

# VETERINARY CLINICAL SCIENCES (V C S)

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Courses primarily for professional curriculum students:

## V C S 305: Shelter Medicine

Cr. 1. S.

*Prereq: First year classification in Veterinary Medicine or with permission of instructor*

An elective course designed to educate the veterinary student about issues of relevance to companion animal population and shelter medicine and welfare.

## V C S 311: Veterinarian in Society I

Cr. R. F.

*Prereq: First-year classification in veterinary medicine*

Introduction to the veterinary profession and the various career opportunities available.

## V C S 313: Veterinarian in Society III

(1-1) Cr. 1. F.

*Prereq: Second-year classification in veterinary medicine*

A continuation of the Veterinarian in Society series. The course covers selected topics on moral and ethical issues affecting the practice of veterinary medicine. Offered on a satisfactory-fail basis only.

## V C S 314: Veterinarian in Society IV

(1-0) Cr. 1. F.

*Prereq: Third-year classification in veterinary medicine*

A continuation of the Veterinarian in Society series. This course will focus on helping students develop their communication, leadership, team building and conflict resolution skills.

## V C S 315: Veterinarian in Society V

(1-0) Cr. 1. S.

*Prereq: Third-year classification in veterinary medicine*

A continuation of the Veterinarian in Society series. This course will emphasize veterinary law.

## V C S 339: Clinical Foundations I

(Cross-listed with B M S). (0-2) Cr. 1. F.

*Prereq: First-year classification in veterinary medicine*

Canine physical examination; basic behavior, animal handling and restraint; medical record keeping.

## V C S 385: Grand Rounds

Cr. R. Repeatable. F.S.

*Prereq: Classification in veterinary medicine*

Seminars and case presentations on selected clinical subjects by fourth-year students of the College of Veterinary Medicine. Attendance is required for a passing grade. Offered on a satisfactory-fail basis only.

## V C S 391: Clinical Imaging

(1-0) Cr. 1. F.

*Prereq: First-year classification in veterinary medicine*

Evaluation of morphologic anatomy of the dog and cat utilizing clinical imaging methods - radiography, ultrasonography, computed tomography, magnetic resonance imaging and nuclear imaging. Emphasis will be placed on normal radiographic anatomy.

## V C S 393: Principles of Surgery

(2-2) Cr. 3. F.

*Prereq: Second year classification in veterinary medicine*

General principles of surgery of companion animals.

## V C S 394: Principles of Surgery Laboratory

(0-3) Cr. 1. S.

*Prereq: Second year classification in veterinary medicine*

General principles of surgery of companion animals.

## V C S 395: Small Animal Surgery

(2-0) Cr. 2. S.

*Prereq: V C S 394*

Small animal surgery.

## V C S 396: Fundamentals in Equine Practice

(2-0) Cr. 2. S.

*Prereq: V C S 394*

This elective course is an introduction and overview of the clinical aspects of common conditions in horses and related conditions, including pathogenesis, clinical manifestations, diagnosis, treatment and prognosis. It is not designed to teach the student how to perform specific procedures, but rather to improve knowledge base of students interested in equine or mixed animal practice. Class will include lecture, photos, video presentations, and other formats.

## V C S 398: Anesthesiology

(2-0) Cr. 2. S.

*Prereq: Second-year classification in veterinary medicine*

Anesthetic equipment, agents and procedures, including pain management for core species.

## V C S 399: Ophthalmology

(1-0) Cr. 1. S.

*Prereq: Third year classification in veterinary medicine*

Principles and techniques of medical and surgical ophthalmology.

**V C S 402: Clinical Cardiology I**

(1-0) Cr. 1. F.

*Prereq: Third or fourth-year classification in veterinary medicine; V C S 444 or concurrent enrollment in V C S 444*

Elective course in diagnosis and management of cardiac diseases. Emphasis on interpretation of electrocardiography.

**V C S 405: Pet Bird and Exotic Species Medicine**

(1-3) Cr. 2. S.

*Prereq: third classification in veterinary medicine*

Elective course in management and diseases of pet birds and exotic species.

**V C S 407: Feline Internal Medicine**

(1-0) Cr. 1. F.

*Prereq: Third-year classification in veterinary medicine*

Elective course in feline internal medicine.

**V C S 409: Oncology**

Cr. 2-4. Repeatable, maximum of 4 credits.

