SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS

New Undergraduate Degree Program

UNIVERSITY:	**SDSU**
MAJOR:	**Engineering Technology**
EXISTING OR NEW MAJOR(S):	**New**
DEGREE:	**Associate of Science (A.S.)**
EXISTING OR NEW DEGREE(S):	**Existing**
INTENDED DATE OF IMPLEMENTATION:	**2020-2021 Academic Year**
PROPOSED CIP CODE:	**15.0000 Engineering Technology**
SPECIALIZATIONS:	**None**
IS A SPECIALIZATION REQUIRED (Y/N):	**No**
DATE OF INTENT TO PLAN APPROVAL:	**Waived**
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 2:9, which pertains to new undergraduate degree program 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.

_____   2/4/2020
President of the University   Date

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

   South Dakota State University (SDSU) requests authorization to offer an Associate of Science (A.S.) in Engineering Technology. The Engineering Technology program will provide a degree program in basic engineering principles as applied in manufacturing and related industries. The program will prepare graduates for entry into or promotion within the manufacturing and related industry sectors in positions as production scheduler, maintenance

planner, product testing and development, technical operations, quality control, product sales, team lead, and/or supervisor/foreman. The A.S. in Engineering Technology (AS-ET) will be offered at the Community College for Sioux Falls (CCSF) for persons interested in technical careers. This degree option will also provide students with a sound foundation for continuing on for a Bachelor's degree when they desire to do so. Graduates of the A.S. in Engineering Technology may transfer to a bachelor's degree program at SDSU in Operations Management or Electronics Engineering Technology.

The University does not request new State resources.

2. **How does the proposed program relate to the university's mission and strategic plan, and to the current Board of Regents Strategic Plan 2014-2020?**

South Dakota State University's mission is to "*provide undergraduate and graduate programs of instruction in the liberal arts and sciences and professional education in agriculture, education, engineering, human science, nursing and pharmacy, and other courses or programs as the Board of Regents may determine.*" (SDCL 13-58-1)[1]

Furthermore, Board-approved programs currently include "*...programs in the agricultural sciences, aviation, education, engineering and technology, human sciences, humanities and liberal arts, nursing, performing and visual arts, pharmaceutical sciences, physical and biological sciences, and social sciences.*" (Board Policy 1:10:2)[2]

An Associate of Science in Engineering Technology supports the South Dakota Board of Regents Strategic Plan 2014-2020[3] goals and relevant action steps:
Goal 1: Student Success
- Grow the number of undergraduate and graduate degrees awarded.
  - Encourage campuses to create innovative programs to attract and retain in SD, more non-resident students.
  - Design clearer pathways for degree completion for adult students.

Goal 2: Academic Quality and Performance
- Grow the number of students participating in experiential learning.

Goal 3: Research and Economic Development
- Increase the number of graduates from STEM programs.
  - Encourage development of academic programs and certificates that align with existing and future state workforce needs.

Goal 4: Affordability and Accountability
- Reduce education and related spending per degree.
  - Identify new and innovative ways to deliver high-quality academic courses and programs that create new markets and reduce cost.

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[1] Retrieved from: https://sdlegislature.gov/Statutes/Codified_Laws/DisplayStatute.aspx?Type=Statute&Statute=13-58-1
[2] Retrieved from: https://www.sdbor.edu/policy/documents/1-10-2.pdf
[3] Retrieved from: https://www.sdbor.edu/the-board/agendaitems/Documents/2014/October/16_BOR1014.pdf

3. **Describe the workforce demand for graduates of the program, including national demand and demand within South Dakota.**

    A review of South Dakota Department of Labor trend data for manufacturing and related industries indicate demand in these sectors for the time period 2016 – 2026 is stable or growing. Manufacturing is expected to grow 0.58% per year, with 5.96% total growth for the 2016-2026 timeframe. For the broad-based sector including engineering technician positions the state projects 0.34% growth, with a total 3.41% change.[4]

4. **How will the proposed program benefit students?**

    A two year engineering technology degree benefits students in a number of ways: it is a fast-track degree that opens the door to a position in technical services, production support, or engineering assistant for someone with limited industry experience; the applied engineering and technical skills credential needed for promotion within an organization; and, the first two years of coursework applied toward a bachelor's degree in a STEM field.

