

St Cloud State University
CSCI 451/551 – Brain Robotics Interface
Spring 2026
Credits: 3
Prerequisites:
Sections
Lecture:
Fulfill any of the following

* Prerequisites: Case by case; please, check your situation what applies.

CH350 / ISELF205 (Mo We Fr 11AM-11:50AM)

Lecture Sessions: Online zoom link: <https://minnstate.zoom.us/j/97033979756> Passcode: 451551CS26

Instructor:

Office:Dr. Adriano Cavalcanti
ISELF205 / CH366K

Office Hours: Thursday's [10am to 1pm]; [4pm to 7pm]

Followed by Cloud Computing Club meetings from 7pm-8pm

& by appointment

<https://minnstate.zoom.us/j/93682218999> or in person ISELF205 / CH366K

Passcode: not required

Cloud Computing Club Meeting: from 6pm to 7pm

<https://minnstate.zoom.us/j/98745543149>

Passcode: not required

Email:adriano.cavalcanti@stcloudstate.edu

note: put in the email subject the class number your query is about, your group number, and short description – e.g. CS111 Group 3 Midterm Question

(320) 308-4734

Phone:

GA: TBA

Course Information on the Web: D2L Brightspace

Course Information:

Credits: 3

Prerequisites: CSCI 310 and CSCI 331, or CSCI 301 and SE 460, or requires students to be admitted.

Expected understanding and some familiarity with full stack development, software programming, math modeling, and machine learning.

Course Outline:

Brain Robotics Interface. 20% BCI EEG Sensors. 20% TensorFlow. 20% Distributed Systems. 20% Cloud Computing. 20% Biomedical Computing.

Course Description:

This course provides students with an understanding of the brain-computer interface for cloud computing and remote devices connectivity. Focus on emerging technologies and techniques from new industry demand with a hands-on approach. It will allow the students to acquire technical knowledge and practice currently highly sought in the marketplace.

Learning Outcome:

Upon completing this course, students will acquire the following knowledge to apply techniques and

implement advanced projects using:

- augmented brain device communication
- cloud computational intelligence
- low latency real-time remote device connectivity

Text and Materials

The required material will be available in the D2L content section. The study material for this course will include covering contents from book chapters, research articles, and online references.

-
-

Software platform: Cloud Computing, Tensorflow.

Hardware architecture: BCI All-in-One Biosensing R&D Bundle, Tello Programmable Drone, DESTEK VR Googles, Android Smartphone, Android Tablet, Laptops.

Textbook/Reference: (Optional)

- Rajesh P. N. Rao, "Brain-Computer Interfacing: An Introduction", ISBN-10: 1108708013, 2019.
- Arshdeep Bahga, "Cloud Computing Solutions Architect", ISBN-10: 0996025596, 2019.
- Aurélien Géron, "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow", ISBN-10: 1492032646, 2019.
- Gary Smart, "Practical Python Programming for IoT", ISBN-10: 1838982469, 2020.

Online resource:

D2L

Course Grades:

Quizzes

(5%)

Lab Activity (15%)

Projects

(20%)

Midterm

(25%)

Final Task (10%)

Final Exam (25%)

Final grades are final. I don't curve grades. Bounty activities are offered along the semester as optional activities for extra credit.

Note: Quizzes count towards your attendance in the class. Each quiz should ideally be submitted on the same day as the lecture. Submissions later than 48 hours will not be accepted. If you missed a quiz, and want to recover it, then you have the option to do some of the optional bounty activities that can cover up to 3 missed quizzes.

Grading Scale - the course is graded using these percentage ranges:

#	Symbol*	Start %*	Color	Assigned Value %
1	F	0		0
2	D-	55		55
3	D	60		60
4	D+	63		63
5	C-	67		67
6	C	70		70
7	C+	73		73
8	B-	77		77
9	B	82		82
10	B+	87		87
11	A-	91		91
12	A	95		95

+ and - decisions are made at the discretion of the instructor.

