

# Cover Sheet: Request 11296

## ANS4XXXL Techniques in Domestic Animal Genetics

### Info

Process	Course New Ugrad/Pro
Status	Pending
Submitter	Mateescu,Raluca RALUCA@UFL.EDU
Created	11/15/2016 8:49:20 AM
Updated	1/12/2017 12:38:35 PM
Description of request	Genomic technologies are rapidly moving from the lab bench to the marketplace. Animal agriculture is no exception to this trend. A variety of genetic tests are commercially available for traits as diverse as coat color, meat quality and racing performance in species from small ruminants to horses. Using cattle and horse examples we will investigate the methods used in a number of genotyping approaches. Laboratory work will take genomics out of the "black-box"; providing an opportunity to learn genotyping and DNA analysis techniques in a hands-on environment.

### Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	CALS - Animal Sciences 514909000	Tenbroeck, Saundra Hodge		11/17/2016
No document changes					
College	Approved	CALS - College of Agricultural and Life Sciences	Brendemuhl, Joel H	Changes required by the CALS CC have been addressed.	1/12/2017
Replaced TECH Spring 2017 syllabus.pdf					12/20/2016
Replaced TECH Spring 2017 syllabus v2.pdf					12/22/2016
Deleted TECH Spring 2017 syllabus v3.pdf					12/22/2016
Added TECH Spring 2017 syllabus v3.pdf					12/22/2016
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			1/12/2017
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

# Course|New for request 11296

## Info

**Request:** ANS4XXXL Techniques in Domestic Animal Genetics

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**Submitter:** Mateescu,Raluca RALUCA@UFL.EDU

**Created:** 12/22/2016 12:21:14 PM

**Form version:** 5

## Responses

**Recommended Prefix**ANS

**Course Level** 4

**Number** XXX

**Category of Instruction** Joint (Ugrad/Grad)

**Lab Code** L

**Course Title**MOLECULAR TECHNIQUES IN DOMESTIC ANIMAL GENETICS

**Transcript Title**Techniques Genetics

**Degree Type**Baccalaureate

**Delivery Method(s)**On-Campus

**Co-Listing**Yes

**Co-Listing Explanation**This is a laboratory techniques class and all students (graduates and undergraduates) will receive the same training in molecular techniques used in genetics. Graduate students will be required to prepare a written proposal describing a potential application of the protocols performed in lab to a topic from animal industry that is related to their research interest.

**Effective Term** Earliest Available

**Effective Year**2017

**Rotating Topic?**No

**Repeatable Credit?**No

**Amount of Credit**2

**S/U Only?**No

**Contact Type** Regularly Scheduled

**Weekly Contact Hours** 4

**Course Description** Studies the principles of basic domestic animal molecular biology techniques and provides hands-on experience through laboratory exercises.

**Prerequisites** ANS3384C or equivalent

**Co-requisites** None

**Rationale and Placement in Curriculum** Our course is intended for students considering careers in diagnostic livestock genetics (a rapidly growing field), research science, or veterinary diagnostics. There are currently few courses available for students seeking instruction in genetic laboratory practices, and none of these concentrate on the topics and methods of particular importance to livestock animals.

**Course Objectives** Students will gain knowledge in:

1. Developing good working habits and analytical skills in a laboratory setting.
2. Practice of standard genomics techniques in genotyping and DNA analysis.
3. Organization and dissemination of their own research findings.

4. Developing skills to interpret scientific data.
5. Developing oral communication skills for formal presentations and informal scientific discourse.

**Course Textbook(s) and/or Other Assigned Reading** No formal textbook is required. Students will be provided readings on Canvas that are current and relevant to topics discussed in class. For reference and further reading students might be interested in one of the following books from the library:

- Mulhardt, C. *Molecular Biology and Genomics (The Experimenter Series)*, 4th Ed, 2007, Academic Press.
- Brown, T.A. 2000. *Essential Molecular Biology: Practical Approach*. 2nd Edition. Oxford University Press.
- Sambrook, J. and Russell, D.W. 2001. *Molecular Cloning: A Laboratory Manual*. 3rd Edition. Cold Spring Harbor Laboratory Press, NY.

Additional materials (handouts and video clips) on each major topic are also released on Canvas.

