9. New Course – from September 11, 2009 Meeting

**ECEN 419. Genomic Signal Processing. (3-0). Credit 3.** Fundamentals of molecular biology; application of engineering principles to systems biology; topics include unearthing intergene relationships, carrying out gene-based classification of disease, modeling genetic regulatory networks, and altering their dynamic behavior. Prerequisite: ECEN 314, junior or senior classification or approval of instructor.
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: Electrical and Computer Engineering

2. Course prefix, number and complete title of course: ECEN 419 Genomic Signal Processing

3. Catalog course description (not to exceed 50 words): Fundamentals of molecular biology; application of engineering principles to systems biology; topics include uncovering intergene relationships, carrying out gene-based classification of disease, modeling genetic regulatory networks, and altering their dynamic behavior.

4. Prerequisite(s): ECEN 314, junior or senior classification or approval of instructor.

Cross-listed with:

Cross-listed courses require the signature of both department heads.

5. Is this a variable credit course? □ Yes ☒ No If yes, from __________ to __________

6. Is this a repeatable course? □ Yes ☒ No If yes, this course may be taken ________ times.

Will this course be repeated within the same semester? □ Yes ☒ No

7. 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)

B.S. in Electrical and Computer Engineering

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

9. Prefix: ECEN 419

Course #

Title (excluding punctuation): Genomic Signal Processing

Lect. 3 Lab 0 SCH 0 CIP and Fund Code 0 1 0 0 0 6

Admin. Unit 0936

Acad. Year 10 - 11

FICE Code 1003 3 6 3 2

Level 4

Approval recommended by:

[Signature]

Department Head - Type Name & Sign

[Date] 7/20/09

Chair, College Review Committee

[Signature] 7/29/09

[Date]

Dean of College

[Signature] 7/29/09

[Date]

Submitted to Coordinating Board by:

[Signature]

Associate Director, Curricular Services

Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.

Curricular Services – 3/09
Course title and number  
ECEN 419 – Genomic Signal Processing

Term  
Fall 2010

Meeting times and location  
TBD

Course Description and Prerequisites

This course will first introduce students to the area of Molecular Biology. This will lay out the groundwork for discussing the application of Engineering Principles to Systems Biology. Examples will include (i) unearthing intergene relationships (ii) carrying out gene based classification of disease (iii) modeling genetic regulatory networks and (iv) altering their dynamic behavior. Pre-requisites: ECEN 314, Junior or Senior classification or Approval of Instructor.

Learning Outcomes or Course Objectives

The aim of this course will be to provide undergraduate ECE students with a glimpse of the fascinating ways in which electrical engineering approaches are being used in the area of systems biology. Having taken this course, the students will (i) develop a basic understanding of molecular biology and (ii) gain an appreciation of how problems arising in systems biology can be formulated and solved using engineering tools. Although the students are not expected to be mastering all the different techniques at the undergraduate level, they will at least come out of the course having absorbed the big picture. For students wishing to delve deeper into this area, a graduate level version of this course (ECEN 669) is available.

Instructor Information

Name  
Dr. A. Datta

Telephone number  
(979) 845-5917

Email address  
datta@ece.tamu.edu

Office hours  
TBD

Office location  
216N ZEC

Textbook and/or Resource Material


Journal Articles

Copies of all these and additional articles can be downloaded by going to the Genomic Signal Processing (GSP) Lab website http://gsp.tamu.edu

- 1 -


Grading Policies
There will be two in-class exams and some computer assignments. Each exam will count towards 25% of the final grade and the computer assignments will count towards the remaining 50%.
Grading Scale: A=90-100, B=80-89, C=70-79, D=60-69, F=below 60.