*Prereq: Fourth-year classification in veterinary medicine*

Elective clinical assignment in oncology.

**V C S 414: Companion Animal Nutrition**

(1-0) Cr. 1. S.

*Prereq: Third or fourth-year classification in veterinary medicine*

Elective course in small animal and equine nutrition.

**V C S 415: Advanced Small Animal Dermatology**

(1-2) Cr. 2. F.

*Prereq: Third or Fourth-year classification in veterinary medicine*

Elective course in dermatology.

**V C S 419: Preceptorship in Companion Animal/Equine Veterinary Medical Practice**

Cr. 2-6. Repeatable, maximum of 6 credits.

*Prereq: Fourth-year classification in veterinary medicine, permission of department curriculum committee*

Elective course in veterinary practice under the guidance of veterinarians in approved practice settings. Maximum of 6 credits in 2 credit increments.

**V C S 419A: Preceptorship in Companion Animal/Equine Veterinary Medical Practice: Companion Animal Practice**

Cr. 2-6. Repeatable, maximum of 6 credits.

*Prereq: Fourth-year classification in veterinary medicine, permission of department curriculum committee*

Elective course in veterinary practice under the guidance of veterinarians in approved practice settings. Maximum of 6 credits in 2 credit increments.

**V C S 419B: Preceptorship in Companion Animal/Equine Veterinary Medical Practice: Equine Practice**

Cr. 2-6. Repeatable, maximum of 6 credits.

*Prereq: Fourth-year classification in veterinary medicine, permission of department curriculum committee*

Elective course in veterinary practice under the guidance of veterinarians in approved practice settings. Maximum of 6 credits in 2 credit increments.

**V C S 419C: Preceptorship in Companion Animal/Equine Veterinary Medical Practice: Zoo/Exotic Animal Practice**

Cr. 2-6. Repeatable, maximum of 6 credits.

*Prereq: Fourth-year classification in veterinary medicine, permission of department curriculum committee*

Elective course in veterinary practice under the guidance of veterinarians in approved practice settings. Maximum of 6 credits in 2 credit increments.

**V C S 419D: Preceptorship in Companion Animal/Equine Veterinary Medical Practice: Other**

Cr. 2-6. Repeatable, maximum of 6 credits.

*Prereq: Fourth-year classification in veterinary medicine, permission of instructor-of record/V C S Department Curriculum Committee*

Elective course in veterinary practice under the guidance of veterinarians in approved practice settings. Maximum of 6 credits in 2 credit increments.

**V C S 420: Practicum**

Cr. R. Repeatable.

*Prereq: VM4 classification, permission of instructor*

External practical experiences in the fourth year curriculum for additional professional development of the veterinary student. Offered on a satisfactory-fail basis only.

**V C S 422: Rotation at Blank Park Zoo**

Cr. 4. F.S.SS.

*Prereq: Fourth-year classification in veterinary medicine and completion of V C S 405. Enrollment by permission of instructor.*

Clinical experience in husbandry, nutrition and training of exotic animals in a zoo environment. Students will get instruction and learn the application of the clinical skills required when dealing with exotic animals, including the hands-off visual examination obtaining historical and clinical information from zookeepers, and the use of immobilization drugs for patient exams. Students will learn the common medical disorders of exotic species and treatment techniques.

**V C S 436: Small Animal Internal Medicine**

(3-0) Cr. 3. F.

*Prereq: Third year classification in veterinary medicine*

Clinical diagnosis and treatment of diseases of small animals.

**V C S 437: Small Animal Shelter Medicine**

(2-0) Cr. 2. Repeatable.

*Prereq: Fourth year classification in Veterinary Medicine*

A 2-week elective rotation at an animal shelter/humane society that works with the public to place pets in homes. This rotation will encompass population medicine (medicine, surgery, intake, adoption, behavior and temperament, neglect and cruelty) that animal shelters deal with on a daily basis. The selected animal shelter/humane society must have a veterinarian(s) on staff and be approved by the course coordinator. More than one VCS 437 may be taken upon approval of the course coordinator.

**V C S 440: Introduction to Clinics**

Cr. R. S.

*Prereq: Third-year classification in veterinary medicine*

Rotating assignments through multiple sections within the Veterinary Medical Center.

**V C S 441: Canine Rehabilitation**

Cr. 2.

