualitative and mixed-methods analyses; emphasis on production of publishable applied research in physiology. **Prerequisite:** VTPP 207 or approval of instructor.

## VTPP 223 Design of Experiments for Physiology Research

**Credits 3. 2 Lecture Hours. 2 Lab Hours.** Team or group formulation and refinement of novel hypotheses and design of controlled in vitro experiments; emphasis on production of publishable research in physiology. **Prerequisite:** VTPP 123 or approval of instructor.

## VTPP 224 In Vitro Experimentation in Physiology Research

**Credits 3. 2 Lecture Hours. 2 Lab Hours.** Team or group collection, analysis and interpretation of data from in vitro experiments; emphasis on production of publishable research in physiology. **Prerequisite:** VTPP 223 or approval of instructor.

## VTPP 234 Design of Models for Physiology Research

**Credits 3. 3 Lecture Hours.** Team or group design of novel models of physiological systems to predict homeostatic behavior arising from the interaction of subsystems; mastering bioinformatics toolboxes to process NextGen-omics data; emphasis on production and formal presentation of basic research in physiology.

## VTPP 235 Analysis and Validation of Models for Physiology Research

**Credits 3. 3 Lecture Hours.** Team or group analysis and validation of models of physiological systems to explain disease states and design potential clinical interventions; analysis of NextGen-omics data; emphasis on production of publishable applied research in physiology. **Prerequisite:** VTPP 234 or approval of instructor.

## VTPP 281 Seminar

**Credits 4. 4 Other Hours.** Exposure to scientists from a variety of biomedical disciplines through attendance at seminars followed by review and discussion of current scientific work in physiology and related subjects, and subsequent student seminar presentations. **Prerequisites:** Freshman or sophomore classification; approval of instructor.

## VTPP 285 Directed Studies

**Credits 0 to 4. 0 to 4 Other Hours.** Course for freshman and sophomore students who desire additional laboratory work in physiology to supplement required courses. **Prerequisites:** Freshman or sophomore classification; approval of department head.

## VTPP 289 Special Topics in...

**Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.** Selected topics in an identified area of veterinary physiology and pharmacology. May be repeated for credit.

## VTPP 291 Research

**Credits 0 to 4. 0 to 4 Other Hours.** Laboratory and/or field research supervised by a faculty member. Must be taken on a satisfactory/unsatisfactory basis. **Prerequisites:** Freshman or sophomore classification; approval of instructor.

## VTPP 323 Physiology of Domestic Animals

**Credits 3. 3 Lecture Hours.** Physiology essential to the understanding of life processes; for animal science, wildlife, agriculture and related fields. **Prerequisite:** BIOL 111 or equivalent; junior or senior classification.

## VTPP 330 Biomedical Toxicology

**Credits 3. 3 Lecture Hours.** Understanding basic toxicologic concepts related to exposure, absorption and elimination of toxic compounds as well as mechanisms of action of toxicants and how they affect the body's organ systems; integration of toxicology with pharmacology and physiology to further understand how various toxicants impact on the body. **Prerequisites:** VIBS 222 or BIOL 319 or approval of instructor; junior or senior classification.

## VTPP 401/BMEN 400 History of Human and Veterinary Medicine in Europe

**Credits 4. 4 Lecture Hours.** Addresses the major developments in human and veterinary medicine in Europe from the Middle Ages to the present; explores key events and figures in medical history and analyzes issues of current biomedical concern in a historical context; for example, animal rights, ethics of humane experimentation, euthanasia. **Prerequisites:** Admitted to major degree sequence in biomedical engineering; VTPP 434. **Cross Listing:** BMEN 400/VTPP 401.

## VTPP 404 Food Toxicology and Safety

**Credits 3. 3 Lecture Hours.** Toxicity and safety of various foods and food additives, ingredients, and contaminants; occurrence, control and prevention of food transmitted diseases. **Prerequisite:** Junior or senior classification.

## VTPP 405 Systemic Veterinary Physiology

**Credits 3. 3 Lecture Hours.** Aspects of cellular physiology, physiology of excitable membranes, physiology of body fluids, neurophysiology, and the physiology of smooth, cardiac and skeletal muscle; basic understanding of mammalian physiology essential as a framework for advanced studies. **Prerequisites:** BIMS 320/GENE 320; junior or senior classification; or approval of instructor; proper English composition and communication.

## VTPP 420 Applied Pharmacology

**Credits 2. 2 Lecture Hours.** Modern themes about therapeutic drugs in animals and people including drug discovery and development, clinical use of drugs and drug regulation. **Prerequisites:** Grade of C or better in BICH 410, BIOL 320, VTPP 423, VTPP 434, or approval of instructor.

## VTPP 423 Applied Biomedical Physiology I

**Credits 4. 3 Lecture Hours. 2 Lab Hours.** Human physiological principles, review of cellular physiology, and development of an understanding of the nervous system and muscle, cardiovascular, and renal physiology; clinical applications related to organ systems. **Prerequisites:** Grade of C or better in PHYS 202 and CHEM 228; junior classification.

