

CAP6101.001F22 MOBILE BIOMETRICS (3 CREDIT HOURS)

COURSE SYLLABUS

College of Engineering
Department of Computer Science and Engineering

Instructor: Dr. Tempestt Neal

Semester: Fall 2022

Meeting Days/Time: MW 3:30pm-4:45pm, CHE103, Aug. 22-Dec. 8, 2022

Office Location: ENB310

Phone Number: [Call me on Microsoft Teams](#)

E-mail: tjneal@usf.edu

Office Hours: TW 10:00am-11:30am

Reaching me during after-hours: I may not be able to quickly respond to messages between 5P-8A on weekdays and anytime on weekends.

TA: Mohamed Ebraheem

TA Office Hours: TR 12:00pm-1:30pm, ENB323

E-mail: mohamedusama@usf.edu

1. University Course Description

CAP 6101 Mobile Biometrics (3). This course covers the foundations of biometric systems on mobile and other edge devices, offers hands-on experience in data collection and in building a verification system, and leads to a thorough overview of current research literature.

2. Course Prerequisites

N/A

3. Course Objectives

The objectives of this course are to develop students':

- (1) knowledge of biometric foundations.
- (2) understanding of behavioral and physical biometric modalities.
- (3) knowledge of data acquisition techniques on mobile platforms.
- (4) abilities to build and evaluate a biometric system.
- (5) abilities to relate classwork to published literature.
- (6) awareness of spoofing and common anti-spoofing techniques.
- (7) awareness of challenges in commercial systems.

4. Student Learning Outcomes

Students will demonstrate the ability to:

- (1) define the modules and properties of biometric systems.
- (2) compare biometric modalities.
- (3) collect and preprocess biometric data.
- (4) implement a biometric system.
- (5) identify prominent themes in published literature.
- (6) identify various vulnerabilities in biometric systems.

(7) communicate practical challenges.

5. Required Texts and/or Readings and Course Materials

All reading materials will be provided as needed.

Please take note of the course's YouTube playlist:

<https://youtube.com/playlist?list=PLK7Df1IsZyKBIEI0leOI4f2ddfHmxYYw>

6. Grading Scale (%) and Categories

Grading Scale (%)

| | |
|-----------|----|
| 94 - 100 | A |
| 90 - 93.9 | A- |
| 87 - 89.9 | B+ |
| 84 - 86.9 | B |
| 80 - 83.9 | B- |
| 77 - 79.9 | C+ |
| 74 - 76.9 | C |
| 70 - 73.9 | C- |
| 67 - 69.9 | D+ |
| 64 - 66.9 | D |
| 60 - 63.9 | D- |
| 0 - 59.9 | F |

Grading Categories

- Guided Learning Assignments (15%)
- Exams (30%)
- Project (30%)
- Position Paper (15%)
- Course Participation (10%)

Extra credit assignments may be assigned but are not guaranteed.

7. Course Schedule (*Subject to Change*)

| Week | Topic | Released | Due |
|----------------|---|---|-------------------|
| 1 (8/22, 8/24) | Biometric Foundations / Introduction to Python | Guided Learning #1: Foundations of Biometrics | |
| 2 (8/29, 8/31) | Overview of Machine Learning Algorithms | | |
| 3 (9/7) | 9/5: Labor Day Holiday Machine Learning (cont.) | Guided Learning #2: ML Algorithms | Guided Learning 1 |

| | | | |
|-------------------|--|---|--|
| 4 (9/12, 9/14) | Performance Measures | | |
| 5 (9/19, 9/21) | Face Recognition | Guided Learning #3: Performance | Guided Learning 2 |
| 6 (9/26, 9/28) | Face Recognition | Project 1 Position Paper | |
| 7 (10/3, 10/5) | Project Labs | | Guided Learning 3 |
| 8 (10/10, 10/12) | Gait and Movement Recognition Exam 1 | Guided Learning #4: Hot Topics | |
| 9 (10/17, 10/19) | Project Labs | | |
| 10 (10/24, 10/26) | Keystroke and Touch Dynamics <i>Guest Lecturer: Dr. Zahid Syed (Associate Professor of Computer Science, College of Innovation and Technology, The University of Michigan- Flint)</i> | Guiding Learning #5: Biometric Attacks | |
| 11 (10/31, 11/2) | Project Labs | | Guided Learning 4 |
| 12 (11/7, 11/9) | Fingerprint Recognition | | |
| 13 (11/14, 11/16) | Biometric System Attacks <i>Guest Lecturer: Dr. Huy Nguyen (Postdoctoral Researcher at National Institute of Informatics, Tokyo, Japan)</i> | | Guided Learning 5 |
| 14 (11/21, 11/23) | Project Labs | | *NLWP Policy* Project 1 Position Paper |
| 15 (11/28, 11/30) | Project Presentations (Test Free Week) | | |
| 16 (12/5, 12/7) | Exam 2 Wednesday, December 7, 12:30P-2:30P | | |

8. Course Policies

8.1 November Late Work Policy (NLWP):

You can submit some assignments¹ by **Wednesday, November 23rd 11:59PM** to receive partial credit (80% highest score). For example:

If submitted on time:

Total Number of Possible Points to Earn: 100

Assignment Weight in Points: 100

Total Number of Earned Points: 92

Score = 92%

If submitted late but by NLWP deadline, 11:59P:

Total Number of Possible Points to Earn: 80

Assignment Weight in Points: 100

Total Number of Earned Points: 92

Score = $(92 / 100) * 80 = 73.6\%$

Note: This policy does not prevent you from submitting an assignment on time, and resubmitting after its due but before the NLWP deadline. Should you decide to do this, however, please be aware that your assignment may be re-graded according to the NLWP (you can earn up to 80%), as the resubmission would then be late. Please consider this - it may be more beneficial for you to *not* resubmit to reduce the chance that a re-grade (which may include a re-evaluation of the entire resubmission - not just the questions you answered incorrectly) may reduce your original score. In case of documented hardship, grades may be adjusted. Hardships must be documented to the instructor by the appropriate USF service (e.g., Counseling Center, Health Services, etc.).