*Prereq: Fourth-year classification in veterinary medicine.*

Elective clinical assignment in rehabilitation.

**V C S 443: Equine Lameness**

(1-2) Cr. 2. S.

*Prereq: Second or third-year classification in veterinary medicine*

Orthopedic diseases of the equine.

**V C S 444: Small Animal Medicine**

(4-0) Cr. 4. F.S.

*Prereq: Third-year classification in veterinary medicine*

Clinical diagnosis and treatment of diseases of small animals.

**V C S 445: Equine Medicine**

(2-0) Cr. 2. F.

*Prereq: Third-year classification in veterinary medicine*

Clinical diagnosis and treatment of diseases of equine.

**V C S 446: Clinical Neurology**

Cr. 2. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical rotation in neurology with an emphasis on neurolocalization, disease processes, use of diagnostics in medical and surgical neurology and treatment options. Exposure to neurosurgical techniques.

**V C S 447: Equine Veterinary Diagnostic Skills**

(3-0) Cr. 2. S.

*Prereq: Fourth-year classification in veterinary medicine - preference to equine track student. Limited to 16 students.*

Hands on experience with equine veterinary diagnostic skills related to theriogenology, medicine, surgery, radiology, and ophthalmology.

**V C S 448: Diagnostic Imaging and Radiobiology**

(2-2) Cr. 3. F.S.

*Prereq: Third-year classification in veterinary medicine*

Essentials of diagnostic image interpretation. Essentials of radiobiology, radiation therapy and protection from radiation.

**V C S 449: Junior Surgery Laboratory**

(1-6) Cr. 3. F.

*Prereq: Third-year classification in veterinary medicine*

Pre-laboratory presentations and laboratories introduce the student to anesthetic and surgical principles and techniques that can be applied to all animal species.

**V C S 449A: Junior Surgery Laboratory: Alternative Curriculum**

(1-6) Cr. 3. F.

*Prereq: Third-year classification in veterinary medicine*

This laboratory introduces the student to anesthetic and surgical principles - and techniques that can be applied to all animal species. Consists of only neutering humane society animals throughout the laboratory.

**V C S 449B: Junior Surgery Laboratory: Traditional Curriculum**

(1-6) Cr. 3. F.

*Prereq: Third-year classification in veterinary medicine*

This laboratory introduces the student to anesthetic and surgical principles and techniques that can be applied to all animal species. Provides a broader range of surgical experiences throughout the laboratory.

**V C S 451: Advanced Junior Surgery Laboratory**

(1-6) Cr. 2. S.

*Prereq: V C S 449*

8 weeks. Continuation of surgical laboratory experience. Techniques and advanced principles learned are applicable to all animal species.

**V C S 451A: Advanced Junior Surgery Laboratory: Alternative Curriculum**

(1-6) Cr. 2. S.

*Prereq: V C S 449*

8 weeks. Continuation of surgical laboratory experience. Techniques and advanced principles learned are applicable to all animal species. Consists of only neutering humane society animals throughout the laboratory.

**V C S 451B: Advanced Junior Surgery Laboratory: Traditional Curriculum**

(1-6) Cr. 2. S.

*Prereq: V C S 449*

8 weeks. Continuation of surgical laboratory experience. Techniques and advanced principles learned are applicable to all animal species. Exposure to more advanced surgical techniques with most surgical principles.

**V C S 451C: Advanced Junior Surgery Laboratory: Traditional Curriculum**  
(1-6) Cr. 2. S.

*Prereq: V C S 449*

8 weeks. Continuation of surgical laboratory experience. Techniques and advanced principles learned are applicable to all animal species. A second repeat for students with a special interest in small animal surgery.

**V C S 452: Clinical Dermatology**

Cr. 2. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine. Must have instructor permission to repeat this course.*

Study of clinical dermatological problems via computer-aided instruction, case simulations, and/or lectures. Clinical management of cases presented to Veterinary Medical Center.

**V C S 453: Small Animal Medicine I**

Cr. 2. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical assignment in small animal medicine.

**V C S 455: Small Animal Soft Tissue Surgery**

Cr. 2. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical assignment in soft tissue surgery.

**V C S 456: Small Animal Orthopedic Surgery**

Cr. 2. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical assignment in orthopedic surgery.

**V C S 457: Equine Medicine**

Cr. 2. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical assignment in equine medicine.

