Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

1. This request is submitted by the Department of Veterinary Pathobiology

2. Course prefix, number and complete title of course: VTMI 615 Immunogenetics and Comparative Immunology

3. Course description (not to exceed 50 words): Genetic mechanisms used to diversify immune receptors; immunoglobulins, T cell receptors, major histocompatibility complex, natural killer cell receptors, toll-like receptors and many others; selected comparative and veterinary examples of different immune recognition systems; evolution of the immune system; theoretical immune surveillance and vaccine development.

4. Prerequisite(s): Graduate classification, GENE 320 and VTPB 409, or equivalent, or permission of instructor

5. Is this a variable credit course? □ Yes ☒ No

6. Is this a repeatable course? □ Yes ☒ No

7. Has this course been taught as a 489/689? □ Yes ☒ No

8. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

   MS in Biomedical Sciences, Genetics; PhD in Genetics or Veterinary Microbiology or Veterinary Pathology

9. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

10. Prefix Course # Title (excluding punctuation)
    VTMI 615 IMMUNOGENE & COMP IMMUNO

    Lect. Lab SCH CIP and Fund Code Admin. Unit Acad. Year FICE Code
    0 0 0 0 3 2 6 0 5 0 7 0 0 2 2 9 0 7 0 9 - 1 0 0 3 6 3 2 Level 6

    Approval recommended by:
    Head of Department G.R. Bratton Date 11/17/08
    Chair, College Review Committee Date 11/17/08
    Dean of College Date 11/24/08

    Head of Department (if cross-listed course) Date
    Dean of College Date

    Submitted to Coordinating Board by:
    Date
    Effective Date

Questions regarding this form should be directed to Sandra Williams at 845.8201.
Curricular Services – 11/07

1 of 7 B21
Immunogenetics and Comparative Immunology (3 credit hours, offered spring 2010 and every spring thereafter)

Course Number: VTMI 615

Instructor: Mike Criscitiello  
Office 105 VRB  
Phone (979) 845-4207  
mcriscitiello@cvm.tamu.edu

Prerequisites: Graduate classification, GENE 320 and VTPB 409 or equivalent, or permission of instructor

Course topics:

- Overview of diversity in immune recognition  
  o Phylogenetic overview: bacteria to plants, invertebrates to mammals  
  o Molecular overview in context of innate and adaptive immune physiology  
    ▪ Receptors  
    ▪ Cells  
    ▪ Tissues  
    ▪ Organisms  
    ▪ Colony / Herd / Populations  
  WEEK 1

- Adaptive receptor systems  
  o Immunoglobulins  
  o T cell receptors  
  o Major histocompatibility complex  
  WEEK 2

- Innate receptor systems  
  o Lectins  
  o Leucine repeat  
  o Toll-like receptors  
  o Natural killer receptors  
  WEEK 3

- Major diversifying mechanisms  
  o RAG (recombination activating gene) mediated somatic cell recombination  
  o AID (activation induced cytosine deaminase) mediated mechanisms  
    ▪ Somatic hypermutation  
    ▪ Class switch recombination  
    ▪ Gene conversion  
  WEEK 4

- Allelic polymorphism  
  WEEK 5

- Comparative immune systems: examples from an evolutionary/veterinary survey  
  o Molluscan FREP  
  o Echinoderm 185/333  
  o Urochordate FuHC  
  o Agnathan variable lymphocyte receptors  
  o Teleost NITR  
  o Vertebrate T cell receptor evolution  
    ▪ Shark NAR-TCR  
    ▪ Marsupial TCRγ  
    ▪ Bovine TCR γ/δ  
  WEEK 6

- Vertebrate immunoglobulin evolution  
  ▪ Heavy/light chain isotype phylogeny  
  ▪ Rabbit appendix / ovine ileal peyer’s patch  
  ▪ Chicken bursa of fabricius  
  WEEK 7

- Evolution of the MHC  
  WEEK 8

Additional topics in graduate section:
Immunogenetic clues to genesis of adaptive immunity: If Mike caught a placoderm while fishing, what immune system might he find?
Vaccine development and biomedical immunotherapy using comparative immunology
Immunogenetics and systemic Darwinism

Graduate students enrolled in VTMI615 will be reading primary literature in the field and meeting for weekly paper presentations by students and discussions afterward.
Textbook: Immunobiology by Charlie Janeway et al, Veterinary Immunology: an Introduction by Ian Tizard or Cellular and Molecular Immunology by Abul Abbas. Other modern immunology texts should be fine as well. Will post/handout additional materials.

