EDG 4437: Teaching and Learning Computer Science for K-12 Teachers.

3 Credits

COURSE SYLLABUS

Semester: Fall 2026
Course Type: 100% Full Distance Learning
Instructor: Dr. Zafer Unal
Office Hours: Online with Appointment
Phone: 727-873-4803
Email: unal@usf.edu

I. Welcome!

This course is designed to equip you with the essential pedagogical knowledge and practical skills needed to become an effective and inclusive computer science educator in K-12 settings. We will explore a wide range of topics, from establishing a well-managed computer lab environment and selecting engaging instructional strategies to designing fair assessments and adapting lessons for diverse learners. You will learn to leverage educational technology, connect CS concepts to college and career readiness, and develop standards-aligned curriculum. By the end of this course, you will have built a comprehensive portfolio of teaching resources, ready to foster a dynamic and equitable computer science classroom. Let's begin this journey to empower the next generation of computational thinkers.

II. University Course Description

This course provides a comprehensive overview of pedagogical methods, classroom management, instructional strategies, assessment techniques, and curriculum development for K-12 computer science education. It covers core topics such as differentiated instruction, educational technology integration, equitable access, and alignment with state and national standards, preparing teachers to create effective and inclusive learning environments.

III. Course Prerequisites

None

IV. Course Purpose

This course serves as a foundational methods course for teaching computer science. Its purpose is to equip K-12 teachers with the practical pedagogical skills, strategies, and resources needed to design, manage, and assess an effective and inclusive computer science classroom. The course focuses on exploring and applying evidence-based practices for instruction, classroom management, and curriculum planning, making it essential for educators seeking to successfully implement computer science in their schools.

V. Course Format

This fully online course is structured through weekly modules that combine asynchronous recorded lectures with hands-on pedagogical demonstrations and projects. Students engage through discussion boards for peer interaction and complete practical assignments applying teaching strategies to real-world educational scenarios. The course offers flexibility through asynchronous learning while maintaining support through individual consultation sessions with the instructor as needed.

VI. Student Learning Outcomes

Upon completion of this course, students will be able to:

- Apply appropriate and effective classroom management strategies for a computer science learning environment.
- Select and implement a variety of instructional strategies for teaching computer science concepts.
- Design and apply formative and summative assessment strategies for computer science.
- Implement accommodations, adaptations, and strategies to ensure equitable use of technology for diverse student populations.
- Determine characteristics and apply uses of instructional technologies for collaborative learning.
- Identify opportunities, skills, and paths related to college and career readiness in computer science.
- Apply practices for planning and developing computer science curricula that meet state and national standards.

VII. Course Objectives

Students will:

- Develop a classroom management plan tailored to a computer lab or technology-rich classroom.
- Create and critique lesson plans that utilize specific instructional strategies like case studies, simulations, and team software development.
- Construct rubrics and design portfolio assessments for computer science projects.
- Design a differentiated lesson plan that includes accommodations for students with exceptionalities and English language learners.
- Evaluate and implement collaborative online tools to facilitate student learning.
- Research and present on computer science career pathways and their connection to K-12 learning.
- Map a unit of computer science curriculum to state and/or national standards and identify ongoing professional development resources.

VIII. Required Texts and/or Readings and Course Materials

- There are no required text in this course. All of the course materials (videos, readings etc. will be available on the course website with free access. A computer with internet access and capable of running AI applications is required for this course.

IX. Supplementary (Optional) Texts and Materials

NA

X. How to Succeed in this Course

To succeed in this course, students should establish strong study habits from the beginning. This includes completing all weekly readings prior to attempting practical exercises and actively engaging with technical demonstrations. Time management is crucial - start assignments well before deadlines to allow for troubleshooting and maintain detailed documentation of your technical implementation process. Regular engagement with course materials, peers, and AI tools is essential for building practical skills. Finally, always maintain backup copies of all project work to prevent any potential data loss during technical exercises.

