Course Change Request

New Course Proposal

Date Submitted: 09/15/16 4:23 pm

Viewing: MARB 433 : Applied Bioinformatics

Last edit: 10/19/16 3:25 pm

Changes proposed by: ballr

Faculty Senate Number

<table>
<thead>
<tr>
<th>Name</th>
<th>E-mail</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rachel Ball</td>
<td><a href="mailto:ballr@tamug.edu">ballr@tamug.edu</a></td>
<td>409-740-4531</td>
</tr>
</tbody>
</table>

Course prefix MARB Course number 433

Department Marine Biology

College/School Galveston Campus

Academic Level Undergraduate

Effective term 2017-2018 Galveston

Complete Course Title Applied Bioinformatics

Abbreviated Course Title APPLIED BIOINFORMATICS

Catalog course description

Fundamental concepts and methods in bioinformatics using sequence analysis and practical applications; includes biological databases, sequence and structure alignments, structural bioinformatics, gene prediction and genome analysis; emphasis on understanding and application of these concepts.

Prerequisites and Restrictions

MARB 301; junior or senior classification or approval of instructor

Concurrent Enrollment No

Should catalog prerequisites / concurrent enrollment be enforced? Yes

Enforced Prerequisites / Concurrent Enrollment

<table>
<thead>
<tr>
<th>And/Or</th>
<th>Course Prefix/Number</th>
<th>Min Grade/Score</th>
<th>Academic Level</th>
<th>}</th>
<th>Concurrency</th>
</tr>
</thead>
<tbody>
<tr>
<td>(</td>
<td>MARB 301</td>
<td>D</td>
<td>UG</td>
<td>)</td>
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</table>

Crosslistings No

Crosslisted With

Stacked Yes

Stacked with MARB 633 - Applied Bioinformatics

Semester 3.00 Contact Hour(s) (per week): Lecture: 3.00 Lab: 0 Other: 0 Total 3

In Workflow

1. MARB Department Head
2. Curricular Services Review
3. GV Committee
   Preparer UG
4. GV Committee Chair UG
5. GV College Dean UG
6. UCC Preparer
7. UCC Chair
8. Faculty Senate
   Preparer
9. Faculty Senate
10. Provost II
11. President
12. Curricular Services
13. Banner

Approval Path

1. 09/16/16 1:30 pm
   John Schwarz (schwarzj): Approved for MARB Department Head
2. 09/19/16 2:58 pm
   Sandra Williams (sandra williams): Approved for Curricular Services Review
3. 09/19/16 3:52 pm
   Meredith Zalesak (zalesakm): Approved for GV Committee Preparer UG
4. 09/19/16 5:11 pm
   Donna Lang (langd): Approved for GV Committee Chair UG
5. 09/29/16 10:33 am
   Patrick Louchouarn (loup): Approved for GV College Dean UG
6. 10/11/16 10:08 am
   Sandra Williams (sandra-williams): Approved for UCC Preparer
7. 11/07/16 9:19 am
   Sandra Williams (sandra-williams): Approved for UCC Chair
Repeatable for credit? No
Three-peat? No
CIP/Fund Code 2611030002
Default Grade Mode Letter Grade (G)
Method of instruction Lecture
Will this course be taught as a distance education course? No
Is 100% of this course going to be taught in Texas? Yes
Will classroom space be needed for this course? Yes

This will be a required course or an elective course for the following programs:

Required (select program)

Elective (select program)

<table>
<thead>
<tr>
<th>Program(s)</th>
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</thead>
<tbody>
<tr>
<td>(BS-MARF) Marine Fisheries - BS</td>
</tr>
<tr>
<td>(BS-MARB) Marine Biology - BS</td>
</tr>
</tbody>
</table>

Has/will this course be (en) submitted for core curriculum consideration? No
Has/will this course be (en) submitted for Writing or Communication consideration? No
Has/will this course be (en) submitted for ICD consideration? No

Course Syllabus

Syllabus: Upload syllabus
Upload syllabus [MARB 433: Bioinformatics Syllabus (Spring 2018).pdf]

Letters of support or other documentation
Upload files [MARB 431 and MARB 633 approval from STAT in CS.pdf]
[MARB 433 Letter of Support.docx]

Additional information
Reviewer Comments
Sandra Williams (sandra-williams) (09/02/16 12:38 pm): Edited course description - objectives should be listed in syllabus. Update syllabus: late submission policy - what about university excused absences?
Sandra Williams (sandra-williams) (09/02/16 12:39 pm): Edited course description - objectives should be listed in syllabus. Update syllabus: late submission policy - what about university excused absences?
Meredith Zalesak (zalesakm) (09/07/16 11:54 am): Rollback: Fix syllabus and title.
Sandra Williams (sandra-williams) (09/19/16 2:57 pm): Sending course forward but note the following: Syllabus late submission penalty still does not account for university excused absence; if listing university excused absences, it should show 10 (not 8) per student rule 7.
Sandra Williams (sandra-williams) (10/19/16 3:25 pm): Update received.
Course title and number: MARB 433 – Applied Bioinformatics
Term: Spring 2018
Meeting times and location: TBD

Course Description and Prerequisites

Fundamental concepts and methods in bioinformatics using sequence analysis and practical applications; includes biological databases, sequence and structure alignments, structural bioinformatics, gene prediction and genome analysis; emphasis on the understanding and application of these concepts.

