

## Urban Planning—UP

- 494 Planning Practicum**  
Spring. 4(0-8) P:M: (UP 365 and UP 454)  
Collection, analysis and synthesis of planning information for an established urban or regional area. Problem identification and alternative plan formulation. Formulation of comprehensive physical development policies and plans, implementation of programs.
- 800 Special Topics in Urban Planning**  
Fall, Spring, Summer. 2 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to graduate students in Urban and Regional Planning.  
Issues and current research in urban planning.
- 801 Concepts and Issues in Planning and Development**  
Fall. 4(4-0)  
Urban and regional planning and development. History of the planning profession. Current urban issues and planning approaches.
- 814 Applied Research Methods for Planning and Development**  
Spring. 3(2-2) Interdepartmental with Geography. P:NM: (UP 813) RB: (UP 813) R: Open only to graduate students in Urban and Regional Planning, Public Administration, and Geography.  
Techniques in urban and regional planning analysis. Forecasting models. Methods of urban project evaluation.
- 823 Urban Land Management**  
Fall. 4(4-0) P:NM: (UP 801 or concurrently)  
Concepts, principles, tools, and techniques of urban and regional land management. Land use planning, public facilities, infrastructure location, and environmental sensitivity in land management.
- 834 Urban Design and Project Development**  
Spring. 3(1-4) P:NM: (UP 801) R: Open only to graduate students in Urban and Regional Planning.  
Design of development projects. Integration of structures, spaces, activities, and design elements in various urban settings.
- 838 Land Use Law**  
Spring. 3(3-0) Interdepartmental with Resource Development; Agricultural Economics; Forestry. Administered by Department of Resource Development. P:NM: (RD 430)  
Public and private land use controls in the U.S. Civil rights, housing, energy problems, growth management, waste management, and land conservation. Cases, statutes and other regulations.
- 844 Decision Theory for Urban Planning and Development**  
Spring. 4(4-0) P:NM: (UP 801) or two graduate courses in the Master of Public Administration program.  
The planning and development process. Decision making in a political context. Professional ethics and practice. Gender, class, race and ethnicity in relationship to planning and development.
- 848 Urban Policy Analysis**  
Spring. 3(3-0)  
History of national urban policy. Developmental stages in processing new public policies.
- 854 Economics of Planning and Development**  
Spring. 3(3-0) Interdepartmental with Geography. P:NM: (UP 801)  
The physical urban environment and local economic development.

- 865 Planning and Development Law**  
Fall. 3(3-0) P:NM: (UP 801)  
Constitutional and statutory bases for planning and development. Effects of case law on design, administration, and implementation of regulations.
- 867 Methods and Modeling in Regional Science**  
Spring of even years. 3(3-0) Interdepartmental with Geography; Resource Development. Administered by Department of Geography. P:NM: (EC 820 and GEO 865) and (GEO 415 and RD 461)  
Techniques for regional research: economic base analysis, input-output analysis, mathematical programming, and econometric and simulation analysis.
- 868 Growth Management and Environmental Planning**  
Fall. 3(3-0) P:M: (UP 865 or concurrently and UP 801 or concurrently and UP 823) R: Open only to graduate students in Urban and Regional Planning or Urban and Regional Planning-Urban Studies or Geography.  
Principles and techniques of growth management and environmental planning, with a focus on land use issues. Selected environmental regulation topics relevant to planning in urban areas.
- 889 Master's Research**  
Fall, Spring, Summer. 3 credits. P:NM: (UP 897 or concurrently) R: Open only to master's students in the Urban and Regional Planning major. Approval of department.  
Supervised individual research for Plan B master's program.
- 890 Independent Study**  
Fall, Spring, Summer. 2 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Approval of department.  
Faculty-supervised study in aspects of urban planning.
- 893 Internship in Urban Planning**  
Fall, Spring, Summer. 2 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Approval of department.  
Supervised individual experience in approved agencies and departments in the Lansing area.
- 894 Planning Practicum**  
Fall. 4(0-8) P:NM: (UP 801 and UP 823 and UP 865) R: Open only to second-year master's students in the Urban and Regional Planning major. SA: UP 894A, UP 894B  
Professional practice in the collection, analysis and synthesis of information by students or student groups under faculty supervision. Developing solutions to specific urban problems.
- 897 Research Writing Seminar**  
Fall. 2(2-0) R: Open only to second-year master's students in the Urban and Regional Planning major.  
Research writing and presentation methods.
- 899 Master's Thesis Research**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. P:NM: (UP 897) or concurrently. R: Approval of department.  
Master's thesis research.