Office Hours: TBD

Grading:

Graduate:

Exams (3, 25% each)  75%
Pop Quizzes  10%
Paper discussions  15%

Course grades will be determined by the percent of total points earned during the semester:

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<th>FINAL PERCENTAGE</th>
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Attendance: Attendance at all scheduled examinations is required. *Documentation from a physician is required for missing a major or final examination.

Attendance at all lectures is expected and strongly encouraged. Come to class on time. Entering or leaving the classroom during class is disruptive to your classmates. Every attempt will be made to begin and end each class on time.

Students with an excused absence will be permitted to make up examinations and quizzes. Make-ups are to be arranged with the instructor as soon as possible after the absence. No make-up examination, quiz will be provided for a non-excused absence.

Assignments: Power points of lectures will be provided, and reading material will be assigned for Janeway or handout from literature. Exams will be a mixture of multiple choice and short answer/essay. Graduate students will meet weekly for additional paper discussions and will be graded on participation and a paper presentation. Short pop quizzes will be given approximately weekly to discourage students from falling behind and missing class.

Course Rationale: The purpose of this course is to provide an advanced immunology course for those who enjoyed the more molecular aspects of general immunology, have interests in comparative veterinary immunology, or applied immunology such as immunodiagnostics and vaccine development. Taken after general immunology, this course should prepare undergraduate students well for graduate school and professional school immunology or host defense classes, and should be particularly useful for those pursuing careers in comparative biomedical basic or clinical sciences. Graduate students will benefit from the advanced immunology and evolution, especially relevant for those interested in vaccine development or comparative host defense.

Course Goals and Learning Objectives: Students should come away from this course with a strong background in the unique genetic mechanisms operating in the vertebrate adaptive immune system, and to a lesser extent innate systems throughout the six Kingdoms. These will be put into the context of their natural history, allowing students to gain an appreciation of distinctions in the immune repertoires of other organisms compared to ours. Graduate students will benefit from weekly practice reading the primary molecular immunology literature, and discussing publications with their peers in a setting of faculty guidance. The student can apply this broader approach to the study of the evolution of immunity in his or her own comparative studies of other biological systems in the future.

Americans with Disabilities Act (ADA) Policy Statement
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Cain Hall or call 845-1637.
Academic Integrity Statements

AGGIE HONOR CODE

"An Aggie does not lie, cheat, or steal or tolerate those who do."

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not excuse any member of the TAMU community from the requirements or the processes of the Honor System.
September 17, 2008

Dr. Craig Coates  
Chair, Faculty of Genetics  
Department of Entomology  
TAMU 2475

Dear Dr. Coates:

I am writing this letter requesting your support for two new classes that we would like to add to our curriculum. A new faculty member, Mike Criscitiello, would like to use his expertise in the evolution of the antigen receptor genes of the adaptive immune system to offer an undergraduate and graduate level course in Immunogenetics and Comparative Immunology.

There is a need amongst both undergrads in the BIMS program and graduate students in several programs for an advanced immunology course, especially one with veterinary and biomedical relevance. This course will rely heavily on students previous coursework in molecular biology, genetics, and fundamental immunology. We know of nothing similar being taught on campus (or as a semester long course anywhere else in the country) and do not foresee any future conflicts, as Mike's background and the unique needs of students in the school of veterinary medicine and biomedical sciences make this course unlikely to be duplicated.

Mike is driven to get both his research and pedagogical programs up and running here at TAMU, and came into the department with a short list of groups outside of the Veterinary Pathobiology department that he was interested in exploring. The genomic, evolutionary and host/pathogen strengths of the existing FoG lead me to believe interaction with the group will be beneficial for him as well as Genetics and Veterinary Pathobiology and I believe he will soon be a boon to the faculty and students of both programs. His use of lower vertebrate (shark and frog) models for immunology is unique here and his initial track record of NIH funding suggests a promising future. He is applying for membership on the Genetics Faculty and is interested in cross-listing the course. He has also submitted application for appointment to the Graduate Faculty.