    The proposed Engineering Technology program is tailored to be completed in two years (full-time) or three or more years (part-time) at CCSF. Students with previous general education credits could conceivably complete the program in as little as one year, depending on technical course schedules. The curriculum for the associate degree has been designed to allow students to fulfil the first 60 credits of coursework towards their baccalaureate degree. Students may elect to go on for a B.S. in Operations Management or Electronics Engineering Technology.

5. **Program Proposal Rationale:**

    A. **If a new degree is proposed, what is the rationale?**

        SDSU is authorized to deliver the Associate of Science (A.S.) degree.

    B. **What is the rationale for the curriculum?**

        The curriculum is designed to prepare graduates for entry into or promotion within the manufacturing and related industry sectors in positions as production scheduler, maintenance planner, product testing and development, technical operations, quality control, product sales, team lead, and/or supervisor/foreman. Mathematics, applied science, technical content in process development, industry materials, technical systems, and engineering design fundamentals prepare the graduate to be successful following graduation. This proposed program is tailored to be completed in two years and afford the graduate an opportunity to pursue a Bachelor of Science degree in Operations Management or Electronics Engineering Technology.

    C. **Demonstrate/provide evidence that the curriculum is consistent with current national standards.** *Complete the tables below and explain any unusual aspects of the proposed curriculum?*

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[4] South Dakota Dept. of Labor & Regulation (August 2018). Labor Market Information Center, Employment Projections by Industry. https://dlr.sd.gov/lmic/menu_projections_industry.aspx

Accreditation Board for Engineering and Technology – Engineering Technology Accreditation Commission (ABET-ETAC)[5] accredits two year engineering technology programs. The student outcomes for this proposal, listed below, were used as a guide to determine the curriculum. There are no plans at this time to seek ABET accreditation for this new program.

D. Summary of the degree program (complete the following tables):

A.S. in Engineering Technology	Credit Hours	Credit Hours	Percent
System General Education Requirements**	25		
Subtotal, Degree Requirements		25	42%
Supporting Coursework	9		
Major Requirements	17		
Technical Electives	9		
Subtotal, Program Requirements		35	58%
Electives		0	0%
Degree Total		60	100%

**Board Policy 2:26 requires all associate degree programs to include 24 credits of coursework. At least three credit hours shall be earned from each of six goals (total of 18 credits). The additional six credits designated by SDSU will include Goal #1 and student choice from Goal #3,#4, or #6.

System General Education Requirements

Prefix	Number	Course Title	Credit Hours	New (yes, no)
ENGL	101	Composition I (SGR #1)	3	No
		Student Choice – SGR #1 Written Communication	3	No
SPCM	101	Fundamentals of Speech (SGR #2)	3	No
ECON	201	Principles of Microeconomics (SGR #3)	3	No
		Student Choice – SGR #4 Humanities and Arts/Diversity	3	No
MATH	114	College Algebra (SGR #5)	3	No
CHEM	106-106L	Chemistry Survey & Lab (SGR #6)	3,1	No
		Student Choice – SGR #3, #4, or #6	3	
		Subtotal	25	

Supporting Coursework

Prefix	Number	Course Title	Credit Hours	New (yes, no)
ACCT	210	Principles of Accounting I	3	No
CM	130	Management Tools & Analysis	3	No
STAT	281	Introduction to Statistics	3	No
		Subtotal	9	

Major Requirements

Prefix	Number	Course Title	Credit Hours	New (yes, no)
ET	210-210L	Introduction to Electronic Systems & Lab	4, 0	No
GE	101	Introduction to Engineering & Technology Professions	1	No
GE	121	Engineering Design Graphics I [6]	1	No
GE	122	Engineering Design Graphics II [6]	1	No
GE	123	Computer Aided Design [6]	1	No
GE	265	Industrial Safety	3	No
MNET	243	Introduction to Materials Science [6]	3	No
MNET	265	Quality Assurance	3	No
		Subtotal	17	

Technical Electives

Select 9 credits of technical electives. Courses will require advisor approvals. The following are recommended courses.

