NEW COURSE PROPOSAL
Graduate Programs

FLORIDA ATLANTIC UNIVERSITY

UGPC Approval _____

UFS Approval _____

SCNS Submittal _____

Confirmed _____

Banner _____

Catalog _____

Department Electrical Engineering and Computer Science

College Engineering and Computer Science

(*To obtain a course number, contact **erudolph@fau.edu***)

Prefix COT	*(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)* **Lab Code**	**Type of Course**	**Course Title**
Number 6432		Lecture	

Credits *(See Definition of a Credit Hour)*	**Grading** (Select One Option)	**Course Description** *(Syllabus must be attached; see Template and Guidelines)*
3	**Regular** ◯	
Effective Date *(TERM & YEAR)* Spring 2026	**Sat/UnSat** ◯	

Prerequisites	**Academic Service Learning (ASL) course** ☐
	Academic Service Learning statement must be indicated in syllabus and approval attached to this form.
	Corequisites / **Registration Controls** *(For example, Major, College, Level)*
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**
Faculty Contact/Email/Phone Arslan Munir, arslanm@fau.edu, 561-297-3855	**List/Attach comments from departments affected by new course**

Approved by	**Date**
Department Chair _Haik dVa_	2/25/2025
College Curriculum Chair _FranciscoPresuel-Moreno_	4/3/2025
College Dean _Raquel Assis_	9/23/2025
UGPC Chair _Arthur Sementelli (Oct 15, 2025 00:40:34 EDT)_	10/15/2025
UGC Chair _Arthur Sementelli (Oct 15, 2025 00:40:34 EDT)_	10/15/2025
Graduate College Dean _Robert W Stackman_	10/15/2025
UFS President _____	_____
Provost _____	_____

Email this form and syllabus to UGPC@fau.edu 10 days before the UGPC meeting.

FLORIDA ATLANTIC UNIVERSITY

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COT 6432
Parallel Computing
Date: TBD
Building: Room: TBD
3 Credit(s)
Spring 2026 – 1 Full Term

Instructor Information

Arslan Munir
Email: arslanm@fau.edu
Office:
Office Hours:
Phone:

TA Name:
Office:
Office Hours:
Telephone: Email:

Course Description

Introduces students to the domain of parallel computing and parallel architectures. The course covers concepts on parallel architectures including distributed memory, shared memory, and graphics processing units; parallel programming including MPI, OpenMP, and CUDA; parallel performance analysis; memory hierarchy design; instruction-level parallelism; data-level parallelism; thread-level parallelism; and cache coherence.

Prerequisites

Graduate standing of EECS.

Corequisites

Instructional Method

In-Person

Required Texts/Materials

Textbook: None; Instructor uses multiple reference book and sources

Reference Books:

- Introduction to Parallel Computing, by Ananth Grama, Anshul Gupta, George Karypis, and Vipin Kumar, 2nd Edition, Addison-Wesley, 2003.

- Parallel Programming in C with MPI and OpenMP by Michael Quinn, McGraw-Hill Science/Engineering/Math, 1st edition 2003.

- Programming Massively Parallel Processors: A Hands-on Approach, by David B. Kirk, Wen-mei W. Hwu, Morgan Kaufmann, 3rd Edition, 2016.

- CUDA by Example: An Introduction to General-Purpose GPU Programming, by Jason Sanders, Edward Kandrot, Addison-Wesley Professional; 1st edition, 2010.

- Computer Architecture: A Quantitative Approach, by John Hennessy and David Patterson, Morgan Kaufmann, 6th edition, 2017.

Course Objectives/Student Learning Outcomes

At the end of this course, students should be able to:

- Understand the architecture of distributed memory, shared memory, and graphics processing units

- Program parallel architectures using MPI, OpenMP, and CUDA

- Analyze performance of parallel systems

- Understand memory hierarchy design for computing systems and cache coherence

- Understand different types of parallelism, such as instruction-level parallelism, data-level parallelism, and thread-level parallelism

Faculty Rights and Responsibilities

Florida Atlantic University respects the rights of instructors to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede their exercise. To ensure these rights, faculty members have the prerogative to:

• Establish and implement academic standards.

• Establish and enforce reasonable behavior standards in each class.

• Recommend disciplinary action for students whose behavior may be judged as disruptive under the Student Code of Conduct University Regulation 4.007.