## VETERINARY MEDICINE

VM

### College of Veterinary Medicine

- 101 Veterinary Medicine in Society**  
Spring. 1(1-0)  
Role of the veterinary profession in animal and human health. Impact of veterinary medicine on society.
- 200 Veterinary Systems Biology and Medical Science I**  
Spring. 7(5-4) P:M: (CEM 141 and MTH 110) R: Open only to Veterinary Technology majors.  
Multidisciplinary approach to the musculoskeletal system of animals. Integration of anatomy, physiology, pathophysiology, pharmacology, and nursing care of animals. Techniques of restraint. Patient management. Medical record keeping.
- 201 Veterinary Systems Biology and Medical Science II**  
Spring. 7(5-4) P:M: (CEM 141 and MTH 110) R: Open only to Veterinary Technology majors.  
Multidisciplinary approach to the hematopoietic and cardiovascular systems of animals. Integration of anatomy, physiology, pathophysiology, pharmacology, and nursing care related to health and disease.
- 290 Special Studies in Veterinary Medicine**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to Veterinary Technology majors.  
Faculty-directed individual study on an experimental, theoretical or applied problem. May involve a supervised off-campus experience.
- 300 Veterinary Systems Biology and Medical Science III**  
Fall. 7(5-4) P:M: (VM 200 and VM 201) and completion of Tier I writing requirement. R: Open only to Veterinary Technology majors.  
Multidisciplinary approach to the neurologic and respiratory systems of animals. Integration of anatomy, physiology, pathophysiology, pharmacology, and nursing care related to health and disease.
- 301 Veterinary Systems Biology and Medical Science IV**  
Fall. 7(5-4) P:M: (VM 200 and VM 201) and completion of Tier I writing requirement. R: Open only to Veterinary Technology majors.  
Multidisciplinary approach to the urogenital and endocrine systems of animals. Integration of anatomy, physiology, pathophysiology, pharmacology, and nursing care related to health and disease.
- 302 Veterinary Systems Biology and Medical Science V**  
Spring. 7(5-4) P:M: (VM 300 and VM 301) and completion of Tier I writing requirement. R: Open only to Veterinary Technology majors.  
Multidisciplinary approach to the gastrointestinal and integumentary systems of animals. Integration of anatomy, physiology, pathophysiology, pharmacology, and nursing care related to health and disease.

- 303 Anesthesiology for Veterinary Technicians**  
Spring. 2(3-2) P:M: (VM 300 and VM 301) R: Open only to Veterinary Technology majors.  
Pharmacologic action of preanesthetic and anesthetic drugs. Principles and techniques of induction, maintenance, monitoring, and recovery of the patient. Humane methods of euthanasia. Offered half of semester.
- 304 Radiology for Veterinary Technicians**  
Spring. 2(3-2) P:M: (VM 300 and VM 301) R: Open only to Veterinary Technology majors.  
Fundamentals of radiology. Production of x-rays, components of the x-ray machine, use of screens and grids, handling film, imaging quality, film processing, patient positioning, and radiation safety. Offered half of semester.
- 369 Introduction to Zoo and Aquarium Science**  
Spring. 3(3-0) Interdepartmental with Zoology; Landscape Architecture; Fisheries and Wildlife. Administered by Department of Zoology. P:M: (BS 110 or LBS 144 or LBS 148H)  
Fundamentals of zoo and aquarium operations including research, interpretation, design, nutrition, captive breeding, conservation, ethics and management.
- 400 Laboratory Animal Technology**  
Fall. 2(1-2) P:M: (VM 302) R: Open only to senior students in the Veterinary Technology major.  
Animal husbandry, nutrition, preventive medicine, and medical management of common laboratory animals. Pathophysiology of selected diseases.
- 401 Clinical and Anatomic Pathology for Veterinary Technologists**  
Fall. 2(1-2) P:M: (VM 302) R: Open only to senior students in the Veterinary Technology major.  
Advanced cytologic techniques encompassing sample collection, processing, and evaluation. Necropsy procedures including history collection, lesion description, specimen submission, and client education concerning necropsy reports.