Course Topics, Calendar of Activities, Major Assignment Dates
Exam 1: Oct 1st, 2010 (approx.).
Exam 2: November 5th, 2010 (approx.).
Computer Assignments: once every 10 days after week 9.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Reading (from text)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction, Organic Chemistry Review</td>
<td>Chapters 1 and 2</td>
</tr>
<tr>
<td>2</td>
<td>Energy Considerations in Biochemical Reactions</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>3</td>
<td>Proteins</td>
<td>Chapter 4</td>
</tr>
<tr>
<td>4</td>
<td>DNA, Transcription and Translation</td>
<td>Chapters 5 and 6</td>
</tr>
<tr>
<td>5</td>
<td>Chromosomes, Gene Regulation and Genetic Variation</td>
<td>Chapters 7 and 8</td>
</tr>
<tr>
<td>6</td>
<td>DNA Technology</td>
<td>Chapter 9</td>
</tr>
<tr>
<td>7</td>
<td>Cell Division</td>
<td>Chapter 10</td>
</tr>
<tr>
<td>8</td>
<td>Cell Cycle Control, Cell Death and Cancer</td>
<td>Chapter 11</td>
</tr>
<tr>
<td>9</td>
<td>Expression Microarrays</td>
<td>Chapter 12</td>
</tr>
<tr>
<td>10</td>
<td>Classification</td>
<td>Chapter 13</td>
</tr>
<tr>
<td>11</td>
<td>Clustering</td>
<td>Chapter 14</td>
</tr>
<tr>
<td>12</td>
<td>Genetic Regulatory Networks</td>
<td>Chapter 15</td>
</tr>
<tr>
<td>13</td>
<td>Intervention</td>
<td>Chapter 16</td>
</tr>
<tr>
<td>14</td>
<td>Intervention Based on Control Theory</td>
<td>Chapter 17</td>
</tr>
</tbody>
</table>

Other Pertinent Course Information
Power Point Lecture notes used earlier for teaching the 489 version of this course are available and the students will be able to access them through a website.

Student Rules Regarding Attendance (Excused Absences)
Information is available at:  [http://student-rules.tamu.edu/search/rule7.htm](http://student-rules.tamu.edu/search/rule7.htm)

Americans with Disabilities Act (ADA)
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 Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

**Academic Integrity**
For additional information please visit: http://www.tamu.edu/aggiehonor

“An Aggie does not lie, cheat, or steal, or tolerate those who do.”
Sandra,  

Below is an email correspondence with Dr. Scott from the College of Science and Dr. MacKenzie from the Biology Department posing no objections to the ECEN 419 course.

Thanks,
April

---

A. Datta

---

April:

Here is the relevant email. This should take care of Biology.

Regards,
Datta.

---

Costas Georghiades

---

Thank you Ray. We will of course have no objection to Biology offering a course on Systems Biology in the future, should they decide to do so.

Tim, thank you for your quick response to this request. I also appreciate your collegial response to our proposed new course offering.

Best regards,
Costas
Tim:

Thank you for the very helpful and collegial response, which I am relaying to the Electrical Engineering department (Costas: it might be helpful to have a formal statement like the one offered with your New Course Request when it hits the University Curriculum Committee or the Faculty Senate...)

I certainly can't imagine how there could be an engineering objection to a future interest by Biology in a Systems Biology Course. If such a situation were to develop, we need to point to this correspondence and remind everyone involved of the importance of collegiality in the development of our educational approaches for the future.

It also seems to me that there might be an opportunity for some sort of interdisciplinary course, taught by an interdisciplinary team of instructors from both engineering and biology. I hope the involved engineering faculty and biology faculty might think about this to see if it could be beneficial to our programs and to our students.

Best regards,
Ray

-----Original Message-----
From: Timothy Scott [mailto:tim@science.tamu.edu]
Sent: Wednesday, May 20, 2009 5:31 PM
To: Ray James
Subject: FW: ECEN 419 RE: Scan from ESSAP

Let me know if you need anything else.

ts

Timothy P. Scott, Ph.D.
Associate Dean for Undergraduate Programs
College of Science
Texas A&M University
tim@science.tamu.edu

514 Blocker

3257 TAMU 1 College Station, TX  77843-3257

Tel. 979.845.7362 I Fax. 979.845.6077

www.science.tamu.edu

Be curious.

-----Original Message-----
From: Duncan MacKenzie [mailto:duncan@mail.bio.tamu.edu]
Sent: Wednesday, May 20, 2009 4:09 PM
To: Timothy Scott
Cc: Christine Farris; Thomas McKnight
Subject: FW: ECEN 419 RE: Scan from ESSAP

Hi Tim. After talking it over with Rodolfo Aramayo (who teaches our Genomics class) and Tom McKnight, we have decided that we have no objections to Engineering teaching this class as long as it will not prevent us from offering our own Systems Biology course in the future. If Engineering needs a more formal statement, Tom McKnight
can provide it.

Thanks for the heads-up.