With growing amount of sequence data generated, the main objective of this course is to help the students in being able to use cutting-edge bioinformatics tools to solve problems from their own research and in their professional work.

For the assignments, graduate students will have the opportunity to work with their own sequence data to advance their research project instead of the provided data.

Prerequisites: MARB 301; Junior or Senior classification or approval of instructor

This course does assume that the students have some familiarity with the use of computers and the internet.

Learning Outcomes or Course Objectives

1. Identify the challenges and opportunities in bioinformatics applications.
2. Use computational tools to study biological systems.
3. Apply different computer programs and methodologies for various biological analyzes.
4. Describe and differentiate common algorithms for studying and processing biological sequence data.
5. Define the corresponding data needed for addressing specific bioinformatics questions.
6. Analyze and discuss the results for biological applications.

Instructor Information

Name: Dr. Jessica Labonté
Telephone number: (409) 740-4921
Email address: labontej@tamug.edu
Office hours: Monday, 1:00-4:00, and by appointment
Office location: OSCB 267

Textbook and/or Resource Material

There a no required textbooks for this course. Weekly readings will be posted on eCampus at least 10 days before class.

Suggested textbooks:
Grading Policies

<table>
<thead>
<tr>
<th>Assignment</th>
<th>%</th>
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<tbody>
<tr>
<td>Assignment #1 (BLAST searches)</td>
<td>5</td>
</tr>
<tr>
<td>Assignment #2 (Multiple sequence alignment)</td>
<td>5</td>
</tr>
<tr>
<td>Assignment #3 (Phylogenetic analysis)</td>
<td>15</td>
</tr>
<tr>
<td>Assignment #4 (Protein structure)</td>
<td>10</td>
</tr>
<tr>
<td>Assignment #5 (Gene prediction and promoters)</td>
<td>10</td>
</tr>
<tr>
<td>Assignment #6 (Gene syntheny)</td>
<td>15</td>
</tr>
<tr>
<td>Quizzes</td>
<td>10</td>
</tr>
<tr>
<td>Final examination</td>
<td>30</td>
</tr>
</tbody>
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Grade

| Grade | A: 90-100 | B: 80-89 | C: 70-79 | D: 60-69 | F: <60 |

Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
</tr>
<tr>
<td></td>
<td>Collecting and storing data</td>
</tr>
<tr>
<td>2</td>
<td>Biological databases</td>
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<tr>
<td></td>
<td>Database searching for similar sequences</td>
</tr>
<tr>
<td>3</td>
<td>Pairwise sequence alignment</td>
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<tr>
<td></td>
<td>Multiple sequence alignment</td>
</tr>
<tr>
<td></td>
<td><strong>Assignment #1 is due (Finding sequences similar to a given sequences using database searches)</strong></td>
</tr>
<tr>
<td>4</td>
<td>Multiple sequence alignment (continued)</td>
</tr>
<tr>
<td></td>
<td>Other alignment methods (hidden Markov models, protein motifs and domain prediction)</td>
</tr>
<tr>
<td>5</td>
<td>Phylogenetic reconstruction methods</td>
</tr>
<tr>
<td></td>
<td><strong>Assignment #2 is due (Multiple sequence alignment of the sequences from assignment #1)</strong></td>
</tr>
<tr>
<td>6</td>
<td>Phylogenetic tree construction programs</td>
</tr>
<tr>
<td>7</td>
<td>RNA structure prediction</td>
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<td><strong>Assignment #3 is due (Phylogenetic tree of the alignment from assignment #2)</strong></td>
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<tr>
<td>8-9</td>
<td>Protein structure and visualization</td>
</tr>
<tr>
<td>9</td>
<td>Protein structure comparison, and classification</td>
</tr>
<tr>
<td>10</td>
<td>Gene and regulatory promoter prediction</td>
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<td><strong>Assignment #4 is due (Prediction and analysis of the structure of a given protein)</strong></td>
</tr>
<tr>
<td>11</td>
<td>Genome mapping, assembly and comparison</td>
</tr>
<tr>
<td></td>
<td><strong>Assignment #5 is due (Prediction of the genes and regulatory promoters of a given short genome)</strong></td>
</tr>
<tr>
<td>12</td>
<td>Gene syntheny and horizontal gene transfer</td>
</tr>
<tr>
<td>13</td>
<td>Functional genomics</td>
</tr>
<tr>
<td></td>
<td><strong>Assignment #6 is due (Syntheny analysis of given sequences)</strong></td>
</tr>
<tr>
<td>14</td>
<td>Proteomics, metagenomics, transcriptomics, and metabolomics</td>
</tr>
<tr>
<td>15</td>
<td>Final examination</td>
</tr>
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* There will be weekly short quizzes at the end of class.

