New Course Proposal
Update 10-3-2017

DEPARTMENT: __School of Food and Agriculture____ COLLEGE: __NSFA____________________
COURSE DESIGNATOR: __AVS__________________ PROPOSED COURSE #: __254________________
COURSE TITLE: __Introduction to Animal Microbiomes__ EFFECTIVE SEMESTER: __Fall 2020________________
MaineStreet Effective Date (OSR USE ONLY): _______________________________

Requested Action: Note: A complete Syllabus is required for all new courses, including travel-study courses offered through CED or Summer Session and for the addition of General Education and/or travel-study to an existing course. Please be sure that all elements required for a syllabus at the University of Maine are present. We recommend you work closely with the syllabus check list found at www.umaine.edu/upcc.

NEW COURSE: (check all that apply and complete Section 1):
___ New Course  ___ One-time course w/GenEd  ___ X New Course/GenEd (Complete Section 2)
___ One-time Course  ___ Experimental  ___ Travel Study Course  ___ Service-Learning*
(*Add SL: before the title of course. Refer to documentation on the criteria for Service-Learning at www.umaine.edu/upcc )

ENDORSEMENTS (Please Print and Sign Name) ________________________________
Leader, Initiating Department/Unit(s)
College(s) Curriculum Committee Chair(s)
Dean(s)
Senior Associate Provost for Academic Affairs

*If more writing space is required please staple additional pages to the end of this document*

** When determining the number of credit hours for your course please note the Definition of an Undergraduate Student Credit Hour as published in the Undergraduate Catalog:
Definition of an Undergraduate Student Credit Hour: The University of Maine defines a Student Credit Hour in an undergraduate program as an expectation, on average, of approximately 45 clock hours of student academic engagement per credit hour per course. Student Academic Engagement in a course can take many forms including, but not limited to: class time, testing, reading, writing, studying, discussion group time, laboratory work, internships, practica, practicing, performing or otherwise working on course content. **
PROPOSED CATALOG DESCRIPTION:
Designator: AVS
Number: 254
Title: Introduction to Animal Microbiomes
Prerequisites: BIO 200 or BIO 208 or BMB 155 or BMB 280 or SMS 201; or instructor’s permission
Credit Hours: 3
Does it meet Service Learning?: No
Description: This course introduces students to host-associated microbiomes; the genomic collection of bacteria, archaea, fungi, protozoa, and viruses present in a host ecosystem. In each lecture, we will focus on an anatomical location, and discuss the host and environmental pressures which select for the resident microbial community. The material is primarily in animals (mammals, birds, fish, amphibians) but includes some human-specific comparisons. This course will introduce ecological theories (e.g. environmental selection, neutral theory) in the context of microbial communities, the history of host-associated microbiology, and how technology has contributed to or limited our understanding of organisms and their critical role in our health and development. The skill-set objectives include group discussions, reading scientific literature, and scientific writing in a variety of styles and both technical and non-technical formats.

REASON FOR NEW COURSE Please include updated catalog changes when submitting course
There is a need for courses which introduce students to microbial ecology, especially in the context of human and animal health, and there are currently no courses at UMaine which provide this. Research and industry have lately demonstrated a huge demand for host-associated microbiomes, and this course would prepare students going into the areas of animal or human health practice, health research, biomedical industry, and more. This course is anticipated to have broad appeal across Food and Agriculture, Microbiology, Biology, and Ecology.

Can this course be repeated for credit? No (If no please skip the next two questions)
If YES, total number of credits allowed: n/a
If YES, total number of completions allowed: n/a
Can students enroll multiple times in term? n/a

Catalog Edits
Please include relevant catalog language here along with any edits that will be necessary with the addition of this course.

___ YES, I have submitted catalog changes documenting how this new course will add to/change the degree requirements for any relevant majors/minors.
___X___ NO, this course will not be added to any lists of requirements, and therefore I have no submitted catalog changes for it.

COMPONENTS (TYPE OF COURSE/USED BY STUDENT RECORDS FOR MaineStreet)
Please check ONLY ONE box unless the proposed course will have multiple non-graded components:

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*Refer to documentation on criteria for Service-Learning at: www.umaine.edu/upcc
When will this course typically be offered? (Please Check all that Apply)

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Please explain how Student Learning Outcomes for the course as presented in the course syllabus align with the Student Learning Outcomes for the proposed general education category (Examples):

The proposed GenEd category for this course is Population and Environment, which require “students to understand how humankind interacts with our finite physical and biological environment”. As our understanding of microorganisms grows, we are also able to better understand ourselves and our natural world. Microorganisms are essential to life on this planet, and in the context of host-associated microorganisms, they allow us to gain nutrients from our diet, assist or evade our immune systems, and are essential to animal wellbeing. In addition, the microbial communities that live in or on animals are susceptible to environmental pressures or lifestyle choices, in the same way that natural ecosystems are.

To assess whether students are meeting these learning objectives, open-ended written assignments will be used, and students will be graded on the quality of presentation as well as their comprehension of the material. These formats (see Syllabus) require students to understand how microbial communities are linked to animal health and environmental conditions.

This course will fulfill the following Student Learning Outcomes Students for the Population and Environment category:

- “Recognize and understand the role of both local and global environmental change on the quality of human life,”
  - The microbial communities associated with animals can be susceptible to environmental changes, or can help us weather them. In each lecture, this course will teach students about the environmental pressures which naturally occur in different anatomical locations and how that selects for a microbial community, as well as how changes to that environment (such as disease or local climate conditions) can disrupt the microbial community and create problems for the host animal.
  - Learning objectives: Describe the dynamics which shape host-associated microbiomes; Describe how host-associated microbial ecosystems are affected by environmental (external to the body) conditions; Describe how climate change affects range and diet selection, and how this can impact gut microbial communities and animal survival; Describe vertical and horizontal transmission, as well as environmental exposure of microorganisms; Describe the effect of pollution and air quality on health and the microbiome.

