Real Time College

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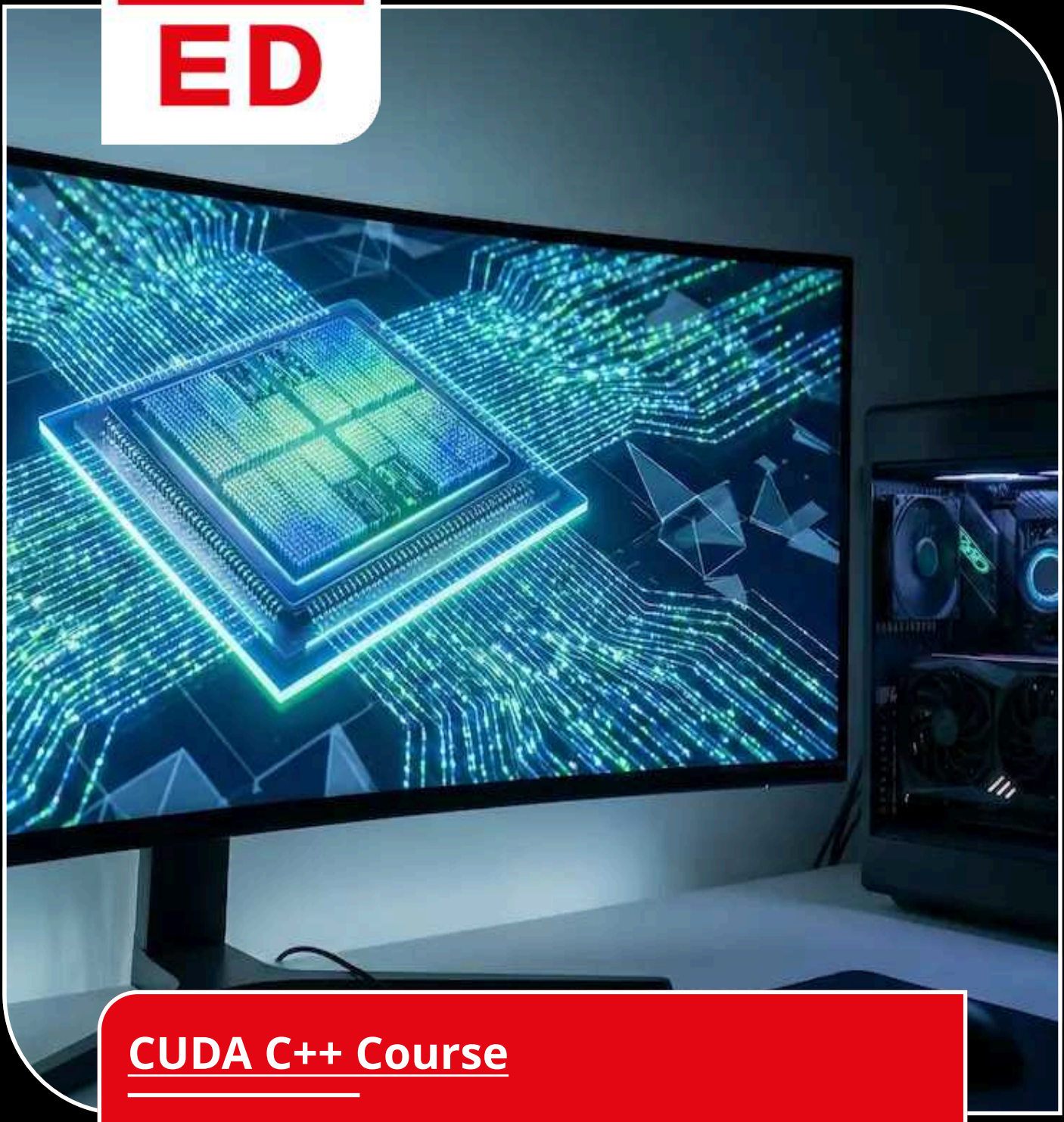


CUDA C++ Course

Duration: **25** Hours | **Hands-On Training:** 65%

TABLE OF CONTENTS

About RealTime Group 3

Course Overview 7

Who should attend, Prerequisite/Advantage 8

list of Software oriented courses 9

Notes and highlights 12

ABOUT REAL TIME GROUP

Experience the Industry. Master the Technology.