XI. Academic Continuity

As this course is already fully online, any disruptions due to emergencies or severe weather will have minimal impact on course delivery. All course materials, including recorded lectures, assignments, and resources, will remain accessible through Canvas. If USF systems are impacted, backup copies of essential materials will be made available through Microsoft Teams. The instructor will communicate any changes or contingency plans through Canvas announcements and email. While most activities are asynchronous, any scheduled synchronous sessions (like individual consultations) will be rescheduled if disrupted, with alternative times communicated through Canvas.

XII. Communication

Primary communication for this course will be through Canvas messaging and announcements. For urgent matters, you may contact your instructor with the email provided on top. Your instructor typically responds to messages within 24 hours during weekdays and 48 hours on weekends. Virtual office hours are available by appointment through Microsoft Teams. Professional communication etiquette is expected in all interactions - please include your name and course number in email subjects.

XIII. Grading Scale

Grading Scale (%)	
90-100	A
80 - 89	B
70 - 79	C
60 - 69	D
0 - 59	F

XIV. Grade Categories and Weights

The final grade is directly tied to the mastery of each sub-competency. Each assignment will be graded using a specialized rubric designed to assess mastery of its corresponding sub-competency.

Sub-Competency	Assessments	Weight of final Grade
7.1: Apply effective classroom management strategies.	Discussion 7.1: Lab Management Scenario, Classroom Management Plan 7.1	15%
7.2: Apply effective instructional strategies.	Discussion 7.2: Instructional Strategy Analysis,	20%

	Instructional Design Project 7.2	
7.3: Apply formative and summative assessment strategies.	Discussion 7.3: Rubric Critique, Assessment Design Project 7.3	15%
7.4: Apply accommodations for equitable use.	Discussion 7.4: UDL in CS, Differentiated Lesson Plan 7.4	15%
7.5: Determine characteristics and apply uses of instructional technologies.	Discussion 7.5: Tool Evaluation, Technology Integration Activity 7.5	10%
7.6: Recognize college and career readiness paths.	Discussion 7.6: Career Pathway Profile, College & Career Readiness Report 7.6	10%
7.7: Apply practices for planning and developing curricula.	Discussion 7.7: Standards Alignment, Curriculum Mapping Project 7.7	15%
Course Participation	Consistent engagement in weekly modules and discussions	5%
TOTAL		100%

XV. Instructor Feedback Policy & Grade Dissemination

Course modules open every Monday at 12:00 AM and close Sunday at 11:59 PM EST. All assignments must be submitted within this one-week window; late submissions are not accepted given the full week provided for completion. Individual feedback and grades will be posted in Canvas by Wednesday 5:00 PM of the following week. Major assignments like projects and the final portfolio may require additional grading time, which will be communicated in advance. All grades and feedback can be accessed through the Canvas gradebook.

XVI. Course Schedule.

Week	Topics & Subitems	Assessment/Assignment
1	**Foundations of CS Classroom Management (Sub-competency 7.1):** (1) Setting norms and routines (2) Physical and digital lab layout (3) Cooperative learning structures (4) Managing electronic communications	**Discussion 7.1: Lab Management Scenario** Analyze a case study of a challenging computer lab scenario (e.g., off-task behavior, technical issues) and propose a specific management strategy based on course principles.
2	**Developing a Management Plan (Sub-competency 7.1):** (1) Proactive vs. reactive strategies (2) Giving effective instructions (3) Time management in the lab (4) Plan for early finishers and technical failures	**Classroom Management Plan 7.1** Create a comprehensive classroom management plan for a computer science lab or technology-rich classroom, detailing routines, rules, consequences, and procedures.
3	**CS Instructional Strategies I (Sub-competency 7.2):** (1) Independent & Project-Based Learning (2) Case	**Discussion 7.2: Instructional Strategy Analysis** Select one instructional strategy (e.g., PBL, case studies). Describe a specific CS topic it would be

