SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS

New Baccalaureate Degree Minor

UNIVERSITY:	**SDSU**
TITLE OF PROPOSED MINOR:	**Engineering Management**

education, engineering, human sciences, nursing, pharmacy, and other courses or programs as the Board of Regents may determine.

sectors that typically employ technical managers. Similarly, the BLS Occupational Outlook Handbook projects engineering services organizations, which hire and promote degreed engineers, are expected to grow 16% for the same period while architectural and engineering manager employment to grow 6%.[3] Competition in the job market for engineering manager positions are highly competitive with the starting salaries over $100,000 per year.[4]

The intent is to address demand for technical managers by offering an Engineering Management minor to complement engineering, engineering technology, and applied science undergraduate programs at SDSU. The need for technical managers in manufacturing, construction, engineering services, research labs, and government is particularly pressing as these are complex, high stress jobs with long working hours making these positions hard to fill. The problem is compounded by the fact the transition from design engineer or research scientist to successful manager is not an easy one but it is the typical career advancement in organizations without a technical promotion ladder. A competent technical manager, as measured by their professional expertise in the work being performed, can have significant impact on employee job satisfaction and retention.[5] That is, if the supervisor for a team of engineers is skilled in the techniques and processes performed by her/his reports, employees are more likely to stay with the organization and be more productive. The Engineering Management minor will prepare graduates to make the future transition to the managerial role more effective.

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

	Fiscal Years*			
	1st	**2nd**	**3rd**	**4th**
Estimates	**FY 20**	**FY 21**	**FY 22**	**FY 23**
Students enrolled in the minor (fall)	15	19	25	33
Completions by graduates	3	10	15	23

*Do not include current fiscal year.

The estimates are based on enrollment in selected programs in the College of Engineering (Civil Engineering, Computer S0 1 i2eringd,inee Sering

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

The proposed minor is framed by a detailed curriculum review of 17 engineering management and similarly named minors at universities across the nation. A summary of three of the most suitable analogs to the proposed minor can be found in Appendix B. Common courses in these programs include: engineering economy, technology/engineering/systems management, project management, accounting/finance, cost estimating & management analysis, probability and statistics.

For the purposes of the Engineering Management minor at SDSU, the intent is to focus on four key content areas to assure students have the breadth of knowledge and skills to be promoted to into a leadership position and be a successful manager. These content areas are also tied to ABET student outcome criteria of solving complex problems, communicating effectively, and analyzing and interpreting data, reflected in the learning outcomes for the minor. See Appendix A for student outcomes mapped to the proposed curriculum.

The key content areas are engineering economy, project management, systems engineering and management, and probability and statistics. 1) Engineering economics (aka engineering

Prefix	Number	Course Title	Credit Hours	New

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

Appendix A
Engineering Management Minor - Student Learning Outcomes

	Required Courses				Elective Courses				
Individual Student Learning Outcomes	STAT 281 or STAT 381	GE 385	GE 469	OM 460 or CEE 482	BLAW 350	CM 473	MNET 367-367L	OM 425	OM 462
Students will analyze and interpret technical data.	X	X					X	X	X
Students will identify, formulate, and solve broadly defined problems by applying math and/or technical knowledge relevant to the discipline.		X		X					X
Students will demonstrate mastery in communication (written & oral) with a wide range of audiences.			X		X	X			
Students will demonstrate mastery in t EMC 9.67									

Appendix B
Example Curriculums

Montana State University Engineering Management minor

Required Courses		Credits
Engineering Economic Analysis		3
Engineering Management & Ethics		3
Production Inventory Cost Analysis		3
Project Management for Engineers		3
Required Pre-Requisites (not counted in total credits for the minor)		
Applied Engineering Data Analysis or Engineering Probability & Statistics I		3
Calculus for Technology II or Calculus II		3
Technical Problem Solving Elective (choose from 4 courses)		3
Managerial Problem Solving Electives (choose from 12 courses)		6
	Total	21

Rochester Institute of Technology Engineering Management minor

Required Courses		
Cost Management in Technical Organizations		3
Engineering Economy		3
Engineering Management		3
Required Prerequisites		
Linear Systems & Differential Equations		3
Probability & Statistics II or Applied Statistics		3
Electives (choose from 7 courses)		6
	Total	21

University of Colorado at Boulder Engineering Management minor

Required Courses		
Introduction to Engineering Management		3
Engineering Economics		3
Project Management Systems or Pre-construction Estimating & Scheduling or Software Development Methods & Tools or Introduction to Construction		3
Electives (choose from 8 courses)		9
	Total	18

Appendix C
New Course Requests

GE 385 Introduction to System Engineering and Management
Credits: 3
Introduction to the discipline of systems engineering and its intersection with engineering management. Course will cover the process of new systems development comprising concept, design, and build. Risk management, human factors, project management, integration of hardware and software, and system validation.
Prerequisites: None; Co-requisites: None; Registration Restrictions: None