



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

New Baccalaureate Degree Minor

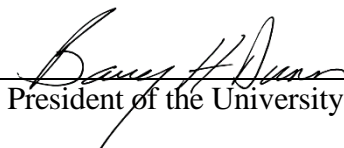
UNIVERSITY:	SDSU
TITLE OF PROPOSED MINOR:	Concrete Materials Science
DEGREE(S) IN WHICH MINOR MAY BE EARNED:	Any degree excluding the Concrete Industry Management (B.S.)
EXISTING RELATED MAJORS OR MINORS:	Concrete Industry Management (B.S.)
INTENDED DATE OF IMPLEMENTATION:	Fall 2023
PROPOSED CIP CODE:	15.1501
UNIVERSITY DEPARTMENT:	Construction & Operations Management
BANNER DEPARTMENT CODE:	SCOM
UNIVERSITY DIVISION:	Jerome J Lohr College of Engineering
BANNER DIVISION CODE:	3E

☒ **Please check this box to confirm that:**

- The individual preparing this request has read [AAC Guideline 2.8](#), which pertains to new baccalaureate degree minor requests, and that this request meets the requirements outlined in the guidelines.
- This request will not be posted to the university website for review of the Academic Affairs Committee until it is approved by the Executive Director and Chief Academic Officer.

University Approval

To the Board of Regents and the Executive Director: I certify that I have read this proposal, that I believe it to be accurate, and that it has been evaluated and approved as provided by university policy.



President of the University

4/3/2023

Date

1. Do you have a major in this field? ☐ Yes ☒ No

2. If you do not have a major in this field, explain how the proposed minor relates to your university mission and strategic plan, and to the current Board of Regents Strategic Plan 2014-2020.

South Dakota State University (SDSU) requests authorization to offer a baccalaureate minor in Concrete Materials Science. The concrete industry is a large part of the growing construction industry, and there is strong demand for students and graduates with knowledge of the field. The nature of the construction industry is such that graduates who possess knowledge of concrete can work in the construction field at many levels including construction management,

cost estimator, and contractor. The Department of Construction and Operations Management currently delivers programs in Concrete Industry Management (B.S.), Construction Management (B.S.), Construction Technology (A.S.), Operations Management (B.S.), Construction Minor, Heavy-Highway Construction Minor, Engineering Management Minor, and Pre-Construction Planning Certificate.

This undergraduate minor fits with the mission and strategic plan of South Dakota State University. Specifically, the program will contribute to the attainment of SDSU's *Imagine 2023* strategic plan¹ through student centered education and engagement, two hallmarks of the CIM classes and program. This minor will increase the value of its students to potential employers, which will increase their quality-of-life immediately upon entering the workforce.

In addition, the Concrete Materials Science Minor will contribute to the South Dakota Board of Regents' *Strategic Plan 2022-2027* Goal 4: Workforce and Economic Development in which "Public post-secondary and higher education serves as a critical pipeline for the workforce locally in South Dakota and as well as nationally and globally".² Conversations with major employers in the concrete industry at the CIM National Steering Committee Strategic Planning Meeting in Orlando, FL last summer highlighted the demand for skilled and knowledgeable employees in this industry not only nationally, but globally as well. All executives interviewed agreed that if they could not find enough CIM students (which has been the case to date,) they would be delighted to have students from other majors who had a fundamental knowledge of concrete and the concrete industry. This minor will supply that knowledge.

3. What is the nature/purpose of the proposed minor? Please include a brief (1-2 sentence) description of the academic field in this program.

The purpose of this minor is to give a solid background in concrete and related materials technology. The proposed Concrete Materials Science minor offers credentials in concrete technology to students who have other majors at SDSU but who are not Concrete Industry Management (CIM) majors. The concrete industry is a large part of the growing construction industry and there is strong demand for students and graduates with knowledge in the field. The nature of the construction industry is such that graduates who possess knowledge of concrete can work in the construction field at many levels including construction management, cost estimator, or contractor. Specifically, students in the minor in Concrete Materials Science will learn about the concrete industry - specific safety practices and potential hazards, concrete mix design technology, cost estimating skills, and specific properties of plastic and hardened concrete. These skills will make graduates much more valuable to prospective employers than someone who does not have these skills and knowledge.