Attendance Policies:

Make-up Policy: If an absence is excused, the instructor will either provide the student an opportunity to make up any quiz, exam or other work that contributes to the final grade or provide a satisfactory alternative by a date agreed upon by the student and instructor. If the instructor has a regularly scheduled make up exam, students are
expected to attend unless they have a university approved excuse. The make-up work must be completed in a
timeframe not to exceed 30 calendar days from the last day of the initial absence. The student is responsible for
providing satisfactory evidence to the instructor to substantiate the reason for the absence. Among the
reasons absences are considered excused by the university are the following (see Student Rule 7 for details
http://studentrules.tamu.edu/rule07). The fact that these are university-excused absences does not relieve the
student of responsibility for prior notification and documentation. Failure to notify and/or document properly may
result in an unexcused absence. Falsification of documentation is a violation of the Honor Code.
1) Participation in an activity that is required for a class and appears on the university authorized activity list at
https://studentactivities.tamu.edu/app/sponsauth/index
2) Death or major illness in a student's immediate family.
3) Illness of a dependent family member.
4) Participation in legal proceedings or administrative procedures that require a student's presence.
5) Religious holy day. NOTE: Prior notification is NOT required.
6) Injury or illness that is too severe or contagious for the student to attend class.
   a) Injury or illness of three or more class days: Student will provide a medical confirmation note from his or her
      medical provider within one week of the last date of the absence (see Student Rules 7.1.6.1)
   b) Injury or illness of less than three class days:
      Student will provide one or both of these (at instructor's discretion), within one week of the last date of the
      absence:
      (i.) Texas A&M University Explanatory Statement for Absence from Class form available at
      http://attendance.tamu.edu
      (ii.) Confirmation of visit to a health care professional affirming date and time of visit.
   c) An absence for a non-acute medical service does not constitute an excused absence.
7) Required participation in military duties.
8) Mandatory admission interviews for professional or graduate school that cannot be rescheduled.
9) Mandatory participation as a student-athlete in NCAA-sanctioned competition.
10) In accordance with Title IX of the Educational Amendments of 1972, Texas A&M University shall treat
    pregnancy (childbirth, false pregnancy, termination of pregnancy and recovery therefrom) and related conditions as
    a justification for an excused absence for so long a period of time as is deemed medically necessary by the
    student's physician. Requests for excused absence related to pregnancy should be directed to the instructor.
    Other absences may be excused at the discretion of the instructor with prior notification and proper documentation.
    In cases where prior notification is not feasible (e.g., accident or emergency) the student must provide notification
    by the end of the second working day after the absence, including an explanation of why notice could not be sent
    prior to the class. Accommodations sought for absences due to the observance of a religious holiday can be
    sought either prior or after the absence, but not later than two working days after the absence.

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 Counseling Office, Seibel
Student Center, or call (409)740-4587. For additional information visit

Academic Integrity

For additional information please visit:  http://www.tamug.edu/HonorSystem

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Thanks for reaching out to Wayne, John. As long as Biology has no objection, I certainly don’t.

Best,

Tim

Dear Dr. Schwarz,

Thank you for your descriptions of the MARB 433/633 courses and the expected student clientele. I also appreciate the background information on how courses are reviewed/approved at our sister campuses. The Department of Biology will have no objection to your offering these courses.

Best regards,
Wayne Versaw

Wayne K. Versaw  
Associate Head for Academic Affairs  
Department of Biology  
Texas A&M University  
3258 TAMU  
College Station, TX 77843-3258

Tel: 979-847-8587  
Fax: 979-845-2891

wversaw@tamu.edu
FYI

John R. Schwarz, Regents Professor and Head
Department of Marine Biology
Director, Seafood Safety Laboratory
Texas A&M University, Galveston Campus
P.O. Box 1675, OCSB Room 268
Galveston, Texas 77553-1675

(409) 740-4453 (voice)
(409) 740-5001 (fax)
schwarzj@tamug.edu

“There is no medicine like hope, no incentive so great and no tonic so powerful as the expectation of something better tomorrow” Anonymous

Dear Professor Schwarz,

I examined the syllabus for your proposed course and the course seems to have very little overlap with the material covered in the bioinformatics course taught in our department. Thus, the Department of Statistics has no objection to the course, Applied Bioinformatics, to be offered by your department.

Best,

Michael

Dr. Michael Longnecker
Professor/Associate Department Head
Holder of the George P. Mitchell ’40 Chair in Statistics
Department of Statistics
Texas A&M University-CS
979-845-3141
Drs. Johnson and Longnecker,

The Marine Biology Department is proposing to offer a new course(s), “Applied Bioinformatics”, at both the undergraduate (MARB 433) and graduate (MARB 633) levels. If approved, these stacked courses would officially be offered in FY 2018. The courses primarily emphasize analysis and application of data and not statistical theory. A syllabus for each course is attached for your review. Your Department’s comments are requested.

Please contact me should clarification be needed.

Regards,

John R. Schwarz, Regents Professor and Head
Department of Marine Biology
Director, Seafood Safety Laboratory
Texas A&M University, Galveston Campus
P.O. Box 1675, OCSB Room 268
Galveston, Texas 77553-1675

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