Additional recommended readings:

- Andersson, L., & Georges, M. (2004). Domestic-animal genomics: deciphering the genetics of complex traits. *Nature Reviews. Genetics*, 5(3), 202–12.
- Gomes, R. C., Silva, S. L., Carvalho, M. E., Rezende, F. M., Pinto, L. F. B., Santana, M. H. a, ... Ferraz, J. B. S. (2013). Protein synthesis and degradation gene SNPs related to feed intake, feed efficiency, growth, and ultrasound carcass traits in Nellore cattle. *Genetics and Molecular Research*, 12(3), 2923–2936.
- Hu, Z.-L., Fernando, R., Garrick, D., & Reecy, J. M. (2010). SNPlotz: a generic genome plot tool to aid the SNP association studies. *BMC Bioinformatics*, 11(Suppl 4), P4.
- Liu, L., Li, Y., Li, S., Hu, N., He, Y., Pong, R., ... Law, M. (2012). Comparison of next-generation sequencing systems. *Journal of Biomedicine & Biotechnology*, 2012,
- Mardis, E. R. (2012). *Next-Generation Sequencing Technologies*.
- Matukumalli LK, Lawley CT, Schnabel RD, Taylor JF, Allan MF, et al. (2009) Development and Characterization of a High Density SNP Genotyping Assay for Cattle. *PLOS ONE* 4(4): e5350.
- Staehling-hampton, K. (2008). *Introduction to Next Generation Sequencing Using the Illumina 1G Genome Analyzer ( Solexa )*.
- Vignal, A., Milan, D., SanCristobal, M., & Eggen, A. (2002). A review on SNP and other types of molecular markers and their use in animal genetics. *Genetics Selection Evolution*, 34(3), 275.

### **Weekly Schedule of Topics** WEEK DATE Lab Topic

- 1 1/5 Lab Safety, Lab Notebooks
- 2 1/10 Pipetting Practice
- 1/12 Serial Dilutions
- 3 1/17 DNA Extraction from hair
- 1/19 DNA extraction from blood
- 4 1/24 DNA extraction from blood con't
- 1/26 DNA Quantification
- 5 1/31 PCR Basics
- 2/2 PCR Continued
- 6 2/7 Gel Electrophoresis
- 2/9 Restriction Endonucleases
- 7 2/14 PCR Primer Design
- 2/16 PCR Primer Optimization
- 8 2/21 T-ARMS-PCR
- 2/23 Electrophoresis of Small Products
- 9 2/28 High GC PCR
- 3/2 Catch-up Day
- SPRING BREAK
- 10 3/14 PCR prep for Sequencing
- 3/16 Field trip to the UF Sequencing Core

11 3/21 DNA sequencing  
3/23 Bioinformatics  
12 3/28 High Resolution Melt  
3/30 RNA extraction  
13 4/4 RT-PCR  
4/6 qPCR  
14 4/11 qPCR Analysis  
4/13 Presentations Day 1  
15 4/18 Presentations Day 2

#### **Links and Policies** Attendance and Make-Up Work

This course requires active participation, hands-on lab work and discussion with your peers. As such attendance is imperative.

University policies for class attendance and make-up exams, assignments and other work can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>. It is your personal responsibility to obtain information presented in class. Documentation of approved absences (personal illness, family emergency etc.) must be presented within 5 days for arrangements to be made to make-up quizzes and assignments. University approved absences for sports and student organizations must be disclosed at least two weeks in advance. Late assignments due to unexcused absence will be penalized 25% for the first 24 hours beyond the due date, 50% for 24-48hrs late and will not be accepted thereafter.

#### Online Course Evaluation Process:

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria.

These evaluations are conducted online at <https://evaluations.ufl.edu>.

Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

#### Academic Integrity and Plagiarism:

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conductionor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

#### Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

#### Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student

who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)

#### Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general wellbeing

are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, [www.counseling.ufl.edu/cwc/](http://www.counseling.ufl.edu/cwc/) Counseling Services, Groups and Workshops, Outreach and Consultation, Self-Help Library, Wellness Coaching

- U Matter We Care, [www.umatter.ufl.edu/](http://www.umatter.ufl.edu/)

- Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)

#### **Grading Scheme** Credit and assessments

40% (35% for graduate students)- Quizzes

The quizzes will be taken online using the canvas system and are due 1 hour before class commences each day. They will consist of short questions from the readings and protocols assigned for the upcoming lab period. You will have a limited time to take it once you start the quiz (10 minutes) – so it is important that you study before you start taking the quiz. Please make sure you have a secure internet connection (if you lose the internet connection your quiz will end and you will not be allowed to take it again).