Then, other factors come into play:

Attendance:

If a student does not attend a percentage of classes that falls in the same letter grade range determined above or higher, a lower grade will be assigned. Such a grade is determined at the discretion of the instructor depending on the severity of the attendance problem.

Professional Email Etiquette Guidelines

To ensure effective and respectful communication, please observe the following guidelines when scheduling meetings or sending emails:

Initial Contact and Follow-up

1. Allow at least 24 hours for a response to your initial email.
2. Wait 48 hours before sending a polite follow-up reminder to the original recipient.

Escalation Procedure

1. After the third day, if you haven't received a response, you may escalate your inquiry.
2. Send additional requests to the next level of authority, such as a department chair or supervisor.

Best Practices

-
-
-

Be mindful of others' busy schedules and responsibilities.

Avoid overstepping boundaries or appearing insensitive to chain-of-command protocols.

Demonstrate organization, patience, and professionalism in your communication.

By adhering to these guidelines, you will project a positive and respectful image, while also ensuring that your concerns are addressed efficiently.

Dr. Cavalcanti's Letter of Recommendation Policy

Dr. Cavalcanti is committed to supporting students and researchers in their academic and professional pursuits. To ensure that he can provide a strong and informed recommendation, the following guidelines and requirements must be met:

Eligibility Requirements

To request a recommendation letter from Dr. Cavalcanti, you must meet the following requirements:

1. Academic Performance: You must have taken at least 2 courses with Dr. Cavalcanti and achieved a grade of A or B in both courses.
2. Avatar GitHub Contributions: You must have made at least 2 significant contributions to the Avatar GitHub code base, with a minimum of 2 pull requests approved and merged.
3. Avatar Lab or Data Harvesting Contributions: You must have made significant contributions to the Avatar Lab or data harvesting efforts, as determined by Dr. Cavalcanti.

Requesting a Recommendation Letter

If you meet one of the above requirements, please follow these steps to request a recommendation letter:

1. Provide Adequate Notice: Request the letter at least 4-6 weeks before the deadline.
2. Submit Required Materials: Provide Dr. Cavalcanti with your:

-
-
-

Updated resume or CV

Personal statement or statement of purpose

Information about the opportunity or program you are applying for

3. Schedule a Meeting: Arrange a meeting with Dr. Cavalcanti to discuss your request and provide additional context.

Important Notes

-
-

Dr. Cavalcanti reserves the right to decline any request for a recommendation letter.

It is essential to provide Dr. Cavalcanti with sufficient information and context to write a compelling and informed letter.

DISABILITY PROCEDURES FOR COURSE:

In any case if the student needs special arrangements for taking any exam for course, for the student's own benefit, the student is required and strongly advised to contact the instructor by email informing about it already in the first week of the class, but no later than the second week of the class. Also,

contact with the same time-frame the Disability Services (DS) informing that the instructor was communicated about the need for special arrangement for the exams along the quarter in this class. The DS will then notify the instructor that the student qualifies for the disability exam special arrangements.

COURSE ENROLLMENT, DROP AND WITHDRAWAL

This policy provides information to students about their responsibility to manage their class/course schedule through e-services. It specifies the reasons and process for a student to get approval for a withdrawal or drop after the date the student can take that action in e-services. It sets out related expectations around course attendance and course management by the university.

<https://policies.stcloudstate.edu/SCSU/Viewer.aspx?id=158>

Inconsistent performance:

Performance that is significantly lower than the overall grade on an exam or in a category of assignments could result in grade adjustments at the discretion of the instructor. This typically matters in cases of a lack of effort, such as opting not to show up for labs, quizzes or not taking a particular exam seriously.

Improvement:

Students who show significant improvement as the course proceeds, via tangible written work, could earn higher grades at the discretion of the instructor.

Class participation and effort: Exceptionally strong participation and effort could improve grades in the middle of a grade level (e.g., B+ to A-), whereas exceptionally poor participation (especially distracting behavior like using cell phones and laptops in lecture) could drop grades to the next highest grade level (e.g., B+ to B).

