

 FLORIDA ATLANTIC UNIVERSITY	NEW COURSE PROPOSAL Graduate Programs		UGPC Approval _____ UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner Posted _____ Catalog _____
	Department Computer and Electrical Eng. and CS (CEECS) College Engineering and Computer Science <i>(To obtain a course number, contact erudolph@fau.edu)</i>		
Prefix CAP Number 6616	<i>(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)</i> Lab Code	Type of Course <input style="border: 2px solid red;" type="text" value="Lecture"/>	Course Title Applied Machine Learning
Credits <i>(Review Provost Memorandum)</i> 3 Effective Date <i>(TERM & YEAR)</i> Spring 2021	Grading <i>(Select One Option)</i> Regular <input checked="" type="radio"/> Sat/UnSat <input type="radio"/>	Course Description <i>(Syllabus must be attached; see Guidelines)</i> This course covers theoretical foundations and tools for machine learning and data analytics. The class introduces major machine learning topics such as supervised learning, unsupervised learning, and numeric predictive models. Case studies include application of machine learning to different domains.	
Prerequisites STA 2023 Introductory Statistics or equivalent and Graduate Standing.		Corequisites	Registration Controls <i>(Major, College, Level)</i> Opened to all majors except computer science and computer engineering majors.
Prerequisites, Corequisites and Registration Controls are enforced for all sections of course			
Minimum qualifications needed to teach course: Member of the FAU graduate faculty and has a terminal degree in the subject area (or a closely related field.)		List textbook information in syllabus or here Data Mining, Practical Machine Learning Tools and Techniques, Ian Witten Eibe, Frank Mark Hall Christopher Pal, 4th edition, Morgan Kaufmann 2016.	
Faculty Contact/Email/Phone Hanqi Zhuang/ Zhuang@fau.edu /561-297-3413		List/Attach comments from departments affected by new course Mathematical Sciences, ITOM, School of Comm. and Multimedia Studies	

Approved by Department Chair <u>Hanqi Zhuang</u> College Curriculum Chair <u>Ramesh Teegavarapu</u> College Dean <u>Mihaela Cardel</u> UGPC Chair <u>Christopher Beetle</u> 2020.08.21 09:31:48 -04'00' UGC Chair <u>Christopher Beetle</u> 2020.08.26 14:54:26 -04'00' Graduate College Dean <u>Robert W. Johnson</u> member: CE42EA9D-E3BA-488B-AB5E-7D1B6B864E2A CBA7DF15-75DF-484D-ADDC-87F16173373C 2020.08.26 15:08:40 -05'00' UFS President _____ Provost _____	Date <u>6/11/2020</u> <u>6/12/2020</u> <u>6/14/2020</u> _____ _____ _____ _____
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Email this form and syllabus to UGPC@fau.edu one week before the UGPC meeting.

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

1. Course title/number, number of credit hours		
Applied Machine Learning – CAP 6616	3 credit hours	
2. Course prerequisites, corequisites, and where the course fits in the program of study		
Prerequisites: Graduate standing and (STA 2023 or equivalent)		
Opened to all majors except computer science and computer engineering majors.		
3. Course logistics		
Term: Spring 2021 Class location and time: TBA		
4. Instructor contact information		
Instructor's name	TBA	
Office address	TBA	
Office Hours	TBA	
Contact telephone number	TBA	
Email address	TBA	
5. TA contact information		
TA's name	N/A	
Office address	TBA	
Office Hours	TBA	
Contact telephone number	N/A	
Email address	N/A	
6. Course description		
This course covers theoretical foundations and tools for machine learning and data analytics. The class introduces major machine learning topics such as supervised learning, unsupervised learning, and numeric predictive models. Case studies include application of machine learning to different domains.		
7. Course objectives/student learning outcomes/program outcomes		
Course objectives	The goal of this class is for students to learn theoretical foundations and experiences on machine learning algorithms, data analytics projects, and applications of machine learning in solving domain problems. At the end of the class, students should be able to understand the whole process of machine learning project design, including key factors of machine learning projects, the life cycle of the data analytics, and the reporting and validations of machine learning projects.	
8. Course evaluation method		
3 Homework Assignments (each worth 10%)	30%	Students will work on a project where they will use key mechanisms of ML projects, including the life cycle of data analysis, and the reporting and validation of ML projects.
Midterm Exam -	30%	
Final Project -	40%	