40% (35% for graduate students)- Lab Notebooks and Datasets

Although students might be working in groups on experiments, each student is required to maintain a bound lab notebook with numbered pages. The lab notebook should contain a descriptive title, date, purpose, protocols, results, discussion, and other details necessary to repeat your work. The lab notebook will be checked once a week throughout the semester.

20%- Final Presentations

Each student will be required to prepare a presentation at the end of class describing a potential application of the protocols performed in lab to an topic from animal industry that interests them. Scores will be based on instructor's assessments of the presentation, as well as peer-reviews following a well-defined rubric.

10% (graduate students only) – Written Proposal

Graduate students will be required to prepare a written proposal of the application in addition to the oral presentation. The written proposal will count for 10% of the final grade.

#### Grading Scale

93-100%- A

90- 92.9%- A-

87-89.9%- B+

83-86.9%- B

80-82.9%- B-

77-79.9%- C+

73-76.9%- C

70-72.9%- C-

67-69.9%- D+

63-66.9%- D

60-62.9%- D-

60% and Below- E

**Instructor(s)** Raluca Mateescu, Samantha Brooks



# MOLECULAR TECHNIQUES IN DOMESTIC ANIMAL GENETICS

ANS 4xxx/6xxx

**\*\*2 CREDITS\*\***

## **COURSE OVERVIEW**

Genomic technologies are rapidly moving from the lab bench to the marketplace. Animal agriculture is no exception to this trend. A variety of genetic tests are commercially available for traits as diverse as coat color, meat quality and racing performance in species from small ruminants to horses. Using cattle and horse examples we will investigate the methods used in a number of genotyping approaches. Laboratory work will take genomics out of the “black-box”; providing an opportunity to learn genotyping and DNA analysis techniques in a hands-on environment.

### ***Instructors:***

Dr. Samantha Brooks

Dr. Raluca Mateescu

### ***Location:***

Rm. TBA

### ***Time:***

TBA

### ***Prerequisites:***

ANS3384 or equivalent

### ***Office Hours:***

11:30am- 12:30am Fridays OR

By Appointment

**ANS 4xxx/6xxx**

Credits: 2; Prerequisites: ANS 3384C or equivalent

**Course Description**

Studies the principles of basic domestic animal molecular biology techniques and provides hands-on experience through laboratory exercises.

**Objectives**

Students will gain knowledge in:

1. Developing good working habits and analytical skills in a laboratory setting.
2. Practice of standard genomics techniques in genotyping and DNA analysis.
3. Organization and dissemination of their own research findings.
4. Developing skills to interpret scientific data.
5. Developing oral communication skills for formal presentations and informal scientific discourse.

**Textbook**

No formal textbook is required. Students will be provided readings on Canvas that are current and relevant to topics discussed in class. For reference and further reading students might be interested in one of the following books from the library:

- Mulhardt, C. *Molecular Biology and Genomics (The Experimenter Series)*, 4<sup>th</sup> Ed, 2007, Academic Press.
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- Sambrook, J. and Russell, D.W. 2001. *Molecular Cloning: A Laboratory Manual*. 3<sup>rd</sup> Edition. Cold Spring Harbor Laboratory Press, NY.

Additional materials (handouts and video clips) on each major topic are also released on Canvas. To enable productive use of lab time these readings should be completed, and all protocols reviewed, prior to class. Quizzes on topics from the readings will be conducted before each class on canvas.

**Recommended readings:**

Andersson, L., & Georges, M. (2004). Domestic-animal genomics: deciphering the genetics of complex traits. *Nature Reviews. Genetics*, 5(3), 202–12.

Gomes, R. C., Silva, S. L., Carvalho, M. E., Rezende, F. M., Pinto, L. F. B., Santana, M. H. a, ... Ferraz, J. B. S. (2013). Protein synthesis and degradation gene SNPs related to feed intake, feed efficiency, growth, and ultrasound carcass traits in Nellore cattle. *Genetics and Molecular Research*, 12(3), 2923–2936.

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### Communication

Course materials and messages will be hosted on our Canvas e-Learning site. Assignments and assessments will only be accepted through Canvas. Email can be sent either through the Canvas system, or the standard @ufl.edu system. Please be sure you change your canvas settings so that you receive course announcements daily, not once a week, so that you get messages on time! Keep in mind that while email is fast and simple, you should always use a courteous and professional attitude when communicating with your instructors and fellow students. Please be polite to your instructors and fellow students and limit use of slang and abbreviations.