Disability Policy

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/.

Course Evaluation Method

Your grade in the class will be broken into the following components:

- **Course Project:** 20%
- **Homework Assignments:** 20%
- **Class Presentations:** 5%
- **Online Discussions and Class Meeting Participations:** 5%
- **Midterm Exam:** 25%
- **Final Exam:** 25%

Code of Academic Integrity

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.

Attendance Policy Statement

Students are expected to attend all 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. 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.

Religious Accommodation Policy Statement

In accordance with the rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices and beliefs regarding admissions, registration, class attendance, and the scheduling of examinations and work assignments. University Regulation 2.007, Religious Observances, sets forth this policy for FAU and may be accessed on the FAU website at www.fau.edu/regulations.

Any student who feels aggrieved regarding religious accommodations may present a grievance to the executive director of The Office of Civil Rights and Title IX. Any such grievances will follow Florida Atlantic University's established grievance procedure regarding alleged discrimination.

Time Commitment Per Credit Hour

For traditionally delivered courses, not less than one (1) hour of classroom or direct faculty instruction each week for fifteen (15) weeks per Fall or Spring semester, and a minimum of two (2) hours of out-of-class student work for each credit hour. Equivalent time and effort are required for Summer Semesters, which usually have a shortened timeframe. Fully Online courses, hybrid, shortened, intensive format courses, and other non-traditional modes of delivery will demonstrate equivalent time and effort.

Course Grading Scale

Letter Grade	Letter Grade
A	94 - 100%
A-	90 - 93%
B+	87 - 89%
B	83 - 86%
B-	80 - 82%
C+	77 - 79%

Letter Grade	Letter Grade
C	73 - 76%
C-	70 - 72%
D+	67 - 69%
D	63 - 66%
D-	60 - 62%
Letter Grade	Letter Grade
F	Below 60

Grade Appeal Process

You may request a review of the final course grade when you believe that one of the following conditions apply:

• There was a computational or recording error in the grading.

• The grading process used non-academic criteria.

• There was a gross violation of the instructor's own grading system.

University Regulation 4.002 of the University Regulations contains information on the grade appeals process

Policy on Make-up Tests, Late work, and Incompletes

Late submissions will not be accepted or graded.

No makeup exams will be offered.

Throughout the semester, multiple homework assignments will be posted via Canvas. For each homework assignment, you will have about a week to complete and submit your solution via Canvas. Allow enough time to submit your work since once the system is closed there will not be other possibilities to submit (don't send your work via email). Please note that the due date for homework assignments will not be updated after the assignment is posted.

Policy on the Recording of Lectures

Students enrolled in this course may record video or audio of class lectures for their own personal educational use. A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach students about a particular subject. Recording class activities other than class lectures, including but not limited to student presentations (whether individually or as part of a group), class discussion (except when incidental to and

incorporated within a class lecture), labs, clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, and private conversations between students in the class or between a student and the lecturer, is prohibited. Recordings may not be used as a substitute for class participation or class attendance and may not be published or shared without the written consent of the faculty member. Failure to adhere to these requirements may constitute a violation of the University's Student Code of Conduct and/or the Code of Academic Integrity.

Counseling and Psychological Services (CAPS) Center

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/

Student Support Services and Online Resources

- Center for Learning and Student Success (CLASS)
- Counseling and Psychological Services (CAPS)
- FAU Libraries
- Math Learning Center
- Office of Information Technology Helpdesk
- Center for Global Engagement
- Office of Undergraduate Research and Inquiry (OURI)
- Science Learning Center
- Speaking Center
- Student Accessibility Services
- Student Athlete Success Center (SASC)
- Testing and Certification
- Test Preparation
- University Academic Advising Services
- University Center for Excellence in Writing (UCEW)
- Writing Across the Curriculum (WAC)

Course Topical Outline

- Fundamentals of Quantitative Design

- Computer Performance Estimation

- Introduction to Distributed Memory Architectures and MPI

- Introduction to Shared Memory Architectures and OpenMP

- Introduction to Graphics Processing Units and CUDA

- Parallel Performance Analysis

- Memory Hierarchy Design

- Instruction-Level Parallelism

- Data-Level Parallelism

- Thread-Level Parallelism

- Cache Coherence

- Advanced Research Topics and Class Presentations