Duncan

Duncan MacKenzie
Associate Professor
Chair, Undergraduate Programs Committee
Department of Biology
3258 TAMU
Texas A&M University
College Station, TX  77843
duncan@mail.bio.tamu.edu
voice: 979 845-7701
fax: 979 845-2891

Thoughts?

tim

Timothy P. Scott, Ph.D.
Associate Dean for Undergraduate Programs
College of Science
Texas A&M University
tim@science.tamu.edu

514 Blocker

3257 TAMU I College Station, TX  77843- 3257

Tel. 979.845.7362 I Fax. 979.845.6077

www.science.tamu.edu

Be curious.

----- Original Message-----
From: Ray James [mailto:r-james@tamu.edu]
Sent: Tuesday, May 12, 2009 2:25 PM
To: Timothy Scott
Cc: Cathy Sperry
Subject: FW: ECEN 419 RE: Scan from ESSAP
Importance: High

Tim:

This new course request is slowly making it's way out of the College
of Engineering Curriculum Committee (we have some internal turf wars
going on). But, it occurs to us that maybe there will be objections
(we hope not) from some in life sciences. Will you please look at
this request and let me know whether you foresee problems from
Biology, etc.... and any tips on what we should do to keep everyone
happy...?

Ray

----- Original Message-----
From: Cathy Sperry
Sent: Tuesday, May 12, 2009 2:16 PM
Dr. James: Please see the attached New Course Request and syllabus for ECEN 419 - Genomic Signal Processing. Cady Engineering in the College of Agriculture and Life Sciences indicated that we may need letters of support from Biology, Biochemistry, and other departments in life sciences. Please advise.

~Cathy

----- Original Message-----
From: April Place [mailto:aplace@mail.ece.tamu.edu] Sent: Tuesday, May 12, 2009 2:07 PM To: Cathy Sperry Cc: A. Datta Subject: RE: ECEN 419 RE: Scan from ESSAP

April: Please have your department head sign the attached.

Thanks,
April

----- Original Message-----
From: Cathy Sperry [mailto:c-sperry@tamu.edu] Sent: Tuesday, May 12, 2009 11:25 AM To: April Place Cc: A. Datta Subject: RE: ECEN 419 RE: Scan from ESSAP

Attached is the signed new course request and updated syllabus for ECEN 419. Please let me know if you need the hard copies as well.

Thanks,
April
----- Original Message-----
> From: April Place [mailto:aplace@mail.ece.tamu.edu]
> Sent: Tuesday, April 14, 2009 8:40 AM
> To: Cathy Sperry
> Subject: RE: ECEN 419 RE: Scan from ESSAP
>
> Cathy,
>
> Here is Dr. Datta's updated course information. Please let me know
> if you need anything else!
>
> April
>
> April Place
> Class of 2005
> Undergraduate Academic Advisor
> Department of Electrical & Computer Engineering Texas A&M University
> 214 Zachry Engineering Center, MS 3128
> College Station, TX 77843- 3128
> 979- 458- 0174
>
> ----- Original Message-----
> From: Cathy Sperry [mailto:c-sperry@tamu.edu]
> Sent: Thursday, April 09, 2009 1:43 PM
> To: April Place
> Subject: RE: ECEN 419 RE: Scan from ESSAP
>
> It has to be retyped. Thanks!
>
> ----- Original Message-----
> From: April Place [mailto:aplace@mail.ece.tamu.edu]
> Sent: Thursday, April 09, 2009 1:40 PM
> To: Cathy Sperry
> Subject: RE: ECEN 419 RE: Scan from ESSAP
>
> Cathy,
>
> This is all that he gave me. If you need the form and syllabus re-
> typed please let me know and I will ask him for it.
>
> Thanks,
> April
>
> April Place
> Class of 2005
> Undergraduate Academic Advisor
> Department of Electrical & Computer Engineering Texas A&M University
> 214 Zachry Engineering Center, MS 3128
> College Station, TX 77843- 3128
> 979- 458- 0174
>
> ----- Original Message-----
> From: Cathy Sperry [mailto:c-sperry@tamu.edu]
> Sent: Wednesday, April 08, 2009 10:50 AM
> To: April Place
> Subject: RE: ECEN 419 RE: Scan from ESSAP
>
> No. Please send to me and I'll forward to the advisors for a vote.
> Thanks!
>
> ----- Original Message-----
> From: April Place [mailto:aplace@mail.ece.tamu.edu]
Cathy,

Dr. Datta gave me a copy of his updated syllabus and form for the ECEN 419 New Course Request based on Mrs. Williams' recommendations. Did he send you the updated copy as well?