Class Meetings, Attendance, and Conduct:

Attendance, either face to face or online (synchronous or asynchronous), is expected of all students at all classes. Those who attend all classes will experience the greatest success on exams and assignments. Announcements and information dispensed during class supersede any other information. However, there are occasional legitimate reasons why students may miss class. Some leniency is worked into the grading policy to account for this; no makeup work is given. For the case of missing the midterm or final exam, the student can do the replacement exam.

If unusual circumstances prevent you from attending class, it is expected that you will email or visit the instructor during office hours no later than the afternoon prior to your expected absence.

All students are expected to abide by the following rules for class (barring any emergencies):

Arrive to class prior to the official start and be seated when class officially begins. (Plan so that you never arrive late. Late arrivals are disruptive to class and cause you to miss information; therefore, they are treated the same as absences in terms of grading.)

Be present and pay attention during lectures. Remain seated throughout the duration of lecture; do not move around the room or disrupt the lecture in any way. During lectures, pay attention to the lecture and take notes. Keep cell phones away and in a quiet mode. Do not use laptops or other electronic devices unless told otherwise, as they are distracting. Attendance will be monitored and will count toward the grade. Doing what the bullet points above say is also required for attendance to count. If a student isn't following these rules on a given day, the student attendance is treated as absent in final course grading.

Daily quizzes are used to take attendance.

Examinations:

Exams generally emphasize current content, but some topics will recur on multiple exams and the exams will generally be designed to give you a chance to show mastery of the material and assess whether you have ultimately learned the content. Failure to appear for an exam will result in a score of 0 for that test. Makeup exams will be given only in extraordinary circumstances, which needs proof of documentation, such as an event of an illness, or emergency, but the instructor must be notified before

the exam. It is the student's responsibility to inform the instructor prior to the exam. NOT AFTER. Make up tests and Late Homework Policy:

Except in emergency situations, make-up tests are not allowed unless the student has been excused by instructor prior to the examination. In such case, if applicable and needed, the student will take the replacement exam.

ASSIGNMENT SUBMISSION:

It is the student's responsibility to whenever submitting on D2L any material, to double check if the electronic submission was uploaded successfully. Late submission is penalized with 20% of the total grade for that assignment. After passed one week from the official deadline of any assignment, no further belated submission is accepted. After the system has been closed for submission of that particular assignment, and even more specifically after the solution/answer is disclosed on D2L, further "re-submission"/"late submission" is not acceptable. For Midterm and Final exam, no late submission is acceptable after submission is closed and exam session time has been finished, i.e. student and instructor left the classroom/session. Any exam should be submitted through D2L (not email), and before D2L is closed for submission. Not after D2L is closed, neither through email. For any given assignment, once grades are out, no further or late submissions happen or is accepted. Replacement Exam: If for any reason, the student is not able to take any of the scheduled exams on the announced date and time, in such case, the student will take the replacement exam that is available at the end of the semester. For Bounties extra credit points and the Replacement Exam: if you have completely missed either the midterm or the final exam, if you do any bounties activities, when submitting the bounty make sure to leave a comment to have bounties not applied to any exam that is going to be covered by the replacement exam; So, Replacement Exam applies to the student if and only if: your total final grade is below 70%, or if you completely missed the midterm or the final exam – and it stand as zero (no bounties have been applied to the missed exam that you are planning to recover using the Replacement Exam).

Final Exam: you have the choices – (a) implement the Challenging Optional Project – teamwork; or (b) take the actual exam – individual; or (c) take the Replacement Exam [check the rules that apply accordingly] – individual; whichever you have done first will stand, i.e. pick one, don't pick all! Only ONE out of three choices that you may or not may be able select according to your situation. If you eventually by mistake have done the three options (a)(b)(c), the only the one that you uploaded on D2L will be corrected and applied, and that will be the one done/submitted first according to the schedule of activities, any other attempt to do other alternatives after that one first submission is graded and entered to D2L gradebook will single out the other options. It is good to have options. So, choose wisely.