	Studies (3) Role-Playing for user perspectives (4) Fostering reflective thinking	effective for and explain why. Critique a peer's example for depth and applicability.
4	**CS Instructional Strategies II (Sub-competency 7.2):** (1) Using manipulatives and visualizations (2) Simulations and modeling (3) Team Software Development (4) Integrating soft skills	**Instructional Design Project 7.2** Design a detailed lesson plan for a specific computer science concept that utilizes at least two of the instructional strategies covered (e.g., a simulation and team software development).
5	**Assessment for Learning in CS (Sub-competency 7.3):** (1) Formative vs. Summative Assessment (2) Designing effective rubrics (3) Using portfolios in CS (4) Providing meaningful feedback	**Discussion 7.3: Rubric Critique** Find or create a draft rubric for a programming assignment. Critique its clarity, criteria, and effectiveness in measuring student learning. Suggest improvements.
6	**Designing CS Assessments (Sub-competency 7.3):** (1) Unplugged assessment techniques (2) Assessing code and process (3) Peer and self-assessment (4) Aligning assessments with objectives	**Assessment Design Project 7.3** For your lesson plan from Week 4, create a suite of assessments, including one formative assessment tool (e.g., a quiz, exit ticket) and one summative assessment (e.g., a detailed project rubric).
7	**Equity and Access in CS (Sub-competency 7.4):** (1) Universal Design for Learning (UDL) (2) Differentiating CS instruction (3) Supporting diverse learners (4) Culturally responsive teaching in CS	**Discussion 7.4: UDL in CS** Choose one UDL guideline (e.g., multiple means of action/expression). Propose a specific way to apply it in a computer science lesson to reduce barriers for learners.
8	**Accommodations and Adaptations (Sub-competency 7.4):** (1) IEPs and 504 Plans in CS (2) Strategies for ELLs (3) Addressing socioeconomic barriers (4) Co-teaching models	**Differentiated Lesson Plan 7.4** Adapt your lesson plan from Week 4 to include specific accommodations and modifications for at least two different student exceptionalities or learning needs.
9	**Instructional Technologies (Sub-competency 7.5):** (1) Characteristics of collaborative online tools (2) Social networking for professional learning (3) Computer-based learning platforms (4) Mobile devices in CS ed	**Discussion 7.5: Tool Evaluation** Evaluate a collaborative online tool (e.g., Scratch, Replit, GitHub). Post a brief analysis of its strengths, weaknesses, and potential use in a K-12 CS classroom.
10	**Integrating Technology (Sub-competency 7.5):** (1) Selecting the right tool (2) Fostering collaboration (3) Digital citizenship in CS (4) Streamlining workflows	**Technology Integration Activity 7.5** Design a short, collaborative student activity that effectively uses an online tool to teach a fundamental CS concept (e.g., pairs programming in an online IDE).
11	**CS College & Career Readiness (Sub-competency 7.6):** (1) K-12 pathways to CS careers (2) In-demand technical and soft skills (3) Industry	**Discussion 7.6: Career Pathway Profile** Research a specific computer science career. Profile the role, required skills, and educational path, and suggest one way to expose K-12 students to this career.

	certifications (4) Connecting curriculum to real-world applications	
12	**Curriculum Planning & Standards (Sub-competency 7.7):** (1) State and national CS standards (2) Curriculum frameworks (3) Scope and sequence (4) Resource evaluation	**Discussion 7.7: Standards Alignment** Select a common CS standard. Find two different learning activities that address it and discuss which is more effective and why.
13	**Integration & Application:** (1) Synthesizing Competencies 7.1-7.7 (2) Curriculum unit mapping (3) Professional development planning (4) Peer review of portfolios	**College & Career Readiness Report 7.6** Create a resource for students or parents outlining the opportunities, skills, and educational paths related to a career cluster in computer science.
14	**Synthesis & Portfolio Finalization:** (1) Course synthesis (2) Teaching portfolio assembly and review (3) Developing a personal professional growth plan	**Curriculum Mapping Project 7.7** Map a multi-week computer science unit to relevant state/national standards, outline key lessons and assessments, and identify resources for ongoing teacher professional development. **All Final Assignments Due:** Final, polished versions of all major projects (7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7) must be submitted as a cumulative teaching portfolio by the end of Week 14.

