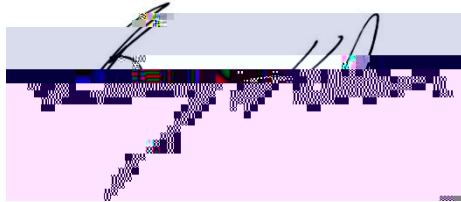


**SOUTH DAKOTA BOARD OF REGENTS  
ACADEMIC AFFAIRS FORMS**

**New Baccalaureate Degree Minor**



mission of SDSU by providing a needed area of professional education in a necessary engineering technique utilized in regional manufacturing. The program would be unique in the region and would meet a present need expressed by industry.

The minor will contribute to the South Dakota Board of Regents *Strategic Plan 2022-2027* -secondary and higher education serves as a critical pipeline for the workforce locally in South Dakota and as well as nationally and globally.

**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 minor in Surface Mount Technology (SMT) will provide knowledge and skills in manufacturing processes, materials and methods for production of printed circuit board, quality control and inspection of processes and products, lean processes, and SMT processes and methods. The minor addresses the need for people with expertise in surface mount technology in the production of printed electronic circuit boards for use in a wide variety of electronically controlled products.

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

Students earning a minor in Surface Mount Technology would be able to pursue careers in printed circuit board manufacturing, a rapidly expanding career area due to the increasing number of integrated circuit chips used in modern products. Regional manufacturers desire students with these skills and presently offer a premium to individuals with this background.

**5. Describe the workforce demand for graduates in related fields, including national demand and demand within South Dakota. Provide data and examples; data sources may include but are not limited to the South Dakota Department of Labor, the US Bureau of Labor Statistics, Regental system dashboards, etc. Please cite any sources in a footnote.**

Surface Mount Technology is the process used to manufacture printed circuit boards. Surface Mount Technology is a \$6 Billion business of which the United States has a 28% share. The trend in smaller consumer electronics, SMART (Self-Monitoring, Analysis, and Reporting Technology), and the increase in Internet of Things (IoT) devices is driving manufacturers to incorporate more and smaller printed circuits into products. Surface Mount Technology makes it possible to manufacture these (Research Nester, 2024).<sup>1</sup> At present, Indeed has more than 700 positions being advertised for Surface Mount Technician and over 250 for Surface Mount Engineer. Salaries for Technicians range from \$15 to over \$65 per hour and for Engineers the range is \$80,000 to over \$250,000 per year.<sup>2</sup>

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<sup>1</sup> Research Nester

There is one school in the United States that teaches Surface Mount Technology, Rochester Institute of Technology, as a minor (RIT, 2024).<sup>3</sup> Local industry approached SDSU to ask if



are fundamental to SGR #5 general education coursework. MATH 103, MATH 114, MATH 115, MATH 120, MATH 121, MATH 123, MATH 125, and STAT 281 are all approved as courses for SGR #5.

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

- At the completion of the Surface Mount Technology minor, students will be able to:
- Describe the Institute of Printed Circuits (IPC) standards and printed circuit board structure and materials.
  - Describe manufacturing processes and methods including LEAN, Screen Printing, Component Pick and Place, Soldering and Test procedures.
  - Describe and demonstrate quality control methods and processes used in Printed Circuit board manufacture.
  - Identify different types of machines used in manufacturing printed circuit boards.
  - Students will be able to demonstrate the use of statistical tests used in manufacturing processes.

	Program Courses that Address the Outcomes				
Individual Student Outcome	GE 101	MNET 231	MNET 367	MNET 467	MNET

**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)?**

	<b>Yes/No</b>	<b><i>Intended Start Date</i></b>
<b>On campus</b>	Yes	2024-2025 Academic Year

<b>Yes/No</b>	<b><i>If Yes, list location(s)</i></b>	

**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.*

SDSU does not request new state resources. The development of course material will be supported by the Surface Mount Technology Education consortium. Daktronics has pledged to allow use of one of its manufacturing lines by teachers and students in the hands-on portion of the courses. The minor would be offered with a combination of existing courses and two new courses. The department has an established connection and working relationship with Daktronics.

**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.











7.