Prefix	Number	Course Title	Credit Hours	New (yes, no)
ET OR	220-220L	Analog Electronics & Lab (4)	4	No
GE AND	231	Technology Society & Ethics (3)		
GE	396	Field Experience (1)		
GE	210	Geometric Dimensioning & Tolerancing	2	No
MNET	150	Introduction to Manufacturing Processes	3	No

6. **Student Outcomes and Demonstration of Individual Achievement**

    A. **What specific knowledge and competencies, including technology competencies, will all students demonstrate before graduation**?

    The Engineering Technology program will adopt the following Accreditation Board for Engineering and Technology – Engineering Technology Accreditation Commission (ABET-ETAC) student outcomes from the General Criteria.[7]

    Upon graduation, graduates of the A.S. in Engineering Technology will possess:
    (1) an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well-defined engineering problems appropriate to the discipline;
    (2) an ability to design solutions for well-defined technical problems and assist with the engineering design of systems, components, or processes appropriate to the discipline;

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[6] GE 121, GE 122, GE 123, and MNET 243 count toward the 12-credit Engineering Graphics Certificate. Completion of the certificate in Engineering Graphics would also require MNET 220-220L (3 cr.) and MNET 240 (3 cr.).
[7] Retrieved from the ABET website, Criteria for Accrediting Engineering Technology programs, 2019-2020.
https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-technology-programs-2019-2020/#1

(3) an ability to apply written, oral, and graphical communication in well-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature

(4) an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results; and

(5) an ability to function effectively as a member of a technical team.

Individual Student Outcome An SDSU Engineering Technology program graduate will possess:	Program Courses that Address the Outcomes											
	ACCT 210	CM 130	ET 210-210L	GE 101	GE 121	GE 122	GE 123	GE 265	MNET 150	MNET 243	MNET 265	STAT 281
an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well-defined engineering problems appropriate to the discipline.		X					X		X			X
an ability to design solutions for well-defined technical problems and assist with the engineering design of systems, components, or processes appropriate to the discipline.					X	X			X	X		
an ability to apply written, oral, and graphical communication in well-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.	X	X		X			X	X				
an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results.			X							X	X	
an ability to function effectively as a member of a technical team.			X									

B. **Are national instruments (i.e., examinations) available to measure individual student achievement in this field? If so, list them.**

There are no certification or licensure exams for two-year engineering technology programs.

C. **How will individual students demonstrate mastery? Describe the specific examinations and/or processes used, including any external measures (including national exams, externally evaluated portfolios, or student activities, etc.). What are the consequences for students who do not demonstrate mastery?**

The University will use the current program assessment and student evaluation process for ABET accreditation under the Engineering Technology Accreditation Commission (ETAC). The student learning outcomes results will be reviewed at three points in the curriculum: introduction, reinforce, and mastery. The table above shows the data points where the Department will collect exam/project/assignment data to assure mastery of the stated outcome skills and knowledge.

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

The following approaches and technologies will be used:
- Lecture and discussion
- Laboratory and Studio based learning (individual and small groups)
- Experiential learning
- Desire2Learn classroom management software

8. **Did the University engage any developmental consultants to assist with the development of the curriculum? Did the University consult any professional or accrediting associations during the development of the curriculum? What were the contributions of the consultants and associations to the development of curriculum?**

    No.

9. **Are students enrolling in the program expected to be new to the university or redirected from other existing programs at the university? Complete the table below and explain the methodology used in developing the estimates.** *If question 12 includes a request for authorization for off-campus or distance delivery, add lines to the table for off-campus/distance students, credit hours, and graduates.*

    It is expected most students will be new to the University. Enrollment estimates listed below are based on historical admissions in the A.S. in Manufacturing Technology offered at the campus in Sioux Falls and projected demand by the SD Department of Labor.