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9. Course grading scale
<p>Grading Scale: [90, 100]: "A"; [85-90): "A-" [80-85): "B+"; [75-80): "B"; [70-75): "B-" [65-70): "C+"; [60-65): "C"; [55-60): "C-" [50-55): "D"; [0, 50): "F."</p>
10. Policy on makeup tests, late work, and incompletes
<p><i>Makeup tests</i> are possible, and are given only if there is solid evidence of medical or otherwise family/personal emergency issues that prevent the student from participating in the exam. Makeup exam should be administered and proctored by department personnel unless there are other pre-approved arrangements</p> <p><i>Late work</i> is not acceptable.</p> <p>A <i>grade of incomplete</i> will be assigned only in the case of solid evidence of medical or otherwise serious emergency situation.</p>
11. Special course requirements
N/A
12. Classroom etiquette policy
<p>University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled in class sessions.</p>
13. Attendance policy statement
<p>Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance.</p> <p>Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.</p>
14. Disability policy statement
<p>In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.</p>
15. Counseling and Psychological Services (CAPS) Center

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Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to <http://www.fau.edu/counseling/>

16. Code of Academic Integrity policy statement

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 an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [University Regulation 4.001](#). If your college has particular policies relating to cheating and plagiarism, state so here or provide a link to the full policy—but be sure the college policy does not conflict with the University Regulation.

17. Required texts/reading

Data Mining, Practical Machine Learning Tools and Techniques, Ian Witten Eibe, Frank Mark Hall Christopher Pal, 4th edition, Morgan Kaufmann 2016.

18. Supplementary/recommended readings

Machine Learning, Tom M. Mitchell, Series: McGraw-Hill Series in Computer Science, McGraw-Hill Education; 1 edition (March 1, 1997)
Pattern Recognition and Machine Learning, Christopher M. Bishop, Springer, 2006.

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

Weekly course topics

Weekly schedule	Topic
Week 1	Introduction
Week 2	Learning from examples
Week 3	Decision tree learning
Week 4	Tools for Machine Learning
Week 5	Bayes Learning 1
Week 6	Bayes Learning 2
Week 7	Machine Learning experiments
Week 8	Machine learning project designs
Week 9	Instance based learning
Week 10	Unsupervised learning
Week 11	Numeric Predictive Models
Week 12	Presentation
Week 13	Presentation
Week 14	Machine learning for domain applications
Week 15	Machine learning project management

From:Rainer Steinwandt <RSTEINWA@fau.edu>
Sent:Wednesday, October 7, 2020 9:44 PM
To:Mihaela Cardei <mcardei@fau.edu>
Cc:William Kalies <WKALIES@fau.edu>; Frederick Hoffman <HOFFMAN@fau.edu>; Hanqi Zhuang <zhuang@fau.edu>
Subject:RE: Curriculum items from CEECS

Hello,

Thanks. With this, there are no concerns from math for the proposed minors, certificate, and courses.

Best,
Rainer

From:Mihaela Cardei <mcardei@fau.edu>
Sent:Wednesday, October 7, 2020 9:17 PM
To:Rainer Steinwandt <RSTEINWA@fau.edu>
Cc:William Kalies <WKALIES@fau.edu>; Frederick Hoffman <HOFFMAN@fau.edu>; Hanqi Zhuang <zhuang@fau.edu>
Subject:Re: Curriculum items from CEECS

Hello Rainer,

Thank you for your reply. We met with the curriculum in AI group and we agreed to follow the guidelines from Dr Ivy (see the attached emails on June 19 and July 26) when proposing new courses in AI. These guidelines clarify that other units could develop courses in their specific areas. We agree that CAP 4612 will not be used to block mathematics/statistics courses in (applied) machine learning.

