VTTP - VET PHYSIOLOGY & PHARM (VTTP)

VTTP 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.

VTTP 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: VTTP 123 or approval of instructor.

VTTP 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: VTTP 223 or approval of instructor.

VTTP 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; emphasis on production and formal presentation of basic research in physiology.
Prerequisite: VTTP 123 or approval of instructor.

VTTP 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; emphasis on production of publishable applied research in physiology.
Prerequisite: VTTP 234 or approval of instructor.

VTTP 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.

VTTP 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.

VTTP 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.

VTTP 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.

VTTP 323 Physiology of Domestic Animals
Credits 3. 3 Lecture Hours.
Physiology essential to understanding of life processes. For students in agriculture and related fields.
Prerequisite: Junior classification.

VTTP 401 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 an historical context; for example, animal rights, ethics of human experimentation, euthanasia.

VTTP 423 Biomedical Physiology I
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Physiological principles, review of cellular physiology, and development of an understanding of the nervous system and muscle, cardiovascular, and respiratory physiology; clinical applications related to organ systems.
Prerequisites: VIBS 305; junior or senior classification.

VTTP 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/VTTP 424.

VTTP 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: VTTP 423 or approval of instructor; junior or senior classification.

VTTP 427 Biomedical Physiology II
Credits 3. 3 Lecture Hours.
Continuation of VTTP 423. Fluid balance and acid-base balance; development of an understanding of renal, gastrointestinal, endocrine and reproductive physiology using human and other mammalian models; clinical applications related to organ systems.
Prerequisites: VTTP 423; junior or senior classification.

VTTP 429 Introduction to Toxicology
Credits 3. 3 Lecture Hours.
An overview of toxicology with emphasis on environmental, human and animal health issues.
Prerequisite: Junior or senior classification.
VTTP 434 Physiology for Bioengineers I  
Credits 4. 3 Lecture Hours. 1 Lab Hour.  
Cellular anatomy, cellular physiology and biochemistry; systems analysis  
of digestive, endocrine and musculoskeletal system function including  
information related to gross anatomy, histology and disease states;  
quantitative aspects of physiology and engineering applications to  
clinical medicine.  
**Prerequisites:** Junior or senior classification; biomedical engineering  
major or approval of instructor.

VTTP 435 Physiology for Bioengineers II  
Credits 4. 3 Lecture Hours. 1 Lab Hour.  
A systems analysis of nervous, cardiovascular, respiratory and urinary  
function including information related to gross anatomy, histology and  
disease states; quantitative aspects of physiology and engineering  
applications to clinical medicine.  
**Prerequisites:** VTTP 434; junior or senior classification.

VTTP 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.

VTTP 439 Non-Coding RNA's  
Credits 3. 3 Lecture Hours.  
Advanced topics in noncoding RNA's in gene regulation; investigation  
of the role of noncoding RNAs and epigenetic regulatory factors in  
modulating gene expression, physiological functions and disease  
development.  
**Prerequisite:** Junior or senior classification or approval of instructor.

VTTP 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; focus on connecting research experience to future career goals.  
**Prerequisites:** VTTP 423 and VTTP 427 or VTTP 434 and VTTP 435; junior  
or senior classification.

VTTP 450 Stem Cell Physiology  
Credits 3. 3 Lecture Hours.  
Advanced topics in stem cell biology; exploration of mammalian stem  
cells, stem cell characteristics, cell differentiation potency, molecular  
basis of stem cell signaling, regulatory pathways, research tools and  
experimental models.  
**Prerequisite:** Junior or senior classification or approval of instructor.

VTTP 452 Fetal and Embryo Physiology  
Credits 3. 3 Lecture Hours.  
Introduction to 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.  
**Prerequisite:** BICH 410 or equivalent, or approval of instructor.

VTTP 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.

VTTP 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.

VTTP 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.

VTTP 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.