**V C S 458: Equine Surgery**

Cr. 2. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical assignment in equine surgery.

**V C S 459: Small Animal Overpopulation Medicine and Surgery**

Cr. 2.

*Prereq: Fourth year classification in Veterinary Medicine*

A 2-week surgical emphasis, elective rotation at a humane society that addresses the issues facing veterinarians and non-veterinary humane society personnel who deal with small animal overpopulation issues. Each section can be taken for credit once.

**V C S 459A: Small Animal Overpopulation Medicine and Surgery :Nebraska Humane Society, Omaha NE**

Cr. 2.

*Prereq: Fourth year classification in Veterinary Medicine*

A 2-week surgical emphasis, elective rotation at a humane society that addresses the issues facing veterinarians and non-veterinary humane society personnel who deal with small animal overpopulation issues. Each section can be taken for credit once.

**V C S 459B: Small Animal Overpopulation Medicine and Surgery: Animal Rescue League of Iowa, Des Moines IA**

Cr. 2.

*Prereq: Fourth year classification in Veterinary Medicine*

A 2-week surgical emphasis, elective rotation at a humane society that addresses the issues facing veterinarians and non-veterinary humane society personnel who deal with small animal overpopulation issues. Each section can be taken for credit once.

**V C S 459C: Small Animal Overpopulation Medicine and Surgery: WaySide Waifs, Kansas City MO**

Cr. 2.

*Prereq: Fourth year classification in Veterinary Medicine*

A 2-week surgical emphasis, elective rotation at a humane society that addresses the issues facing veterinarians and non-veterinary humane society personnel who deal with small animal overpopulation issues. Each section can be taken for credit once.

**V C S 459D: Small Animal Overpopulation Medicine and Surgery: Boulder Humane Society, Boulder, CO**

Cr. 2.

*Prereq: Fourth year classification in Veterinary Medicine*

A 2-week surgical emphasis, elective rotation at a humane society that addresses the issues facing veterinarians and non-veterinary humane society personnel who deal with small animal overpopulation issues. Each section can be taken for credit once.

**V C S 459E: Small Animal Overpopulation Medicine and Surgery: Humane Alliance, Ashville, NC**

Cr. 2.

*Prereq: Fourth year classification in Veterinary Medicine*

A 2-week surgical emphasis, elective rotation at a humane society that addresses the issues facing veterinarians and non-veterinary humane society personnel who deal with small animal overpopulation issues. Each section can be taken for credit once.

**V C S 460: Radiology**

Cr. 2.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical assignment in veterinary radiology.

**V C S 461: Advanced Small Animal Internal Medicine**

Cr. 1. S.

*Prereq: V C S 444 and V C S 436*

A discussion of advanced topics in small animal internal medicine.

**V C S 463: Primary Care**

Cr. 2. Repeatable, maximum of 4 credits.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical experience in hospital based general practice.

**V C S 464: Equine Field Services**

Cr. 2.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical assignment in equine ambulatory practice.

**V C S 465: Farrier**

Cr. 2.

*Prereq: Fourth-year classification in veterinary medicine.*

Elective clinical assignment on the principles and practices of normal and therapeutic horseshoeing and equine foot care.

**V C S 466: Anesthesiology**

Cr. 2. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical assignment in small animal and large animal anesthesiology.

**V C S 467: Pain Management**

Cr. 1-2. Repeatable, maximum of 2 credits.

*Prereq: Fourth year classification in veterinary medicine*

Elective clinical assignment with emphasis on pain management.

**V C S 468: Intensive Care**

Cr. 4. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical assignment to provide supervision of hospital cases requiring intensive care and including emergency cases.

**V C S 469: Ophthalmology**

Cr. 2. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical assignment in ophthalmology.

**V C S 470: Radiology**

Cr. 2. Repeatable, maximum of 4 credits.

*Prereq: Fourth-year classification in veterinary medicine. Completion of V C S 460 Radiology is required. Enrollment by permission of instructor.*

Elective clinical assignment in veterinary radiology.

**V C S 471: Animal Reproduction**

Cr. 2.

*Prereq: Fourth-year classification in veterinary medicine*

Elective clinical assignment in animal reproduction. Equine, Small Animal, Comparative, and Food Animal reproduction only.

**V C S 471C: Animal Reproduction: Comparative**

Cr. 2. Repeatable, maximum of 4 credits. SS.