General Considerations:

If you are having difficulty with the course or with an assignment, see your instructor or GA for help. It is important in this course to begin an assignment when it is first given out and to bring problems to the attention of the instructor. Whenever possible, use the office hours an aid to your success.

Late Add Policy:

Any student who registers late to the class (past the Add period date and time) will not be given the opportunity to make up missed assignments and class participation. A grade of 0 will be given for each assignment that was missed.

Policy on Plagiarizing:

All work in this course should be done independently. Homework and/or lab programming codes must be your own, or at most as team of 2. Copying off a friend/another team of two, or from any other source (such as the Web, Chegg.com, coursehero, etc) is considered plagiarism. Cheating, plagiarizing and any other anti-intellectual behavior, including giving your work to someone else, will be dealt with severely. Please read the academic integrity policy below.

Academic Integrity Policy:

SCSU puts a very high value on academic integrity, and violations are not tolerated. Academic integrity is one of SCSU's core principles to which all students must abide:

- Prohibited Student Conduct

<https://www.stcloudstate.edu/studenthandbook/code/prohibited.aspx>

- Academic Integrity <https://www5.stcloudstate.edu/Policies/SCSU/Viewer.aspx?id=6>

Any violation of academic integrity will receive academic and possibly disciplinary sanctions, including the possible awarding of an F grade which is recorded on the transcript and states that failure of the course was due to an act of academic dishonesty. All acts of academic dishonesty are recorded so repeat offenders can be sanctioned accordingly.

Scholastic Dishonesty:

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.

If it is determined that student has cheated, he or she may be given an "F" for the course, and may face additional sanctions from the University.

The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty:

If you have additional questions, please clarify with your instructor for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class-e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.

Honor Code:

All projects and labs are to be the individual work of each student (of team/group of students) whose name appears on the exam or work being turned in for credit. You can get help from the GAs, or from the instructor. You can ask other students and ONLY discuss errors or problems that you may be experiencing, but you CANNOT discuss, share, disseminate, etc. solutions. The ONLY exceptions to this are lab assignments that are done on the specified lab days, where you are encouraged to discuss and you can even work together. Deviation from this policy will be treated as a violation of the honor code and will be subject to disciplinary action. The following honor code statement will appear on the midterm and final exams, which you'll have to sign:

I pledge that this submission is solely my work, and that I have neither given to nor received help from anyone other than the instructor or GAs.

Students determined to have committed an academic offense will be handled in the following manner:

- The first time, the student will receive a 0 for the assignment.
- The second time, a letter will be written to the department chair for inclusion in the student's record.
- For any subsequent occurrences, the student must meet with the department chair before being allowed to continue in the course.

Career Center:

The Academic Career Center can assist students with the process of career and life planning through a full range of programs and services. You may schedule appointments with the staff to discuss issues including interests, skills, values, and goal setting, as well as how to find career information, internships, full-time jobs, and graduate schools. You are encouraged to utilize the provided services

every year from your first semester to graduation. <https://www.stcloudstate.edu/careercenter>
SCSU Learning environment guidelines:

“All students are encouraged to critically reflect on the course topics and to raise questions to the class and to the professor. Please be respectful to one another by not presenting your question in a hostile manner. Open dialogue on course content is encouraged, but attacks on classmates or myself are not. Please set up a time to talk with me if you have questions about this policy or if you believe this policy is being violated. You may also report hostile, biased or threatening behavior to www.stcloudstate.edu/oea/”

There are many offices on campus that provide additional support and/or information outside of class including:

American Indian Center: www.stcloudstate.edu/aic

Multicultural Student Services: www.stcloudstate.edu/mss

Center for International Studies: www.stcloudstate.edu/internationalstudies

Additional Student Services Offices: <https://www.stcloudstate.edu/campuslife/student-services.aspx>

Counseling and Psychological Services

Counseling and Psychological Services (CAPS) is a department within the Division of Student Life and Development that helps undergraduate and graduate students cope more effectively with personal, mental health, and academic issues that arise in their lives.