The course CAP6616 was originally proposed for the MSITM program and Big Data Analytics Certificate. These are joint programs with ITOM, and as part of the curriculum revisions we decided to add CAP 6616 and the Business course "ISM 6427: Business Innovation with Artificial Intelligence" to both programs. Many of the MSITM students do not have the background to take the existing course CAP 6673. The 6xxx versus 5xxx course level was discussed in the CEECS department and they decided to keep the 6xxx level, same as the Business course ISM 6427, since this will benefit MSITM students.

For your information, all these items CAP 6616, ISM 6427,MSITM, and the Big Data Certificate are on the UGC Consent/Action Agenda for the Senate meeting on October 12th. The proposed courses CAP 6616 and ISM 6427 are part of the program changes.

I hope my explanation addresses your concerns.

Best regards,
Mihaela

From:Rainer Steinwandt <RSTEINWA@fau.edu>
Sent:Wednesday, October 7, 2020 1:35 PM
To:Mihaela Cardei <mcardei@fau.edu>
Cc:William Kalies <WKALIES@fau.edu>; Frederick Hoffman <HOFFMAN@fau.edu>
Subject:RE: Curriculum items from CEECS

Dear Mihaela,

I hope all is well. From a conversation with Bill about a meeting of the AI curriculum group, I understand that your proposed minor and certificate will not prevent us from contributing to a university-wide minor in Applications of AI, where students are not required to take courses in other Colleges. With this understanding, I am happy to say that we have

- No concerns about the AI certificate, thanks for checking.
- No concerns about the AI minor, thanks for checking.

For the courses:

- Proposed CAP 2500: No concerns, thanks for checking.
- Proposed CAP 4612: Within the SUS, Applied Machine Learning is already taught under an STA prefix (see STA 4634/5635 at FSU), so we would seek confirmation that this course will not be used to block mathematics/statistics courses in (applied) machine learning. If CAP 4612 will not be used to block mathematics/statistics courses in (applied) machine learning, we have no concerns.
- Proposed CAP 6616: This course appears to overlap with the existing and fairly accessible CAP 5768 (taught by two departments), specifically on Machine Learning, Decision Trees, Bayes Learning. Is a new course really needed? The proposed course appears to use the very same book as the existing CAP 6673 and the proposed CAP 4612. In view of the light prerequisite, the 6000-level clarification appears problematic – for graduate students in math, we would not be comfortable accepting this as a 6000-level course.

Best,
Rainer

From:Mihaela Cardei <mcardei@fau.edu>
Sent:Tuesday, September 15, 2020 2:53 PM
To:Frederick Hoffman <HOFFMAN@fau.edu>; Rainer Steinwandt <RSTEINWA@fau.edu>
Cc:Hanqi Zhuang <zhuang@fau.edu>; Jerome Haky <hakyj@fau.edu>; Kevin Wagner <kwagne15@fau.edu>; Dan Meeroff <dmeeroff@fau.edu>
Subject:Curriculum items from CEECS

Hello Dr. Hoffman and Dr. Steinwandt,

I am writing regarding the 6 CEECS items that have been discussed yesterday in the UUPC (first 4 items) and Senate meeting (last 2 items):

Certificate in AI
Minor in AI
CAP 2500 Applications of AI
CAP 4612 Applied Machine Learning and Data Mining
Graduate Minor in AI
CAP 6616 Applied Machine Learning

Please find attached the revised forms. As discussed in the meetings, the Department of Mathematical Sciences has been added to the list of departments consulted for these items.

Please let us know if you have any objections on these items.

Best regards,
Mihaela Cardei

From:Tamara Dinev <tdinev@fau.edu>
Sent:Monday, September 14, 2020 8:50 PM
To:Mihaela Cardei <mcardei@fau.edu>
Cc:Hanqi Zhuang <zhuang@fau.edu>
Subject:RE: CAP6616 Applied Machine Learning

Hi Cardei:

Yes, thank you, it looks good.

