

CSCI 7501 COMPUTATIONAL INTELLIGENCE

Spring 2024

Instructor:	Dr. Weitian Tong Associate Professor in Computer Science
Email:	wtong@georgiasouthern.edu
Website:	http://www.weitiantong.com/teaching/Computational-Intelligence/
Office:	IT 2305
Office hours:	TR 9:30 am – 11:00 am; or TR 12:30 pm – 5:00 pm; or by appointment
Lecture class:	<ul style="list-style-type: none">• T 5:30 PM – 8:15 PM• Site Synchronous Instruction (CRN 13182)• Online Synchronous (CRN 13183)
Important Dates:	Please refer to Spring 2024 University Calendar for details. <ul style="list-style-type: none">• January 8, Class begins and Attendance Verification• January 8 – 11, Drop/Add• January 15, Martin Luther King Jr. Holiday – No classes• March 4, Last day to withdraw without academic penalty• March 11 – 16, Spring break for students – No classes• April 29, Last day of classes• April 30 — May 4, Final Exams (Refer to Final Exam Schedule for details)
CRN and Credits:	CRN 13182 & 13183, 3.0 credit hours
Prerequisite(s):	A minimum of “B” in CSCI 7130 or Permission of Instructor.
Course Content:	In-depth study of neural networks, soft computing, and nature-based systems.
Textbook:	There are no required textbooks. Recommended books are listed for students who want to read more. <ul style="list-style-type: none">• Benjamin Doerr, Frank Neumann. Theory of Evolutionary Computation: Recent Developments in Discrete Optimization. Springer. 2020.• Genetic and Evolutionary Computation. Book series. Springer.• Ian Goodfellow, Yoshua Bengio, Aaron Courville. Deep Learning. MIT Press. 2016.• Zhang, Aston and Lipton, Zachary C. and Li, Mu and Smola, Alexander J. Dive into Deep Learning. arXiv. 2021.
Materials:	<ul style="list-style-type: none">• All course materials (such as syllabus, slides, and homework descriptions) are available on Folio.• The actual course schedule will be updated timely on our course website: http://www.weitiantong.com/teaching/Computational-Intelligence/
Assessments:	<ul style="list-style-type: none">• Comprehensive Course Projects (2 times): 90%• Attendance: 10%
Grading Scale:	A: [90, 100]; B: [80, 90); C: [70, 80); D: [60, 70); F: [0, 60).

Objectives:

- Know the scope of Computational Intelligence (CI), and the types of tasks that can be tackled with CI methods.
- Know the most important modern computational intelligence techniques.
- Organize the problem solving flow for a computational intelligence problem, analyzing the possible options and choosing the most appropriate techniques or combinations of techniques.
- Decide, defend and criticize a solution to a computational intelligence problem, arguing on the strengths and weaknesses of the chosen approach.
- Learn the fundamentals of fuzzy computation and apply them correctly to develop correct and efficient solutions to computational intelligence tasks.
- Learn the fundamentals of evolutionary computation and apply them correctly to develop correct and efficient solutions to computational intelligence tasks.
- Learn the fundamentals of neural computation and apply them effectively to develop correct and efficient solutions to a computational intelligence task.

Outcomes:

Upon successful completion of this course, you should be able to

- gain comprehensive theoretical knowledge as well as practical skills related to the design, implementation and analysis of Computational Intelligence (CI) approaches, algorithms and methods;
- explain, critically review, and discuss research papers in areas of CI;
- independently analyze research papers in areas of CI and write literature review papers on topics of CI;
- discuss and argue about current topics in CI;
- design and build CI algorithms and approaches to real-life problems, analyze and improve these algorithms and approaches, as well as argue, justify and discuss decisions made during the development processes.

Topics:

Please follow the course website: "<http://www.weitianlong.com/teaching/Computational-Intelligence/>" for *timely updated course schedule*.

- Introduction to Computational Intelligence
- Fuzzy Computation
- Evolutionary Computation
- Neural Computation
- Hybrid Computation Intelligent Methods

Course Policy:

- **Academic Honesty:** Consultation with fellow students is encouraged. However, directly copying another student's work (past or present) defeats the purpose of the assignments and exams and is an honor code violation. Unless otherwise noted, you are expected to complete all assignments **individually**. Violations of the Georgia Southern University academic honesty policy (including cheating and plagiarism) are taken very seriously. Any violation of

this policy will become part of the student's permanent educational record. More information on the academic dishonesty policy and procedure can be found at: Academic Dishonesty.