“College can be stressful and it is normal for some students to struggle emotionally while balancing the demands of college and personal lives. If you are struggling, please stop by and see me during my office hours. Know that our Counseling & Psychological Services (CAPS) Department is available Monday through Friday 8-4:30 to assist students who need help. Don’t hesitate to reach out for help. We care about you and want you to be successful both personally and professionally here at St. Cloud State University (SCSU).”

How to get an appointment or make a referral to CAPS:

1. Call 320-308-3171

2. Go to the Request an Appointment link on the website
<https://www.stcloudstate.edu/counseling/>

3. Walk in to the CAPS clinic Monday through Friday any time between 8am and 4:30pm

4. Faculty/staff can call CAPS or walk over to CAPS in person with a student for a warm hand-off (we are located in Eastman Hall, 3rd floor)

Faculty/staff should call ahead when possible so we can be prepared for an immediate visit with the student

After hours use any of these crisis resources:

Local crisis line at 320-253-5555 or 800-635-8008

National Suicide Prevention Lifeline or call 1-800-273-8255

Crisis Text Line: Text “MN” to 741-741

Food and Housing Insecurity

“If you face challenges securing food or housing and believes these needs may affect your academic performance in this course, please contact the Case Manager housed in CAPS (Counseling and Psychological Services) at 320-308-3171 for a consult and possible assistance. Feel free to talk to me if you need assistance in accessing this resource.”

For more information on the Huskies Food Pantry; or to order food and self-care items from the Huskies Pantry, access the Pantry website

<https://www.stcloudstate.edu/huskiesfoodpantry/default.aspx>; call the Huskies Pantry 320-308-5685; or e-mail the Pantry foodpantry@stcloudstate.edu.

For information and eligibility screening for community resources and support contact Bridge to Community Resources at <https://www.stcloudstate.edu/sps/community-resources.aspx> or email smmoriarty@stcloudstate.edu.

“Keep the Pack Safe” Statement

“St. Cloud State University (SCSU), in coordination with state and local health departments, is closely monitoring the spread of COVID-19 and following the State of Minnesota’s laws and guidelines to keep everyone safe. We have developed a list of ways that all of us can participate to assure our campus is safe for living and learning. I expect that all of us will honor and respect ourselves and each other by following the “Keep the Pack Safe” guidelines in our classroom. As a reminder:

1. You must wear a face mask/covering when the Stearns county transmission level is determined to be ‘substantial’ or ‘high’ for four consecutive days. Should this situation occur, a communication about the masking mandate will be communicated to campus using various media. During the mask/face-covering mandate, your mask should be on every time you enter an SCSU building, including entering our classroom. Keep your face covering on during class. Please note, while teaching classes, faculty may remove their face covering if they are able to maintain six-foot distancing.
2. If you are unable to wear a face mask or covering for medical reasons, please contact the Student Accessibility Services Office to discuss possible accommodations.
3. Wash your hands frequently and use the hand sanitizers available to you.
4. If you are not feeling well, be sure to call the SCSU Medical Clinic for assistance at (320) 308-3191 or email myhealthservices@stcloudstate.edu .”

LGBTQIA

“The LGBT Resource Center at St. Cloud State University promotes full inclusion of LGBT+ folk and allies and works to dismantle prejudice, discrimination, and oppression toward and within the LGBT+ community. Visit the LGBT Resource Center for more information regarding the offered support services at St. Cloud State University.”

Our Husky Compact

“As our student, we make a bond with you in Our Husky Compact to prepare you to be a global citizen of the 21st Century. As a graduate of St. Cloud State, you will be prepared for a life of intellectual, professional and personal fulfillment with the skills to discover and apply new solutions to challenges and opportunities through risk-taking, innovation and imagination. Lifelong growth and development along the dimensions of Our Husky Compact will prepare all members of the St. Cloud State community to reconsider the world around them.”