*Prereq: Fourth-year classification in veterinary medicine.*

Elective comparative clinical assignment in Theriogenology with caseload management in Food Animal, Equine, Small Animal and Small Ruminants sections. Rotation through these different sections will depend on the caseload (by species) and include routine breeding management, semen collection and cryopreservation in different species, advanced laparoscopic and non-surgical procedures for insemination and embryo flushing/transfer, pregnancy diagnosis as well as management of reproductive emergencies.

**V C S 471E: Animal Reproduction: Equine Reproduction**

Cr. 2. Repeatable, maximum of 4 credits.

*Prereq: Fourth-year classification in veterinary medicine*

Elective clinical assignment in Equine Theriogenology involving both mare and stallion breeding management, cool-shipped semen preparation and semen cryopreservation, embryo transfer, foaling of high-risk pregnant mares as well as normal mares, breeding soundness exams of the mare and stallion, treatment of retained fetal membranes and neonatal care.

**V C S 471S: Animal Reproduction: Small Animal Reproduction**

Cr. 2. Repeatable, maximum of 4 credits.

*Prereq: Fourth-year classification in veterinary medicine*

Elective clinical assignment in Small Animal Theriogenology. Primary reproductive management in the canine involving breeding management of the bitch and stud dog, advanced surgical and non-surgical insemination using fresh or frozen semen, infertility case management for the male and female. High risk pregnancy management, whelping and neonatal care case management as required.

**V C S 473: Small Animal Surgery**

Cr. 1.

*Prereq: fourth-year classification in veterinary medicine*

Clinical assignment in small animal surgery split between soft tissue surgery (one week) and orthopedic surgery (one week).

**V C S 473O: Small Animal Surgery: Orthopedic**

Cr. 1.

*Prereq: fourth-year classification in veterinary medicine*

Clinical assignment in small animal surgery split between soft tissue surgery (one week) and orthopedic surgery (one week).

**V C S 473S: Small Animal Surgery: Soft Tissue**

Cr. 1.

*Prereq: Fourth-year classification in veterinary medicine*

Clinical assignment in small animal surgery split between soft tissue surgery (one week) and orthopedic surgery (one week).

**V C S 475: Cardiology Rotation**

Cr. 2. Repeatable.

*Prereq: Fourth year classification in veterinary medicine*

Elective clinical assignment in cardiology.

**V C S 476: Veterinary Anesthesiology**

Cr. 2. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine*

Assignments in equine, small animal, and large animal anesthesiology. Experience includes case work-up, management and recovery. Understanding of the unique physiology and potential complications of anesthetized patients. Pharmacology of commonly used drugs. Specific protocols and management for both field and general anesthesia.

**V C S 476E: Equine Anesthesiology**

Cr. 2. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine*

Assignments in equine, small animal, and large animal anesthesiology. Experience includes case work-up, management and recovery. Understanding of the unique physiology and potential complications of anesthetized patients. Pharmacology of commonly used drugs. Specific protocols and management for both field and general anesthesia.

**V C S 476S: Small Animal Anesthesiology**

Cr. 2. Repeatable.

*Prereq: Fourth-year classification in veterinary medicine*

Assignments in equine, small animal, and large animal anesthesiology. Experience includes case work-up, management and recovery. Understanding of the unique physiology and potential complications of anesthetized patients. Pharmacology of commonly used drugs. Specific protocols and management for both field and general anesthesia.

**V C S 478: Intensive and Critical Care**

(2-0) Cr. 2. Repeatable, maximum of 4 credits. F.S.SS.

*Prereq: Fourth-year classification in veterinary medicine*

Elective clinical assignment in intensive care.

**V C S 480: Veterinary Dentistry**

Cr. 1. F.

*Prereq: Third or Fourth-year classification in veterinary medicine*

All aspects of veterinary dentistry, prophylaxis, endodontics, and orthodontics. This course is an on-line course.

**V C S 481: Advanced Equine Dentistry**

Cr. 2. S.

*Prereq: Fourth year classification in veterinary medicine*

Clinical rotation in equine dentistry with an emphasis on routine equine dental examinations, specialized equipment, and corrective procedures. Offered only offered for one 2-week rotation. Enrollment is limited.

**V C S 490: Independent Study**

Cr. arr. Repeatable.