* Note: The Schedule is subject to revision

XVII. General Education Statement (undergraduate only – Required if a Gen Ed course)

NA

XVIII. Integration of This Course into Your Academic Experience (Gen Ed courses only)

NA

XIX. Global Citizens Project (only required if a GCP course; must be verbatim)

NA

XX. USF Core Syllabus 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, pregnancy and related conditions, and sexual harassment that **apply to all courses at USF**. Be sure to review these online: usf.edu/provost/faculty-success/resources-policies-forms/core-syllabus-policy-statements.aspx

XXI. Course Policies: Grades

Late Work Policy: Offer specifics about your policy on late work.

Each module provides a full 7-day window for completion, and no late submissions will be accepted after the weekly deadline. To ensure success in this course, it is strongly recommended to begin each module on Monday rather than waiting until the weekend. Starting early allows time to troubleshoot technical issues, engage meaningfully in discussions, and seek clarification if needed. Students who consistently complete work early in the module week typically perform better and experience less stress than those who leave work until the last minute.

Medical Excuses:
If illness prevents coursework completion, students must immediately notify the instructor and submit medical documentation. While this is an online course with no physical attendance requirements, prompt communication regarding any medical issues impacting your ability to complete coursework is essential for arranging accommodations.

Grades of "Incomplete":
For graduate courses: An Incomplete grade ("I") is exceptional and granted at the instructor's discretion only when students are unable to complete course requirements due to illness or other circumstances beyond their control. The course instructor and student must complete and sign the "I" Grade Contract Form that describes the work to be completed, the date it is due, and the grade the student would earn factoring in a zero for all incomplete assignments. The due date can be negotiated and extended by student/instructor as long as it does not exceed two semesters for undergraduate courses and one semester for graduate courses from the original date grades were due for that course. An "I" grade not cleared within the two semesters for undergraduate courses and one semester for graduate courses (including summer semester) will revert to the grade noted on the contract.

Attendance Policy:
For this online course, regular participation is measured through timely completion of weekly modules and engagement with course materials. Students are expected to log in to the course per week to review content, participate in discussions, and complete assignments.

Campus Free Expression:
It is fundamental to the University of South Florida's mission to support an environment where divergent ideas, theories, and philosophies can be openly exchanged and critically evaluated. Consistent with these principles, this course may involve discussion of ideas that you find uncomfortable, disagreeable, or even offensive. In the instructional setting, ideas are intended to be presented in an objective manner and not as an endorsement of what you should personally believe. "Objective" means that the idea(s) presented can be tested by critical peer review and rigorous debate, and that the idea(s) is supported by credible research. In this course you may be asked to engage with complex ideas and to demonstrate an understanding of the ideas. Understanding and engaging with an idea does not require you to believe it or to agree with it.

Final Examinations Policy:
No exam, non-applicable

XXII. Course Policies: Technology and Media (include sections as applicable to your course)

Canvas:
This course is fully delivered through Canvas Learning Management System. Students must log in regularly to access course materials, assignments, and announcements. Weekly modules open Monday 12:00 AM and close Sunday 11:59 PM EST. All course communication, submission of assignments, and grade distribution will be conducted through Canvas. For technical support, contact USF IT at (813) 974-1222 or help@usf.edu.

XXIII. Course Policies: Student Expectations

Health and Wellness: Example statement supporting student health and wellbeing.

Your health is a priority at the University of South Florida. We encourage members of our community to look out for each other and to reach out for help if someone is in need. If you or someone you know is in distress, please make a referral at www.usf.edu/sos so that the Student Outreach & Support can contact and provide helpful resources to the student in distress. A 24-hour licensed mental healthcare professional, offered through the counseling center, is available by phone at 813-974-2831, option 3. Please remember that asking for help is a sign of strength. In case of emergency, please dial 9-1-1.

Title IX Policy: It is recommended you include the paragraph below verbatim.

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.*

Generative AI: With advancements in AI, tools like GPT-4 can generate human-like text, raising potential issues related to academic integrity and the authenticity of student work. Hence, it's essential to establish clear policies that are communicated to students from the outset of a course. CITL has developed some recommendations that you may consider using in your syllabus here: **CITL Generative AI Syllabus Course Policy Recommendations**

Course Hero / Chegg Policy: Offer specifics about your policy on contract cheating, paper mills, or the use of websites that enable cheating.