4. How will the proposed minor benefit students?

The minor in Concrete Materials Science will give students a deeply rooted understanding of concrete mix designs, building systems and processes, and estimating of concrete related projects. This knowledge will be a huge benefit to them in their careers in the construction industry. Majors that would benefit from the minor include Architecture, Construction Management, Mechanical Engineering, Operations Management, and Civil Engineering.

¹ South Dakota State University. <https://www.sdstate.edu/imagine-2023-aspire-discover-achieve> (visited September 13, 2022).

² South Dakota Board of Regents. <https://www.sdbor.edu/the-board/StrategicPlan/Pages/default.aspx> (page 15, visited September 13, 2022).

Concrete Industry Management students would not be considered for this program as the courses are already included in their degree plan.

5. Describe the workforce demand for graduates in related fields, including national demand and demand within South Dakota.

The Concrete Industry Management program started at SDSU in the fall of 2021. At that time the program was, for all intents and purposes, unheard of in the upper Midwest region of the country. The majority of the promotional activities to date have been centered around creating industry awareness of the program; it is still relatively unknown to potential students and their parents from outside of the industry. Those who know construction also know what a vital role concrete plays, so there is a great deal of curiosity about the program. This dynamic has led current students in Construction Management and Civil Engineering programs to ask about the possibility of a CIM or related minor. Data from Middle Tennessee State University's CIM program shows a 100% placement of graduates with high paying jobs (median pay is \$102,280 per year in South Dakota), rapid advancement within the industry (25 years of graduates include presidents, vice-presidents, and general managers in the concrete industry), and careers that last a lifetime with over 80% of tracked graduates still working in the concrete and construction industries. The construction industry job outlook for construction managers is growing faster than average and is anticipated to grow by 8% by 2031.³ Students in the minor program will be able to pursue internships and jobs within the construction industry thus filling a present need for more workers. Graduates who have the added Concrete Materials Science Minor on their academic resume will be far more attractive to potential employers than those who do not.

6. Provide estimated enrollments and completions in the table below and explain the methodology used in developing the estimates.

The estimates below are based on conversations with leadership within the department and the Jerome J. Lohr College of Engineering with the assumption that 5% of Construction Management, 2% of Operations Management, and 2% of Civil Engineering majors will enroll in this minor. Anticipated growth in the minor will be anticipated as a result of promotional and recruiting efforts.

	Fiscal Years*			
	1 st	2 nd	3 rd	4 th
<i>Estimates</i>	FY 24	FY 25	FY 26	FY 27
Students enrolled in the minor (fall)	10	15	20	25
Completions by graduates	0	0	0	10

*Do not include current fiscal year.

7. What is the rationale for the curriculum? Demonstrate/provide evidence that the curriculum is consistent with current national standards.

There are no national standards for this program. The proposed curriculum is drawn from the Concrete Industry Management major offered at SDSU. SDSU is only the 5th university in the country to offer the Concrete Industry Management major and the other institutions do not yet have a minor in place. The National Steering Committee of the Concrete Industry Management

³ Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook*, Construction Managers, at <https://www.bls.gov/ooh/management/construction-managers.htm> (visited November 27, 2022).

program gave SDSU the permission to proceed with the first minor in Concrete Materials Science. The curriculum choices are based on faculty experience in the concrete industry on what would have made a new employee more valuable from the first day of employment. The selected classes will add those needed tools to the graduates' repertoire.

