



**SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS**

New Course Request

SDSU	Jerome J. Lohr College of Engineering / Electrical Engineering & Computer Science
Institution	Division/Department
Dennis D. Hedge	5/3/2021
Institutional Approval Signature	Date

Section 1. Course Title and Description

Prefix & No.	Course Title	Credits
CSC 469-569	Fundamentals of High-Performance Computing	3
EE 469-569	Fundamentals of High-Performance Computing	3

Course Description
An introduction to high-performance computing (HPC) and its application to scientific research computing: accessing and using HPC clusters, task and process-based parallelism, shared and distributed memory, using hardware accelerators (e.g., graphics processing units), and other emerging topics.

Pre-requisites or Co-requisites

Prefix & No.	Course Title	Pre-Req/Co-Req?
None		

Registration Restrictions

None

Section 2. Review of Course

2.1. Will this be a unique or common course?

Unique Course

Prefix & No.	Course Title	Credits
AES 419-519	High-Perf Computing: Earth Science	3
CSC 425-525	High Performance Computing	3
CSC 750	Recent Advances in Parallel Processing	3

Provide explanation of differences between proposed course and existing system catalog courses below:

The new course will differ from the other offerings in several ways:

1. Use of the SDSU HPC cluster is integrated into the course offering as both multi-CPU and GPU programming will be covered.
2. Example problems will come from the domain of problems relevant to JLLCOE engineering students in areas such as power systems engineering, computational flow, linear regression, machine learning, and others.
3. AES 419-519 is limited in coverage to issues relating to earth sciences and the data formats used by that community of scientists. This is a very different domain of problems which does not overlap the proposed new course topics.
4. CSC 425-525 is limited in coverage to shared and distributed memory environments and covers architectural issues. Course content does not overlap.

5. CSC 750 would be a follow on to the proposed new course and will be advance the topics learned in the previous course. This is intended as an upper-level graduate course.

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

No. Schedule Management, explain below: CSC/EE 492-592 Topics: Advanced High Performance Computing was taught the previous three fall semesters. Demand warrants continuation of course with current faculty member, teaching the course.

3.2. Existing program(s) in which course will be offered: Electrical Engineering (B.S., M.S., Ph.D.) and Computer Science (B.S., M.S., Ph.D.)

3.3. Proposed instructional method by university: R - Lecture

3.4. Proposed delivery method by university: 001 - Face to Face Term Based Instruction

3.5. Term change will be effective: Fall 2021

3.6. Can students repeat the course for additional credit? Yes No

3.7. Will grade for this course be limited to S/U (pass/fail)? Yes No

3.8. Will section enrollment be capped? Yes, max per section: 36 No

3.9. Will this course equate (i.e., be considered the same course for degree completion) with any other unique or common courses in the common course system database in Colleague and the Course Inventory Report? Yes No

3.10. Is this prefix approved for your university? Yes No

Section 4. Department and Course Codes (Completed by University Academic Affairs)

4.1. University Department: Electrical Engineering & Computer Science

4.2. Banner Department Code: SEEC

4.3. Proposed CIP Code: 11.0107

Is this a new CIP code for the university? Yes No

NEW COURSE REQUEST
Supporting Justification for On-Campus Review

Timothy M. Hansen	Timothy M. Hansen	1/25/2021
Request Originator	Signature	Date
Siddharth Suryanarayanan	Siddharth Suryanarayanan	3/17/2021
Department Chair	Signature	Date
Bruce Berdanier	Bruce Berdanier	3/19/2021
School/College Dean	Signature	Date

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum.

The main objective of the course is for each student to be able to understand and apply high performance computing (HPC) concepts to their discipline of study. As HPC systems are becoming more commonly used to solve engineering problems students will benefit from an understanding of the concepts and the ability to use these tools.

2. Note whether this course is: Required Elective

3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course?
All students in the JLLCOE would have the needed background for the course.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made.
Graduate students will be expected to undertake a term project over and above the work required by

undergraduate students. Graduate students will also be required to critically review research articles.

5. Desired section size 30
6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
Timothy M. Hansen, Assistant Professor, Ph.D.
7. Note whether adequate facilities are available and list any special equipment needed for the course.
The course utilizes the Roaring Thunder cluster from University Research Computing Cyberinfrastructure. Kevin Brandt and Chad Julius support these resources for the class.
8. Note whether adequate library and media support are available for the course.
Library resources are adequate for the course.
9. Will the new course duplicate courses currently being offered on this campus? Yes No
10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined.
N/A