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 PRINCIPALS 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]

n/a

Approved by:	*Date:*
Department Chair:	05/15/15
College Curriculum Chair:	8/13/15
College Dean:	8/11/2015
UGPC Chair:	
Graduate College Dean:	
UFS President:	
Provost:	

1. **Syllabus** must be attached; see guidelines for requirements: *www.fau.edu/provost/files/course syllabus.2011.pdf*
2. Review **Provost Memorandum: Definition of a Credit Hour** *www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf*
3. **Consent** from affected departments (attach if necessary)

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: Fall 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 principals 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%	
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

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

Course Topical Outline

- Introduction to Bioinformatics
  - Basic Genetics
  - Available Online Tools and Databases
  - Details and Challenges Associated with the Bioinformatics Data
- Classification
  - Tumor Diagnosis Models
  - Patient Response Prediction Models
  - Types of Errors
  - Performance Metrics
  - Cost-Sensitive Classifiers
- Ensemble Learning for Bioinformatics
  - Why Ensemble Learning is Beneficial to Bioinformatics
  - Strong and Weak Classifiers
  - Ensemble Vs Cost Sensitive Classifiers
  - Bagging
  - Boosting
  - Random Forest
- Gene Selection
  - Biomarker Identification Through Gene Selection
  - Filter-based Gene Ranking
  - Filter-based Subset Selection
  - Wrapper-based Subset Selections
  - Imbedded Gene Selection
  - Ensemble Gene Selection
  - Gene Selection Stability
- Other Challenges
  - Small Class of Interest/Class Imbalance
  - Source and Effects of Data Noise on Bioinformatics Data