- 402 Hospital Practice Management for Veterinary Technologists**  
Spring. 3(3-0) R: Open only to senior students in the Veterinary Technology major.  
Veterinary practice economics, personnel management, inventory control, and marketing techniques. Use of computerized models.
- 403 Companion Animal Nutrition and Behavior for Veterinary Technologists**  
Spring. 2(2-0) P:M: (VM 302) and completion of Tier I writing requirement. R: Open only to senior students in the Veterinary Technology major.  
Nutritional management of healthy and diseased canine and feline patients. Normal canine and feline behavior, behavioral abnormalities, and behavioral modification.
- 410 Veterinary Technology Clerkship in Anesthesiology**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in anesthesiology.
- 411 Veterinary Technology Clerkship in Radiology**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in radiology.
- 412 Veterinary Technology Clerkship in Companion Animal Medicine**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in restraint, examination, nursing care, monitoring, and preventive medicine of companion animals.
- 413 Veterinary Technology Clerkship in Companion Animal Surgery**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in surgical nursing.
- 414 Veterinary Technology Clerkship in Equine Medicine and Surgery**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in equine medicine and surgery.
- 450 Veterinary Technology Clerkship in Emergency Medicine**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) P:NM: (VM 412) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in emergency medicine.
- 451 Veterinary Technology Clerkship in Cardiology**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in cardiology.
- 452 Veterinary Technology Clerkship in Neurology**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in neurology and physical therapy.
- 453 Veterinary Technology Clerkship in Ophthalmology**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in ophthalmology.
- 454 Veterinary Technology Clerkship in Critical Care**  
Fall, Spring, Summer. 3 credits. P:M: (VM 412) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in critical care.
- 460 Veterinary Technology Clerkship in Equine Anesthesiology**  
Fall, Spring, Summer. 3 credits. P:M: (VM 410 and VM 414) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in equine anesthesiology.
- 461 Veterinary Technology Clerkship in Equine Field Service**  
Fall, Spring, Summer. 3 credits. P:M: (VM 414) R: Open Only to Veterinary Technology majors.  
Application of principles and techniques in equine field service.
- 462 Veterinary Technology Clerkship in Advanced Equine Medicine and Surgery**  
Fall, Spring, Summer. 3 credits. P:M: (VM 414) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in equine medicine and surgery.
- 470 Veterinary Technology Clerkship in Food Animal Medicine**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in food animal medicine.
- 471 Veterinary Technology Clerkship in Production Medicine**  
Fall, Spring, Summer. 3 credits. P:M: (VM 470) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in production medicine.
- 472 Veterinary Technology Clerkship in Food Animal Anesthesiology**  
Fall, Spring, Summer. 3 credits. P:M: (VM 410 and VM 470) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in food animal anesthesiology.
- 480 Veterinary Technology Clerkship in Clinical Pathology**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in clinical pathology.
- 481 Veterinary Technology Clerkship in Microbiology**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in microbiology.
- 482 Veterinary Technology Clerkship in Necropsy**  
Fall, Spring, Summer. 3 credits. P:M: (VM 302 and VM 303 and VM 304) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in postmortem examination of common domestic species with emphasis on specimen description, collection, and submission.
- 483 Veterinary Technology Clerkship in Biomedical Research**  
Fall, Spring, Summer. 3 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. P:M: (VM 400) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in biomedical research involving laboratory animals.