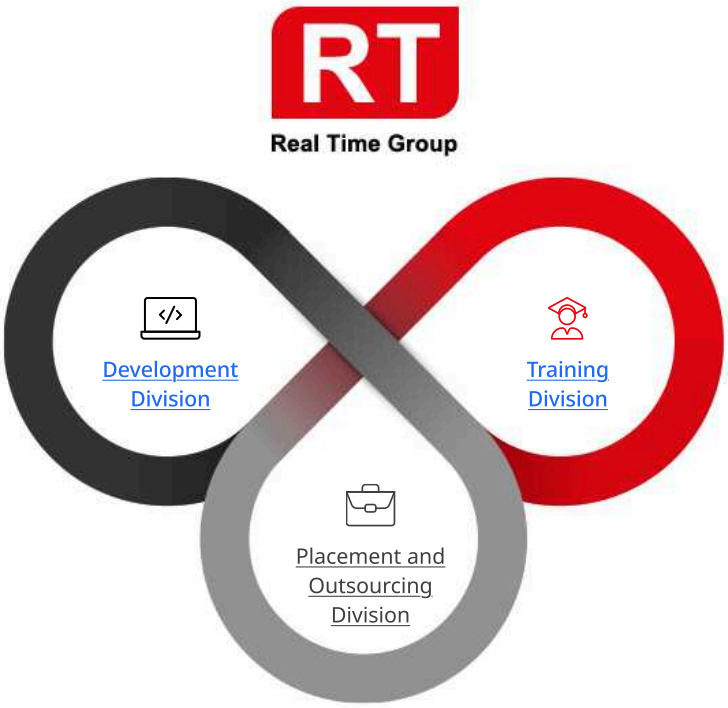
Real Time Group, established in 2007, is a technology company specializing in advanced software and hardware engineering solutions across RT Embedded Systems, Embedded Linux, FPGAs, Artificial Intelligence, Machine Learning, Computer Vision, DevSecOps, Cloud technologies, and Full Stack development.

The company combines deep hands-on development expertise with professional training programs designed to prepare engineers for the high-tech industry. Over the past two decades, Real Time teams have contributed to complex engineering projects for leading organizations including Apple, NVIDIA, Intel, the Israel Defense Forces (IDF), Rafael Advanced Defense Systems, Israel Aerospace Industries (IAI), Elbit Systems, and ELTA Systems.

This industry-driven experience forms the foundation of the Real Time training ecosystem.

OUR THREE-DIVISION ECOSYSTEM

Working together to launch your career:



RT-ED: TRAINING DIVISION

RT-ED provides advanced professional training programs focused on practical engineering skills. Courses are project-based and utilize industry-standard development environments, cloud platforms, and modern development tools.

Participants gain hands-on experience through structured labs, guided exercises, and industry-grade final projects.

DEVELOPMENT DIVISION

The Development Division delivers engineering and software development services across embedded systems, AI technologies, cybersecurity, and cloud infrastructures.

Through interaction with development teams and real-world workflows, students gain exposure to modern engineering practices and production-grade environments.

PLACEMENT AND OUTSOURCING DIVISION

Real Time Group provides structured placement and internship opportunities that support graduates in transitioning into the high-tech industry.

Students may participate in internships within active development teams, gaining real-world project experience under the guidance of experienced engineers and mentors.

COURSE OVERVIEW

The **CUDA C++** course provides in-depth training in high-performance parallel computing using NVIDIA GPU architectures. The program combines a solid understanding of GPU hardware design with advanced CUDA C++ development practices.

Participants study the CUDA programming model, memory hierarchy, synchronization mechanisms, and performance optimization techniques required for efficient large-scale parallel applications.

The course addresses computational challenges that cannot be efficiently solved using CPU-based architectures alone. It focuses on GPU-accelerated solutions in areas such as scientific computing, image and video processing, simulation, and machine learning.