## VTPP 424/VIBS 424 Biomedical Neuroendocrinology and Endocrine Disorders

**Credits 3. 3 Lecture Hours.** Neuroendocrine (hypothalamus-pituitary) control of puberty, menstruation, ovulation, pregnancy, labor, lactation, female reproductive cycles, male reproductive functions, thyroid and parathyroid, adrenal and kidney, diabetes, obesity, sleep, memory, learning and aging and their endocrine disorders; overview on biosynthesis, transport and signaling of peptide and neuropeptide hormones, steroids and prostaglandins. **Prerequisites:** Honors, junior or senior classification, or approval of instructor. **Cross Listing:** VIBS 424/VTPP 424.

## VTPP 425 Pharmacology

**Credits 3. 3 Lecture Hours.** Introduction to pharmacokinetics and pharmacodynamics; survey of major pharmaceutical classes; uses, mechanisms of action and adverse reactions of selected agents. **Prerequisites:** VTPP 423 or grade of C or better in BIOL 320; junior or senior classification or approval of instructor.

## VTPP 427 Applied Biomedical Physiology II

**Credits 3. 3 Lecture Hours.** Human physiology focused on fluid balance and acid-base balance; development of an understanding of physiology as it applies to the cardiovascular, autonomic, renal, respiratory, gastrointestinal, endocrine, reproductive system; clinical applications related to organ systems. **Prerequisites:** VTPP 423 or grade of D or better in BIOL 320; junior or senior classification.

## VTPP 434 Physiology for Bioengineers I

**Credits 4. 3 Lecture Hours. 2 Lab Hours.** Engineering analysis of living systems; quantitative aspects of physiology and engineering applications to clinical medicine; body fluid balance, solute transport, endocrinology, reproduction physiology, neurophysiology, skeletal and smooth muscle physiology. **Prerequisite:** Biomedical engineering (BMEN) major or approval of instructor.

## VTPP 435 Physiology for Bioengineers II

**Credits 4. 3 Lecture Hours. 2 Lab Hours.** Engineering analysis of living systems; quantitative aspects of physiology and engineering applications to clinical medicine; vascular physiology, cardiac physiology, bone physiology, regenerative medicine, renal physiology, pathophysiology. **Prerequisite:** VTPP 434 or approval of instructor.

## VTPP 438 Analysis of Genomic Signals

**Credits 3. 2 Lecture Hours. 2 Lab Hours.** Overview of current high throughput technology for data acquisition and analysis of genomic signals (e.g. mRNA or proteins); emphasis on the microarray technology, methods for analyzing microarray data, and approaches to model the underlying phenomena from the systems biology perspective. **Prerequisites:** Junior or senior classification; BIMS 320/GENE 320 or GENE 320/BIMS 320 and BIOL 111, BIOL 112 or BIOL 213 or equivalent; STAT 302 or equivalent.

## VTPP 444 Practicum in Biomedical Research

**Credits 3. 3 Other Hours.** Team or group development of sustainable collaborations that include biomedical research, high-impact educational practices and community service; emphasis on lifelong learning and the impact of research on biomedical issues and physiology; focus on connecting research experience to future career goals. **Prerequisites:** VTPP 223 and VTPP 224, or VTPP 234 and VTPP 235, or VTPP 232 and VTPP 233, or VTPP 207 and VTPP 208; junior or senior classification; instructor approval.

## VTPP 452 Fetal and Embryo Physiology

**Credits 3. 3 Lecture Hours.** Examination of the physiologic processes driving embryonic development and pregnancy; focus on embryo implantation, establishment of the placenta, development of the fetal circulatory systems and the molecular processes governing embryo differentiation and development; special emphasis on the major organ systems affected by pediatric disease and on the actions of teratogens. **Prerequisites:** BICH 409, BICH 410, or equivalent; or approval of instructor.

## VTPP 481 Seminar

**Credits 4. 4 Other Hours.** Exposure to scientists from a variety of biomedical disciplines through attendance at seminars followed by review and discussion of current scientific work in physiology and related subjects, and subsequent student seminar presentations. **Prerequisites:** Junior or senior classification; approval of instructor.

## VTPP 485 Directed Studies

**Credits 0 to 4. 0 to 4 Other Hours.** Course for junior and senior students who desire additional laboratory work in physiology to supplement required courses. **Prerequisites:** Junior or senior classification and approval of department head.

## VTPP 489 Special Topics in...

**Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.** Selected topics in an identified area of physiology, pharmacology, endocrinology or toxicology. May be repeated for credit. **Prerequisite:** Junior or senior classification.

## VTPP 491 Research

**Credits 0 to 4. 0 to 4 Other Hours.** Laboratory and/or field research supervised by a faculty member. **Prerequisites:** Junior or senior classification; approval of instructor.