*Prereq: Permission of Course Instructor-of-Record and Sponsoring VCS Faculty Member.*

Independent Study in veterinary medicine focusing on basic / translational research or learning issues. Enrollment in this course is not appropriate for clinical experiences in the Veterinary Medical Center or extramural experiences in clinical veterinary practice (i.e., preceptorships).

**V C S 492: Orientation for International Experience**

(2-0) Cr. 1. Repeatable. S.

*Prereq: Classification in veterinary medicine*

8 weeks. Predeparture orientation for group study abroad. Cultural considerations for the study abroad experience and a conversational language introduction. Out of class work may be assigned.

**V C S 495: Grand Rounds Presentations**

Cr. R. S.

*Prereq: Fourth-year classification in veterinary medicine*

Seminars and case presentations on selected subjects by fourth year students of the College of Veterinary Medicine. Completion of a seminar presentation is required for graduation. Offered on a satisfactory-fail basis only.

**V C S 496: International Preceptorship**

Cr. 1-12. Repeatable.

*Prereq: Second-year classification in veterinary medicine. Permission of Course Instructor-of-record and sponsoring VCS Faculty*

International Preceptorships and Study Abroad Group programs. Provides opportunities for students to be involved in applied clinical, production, and/or research experiences in international locations. The course consists of 40 hour per week experiential learning opportunities. Offered on a satisfactory-fail basis only.

**Courses primarily for graduate students, open to qualified undergraduates:**

**V C S 590: Special Topics**

Cr. 1-3. Repeatable.

**V C S 590A: Special Topics: Medicine**

Cr. 1-3. Repeatable.

**V C S 590B: Special Topics: Surgery**

Cr. 1-3. Repeatable.

**V C S 590C: Special Topics: Theriogenology**

Cr. 1-3. Repeatable.

**V C S 590D: Special Topics: Radiology**

Cr. 1-3. Repeatable.

**V C S 590E: Special Topics: Anesthesiology**

Cr. 1-3. Repeatable.

**V C S 590F: Special Topics - Ophthalmology**

Cr. 1-3. Repeatable, maximum of 3 credits. F.S.

Special topics in Ophthalmology.

**V C S 596: International Preceptorship**

(0-40) Cr. 1-12. Repeatable. F.S.SS.

*Prereq: Admission to graduate college*

International Preceptorships and Study Abroad Group programs. Provides opportunities for students to be involved in applied clinical, production, and/or research experiences in international locations. The course consists of 40 hour per week experiential learning opportunities.

**V C S 599: Creative Component**

Cr. arr.

*Prereq: Enrollment in nonthesis master's degree program*

**Courses for graduate students:****V C S 604: Seminar**

Cr. 1. Repeatable. F.S.

**V C S 640: Advanced Radiology**

(2-0) Cr. 2.

*Prereq: V C S 448*

Detailed principles of clinical radiology with particular reference to radiographic interpretation.

**V C S 671: Advanced General Surgery**

(1-3) Cr. 2.

*Prereq: Permission of instructor*

Course designed to discuss and perform advanced surgical procedures in soft tissue, orthopedic and neurological surgery. Minimally invasive surgical procedures and organ transplantation will be included.

**V C S 672: Advanced Special Surgery**

(1-3) Cr. 2.

*Prereq: Permission of instructor*

Innovative techniques in microvascular, thoracic, gastrointestinal, neurological and reconstructive surgery will be investigated.

**V C S 676: Advanced Medicine**

(2-0) Cr. 2.

*Prereq: V C S 445*

Principles of general medicine. A study in depth of factors that contribute to the development of clinical signs as related to the pathogenesis of disease.

**V C S 677: Advanced Medicine**

(2-0) Cr. 2.

*Prereq: V C S 445*

An advanced study of metabolic diseases.

**V C S 699: Research**

Cr. arr. Repeatable.

**V C S 699A: Research: Medicine**

Cr. arr. Repeatable.

**V C S 699B: Research: Surgery**

Cr. arr. Repeatable.

**V C S 699C: Research: Theriogenology**

Cr. arr. Repeatable.

**V C S 699E: Research: Anesthesiology**

Cr. arr. Repeatable.

**V C S 699F: Research: Ophthalmology**

Cr. arr. Repeatable.

Graduate Level Research.

**V C S 699G: Research: Cardiology**

Cr. arr. Repeatable.

Graduate Level Research.