Example: The USF Policy on Academic Integrity specifies that students may not use websites that enable cheating, such as by uploading or downloading material for this purpose. This does apply specifically to Chegg.com and CourseHero.com – almost any use of these websites (including uploading proprietary materials) constitutes a violation of the academic integrity policy.

Professionalism Policy:

All course interactions must maintain professional etiquette. Students will communicate respectfully in discussion boards, emails, and group work. Written communications must be clear, appropriate, and maintain a professional tone. Disruptive behavior in online interactions may affect your final grade. For group activities, timely responses and meaningful contributions are required.

Netiquette Guidelines

Professional communication is essential in our online learning environment. When participating in course activities, maintain the same respect and courtesy as in face-to-face interactions. Consider

diverse perspectives and remember that written communication lacks verbal cues. Keep messages clear, focused, and constructive. Always proofread for clarity, avoiding all caps and informal language. Complete thoughts on one topic before introducing new ones. Avoid sarcasm and humor that could be misinterpreted. Following these guidelines in Canvas will create a positive learning environment.

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.

XXIV. Learning Support and Campus Offices

Academic Accommodations
Students with disabilities are responsible for registering with Student Accessibility Services (SAS) in order to receive academic accommodations. For additional information about academic accommodations and resources, you can visit the SAS website.
SAS website for the Tampa and Sarasota-Manatee campuses.
SAS website for the St. Pete campus.

Academic Support Services
The USF Office of Student Success coordinates and promotes university-wide efforts to enhance undergraduate and graduate student success. For a comprehensive list of academic support services available to all USF students, please visit the Office of Student Success website.

Canvas Technical Support
Include information where students can find technical support.
Example: If you have technical difficulties in Canvas, you can find access to the Canvas guides and video resources in the "Canvas Help" page on the homepage of your Canvas course. You can also contact the help desk by calling 813-974-1222 in Tampa or emailing help@usf.edu.
IT website for the Tampa campus.
IT website for the St. Pete campus.
IT website for the Sarasota-Manatee campus.

Center for Victim Advocacy
Example: The Center for Victim Advocacy empowers survivors of crime, violence, or abuse by promoting the restoration of decision making, by advocating for their rights, and by offering support and resources. Contact information is available online.

Counseling Center
Example: The Counseling Center promotes the wellbeing of the campus community by providing culturally sensitive counseling, consultation, prevention, and training that enhances student academic and personal success. Contact information is available online.
Counseling Center website for the Tampa campus.
Counseling Center website for the St. Pete campus.
Counseling Center website for the Sarasota-Manatee campus.

Tutoring

Example: The Tutoring Hub offers free tutoring in several subjects to USF undergraduates. Appointments are recommended, but not required. For more information, email asctampa@usf.edu.
Tutoring website for the Tampa campus.
Tutoring website for the St. Pete campus.
Tutoring website for the Sarasota-Manatee campus.

Writing Studio

Example: 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, email: writingstudio@usf.edu.
Writing studio website for the Tampa campus.
Writing studio website for the St. Pete campus.
Writing studio website for the Sarasota-Manatee campus.

XXV. Important Dates to Remember

All dates, assignments, and course content are tentative and subject to change at the instructor's discretion. Note: While modules follow a weekly schedule, changes will be announced through Canvas at least one week in advance

For official USF academic deadlines and holidays, refer to the Academic Calendar at http://www.usf.edu/registrar/calendars/
Drop/Add Deadline: Fri, Aug 29, 2025
Labor Day Holiday: Mon, Sept 1, 2025
Mid-term Grading Opens: Mon, Oct 6, 2025
Mid-term Grading Closes: Tues, Oct 21, 2025
Withdrawal Deadline: Sat, Nov 1, 2025
Veterans Day Holiday: Mon, Nov 11, 2025
Thanksgiving Holiday: Thurs, Nov 27 & Fri, Nov 28, 2025
Final Examination Week: Sat, Dec 6 - Thurs, Dec 11, 2025
Last Day of Term: Dec 11, 2025