Thanks,

April

April Place
Class of 2005
Undergraduate Academic Advisor
Department of Electrical & Computer Engineering Texas A&M University
214 Zachry Engineering Center, MS 3128
College Station, TX 77843-3128
979-458-0174

--- Original Message ---
From: Cathy Sperry [mailto:c-sperry@tamu.edu]
Sent: Friday, March 27, 2009 12:55 PM
To: A. Datta; April Place
Subject: FW: ECEN 419 RE: Scan from ESSAP

Dr. Datta and April:

Sandra Williams in Curricular Services has made some recommended changes to the ECEN 419 Course Request (see the following email and attached). Please make these changes and I will forward to the College of Engineering Undergraduate Curriculum Committee.

Thanks!

Cathy

Cathy D. Sperry '95
Manager
Engineering Student Services & Academic Programs Texas A&M
University c-sperry@tamu.edu

204 Zachry Engineering Center | 3127 TAMU | College Station, TX
77843-3127

Tel. 979.845.8699 | Fax. 979.847.8654

http://essap.tamu.edu
Hey Cathy,
Attached are my suggestions for ECEN 419.
For the syllabus, I indicated they may want to include a grading scale (90-100 = A, 80-89 = B, etc.). Also, they may want to include the link to student rules regarding attendance (excused absences). [http://student-rules.tamu.edu/search/rule7.htm](http://student-rules.tamu.edu/search/rule7.htm)

These are only suggestions.

Hope this helps.
Sandra

---
Sandra Williams
Associate Director
Curricular Services
Undergraduate Programs and Academic Services Texas A&M University

1001 General Services Complex | 1369 TAMU College Station, TX 77843-1369 USA Tel. +1 979.845.8201 | Fax +1 979.458.2069 Email sandra-williams@tamu.edu

Hope this helps.
Sandra
From: April Place [aplace@mail.ece.tamu.edu]
Sent: Tuesday, October 13, 2009 4:30 PM
To: Williams, Sandra J
Subject: FW: ECEN 419 Curriculum Approval

Importance: High

Sandra,

Below is an email from the Associate Head for Undergraduate Programs for the Department of Biochemistry & Biophysics (Genetics) stating they have no objection to our new course ECEN 419.

If a more formal letter is required, please let me know.

Thanks!
April

April Place
Class of 2005
Undergraduate Academic Advisor
Department of Electrical & Computer Engineering Texas A&M University
214 Zachry Engineering Center, MS 3128
College Station, TX 77843-3128
Office: 979-458-0174
Fax: 979-845-6259

-----Original Message-----
From: David Peterson [mailto:dopeterson@tamu.edu]
Sent: Tuesday, October 13, 2009 4:21 PM
To: April Place
Cc: Gregory D. Reinhart
Subject: Re: ECEN 419 Curriculum Approval
Importance: High

April,

We have no objections to ECEN 419. Would you like a more formal written document, or will this email suffice?

David Peterson
Professor
Associate Head for Undergraduate Programs
Department of Biochemistry and Biophysics
Texas A&M University
2128 TAMU | College Station, TX 77843-2128
Tel. 979.845.0953

> From: "April Place" <aplace@mail.ece.tamu.edu>
> To: <dopeterson@tamu.edu>,
>       <g-reinhart@tamu.edu>,
>       <smart12me@neo.tamu.edu>
> Cc: "Cathy Sperry" <c-sperry@tamu.edu>,
>      "A. Datta" <datta@mail.ece.tamu.edu>
Good afternoon,

The Electrical & Computer Engineering Department is trying to have a new course approved for the upcoming catalog. The course is ECEN 419: Genomic Signal Processing. The course syllabus is attached.

ECEN 419 has been approved by the College of Engineering and the University Curriculum Committee. However, it has been returned from the Faculty Senate Executive Committee and they are requesting that we submit letters of support from the Genetics Department and Biology Department. The Biology Department has already approved of the course.

Please review the attached course information for ECEN 419 and let me know if there are any concerns or objections with our department offering this course.

The Faculty Senate has requested this information by noon tomorrow (Wednesday the 7th). However, I understand that more time is most likely needed so just please let me know.

I apologize for the very short notice and I appreciate any help that you can give. Please contact me if you have any questions.

Thanks again,
April

April Place
Class of 2005
Undergraduate Academic Advisor
Department of Electrical & Computer Engineering
Texas A&M University
214 Zachry Engineering Center, MS 3128
College Station, TX 77843-3128
Office: 979-458-0174
Fax: 979-845-6259