- “Describe the influence of diverse factors, such as philosophical, cultural, religious, economic, educational, and political, on population growth and environmental quality,”
  - This course will teach students about how lifestyle factors (age, diet, physiological state, the use of antimicrobial toothpaste, etc.) affect host-associated microbiomes in animals, and how this can directly improve or deteriorate animal health. Many of our choices in diet, hygiene, or animal management are affected by cultural, religious, economic, education, or political motives, but all of these can affect microbial communities.
  - Learning objectives: Describe the dynamics which shape host-associated microbiomes; Describe how host-associated microbial ecosystems are affected by environmental (external to the body) conditions; Describe how climate change affects range and diet selection, and how this can impact gut microbial communities and animal survival; Describe vertical and horizontal transmission, as well as environmental exposure of microorganisms; Describe the effect of pollution and air quality on health and the microbiome.
environmental exposure of microorganisms; Describe the effect of pollution and air quality on health and the microbiome.

- “Interpret diverse types of information about environmental issues, to develop their own perspectives on these issues, and to communicate these perspectives effectively.”
  - This course will require students to read scientific literature and discuss recent advances in host-associated microbiomes. While humans will not be the focus of this course, much of what we learn about the microbial communities of other animals is directly translatable to humans, and several topics will be highly relevant, including the use of probiotics and ‘fad’ diets to create a healthy microbiome. In particular, we will discuss the ecological principles behind probiotics, and how current consumer products may not live up to their claims. The assignments for this course are primarily open-ended essays and short oral presentations, both of which teach students to take in a broad amount of information and be able to distill it down into succinct communications of science. In particular, non-technical communication formats will be included to help students learn to communicate science to a general audience.
  - Learning objective: Review scientific journal articles and distill their findings while understanding their limitations; Access online databases of scientific articles and databases.

- “Understand and describe technical and/or scientific approaches for addressing problems that arise in the relationship between human population and the environment.”
  - This course will require students to read scientific literature and be familiar the role of technology in our understanding of microbial ecology. It will also include discussions on how technology has shaped our understanding of science, and the technological changes facing scientists who study organisms which are incredibly difficult to detect and measure, and who do not obey the same ecological principles as macroorganisms. In addition to readings, students will have in-class discussions, and assignments will require them to present this information in open-ended written or short oral presentation formats.
  - Learning objectives: Review scientific journal articles and distill their findings while understanding their limitations; Communicate science in a variety of formats.

THIS SECTION MUST BE COMPLETED FOR GENERAL EDUCATION APPROVALS:
CHECK ALL AREAS FOR WHICH A COURSE IS PROPOSED*- Max. 2

| Quantitative Literacy |  |
| Lab Science |  |
| Science Applications |  |
| Western Cultural Traditions |  |
| Population & Environment | X |
| Cultural Diversity or International Perspectives |  |
| Artistic & Creative Expressions |  |
| Social Context & Institutions |  |
| Ethics |  |
| Writing Intensive |  |
| Capstone Experience |  |

*For information on General Education descriptions please see: www.umaine.edu/upcc

Please provide rational for assigning a Gen Ed to this course:
The overall goal of this course is to teach students that humans, animals, and the environment are all connected by the flow of microorganisms, and to integrate the effects of environment, host lifestyle, and human management of
environment and animals into an understanding of that flow of microorganisms. This course will provide a base of knowledge in microbial ecology, and while it focuses on host-associated microbiomes in animals, could also be applied to host-associated microbiomes in plants or insects. Similarly, many of the basic principles here apply to environmental microbiology. After completed this course, students would be able to apply this knowledge to environmental, and especially soil, microbiology courses, human and animal health, and sustainable agriculture.

**TEXT(s) PLANNED FOR USE:** (if more room is needed please attach a separate page)

All texts will be provided as scientific journal articles available online through Blackboard. A current list can be found on the course syllabus, but will be updated yearly as needed to reflect up-to-date research.

**COURSE INSTRUCTOR:** (Include name, position and teaching load)

Dr. Suzanne Ishaq, Assistant Professor, 50% teaching

Are additional resources required for this course?:

___ X ____ No. The department will not request additional resources for this course, now or in the future, unless the request is accompanied by an explanation of how the increased funding or other support is to be provided.

____ Yes. Please list additional resources required and note how they will be funded or supported

Does the content of this course overlap significantly with other University courses? If so, list the course, explain the overlap, and justify the need for the proposed course.

There are currently no courses at UMaine which provide a body-system wide approach to host-associated microbiome curriculum. While some material may be partially provided in other courses, this course will provide a more holistic view of host, microbes, and health.

What other department/programs are affected? Have affected departments/programs been consulted? Any concerns expressed? Please explain:

In addition to students in the School of Food and Agriculture (primarily Animal and Veterinary Sciences and Nutrition and Food Sciences), the Microbiology, Biology, and Ecology departments may be affected. While this course does not overlap with anything currently offered in those departments, this course may be of interest to their students. I have consulted with faculty in Animal and Veterinary Science, Food Science and Human Nutrition, Plant and Soil Science, and Molecular and Biomedical Sciences to determine student and faculty interest, as well as any overlap in curricula. No concerns were expressed. Drs. Robert Causey, Jim Weber, Dave Marcinkowski, Juan Romero, Sue Sullivan, Pauline Kamath, and Edward Bernard as well as graduate student Stephanie Shea, expressed their support for this course.

Will offering this course result in overload salary payments, either through the college or DLL either to the instructor of this course or to anyone else as a result of rearranging teaching assignments? If yes, please explain:

No.