8. Complete the tables below. Explain any exceptions to Board policy requested.

A. Distribution of Credit Hours

Concrete Materials Science Minor	Credit Hours	Percent
Requirements in minor	18	100%
Electives in minor	0	0%
Total	18	

B. Required Courses in the Minor

Prefix	Number	Course Title	Prerequisites for Course	Credit Hours	New (yes, no)
CIM	101	Introduction to Concrete Industry Management	None	2	No
CIM	120	Introduction to Industrial Safety	None	3	Yes
CIM	125	Plans and Specifications ⁴	None	2	No
CIM	210	Fundamentals of Concrete: Properties and Testing	CIM 101	3	No
CIM	210L	Fundamentals of Concrete: Properties and Testing Lab	None	1	
CM	232	Cost Estimating	CIM 125	3	No
CIM	440	Advanced Concrete Materials	CIM 210	3	No
CIM	440L	Advanced Concrete Materials	None	1	No
Subtotal				18	

The proposed minor includes one new course – CIM 120 Introduction to Industrial Safety. This course will be required as part of the Concrete Industry Management (CIM) major. The CIM program is focused on the unique demands of the concrete industry. CIM 120 Introduction to Industrial Safety is designed to introduce students to the unique hazards inherent within this industry. This class focuses on concrete batch plant safety (complete with several field trips), precast concrete plant safety, and types of equipment specific to the concrete industry. In addition, the MSHA (Mine Safety and Health Administration) New Miner Training program is taught within this class, a requirement for any of the SDSU students who intern or become employed at aggregate or cement manufacturing facilities. In addition, as a 100-level class, CIM 120 instills the safety culture mindset within the students before they begin performing internships and field trips.

Students in the Concrete Industry Management program are not eligible for this minor.

⁴ The Department of Construction and Operations Management has routed a minor course modification to increase CIM 125 from 1 to 2 credits effective fall 2023.

9. What are the learning outcomes expected for all students who complete the minor? How will students achieve these outcomes?

In the Concrete Materials Science Minor students will:

- Acquire fundamental understanding of the different facets of the concrete industry, including working knowledge of various types of plants and facilities.
- Demonstrate knowledge of concrete mix designs and properties.
- Demonstrate knowledge of plastic and hardened concrete testing methods and procedures.
- Demonstrate knowledge of concrete and construction estimating processes.
- Analyze and evaluate concrete and other construction specifications.
- Demonstrate knowledge of construction plans and other construction documents.
- Acquire knowledge of Concrete Industry safety practices and demonstrate acquired knowledge through development of a safety program.
- Complete ACI Field Testing 1 certification.
- Complete MSHA New Miner training.

Individual Student Outcome	Program Courses that Address the Outcomes					
	CIM 101	CIM 120	CIM 125	CM 232	CIM 210/L	CIM 440/L
Acquire fundamental understanding of the different facets of the concrete industry, including working knowledge of various types of plants and facilities.	X	X				
Demonstrate knowledge of concrete mix designs and properties.	X				X	X
Demonstrate knowledge of plastic and hardened concrete testing methods and procedures					X	X
Demonstrate knowledge of concrete and construction estimating processes.			X	X		
Analyze and evaluate concrete and other construction specifications.			X			
Demonstrate knowledge of construction plans and other construction documents.			X	X		
Acquire knowledge of Concrete Industry safety practices and demonstrate acquired knowledge through development of a safety program.		X				
Complete ACI Field Testing 1 certification.					X	
Complete MSHA New Miner training.		X				

10. What instructional approaches and technologies will instructors use to teach courses in the minor? *This refers to the instructional technologies and approaches used to teach courses and NOT the technology applications and approaches expected of students.*

The courses associated with the minor will be face-to-face and online with instruction using lecture, discussion, field trips, and hands-on laboratories.

11. Delivery Location

Note: The accreditation requirements of the Higher Learning Commission (HLC) require Board approval for a university to offer programs off-campus and through distance delivery.

- A. Complete the following charts to indicate if the university seeks authorization to deliver the entire program on campus, at any off campus location (e.g., USD Community Center for Sioux Falls, Black Hills State University-Rapid City, Capital**

City Campus, etc.) or deliver the entire program through distance technology (e.g., as an online program)?

