FLORIDA ATLANTIC UNIVERSITY™

Graduate Programs—NEW COURSE PROPOSAL[1]

UGPC Approval _____
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner Posted _____
Catalog _____

DEPARTMENT: DEPARTMENT OF COMPUTER AND ELECTRICIAL ENGINEERING AND COMPUTER SCIENCE	COLLEGE: COLLEGE OF ENGINEERING AND COMPUTER SCIENCE

RECOMMENDED COURSE IDENTIFICATION:

PREFIX CAP COURSE NUMBER 6771 LAB CODE (L or C) _____

(TO OBTAIN A COURSE NUMBER, CONTACT NMALDONADO@FAU.EDU)

COMPLETE COURSE TITLE: DATA MINING FOR BIOINFORMATICS

EFFECTIVE DATE

(first term course will be offered)

—SUMMER 2016—THIS COURSE WAS OFFERED IN FALL 2007 AND FALL 2010, AS A SPECIAL TOPIC COURSE

CREDITS[2]:

3

TEXTBOOK INFORMATION: DATA MINING: PRACTICAL MACHINE LEARNING TOOLS AND TECHNIQUES, BY I.H. WITTEN AND E. FRANK (3RD EDITION); SELECTED ARTICLES AND PAPERS.

GRADING (SELECT ONLY ONE GRADING OPTION): REGULAR __X__   SATISFACTORY/UNSATISFACTORY _____

COURSE DESCRIPTION, NO MORE THAN THREE LINES: THIS COURSE DEALS WITH THE PRINCIPLES OF DATA MINING AS IT RELATES TO BIOINFORMATICS. TOPICS COVERED INCLUDE GENE SELECTION, CLASS IMBALANCE, CLASSIFICATION, BIOMARKER DISCOVERY, AND PREDICTION MODELS. NO PRIOR KNOWLEDGE OF BIOLOGY IS REQUIRED.

PREREQUISITES *: GRADUATE LEVEL STATUS OR PERMISSION OF THE INSTRUCTOR	COREQUISITES*:N/A	REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL)*:

* PREREQUISITES, COREQUISITES AND REGISTRATION CONTROLS WILL BE ENFORCED FOR ALL COURSE SECTIONS.

MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE:

MEMBER OF THE GRADUATE FACULTY OF FAU AND HAS A TERMINAL DEGREE IN THE SUBJECT AREA (OR A CLOSELY RELATED FIELD)

Faculty contact, email and complete phone number: Taghi M. Khoshgoftaar, khostogf@fau.edu 561-297-3994	Please consult and list departments that might be affected by the new course and attach comments.[3] ITOM (College of Business) Mathematical Sciences (College of Science)

Approved by:

Department Chair: _Nargess Endly_

College Curriculum Chair: _____

College Dean: _____

UGPC Chair: _____

Graduate College Dean: _____

UFS President: _____

Provost: _____

Date:

9/9/15

9/21/15

9/21/15

Email this form and syllabus to UGPC@fau.edu one week before the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website prior to the meeting.

Department of Computer & Electrical Engineering and Computer Science
Florida Atlantic University
Course Syllabus

1. Course title/number, number of credit hours	
Data Mining for Bioinformatics CAP 6771	3 credit hours

2. Course prerequisites, corequisites, and where the course fits in the program of study
Prerequisites: Graduate standing or permission of instructor

3. Course logistics
Term: Summer 2016 This is a classroom lecture course with DL sections. *Class location and time*: TBA

4. Instructor contact information	
Instructor's name *Office address* *Office Hours* *Contact telephone number* *Email address*	Dr.Taghi M Khoshgoftaar, Professor Engineering East Bldg., Room 511 TBA 561-297-3994 khoshgof@fau.edu

5. TA contact information	

6. Course description
This course deals with the principles of data mining as it relates to bioinformatics. Topics covered include gene selection, class imbalance, classification, biomarker discovery, and prediction models. No prior knowledge of biology is required.

7. Course objectives/student learning outcomes/program outcomes	
Course objectives	Enable students to understand the basic concept of data mining algorithms with an emphasis on their application and utilization on bioinformatics data
BSCS program outcomes	

8. Course evaluation method	
Assignments (Homework, Programming, etc.) - 45% Term Project – 40% Paper Presentation – 15%	The course term project involves a literature review of current state-of-the art methods in bioinformatics, or a small research project into new methods for the field.

9. Course grading scale
Grading Scale: 90 and above: "A", above 85 but below 90: "B+", 80-85: "B", above 75 but below 80: "C+", 70-75: "C", above 65 but below 70: "D+", 60-65: "D", above 55 but below 60: D-, 55 and below: "F."

10. Policy on makeup tests, late work, and incompletes

Assignments are to be submitted on time, with possible point penalties for late submissions. In no case will an assignment be accepted after the graded papers for that assignment have been returned to the students. However, appropriate accommodations will be made for students having a valid medical excuse for being unable to work on an assignment during its two week period.

Unless there is solid evidence of medical or otherwise serious emergency situation incomplete grades will not be given.

11. Special course requirements

12. Classroom etiquette policy

University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones, are to be disabled in class sessions, and laptops are only to be used for note taking and related activities.

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13. Disability policy statement

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in Boca Raton campus, SU 133 (561) 297-3880 and follow all OSD procedures.

14. Honor code policy

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and place high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. See University Regulation 4.001 at www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf

15. Required texts/reading

(1) Data Mining: Practical Machine Learning Tools and Techniques, by I.H. Witten and E. Frank
(2) Selected articles and papers are posted on the course web site.