### Fees

In lab opportunities are a great learning experience, but do require reagents and consumables. We have carefully budgeted supplies for the semester so that we have what we need for the planned experiments, but keep costs as low as possible for our students. Please keep this in mind and avoid unnecessary waste of items like gloves, tubes and reagents as you would through this course.

### Credit and assessments

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#### 10% (graduate students only) – Written Proposal

Graduate students will be required to prepare a written proposal of the application in addition to the oral presentation. The written proposal will count for 10% of the final grade.

Due dates for all assignments are presented in the course schedule.



## Grading Scale

93-100%- A	80-82.9%- B-	67-69.9%- D+
90- 92.9%- A-	77-79.9%- C+	63-66.9%- D
87-89.9%- B+	73-76.9%- C	60-62.9%- D-
83-86.9%- B	70-72.9%- C-	60% and Below- E

More information on grades and grading policies is here:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

## Dress Code

This is a wet-lab course. Students are required to dress appropriately, including shoes that cover the top of your foot, shirts that cover all of the torso (no tank or tube tops) and long pants. Long hair should be tied back, to protect both you and your experiments.

Furthermore, as representatives of this class, our department and our university you are expected to dress, and to act, in a professional manner at all times.

## Cell Phone, Laptops and Other Technology

Cell phones must remain silenced and stored during class and labs unless specifically permitted for an activity or assignment.

Use of laptops, tablets, and internet connected devices is encouraged during specific sessions in this course. However, these devices do come with social responsibility. Students are expected to keep sounds turned off, not to distract those around them, and most of all to limit “multitasking” activities that will distract themselves (ie email and social media.) Excessive multitasking and disruptive use of electronic devices will result in a dismissal from the classroom.

## Attendance and Make-Up Work

This course requires active participation, hands-on lab work and discussion with your peers. As such attendance is imperative.

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Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

**Academic Integrity and Plagiarism:**

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

**Software Use**

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

**Services for Students with Disabilities**

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

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**Campus Helping Resources**

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- *U Matter We Care, [www.umatter.ufl.edu/](http://www.umatter.ufl.edu/)*
- *Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)*

**Course Schedule (subject to modification to accommodate guest speakers)**

<b>WEEK</b>	<b>DATE</b>	<b>Lab Topic</b>	<b>Location</b>	<b>Due</b>
1	1/5	Lab Safety, Lab Notebooks	TBA	-
2	1/10	Pipetting Practice	TBA	Quiz
	1/12	Serial Dilutions	TBA	Quiz
3	1/17	DNA Extraction from hair	TBA	Quiz
	1/19	DNA extraction from blood	TBA	Quiz, Notebooks
4	1/24	DNA extraction from blood con't	TBA	Quiz
	1/26	DNA Quantification	TBA	Quiz
5	1/31	PCR Basics	TBA	Quiz
	2/2	PCR Continued	TBA	Quiz, Notebooks
6	2/7	Gel Electrophoresis	TBA	Quiz
	2/9	Restriction Endonucleases	TBA	Quiz
7	2/14	PCR Primer Design	TBA	Quiz
	2/16	PCR Primer Optimization	TBA	Quiz, Notebooks
8	2/21	T-ARMS-PCR	TBA	Quiz
	2/23	Electrophoresis of Small Products	TBA	Quiz
9	2/28	High GC PCR	TBA	Quiz, Presentations Topics
	3/2	Catch-up Day	TBA	Quiz, Notebooks
		SPRING BREAK	TBA	
10	3/14	PCR prep for Sequencing	TBA	Quiz
	3/16	Field trip to the UF Sequencing Core	TBA	Quiz
11	3/21	DNA sequencing	TBA	Quiz
	3/23	Bioinformatics	TBA	Quiz, Notebooks
12	3/28	High Resolution Melt	TBA	Quiz
	3/30	RNA extraction	TBA	Quiz
13	4/4	RT-PCR	TBA	Quiz
	4/6	qPCR	TBA	Quiz, Notebooks
14	4/11	qPCR Analysis	TBA	
	4/13	Presentations Day 1	TBA	Peer-Reviews
15	4/18	Presentations Day 2	TBA	Peer-Reviews