8.2 Submitting Late

An assignment is considered late if:

- it qualifies for the NLWP, but it is submitted for grading after November 23, 2022, 11:59PM
- it does not qualify for the NLWP and is submitted after its assigned due date as set in Canvas

You are given a 10-minute grace period to submit **any** assignment before it is considered late without penalty.

After the 10-minute grace period, you will not receive credit for the assignment.

Grades of "Incomplete": The current university policy concerning incomplete grades will be followed in this course. For USF Tampa undergraduate courses and USFSM undergraduate and graduate courses: An "I" grade may be awarded to a student only when a small portion of the student's work is incomplete and only when the student is otherwise earning a passing grade. The time limit for removing the "I" is to be set by the instructor of the course. For undergraduate students, this time limit may not exceed two academic semesters, whether or not the student is in residence, and/or graduation, whichever comes first. For graduate students, this time limit may not exceed one academic semester. "I" grades not removed by the end of the time limit will be changed to "IF" or "IU," whichever is appropriate.

¹ Some exclusions may apply; those assignments will be noted as exclusions as they are released.

Make-up Exams Policy: If a student cannot be present for an examination for a valid reason (validity to be determined by the instructor), a make-up exam will be given only if the student has notified the instructor in advance that s/he cannot be present for the exam. Make-up exams are given at the convenience of the instructor.

Group Work Policy: Everyone must take part in the projects. All members of a group will receive the same score; that is, the project is assessed, and everyone receives this score. However, that number is only a fraction of your grade for this project. The remaining grade is individual and refers to your teamwork. Every person in the group will periodically provide the instructor with a suggested grade for every other member of the group, and the instructor will assign a grade that is informed by those suggestions. Note that this does not apply to students that do not participate; these students will be assigned a zero.

Canvas: This course will use USF's learning management system (LMS), Canvas. If you need help learning how to perform various tasks related to this course or other courses being offered in Canvas, please view the following videos or consult the Canvas help guides. You may also contact USF's IT department at (813) 974-1222 or help@usf.edu.

Professionalism Policy: Per university policy and (virtual) classroom etiquette; mobile phones, iPods, etc. must be silenced during all classroom and lab lectures. Students who habitually disturb the class and have been warned may suffer a reduction in their final class grade.

End of Semester Student Evaluations: All classes at USF make use of an online system for students to provide feedback to the University regarding the course. These surveys will be made available at the end of the semester, and the University will notify you by email when the response window opens. Your participation is highly encouraged and valued.

Turnitin.com: In this course, turnitin.com may be utilized. Turnitin is an automated system which instructors may use to quickly and easily compare each student's assignment with billions of web sites, as well as an enormous database of student papers that grows with each submission. After the assignment is processed, as instructor I receive a report from turnitin.com that states if and how another author's work was used in the assignment. For a more detailed look at this process visit <http://www.turnitin.com>.

The Writing Studio: The Writing Studio is a free resource for USF undergraduate and graduate students. At the Writing Studio, a trained writing consultant will work individually with you, at any point in the writing process from brainstorming to editing. Appointments are recommended, but not required. For more information or to make an appointment, visit <http://www.lib.usf.edu/writing/>, stop by LIB 2nd Floor, or call 813-974-8293.

WhatsApp, GroupMe, and Student-to-Student Communication: While students may use digital communication tools (WhatsApp, GroupMe, etc.) to communicate with fellow students, it is important to remember that academic integrity policies still apply in these environments. Informing others about the contents of tests is prohibited by the official regulation (<https://usf.app.box.com/v/usfregulation3027>), as is receiving unauthorized information about an examination. Students are expected and required to immediately report instances of such violations to the instructor.

Title IX Policy: Title IX provides federal protections for discrimination based on sex, which includes discrimination based on pregnancy, sexual harassment, and interpersonal violence. In an effort to provide support and equal access, USF has designated all faculty (TA, Adjunct, etc.) as Responsible Employees, who are required to report any disclosures of sexual harassment, sexual violence, relationship violence or stalking. The Title IX Office makes every effort, when safe to do so, to reach out and provide resources and accommodations, and to discuss possible options for resolution. Anyone wishing to make a Title IX report or seeking accommodations may do so online, in person, via phone, or email to the Title IX Office. For information about Title IX or for a full list of resources please visit:

<https://www.usf.edu/title-ix/gethelp/resources.aspx>. If you are unsure what to do, please contact Victim Advocacy – a confidential resource that can review all your options – at 813-974-5756 or va@admin.usf.edu.

10. Standard University Policies

USF has a set of central policies related to student recording class sessions, academic integrity and grievances, student accessibility services, academic disruption, religious observances, academic continuity, food insecurity, and sexual harassment that **apply to all courses** at USF. Be sure to review these online at:
<https://www.usf.edu/provost/faculty/core-syllabus-policy-statements.aspx>