Best Regards:

Tamara

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Tamara Dinev, Ph.D., Department Chair and Professor
Dean's Distinguished Research Fellow
Department of Information Technology and Operations Management, FL 219
College of Business, Florida Atlantic University
Boca Raton, Florida 33431
tel. (561) 297-3181, email: tdinev@fau.edu
Google Scholar:<https://scholar.google.com/citations?user=YH8QZ-YAAAAJ&hl=en>

From:Mihaela Cardei <mcardei@fau.edu>
Sent:Monday, September 14, 2020 8:41 PM
To:Tamara Dinev <tdinev@fau.edu>
Cc:Hanqi Zhuang <zhuang@fau.edu>
Subject:CAP6616 Applied Machine Learning

Hello Dr Dinev,

Please find attached the syllabus for CAP 6616 Applied Machine Learning. This course and ISM 6427 have been added to the MSITM & Big Data Certificate.

Please let me know if the syllabus looks ok on your side,

thanks,
Mihaela Cardei

From:Mihaela Cardei <mcardei@fau.edu>
Sent:Thursday, September 17, 2020 2:18 PM
To:William Trapani <wtrapan1@fau.edu>
Cc:Hanqi Zhuang <zhuang@fau.edu>; Kevin Wagner <kwagne15@fau.edu>; Michael Horswell <HORSWELL@fau.edu>; Stella Batalama <sbatalama@fau.edu>
Subject:Re: Curriculum items from CEECS

Hello Bill,

Thank you for your prompt reply and support of our proposals. We agree with the two items listed below.

Best regards,
Mihaela

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From:William Trapani <wtrapan1@fau.edu>
Sent:Thursday, September 17, 2020 10:53 AM
To:Mihaela Cardei <mcardei@fau.edu>
Cc:Hanqi Zhuang <zhuang@fau.edu>; Kevin Wagner <kwagne15@fau.edu>; Michael Horswell <HORSWELL@fau.edu>
Subject:Re: Curriculum items from CEECS

Good morning Mihaela,

Arts and Letters has two concerns, neither of which can be addressed by the letter of the documents.

1. We would hope there would be a pathway for our courses to be considered and eventually listed in the minor, most likely under what you are calling the "Applications Track" electives. The Table does allow for additional electives per advisor permission so at a minimum we are seeking assurance that those permissions would not be overly restrictive and that our faculty's courses would find a home in the minor. Ideally there would be a commitment to list the courses so that we do not have to worry over individual instructor approval.

2. We are working on advancing our own profile in these areas and we will no doubt be seeking approval for minors and/or certificates of our own. Insofar as we follow Associate Provost Russ Ivy's guidance to Dean's in his June email that such degrees not claim the direct and simplified label "Artificial Intelligence" as their title and that they do not wholly duplicate courses you offer we would anticipate Engineering and Computer Science's support for our degrees/certificates.

We have no specific concerns with the content of the proposed course or of the proposed minor other than the two listed above so assuming we have an understanding on those points Arts and Letters is in support of your proposal(s).

Best,
Bill

William Trapani
Director, School of Interdisciplinary Studies
Dorothy F. Schmidt College of Arts and Letters
Florida Atlantic University

From: Mihaela Cardei <mcardei@fau.edu>
Sent: Tuesday, September 15, 2020 3:44 PM
To: William Trapani <wtrapan1@fau.edu>
Cc: Hanqi Zhuang <zhuang@fau.edu>; Kevin Wagner <kwagne15@fau.edu>
Subject: Curriculum items from CEECS

Hello Dr. Trapani,

I am following up regarding the 2 CEECS items discussed yesterday in the Senate meeting (attached):

CAP 6616 Applied Machine Learning
Graduate Minor in AI

We have revised the forms according to the meeting discussions.

Please let us know if you have any objections on these items.

Best regards,
Mihaela