	Yes/No	Intended Start Date
On campus	Yes	2023-2024 Academic Year

	Yes/No	If Yes, list location(s)	Intended Start Date
Off campus	No		

	Yes/No	If Yes, identify delivery methods <i>Delivery methods are defined in AAC Guideline 5.5.</i>	Intended Start Date
Distance Delivery (online/other distance delivery methods)	Yes		2023-2024 Academic Year
Does another BOR institution already have authorization to offer the program online?	No	If yes, identify institutions:	

B. Complete the following chart to indicate if the university seeks authorization to deliver more than 50% but less than 100% of the minor through distance learning (e.g., as an online program)? This question responds to HLC definitions for distance delivery.

	Yes/No	If Yes, identify delivery methods	Intended Start Date
Distance Delivery (online/other distance delivery methods)	No		

12. Does the University request any exceptions to any Board policy for this minor? Explain any requests for exceptions to Board Policy. If not requesting any exceptions, enter "None."

None.

13. Cost, Budget, and Resources: Explain the amount and source(s) of any one-time and continuing investments in personnel, professional development, release time, time redirected from other assignments, instructional technology & software, other operations and maintenance, facilities, etc., needed to implement the proposed minor. Address off-campus or distance delivery separately.

The minor will be offered using existing resources. The courses that are part of the Concrete Materials Science minor are required for the Concrete Industry Management major.

14. New Course Approval: New courses required to implement the new minor may receive approval in conjunction with program approval or receive approval separately. Please check the appropriate statement.

- ☒ YES,
the university is seeking approval of new courses related to the proposed program in conjunction with program approval. All New Course Request forms are included as Appendix C and match those described in section 7.
- ☐ NO,
the university is not seeking approval of all new courses related to the proposed program in conjunction with program approval; the institution will submit new course approval requests separately or at a later date in accordance with Academic Affairs Guidelines.

Appendix A
Corresponding Curriculum Requests – New Course Requests



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New Course Request

<u>SDSU</u>	<u>Jerome J. Lohr College of Engineering / Construction and Operations Management</u>
Institution	Division/Department
<u>Dennis D. Hedge</u>	<u>4/3/2023</u>
Institutional Approval Signature	Date

Section 1. Course Title and Description

Prefix & No.	Course Title	Credits
CIM 120	Introduction to Industrial Safety	3

Course Description
Safety course focused on the cement, concrete and aggregate industries.

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
GE 265	Industrial Safety	3
CM 400	Risk Management and Construction Safety	3

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

The Concrete Industry Management (CIM) program is focused on the unique demands of the concrete industry. As such, CIM 120 Introduction to Industrial Safety, is designed to introduce students to the unique hazards inherent within this industry. This class focuses on concrete batch plant safety (complete with several field trips), precast concrete plant safety, and types of equipment specific to the concrete industry. In addition, the MSHA (Mine Safety and Health Administration) New Miner Training program is taught within this class, a requirement for any of the SDSU students who intern or become employed at aggregate or cement manufacturing facilities. In addition, as a 100-level class, CIM 120 instills the safety culture mindset within the students before they begin performing internships and field trips.

GE 265 Industrial Safety provides a broad overview of construction and manufacturing safety practices, but without the focus on the industry that funds the CIM program and any of the MSHA facets. CM 400 Risk Management and Construction Safety focuses on OSHA certification and is certainly a valuable course (a requirement for students later in

their academic careers), but again lacks the focus on the concrete industry and MSHA facets.

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

☒ No. Replacement of CIM 216 Concrete Methods and Materials (3 cr.)

Effective date of deletion: fall 2023

3.2. Existing program(s) in which course will be offered: Concrete Industry Management (B.S.), Concrete Technology minor

3.3. Proposed instructional method by university (as defined by [AAC Guideline 5.4](#)): R - Lecture

3.4. Proposed delivery method by university (as defined by [AAC Guideline 5.5](#)): 001- Face to Face Term Based Instruction, 015 - Internet Asynchronous – Term Based Instruction, 018 - Internet Synchronous

3.5. Term change will be effective: fall 2023

3.6. Can students repeat the course for additional credit? ☐ Yes, total credit limit: ☒ 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: 30 ☐ 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: Construction and Operations Management

4.2. Banner Department Code: SCOM

4.3. Proposed CIP Code: 15.1501

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