Thank you for your consideration of support for these courses. Enclosed please find the draft syllabus and new course applications. Please contact me if I can provide other information.

Most appreciatively,

Gerald Bratton, DVM, PhD  
Professor and Head

Encl.

APPROVED:

Craig Coates, Chair  
Faculty of Genetics

4467 TAMU  
College Station, TX 77843-4467

Tel. 979.845.5941  Fax. 979.845.9231  
http://vtb-www.cvm.tamu.edu/
Dr. Tom McKnight  
Interim Head  
Department of Biology  
TAMU 3258

Dear Dr. McKnight:

I am writing this letter requesting your support for two new classes that we would like to add to our curriculum. A new faculty member, Dr. Mike Criscitiello, would like to use his expertise in the evolution of the antigen receptor genes of the adaptive immune system to offer an undergraduate and graduate level course in Immunogenetics and Comparative Immunology.

There is a need amongst both undergrads in the BIMS program and graduate students in several programs for an advanced immunogenetics course, especially one with veterinary and biomedical relevance. This course will rely heavily on student's previous coursework in molecular biology, genetics, and fundamental immunology. We know of nothing similar being taught on campus (or as a semester long course anywhere in the country) and do not foresee any future conflicts, as Mike's background and the unique needs of students in the school of veterinary medicine and biomedical sciences make this course unlikely to be duplicated.

Mike is driven to get both his research and pedagogical programs up and running here at TAMU, and came into the department with a short list of groups outside of the Veterinary Pathobiology department that he was interested in exploring. The genomic, evolutionary and host/pathogen strengths of the Biology faculty lead me to believe interaction with the group will be beneficial for him, for biology, and for us, and I believe he will soon be a boon to the faculty and students of both programs. His use of lower vertebrate (shark and frog) models for immunology is unique here and his initial track record of NIH funding suggests a promising future. He is interested in cross-listing the courses.

Thank you for your consideration of support for these courses. Enclosed please find the draft syllabus and new course applications. Please contact me if I can provide other information.

Most appreciatively,

Gerald Brattoli, DVM, PhD  
Professor and Head

Encl.

APPROVED:

Tom McKnight  
Interim Head, Department of Biology

4467 TAMU  
College Station, TX 77843-4467  
Tel. 979.845.5941  Fax. 979.845.9231  
http://ftpdb-www.cvm.tamu.edu/
October 27, 2008

Dr. David Peterson  
Associate Department Head  
Biochemistry & Biophysics  
MS 2128

Dear Dr. Peterson:

I am writing this letter requesting your support for a new class that we would like to add to our curriculum. A new faculty member, Mike Criscitiello, would like to use his expertise in the evolution of the antigen receptor genes of the adaptive immune system to develop a course in Immunogenetics and Comparative Immunology. Previously a course in immunogenetics was offered by a member of our faculty; however, he has now retired.

There is a need amongst both undergrads in the BIMS program and graduate students in several programs for an advanced immunology course, especially one with veterinary and biomedical relevance. This course will rely heavily on student's previous coursework in molecular biology, genetics, and fundamental immunology. We know of nothing similar being taught on campus (or as a semester long course in the country, even) and do not foresee any future conflicts, as Mike's background and the unique needs of students in the school of veterinary medicine and biomedical sciences make this course unlikely to be duplicated.

Letters requesting support, along with course applications and syllabi, have been sent to the Faculty of Genetics and Department of Biology, and we have received positive responses from them.

Thank you for your consideration of support for this course. Enclosed please find the draft syllabus and new course application. Please contact me if I can provide other information.

Most appreciatively,

Gerald Bratton, DVM, PhD  
Professor and Head

Encl.

APPROVED:

David Peterson, PhD  
Professor and Associate Department Head

THIS SOUNDS LIKE A GREAT ADDITION TO THE COURSE OFFERINGS IN THE BIOLOGICAL SCIENCES.