	Fiscal Years			
	1st	2nd	3rd	4th
Estimates	FY 21	FY 22	FY 23	FY 24
Students new to the university	4	6	10	14
Students from other university programs	1	1	2	2
Continuing students	0	2	3	5
=Total students in the program (fall)	5	9	15	21
Program credit hours (major courses)	60	153	261	387
Graduates	0	2	3	5

10. **Is program accreditation available? If so, identify the accrediting organization and explain whether accreditation is required or optional, the resources required, and the University's plans concerning the accreditation of this program.**

    Yes. The Accreditation Board for Engineering and Technology – Engineering Technology Accreditation Commission (ABET-ETAC) is an optional accreditation for the AS-ET program. Once the program has started producing graduates and we have a critical mass of assessment data, ABET accreditation should be considered.

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

    No.

12. Delivery Location

    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., UC Sioux Falls, Capital University Center, Black Hills State University-Rapid City, etc.) or deliver the entire program through distance technology (e.g., as an online program)?

	Yes/No	*Intended Start Date*
On campus	Yes	2020-2021 AY

	Yes/No	*If Yes, list location(s)*	*Intended Start Date*
Off campus	Yes	Community College for Sioux Falls	2020-2021 AY

	Yes/No	*If Yes, identify delivery methods* *Delivery methods are defined in* AAC Guideline 5.5.	*Intended Start Date*
Distance Delivery (online/other distance delivery methods)	No		
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 program 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)	Yes	015 - Internet Asynchronous – Term Based Instruction 018 - Internet Synchronous	2019-2020 AY

    67% of the A.S. in Engineering Technology is available online.

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 major. Address off-campus or distance delivery separately. *Complete Appendix B – Budget and briefly summarize to support Board staff analysis.*

    The proposed new program will be supported by tuition revenue by year four. One full-time faculty member is needed to teach and advise students in year 1 and beyond. Part-time faculty (at standard rates) will be used to deliver remaining technical content. A computer lab with CAD

software is required in Year 1 and, based on previous offerings in Sioux Falls, has not been a problem. There will be a cost for the software. A program budget is provided in Appendix B.

14. Is the university requesting or intending to request permission for a new fee or to attach an existing fee to the program? *If yes, explain.*

☐ ☒
Yes No

15. New Course Approval: New courses required to implement the new undergraduate degree program 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 5D.

☒ 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.

South Dakota State University, A.S. in Engineering Technology

1. Assumptions

		1st	2nd	3rd	4th
Headcount & hours from proposal		FY21	FY22	FY23	FY24
Fall headcount (see table in proposal)		5	9	15	21
Program FY cr hrs, On-Campus		0	0	0	0
Program FY cr hrs, Off-Campus		60	153	261	387
Faculty, Regular FTE	See p. 3	*1.00*	*1.00*	*1.00*	*1.00*
Faculty Salary & Benefits, average	See p. 3	$73,482	$73,482	$73,482	$73,482
Faculty, Adjunct - number of courses	See p. 3	1	3	4	4
Faculty, Adjunct - per course	See p. 3	$3,929	$3,929	$3,929	$3,929
Other FTE (see next page)	See p. 3	*0.00*	*0.00*	*0.00*	*0.00*
Other Salary & Benefits, average	See p. 3	$8,470	$8,470	$8,470	$8,470

2. Budget

Salary & Benefits					
Faculty, Regular		$73,482	$73,482	$73,482	$73,482
Faculty, Adjunct (rate x number of courses)		$3,929	$11,787	$15,716	$15,716
Other FTE		$0	$0	$0	$0
S&B Subtotal		$77,411	$85,269	$89,198	$89,198
Operating Expenses					
Travel		$0	$0	$0	$0
Contractual Services		$0	$0	$0	$0
Supplies & materials		$2,500	$2,500	$2,500	$2,500
Capital equipment		$0	$0	$0	$0
OE Subtotal		$2,500	$2,500	$2,500	$2,500
Total		**$79,911**	**$87,769**	**$91,698**	**$91,698**