By covering both architectural concepts and low-level optimization strategies, the course provides a structured foundation for developing and analyzing CUDA-based applications across different NVIDIA platforms.

WHO SHOULD ATTEND\ PREREQUISITES

Who should attend:

- Software Developers with C++ background
- Computer Vision Engineers
- Robotics Engineers
- Autonomous Systems Developers
- Engineers working with high-performance computing

Prerequisite/Advantage:

- Completed **C for Embedded**
- Completed **C++** course
- Strong understanding of:
  - Pointers and memory management
  - Data structures
  - Basic parallel computing concepts

COURSE CURRICULUM

Below is a breakdown of the core modules covered in this course, along with their descriptions and duration.

Select a module to view detailed content.

MODULE NAME	DESCRIPTION
Day 1 Foundations Of GPU Computing	• Overview of GPU architecture • Key differences between CPU and GPU execution models • Introduction to NVIDIA CUDA • CUDA programming model
Day 2 CUDA Execution Model	• Kernels, Threads, Blocks, and Grids • Thread indexing and data access patterns • Kernel launch configuration • Execution flow and scheduling principles
Day 3 CUDA Memory Architecture	• Memory hierarchy (Global, Shared, Constant, Texture) • Memory allocation and data transfers • Coalesced memory access • Unified Memory • Pinned memory and asynchronous transfers • Managed memory and memory pools
Day 4 CUDA Programming & Synchronization	• Basic kernel implementation • Shared memory usage • Synchronization primitives (barriers, atomics) • CUDA Streams and asynchronous execution • CUDA Events for timing and profiling

MODULE NAME	DESCRIPTION
Day 5 Performance Optimization	• Occupancy and latency hiding • Kernel optimization strategies • Loop unrolling and data reuse • Multi-kernel execution flow concepts (including MPS) • Performance analysis methodologies
Day 6 Profiling, Debugging & Development Tools	• CUDA-GDB • NVIDIA Nsight Systems • NVIDIA Nsight Compute • Profiling and performance monitoring techniques
Day 7 CUDA Libraries	• cuBLAS • cuFFT • cuDNN • Thrust
Day 8 Advanced CUDA Topics	• Kernel priority and preemption concepts • Multi-GPU programming • GPU segmentation and virtualization concepts • Integration with OpenMP, OpenACC, and OpenCL • Interoperability with graphics APIs (OpenGL, DirectX)
Day 9 Applications Of CUDA	• Matrix multiplication and numerical algorithms • Image and video processing acceleration • Scientific computing applications • Machine learning acceleration • Computer graphics and visualization

MEET YOUR INSTRUCTOR

ALEX SHOYHIT

Head of Machine Learning Departments

Alex holds a B.Sc. in Information Systems and an M.A. in Electrical and Electronic Engineering. As a ML Engineer at RTG, Alex specializes in the field of artificial intelligence, applying over 13 years of experience in project development, management, and transitioning from development to production in various domains such as Linux Embedded. Throughout his career, Alex developed his expertise working with the integration of Machine Learning and Deep Learning in Computer Vision & Data Analysis field.

What Do The Course Graduates Say?

Grisha
Data Science
Course Graduate

I highly recommend the Data Science course at RTG College for anyone looking to enter the field. The small groups, personal attention, and emphasis on real projects gave me a significant advantage in job interviews.

Binyamin
Data Science
Course Graduate

Within a few months, I acquired practical tools that enabled me to integrate into my first position at a tech company, with a significantly increased salary. The industry-experienced instructors and practical projects made all the difference.

Shaked
Full Stack Course
Graduate

The Tools I Gained From The Course Are Among The Most Up-To-Date In The Development Market Today. What Gave Me Peace Of Mind Was Knowing That At The End Of The Course, A Professional Placement Company Would Support Me In Entering The Field

MISCELLANEOUS

• Course opening is contingent upon minimum enrollment.

• Registration fees are non-refundable except in cases where the college does not open the course.

• All content and implications of the syllabus are subject to college regulations.

• The college informs students that there may be changes in course content and scheduling.

• The college commits to notifying students of any changes.

• The college reserves the right to modify course content at its sole discretion.

Thank You!

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