- **Late Assignments, make-up work/tests:** **No** late work will be accepted and there is **no** make-up work available in this class, unless the absence is due to a situation that is beyond your control and can be **verified by written documentation**.
- **Attendance:** **Attendance is very important** for this course. You are expected to attend the all of the lectures.
- **Grading disagreement:** Requests for re-evaluation of assignments and quizzes must be made by email **within one week** after the grades are available. Requests for re-evaluation of tests (i.e., Midterm and Final) must be made by email **within 24 hours** after grades are available.
- **Communication:** **Important news will be announced on Folio.** To ensure effective communication, you are required to check Folio or your university email (if the announcements are pushed to your email) for all communications related to this class. It is your responsibility to check your Folio account and university email daily, as many important communications will be done via email.
- **Distribution of course materials:** Lecture notes, assignments/quizzes/exams, as well as their sample solutions, are prepared for students in this course **only**. Any other use, distribution, or posting in places outside this course are prohibited without written permission from the instructor.
- **Illnesses:** We want you to take appropriate precautions for your health as well as the well-being of your classmates. If you become ill during the term, please contact me immediately. We will work through what you will need to do, to either continue working in class or make up work that might have been missed during your absence. If you have an illness that would result in an extended absence, you will need to contact the Dean of Students office. In the event of serious illness, injury, or extenuating circumstances, the DOS office will notify professors at your request.
- **Disability-related Accommodations:** Georgia Southern University is committed to providing reasonable accommodations to students with documented disabilities as required under federal law. Disabilities may include ADD or AD/HD, autism spectrum disorders, brain injuries, chronic medical conditions, communication disorders, hearing impairment, learning disabilities, mobility impairment, psychological disorders and visual impairment. The purpose of disability accommodation is to provide equal access to the academic material and equal access to demonstrate mastery of the material. If you have a disability and need accommodations, please contact the Student Accessibility Resource Center (SARC). You will need to meet with a SARC staff member who can help you gather documentation of your disability or refer you to an appropriate resource for assessment. Once documentation of the disability is approved, SARC staff will provide you with an accommodation letter detailing the approved accommodations which you should present to me so we can discuss and implement your accommodations. Disability accommodations work best starting at the beginning of the semester, but can be approved and started at any point in the semester. Accommodations start at the time the accommodation letter is presented to faculty within reasonable timelines; accommodations are not given retroactively. SARC on the Statesboro campus is located on the second floor of Cone Hall and the phone number is (912) 478-1566. SARC for Savannah and Liberty campuses is located on the second floor of Memorial College Center and the phone number is (912) 344-2572.
- **Equal Opportunity & Title IX:** Please refer to "Equal Opportunity & Title IX" for more infor-

mation.

- **Reporting:** Georgia Southern University does not discriminate on the basis of sex, race, color, sexual orientation, gender identity or expression, national origin, religion, age, veteran status, political affiliation, or disability. While students are encouraged to share with faculty any issues or concerns they may be having, please be aware there are reporting requirements which are a part of the job requirements at Georgia Southern University. For example, if you disclose an issue of sexual misconduct, the information will be kept as private as possible but faculty and staff are required to bring it to the attention of the institution's Title IX Coordinator/Director of Equal Opportunity and Title IX.
- **Pregnant and Parenting Students:** Georgia Southern University does not discriminate against students who are pregnant, give birth, experience a false pregnancy, termination of pregnancy, or recovery therefrom. Students should work with their faculty as soon as possible to arrange appropriate accommodations based on this status; delays in reporting may impact available accommodations. Students will be treated similarly to other similarly situated students. Absences from class may be excused due to pregnancy or childbirth for as long as medically necessary. At the conclusion of medical leave, the student will be allowed to return to the same academic status. Medical certification may be requested from the student. Both students and faculty are able to consult with the Title IX Coordinator regarding any questions or issues which arise.

Enjoy the class!