3. Program Resources

Off-campus support tuition/hr, HEFF net	UG	$243.73	$243.73	$243.73	$243.73
Off-campus tuition revenue	hrs x amt	$14,624	$37,291	$63,613	$94,323
On-campus support tuition/hr, HEFF net	UG	$219.79	$219.79	$219.79	$219.79
On-campus tuition revenue	hrs x amt	$0	$0	$0	$0
Program fee, per cr hr (if any)	$84.40	$0	$0	$0	$0
Delivery fee, per cr hr (if any)	$0.00	$0	$0	$0	$0
University redirections		$0	$0	$0	$0
Community/Employers		$0	$0	$0	$0
Grants/Donations/Other		$0	$0	$0	$0
Total Resources		**$14,624**	**$37,291**	**$63,613**	**$94,323**
Resources Over (Under) Budget		**($65,287)**	**($50,478)**	**($28,085)**	**$2,625**

South Dakota State University
New Undergraduate Degree/Program: Associate of Science in Engineering Technology

Provide a summary of the program costs and resources in the new program proposal.

Estimated Salary & Benefits per FTE	Faculty	Other
Estimated salary (average) - explain below	$56,839	$0
University's variable benefits rate (see below)	0.1438	0.1438
Variable benefits	$8,173	$0
Health insurance/FTE, FY18	$8,470	$8,470
Average S&B	$73,482	$8,470

Explain faculty used to develop the average salary & fiscal year salaries used. Enter amount above.

Currently have 1 faculty member teaching in the 150000 CIP code, salary $50328. The Oklahoma Survey for Instructor in this CIP is $63349. Averaged these two = $56839.

Explain adjunct faculty costs used in table:

2 courses per year to be taught by adjuncts at $3929 per course.

Explain other [for example, CSA or exempt] salary & benefits. Enter amount above.

NA

Summarize the operating expenses shown in the table:

Lab supplies for electronics course, CAD & other software.

Summarize resources available to support the new program (redirection, donations, grants, etc).

None

State-support: Change cell on page 1 to use the UG or GR net amount.

Off-Campus Tuition, HEFF & Net	FY19 Rate	HEFF	Net	
Undergraduate	$340.05	$39.11	**$300.94**	*Change cell on page 1*
Graduate	$450.90	$51.85	**$399.05**	*to point to your net*
Externally Supported	$40.00			

South Dakota State University
New Undergraduate Degree/Program: Associate of Science in Engineering Technology

State-support: Change cell on page 1 to use the UG or GR net amount for your university.

On-Campus Tuition, HEFF & Net	FY19 Rate	HEFF	Net	
UG Resident - DSU, NSU	$243.30	$27.98	**$215.32**	*Change cell on page 1*
UG Resident - SDSU, USD	$248.35	$28.56	**$219.79**	
UG Resident - BHSU	$254.20	$29.23	**$224.97**	*to point to your net*
UG Resident - SDSMT	$249.70	$28.72	**$220.98**	
GR Resident - DSU,NSU	$319.40	$36.73	**$282.67**	*Change cell on page 1*
GR Resident - SDSU, USD	$326.05	$37.50	**$288.55**	
GR Resident - BHSU	$328.20	$37.74	**$290.46**	*to point to your net*
GR Resident - SDSMT	$324.85	$37.36	**$287.49**	
UG Nonresident - DSU,NSU	$342.40	$39.38	**$303.02**	*Change cell on page 1*
UG Nonresident - BHSU	$355.70	$40.91	**$314.79**	*to point to your net*
UG Nonresident - SDSU, USD	$360.50	$41.46	**$319.04**	
UG Nonresident - SDSMT	$391.10	$44.98	**$346.12**	
x GR Nonresident - DSU,NSU	$596.30	$68.57	**$527.73**	*Change cell on page 1*
x GR Nonresident - BHSU	$612.40	$70.43	**$541.97**	*to point to your net*
x GR Nonresident - SDSU, USD	$626.85	$72.09	**$554.76**	
x GR Nonresident - SDSMT	$652.00	$74.98	**$577.02**	
UG Sioux Falls Associate Degree	$275.40	$31.67	**$243.73**	*Change cell on page 1*
				to point to your net

Variable Benefits Rates

University	FY19	
BHSU	14.64%	*Change the benefits rate cell in the*
DSU	14.36%	*table on page 2 to point to the rate*
NSU	14.31%	*for your university.*
SDSM&T	14.20%	
SDSU	14.38%	
USD	14.34%	