Sexual and Relationship Violence

“St. Cloud State University (SCSU) is committed to fostering a safe and inclusive learning environment for all students. If you (or someone you know) has experienced/survived any form of sexual harassment or sexual violence, including rape, sexual assault, relationship or inter-partner violence, or stalking, know that help and support are available. SCSU strongly encourages all individuals to report incidents of sexual harassment to the Title IX Coordinator: Chocolella Simpson, MPA

Director, Equal Opportunity & Title IX Coordinator

Office of Institutional Equity & Access

121 Administrative Services Building

Phone: 320-308-5123

Email: oea@stcloudstate.edu

Additional information and online reporting options are available [here](#).

Please be aware that if you share, verbally or in writing, incidents of this nature, as your instructor, I am required to disclose this information to Title IX Coordinator, the designated

employee to coordinate the university's efforts to comply with Title IX federal and state requirements. If you wish to speak to a confidential employee or resource, who does not have this responsibility, you can contact the following resources:

SCSU Counseling and Psychological Services

<https://www.stcloudstate.edu/counseling/>

Open Monday-Friday 8-4:30pm

SCSU Health Services

Open Monday-Friday 8-4:30pm

SCSU's Gender Violence Prevention Program;

Women's Center

320-308-3171

320-308-3191

320-308-4958

Page 10 of 12Central MN Sexual Assault Center (Community program)

320-251-4357

800-237-5090

24-hour hotline

Your safety and success as an SCSU student are of utmost importance. If you have any questions or want additional information, please contact the Office for Institutional Equity and Access at (320) 308-5123, via email at oea@stcloudstate.edu, or in person.”

Student Accessibility Services

“St. Cloud State University is an affirmative action, equal opportunity employer and educator. St. Cloud State University is committed to a policy of nondiscrimination in employment and education opportunity and works to provide reasonable accommodations for all persons with disabilities. Accommodations are provided on an individualized, as-needed basis, determined through appropriate documentation of need. Please contact Student Accessibility Services or 320-308-4080, office Centennial Hall (CH) 202 to meet and discuss reasonable and appropriate accommodations for your plan. The accommodations authorized in your plan should be discussed with your instructor. All discussions will remain confidential. This syllabus is available in alternate formats upon request.”

Student Accessibility Services:

An affirmative action, equal opportunity employer, and educator. St. Cloud State University is committed to a policy of nondiscrimination in employment and education opportunity and works to provide reasonable accommodations for all persons with disabilities.

If you have a disability, or think you may have a disability, you may want to contact Student Accessibility Services to begin the conversation or request official accommodations. You can find more information about Student Accessibility Services, here: <https://www.stcloudstate.edu/sas/default.aspx>; you can also contact them at 320-308-4080, and Room 202 of Centennial Hall.

Student Accessibility Services works with students with disabilities and faculty members to identify reasonable accommodations. If you have previously been approved for accommodations through Student Accessibility Services, please contact SAS so we can develop an implementation plan together.”

Resources

Below are some resources you may find useful as you are planning for Fall Semester 2021.

Academic Technology Support

D2L@stcloudstate.edu is your first line of help. The System-Wide HelpDesk can answer basic questions about D2L, but there are some things that are very specific to St. Cloud State

University (SCSU) where they will not be able to help.

<https://www.stcloudstate.edu/its/services/academic/default.aspx>

Virtual appointments can be made at:

<https://outlook.office365.com/owa/calendar/OnlineSupport@MinnState.edu/bookings/>

Academic Support Services / Bridge to Community Resources

<https://www.stcloudstate.edu/academics/academic-support/default.aspx>

For community resources related to housing, food, utilities, childcare, mental health, legal, and related social services: <https://www.stcloudstate.edu/sps/community-resources.aspx>

Contact information: smmoriarty@stcloudstate.edu.

Calendars

Includes listings and descriptions of upcoming events and links to the Academic and Interfaith Calendars.

<https://www.stcloudstate.edu/events/default.aspx>

Disclaimer: Please note that the specifics of this course syllabus are subject to change, and you will be responsible for abiding by any such changes. Your instructor will notify you of any changes.