## Veterinary Medicine—VM

- 484 Veterinary Technology Clerkship in Zoo and Wildlife Medicine**  
Fall, Spring, Summer. 3 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. P:M: (VM 410 and VM 414 and VM 411 and VM 412 and VM 413) R: Open only to Veterinary Technology majors.  
Application of principles and techniques in zoo and wildlife medicine.
- 485 Veterinary Technology Clerkship in Special Problems**  
Fall, Spring, Summer. 3 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. P:M: (VM 302) R: Open only to senior students in the Veterinary Technology major.  
Application of principles and techniques in experimental, therapeutic, or laboratory medicine.
- 511 Veterinary Perspectives I**  
Fall. 2(1-2) R: Open only to graduate-professional students in College of Veterinary Medicine.  
Animal handling, restraint, and physical examination.
- 512 Veterinary Integrative Problem Solving I**  
Fall. 1(1-0) R: Open only to graduate-professional students in College of Veterinary Medicine.  
Integration of subject material from concurrent semester courses.
- 521 Veterinary Perspectives II**  
Spring. 2(2-0) R: Open only to graduate-professional students in College of Veterinary Medicine. Not open to students with credit in VM 590.  
Veterinary medical history and ethics. Client communication and animal behavior.
- 522 Veterinary Integrative Problem Solving II**  
Spring. 3(3-0) R: Open only to graduate-professional students in College of Veterinary Medicine.  
Integration of subject material from concurrent and previous semester courses.
- 532 Veterinary Integrative Problem Solving III**  
Fall. 3(1-4) R: Completion of semester 2 of the graduate-professional program in the College of Veterinary Medicine.  
Integration of subject material from concurrent and previous semester courses.
- 533 Veterinary Epidemiology**  
Fall. 3(3-0) P:NM: Completion of semester 2 of the graduate-professional program in the college of Veterinary Medicine. Not open to students with credit in VM 549.  
Basic epidemiologic theory and study design. Veterinary descriptive and inferential biostatistics. Production veterinary medicine.
- 541 Veterinary Perspectives III**  
Spring. 2(2-0) P:NM: Completion of semester 2 of the graduate-professional program in the College of Veterinary Medicine. Not open to students with credit in VM 602.  
Concepts and principles of veterinary practice management.
- 542 Veterinary Integrative Problem Solving IV**  
Spring. 3(2-3) P:NM: Completion of semester 2 of the graduate-professional program in the College of Veterinary Medicine.  
Integration of subject material from concurrent and previous courses.
- 543 Cardiovascular Diseases**  
Spring. 2(2-0) P:NM: Completion of semester 2 of the graduate-professional program in the College of Veterinary Medicine.  
Cardiovascular diseases of domestic animals. Pathogenesis, diagnosis, and treatment.
- 544 Veterinary Public Health**  
Spring. 2(2-0) P:NM: Completion of semester 2 of the graduate-professional program in the College of Veterinary Medicine.  
Veterinary environmental and occupational and public health. Milk and meat hygiene. Control of zoonotic diseases.
- 545 Principles of Anesthesia and Surgery**  
Spring. 4(3-2) P:NM: Completion of semester 2 of the graduate-professional program in the College of Veterinary Medicine. Not open to students with credit in VM 570 or VM 578.  
Administering anesthetic agents. Fundamentals of surgery: sterile technique, tissue handling, suture patterns, wound healing, postoperative care.
- 546 Musculoskeletal Diseases**  
Spring. 5(5-0) P:NM: Completion of semester 2 of the graduate-professional program in the College of Veterinary Medicine. Not open to students with credit in VM 582 or VM 592.  
Musculoskeletal diseases of domestic animals. Pathogenesis, diagnosis, and treatment.
- 547 Respiratory Diseases**  
Spring. 2(2-0) P:NM: Completion of semester 2 of the graduate-professional program in the College of Veterinary Medicine. Not open to students with credit in VM 574.  
Respiratory diseases of domestic animals. Pathogenesis, diagnosis, and treatment.
- 552 Veterinary Integrative Problem Solving V**  
Fall. 3(2-3) P:NM: Completion of semester 4 of the graduate-professional program in the College of Veterinary Medicine.  
Integration of subject material from concurrent and previous semester courses.
- 553 Theriogenology and Urinary Diseases**  
Fall. 5(4-2) P:NM: Completion of semester 4 of the graduate-professional program in the College of Veterinary Medicine. Not open to students with credit in VM 560 or VM 580.  
Urogenital diseases of domestic animals. Pathogenesis, diagnosis, and treatment.
- 554 Hematological, Oncological and Dermatological Diseases**  
Fall. 3(3-0) P:NM: Completion of semester 4 of the graduate-professional program in the College of Veterinary Medicine. Not open to students with credit in VM 562 or VM 568.  
Hematological, oncological and dermatological diseases of domestic animals. Pathogenesis, clinical presentation, diagnosis and treatment.
- 555 Neurological and Ophthalmological Diseases**  
Fall. 3(3-0) P:NM: Completion of semester 4 of the graduate-professional program in the College of Veterinary Medicine. Not open to students with credit in VM 563 or VM 566.  
Neurological and ophthalmological diseases of domestic animals. Pathogenesis, diagnosis, and treatment.
- 556 Digestive, Metabolic and Endocrinological Diseases**  
Fall. 5(5-0) P:NM: Completion of semester 4 of the graduate-professional program in the College of Veterinary Medicine. Not open to students with credit in VM 540 or VM 576 or VM 586.  
Digestive, metabolic, and endocrinological diseases of domestic animals. Pathogenesis, diagnosis, and treatment.
- 557 Operative Surgery**  
Fall. 2(1-3) P:NM: Completion of semester 4 of the graduate-professional program in the College of Veterinary Medicine. Not open to students with credit in VM 578 or VM 588 or VM 596.  
Soft tissue and orthopedic surgery of domestic animals: preoperative evaluation, surgery, and postoperative care.
- 611 Veterinary Externship**  
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Completion of 5 semesters of the graduate-professional program in the College of Veterinary Medicine.  
Clinical or research experience in an off-campus setting.
- 690 Special Problems in Veterinary Medicine**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to graduate-professional students in the College of Veterinary Medicine.  
Individual study directed by a faculty member on an experimental, theoretical, or applied problem. May involve off campus experience in a preceptorial mode.
- 818 The Epidemiology of Zoonotic Diseases**  
Spring of odd years. 3(3-0) Interdepartmental with Epidemiology. Administered by Epidemiology. P:NM: (EPI 810) R: Open only to master's students in the Epidemiology major or approval of department.  
Human susceptibility to diseases of animals. Modes of transmission, surveillance, and strategies for prevention of specific zoonotic diseases.
- 820 Current Topics in Comparative Medicine and Integrative Biology**  
Spring. 2(2-0) A student may earn a maximum of 6 credits in all enrollments for this course. RB: Enrollment in graduate-professional program or graduate program in the biomedical sciences.  
Selected topics in comparative medicine using recently published literature to illustrate concepts. Topics will change with instructor from semester to semester.