16. Supplementary/recommended readings

17. Course topical outline, including dates for exams/quizzes, papers, completion of reading

Date:	Topic	Reading
Week 1	Introduction to Data Mining	Ch 1-2
Week 2	Classification models	Ch 3-4

Week 3	Introduction to Bioinformatics: • Basic Genetics • Available Online Tools and Databases • Details and Challenges Associated with the Bioinformatics Data	Selected Articles
Week 4	• Tumor Diagnosis Models • Patient Response Prediction Models • Types of Errors • Performance Metrics . • Cost-Sensitive Classifiers **Homework 1 due**	Selected Articles
Week 5	Ensemble Learning for Bioinformatics • Why Ensemble Learning is Beneficial to Bioinformatics • Strong and Weak Classifiers • Ensemble Vs Cost Sensitive Classifiers	Selected Articles
Week 6	Ensemble Learning for Bioinformatics • Bagging • Boosting • Random Forest **Homework 2 due**	Selected Articles
Week 7	Gene Selection • Biomarker Identification Through Gene Selection • Filter-based Gene Ranking	Selected Articles
Week 8	Filter-based Subset Selection Wrapper-based Subset Selections Embedded Gene Selection **Homework 3 due**	Selected Articles
Week 9	Ensemble Gene Selection Gene Selection Stability	Selected Articles
Week 10	Small Class of Interest/Class Imbalance	Selected Articles
Week 11	Source and Effects of Data Noise on Bioinformatics Data	Selected Articles
Week 12	Quality of Bioinformatics Data Case Studies **Homework 4 due**	Selected Articles
Week 13	Guest lecture Students class (term project) presentations	
Week 14	Students class (term project) presentations	
Week 15	No Class **Term Project Due**	

RE: Request from the CEECS Department

Tamara Dinev

To: Mihaela Cardei

Cc: Nurgun Erdol, Chiang-Sheng Huang, Caryn Conley

Tuesday, September 15, 2015 2:30 PM

Dear Dr. Cardei:

Regarding the 4 new course proposals below, I approve of their creation.

Regarding the Certificate in Big Data Analytics, per our conversation today with Dr. Erdol, rather than having two separate certificates in Data/Business Analytics, we agreed to create one certificate – in Big Data Analytics – with two tracks: Computer Science track and Business track. Students in each track with take 3 courses offered by the corresponding college, and one from the other college. Thus, a student in Computer Science track will take 3 CAP courses and 1 ISM course, and a student in College of Business will take 3 ISM courses and one CAP course.

Please contact Dr. Huang to coordinate how to amend our proposals toward this final version and fast track through the colleges so we can present our proposal at the upcoming University Council session.

Best Regards:
Tamara
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Tamara Dinev, Ph.D.
Department Chair and Professor
Department of Information Technology and Operations Management
College of Business
Florida Atlantic University
Boca Raton, Florida 33431
OFFICE: Fleming Hall, 219
TEL: (561) 297-3181
FAX: (561) 297-3043
e-mail: tdinev@fau.edu

From: Mihaela Cardei
Sent: Thursday, September 10, 2015 9:25 AM
To: Tamara Dinev <tdinev@fau.edu>
Cc: Nurgun Erdol <erdol@fau.edu>; Mihaela Cardei <mcardei@fau.edu>
Subject: Request from the CEECS Department

Dear Dr. Dinev

I am the chair of the Graduate Programs Committee in the Department of Computer & Electrical Engineering and Computer Science (CEECS) at FAU, and we are proposing a Certificate Program in Big Data Analytics.

Please find attached to this email the Certificate description and 4 new course proposals (CAP 6771, CAP 6780, CAP6688, and CAP6776) which are listed in the Certificate.

We would need you approval that ITOM Department supports the Certificate in Big Data Analytics and the 4 new courses.

Could you please review the material and email me your approval decision?

Thank you,

Mihaela Cardei, PhD
Professor
Computer & Electrical Engineering and Computer Science Department
College of Engineering and Computer Science
Florida Atlantic University
http://www.cse.fau.edu/~mihaela

Re: Request for approval - Big Data Analytics Certificate & new courses

Rainer Steinwandt [srainer@math.fau.edu]

To: Mihaela Cardei

Wednesday, September 16, 2015 11:14 PM

Dear Mihaela,

Thank you for your email. The proposed certificate program and the associated courses of the CEECS Department and ITOM look very fine to me. For the Department of Mathematical Sciences, I support this certificate program and the associated courses and hope that this program will be a great success.

Kind regards,
Rainer

----- Original Message -----
From: "Mihaela Cardei" <mcardei@fau.edu>
To: "Rainer Steinwandt" <srainer@math.fau.edu>
Cc: "Nurgun Erdol" <erdol@fau.edu>, "Tamara Dinev" <tdinev@fau.edu>,
"Chiang-Sheng Huang" <dhuang@fau.edu>, "Mihaela Cardei" <mcardei@fau.edu>
Sent: Wednesday, September 16, 2015 7:26:41 PM
Subject: Request for approval - Big Data Analytics Certificate & new courses

Dear Dr. Steinwandt,

The Department of Computer & Electrical Engineering and Computer Science (CEECS) and the Department of Information Technology and Operations Management (ITOM) at FAU are proposing a joint Certificate Program in Big Data Analytics, with two tracks: Computer Science and Business.

In addition, CEECS Department is proposing 4 new course proposals (CAP 6771, CAP 6780, CAP6688, and CAP6776) and ITOM is proposing 3 new course proposals (ISM6422, ISM6119, ISM6058).

Please find attached to this email the Certificate and new course proposal documents.

We would need your approval that the Department of Mathematical Sciences supports the joint Certificate in Big Data Analytics and the new course proposals.

Could you please review the material and email me your approval decision?

Thank you,

Mihaela Cardei, PhD
Professor
Computer & Electrical Engineering and Computer Science Department
College of Engineering and Computer Science
Florida Atlantic University
http://www.cse.fau.edu/~mihaela