

# PARALLEL AND CLOUD COMPUTING CERTIFICATE, GRADUATE

Certificates are intended primarily for working professionals, and provide a "bite-sized" chunk of graduate coursework. See Professional Master of Computer Science (MCS) (<http://catalog.ewu.edu/stem/cs-ee/parallel-cloud-graduate-certificate/stem/cs-ee/computer-science-mcs/>) for additional information.

## Required Certificate Prerequisites—must be completed prior to admission.

CSCD 240	C AND UNIX PROGRAMMING or CSCD 255 C PROGRAMMING FOR ENGINEERS	
CSCD 300	DATA STRUCTURES	
<b>Certificate Requirements</b>		
CSCD 545	GPU COMPUTING	4
CSCD 567	PARALLEL AND CLOUD COMPUTING	4
CSCD 601	RESEARCH REPORT	4
Total Credits		12

## Students who successfully earn a Parallel and Cloud Computing, Graduate Certificate from EWU should be able to do the following:

- apply GPU parallel patterns to real-world problems, such as sorting, reduction, prefix sum and stencil computing algorithms;
- apply the features of a cloud system in designing real-world information systems, including high availability, fault tolerance and high scalability;
- develop applications using Amazon AWS, including Amazon EC2, Amazon S3, Amazon DynamoDB, Lambda, Amazon Elastic MapReduce, Elastic Load Balancer and Auto Scaling Group etc;
- implement their own Remote Procedure Call using TCP Socket, synchronizations between client and server and typical failure handler on server;
- solve real-world problems using MapReduce framework, such as frequent itemset mining problem;
- understand different types of GPU memory and know how to effectively use shared memory and constant memory to further improve performance;
- understand the concepts of Cloud computing and Distributed Computing, and in particular use Hadoop and MapReduce to store and process large datasets;
- understand the issues and challenges in writing correct and efficient shared-memory threaded programs;
- understand the principles and the design of the Hadoop and MapReduce framework.
- use CUDA C to parallelize real-world applications, such as text processing, image processing and scientific computing on GPUs;
- use underlying concepts to identify factors that limit performance, so that they can write efficient and high-performance parallel programs on GPUs.