



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

New Course Request

SDSU	Jerome J. Lohr College of Engineering/ Mechanical Engineering	
Institution	Division/Department	
Dennis D. Hedge		12/11/2018
Institutional Approval Signature		Date

Section 1. Course Title and Description

Prefix & No.	Course Title	Credits
ME 441	Robotic Systems	3
ME 541	Robotic Systems	3

Course Description	<p>This course develops understanding of the kinematic and dynamic modeling, design, and control of robots functioning in both terrestrial and aerial environments. Topics include inertial and body reference frames, rigid body motion, homogeneous transformations, Denavit-Hartenberg representation, forward and inverse kinematics, Lagrangian dynamics, modeling in Simulink, linear control design, introduction to advanced controllers, optimal control of a quadrotor. Students conduct hands-on experiments with mobile robots, manipulators and quadrotors.</p>
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ME 441 Pre-requisites or Co-requisites

Prefix & No.	Course Title	Pre-Req/Co-Req?
ME 321	Fundamentals of Machine Design	Prerequisite

Registration Restrictions

None

Section 2. Review of Course

2.1. Was the course first offered as an experimental course? Yes No

2.2. Will this be a unique or common course?

Unique Course

Prefix & No.	Course Title	Credits
EE 452-452L/552-552L	Robotic Control Systems	3
ME 781	Robotics	3

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

<p>This course is focused on the mechanical fundamentals of multi-body kinematics, dynamics, and control of a broad range of robotic systems, including mobile robots, manipulators and unmanned aerial vehicles. It is designed for dual offering to both undergraduate and graduate students. The EE 452-452L/552-552L course is primarily focused on control strategies and signal processing from an electrical engineering perspective. ME 781 is a 700-level, graduate-only course and concentrates on sensors, computer control and application of industrial robots used in manufacturing processes.</p>
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Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

No. Schedule Management, explain below: This is a technical elective course, previously offered as special topics. It will be offered in rotation with other technical electives with no net change in staffing required.

3.2. Existing program(s) in which course will be offered: Mechanical Engineering (B.S./M.S.)

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 2019

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: 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 Code: SME

4.2. Proposed CIP Code: 14.1901

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

**NEW COURSE REQUEST
Supporting Justification for On-Campus Review**

Doang K. Nguyen	Doang K. Nguyen	10/18/2018
Request Originator	Signature	Date
Kurt Bassett	Kurt Bassett	11/14/2018
Department Chair	Signature	Date
Bruce Berdanier	Bruce Berdanier	11/19/2018
School/College Dean	Signature	Date

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum.
 Robotics is a rapidly expanding field of study where engineers are applying their knowledge and expertise to developing technologies that automate processes. Advancements have greatly expanded the potential applications of robotics to include not only manufacturing but agriculture, construction, transportation, safety and security, service, and medical fields. This course provides students with the opportunity to learn, apply, and retain multidisciplinary knowledge and skills required to design effective robotic systems. This course was previously offered as a special topics ME 492/592 course at SDSU. There is significant student demand for a course focused on robotics. There is also widespread demand for graduates with this knowledge among employers.
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?
 None.

4. If this will be a dual listed course, indicate how the distinction between the two levels will be made.

Graduate students will be assigned separate exercises and projects requiring advanced analytical and reporting skills. These exercises will be used to evaluate graduate students differently from undergraduate students.

5. Desired section size 15 undergraduate, 10 graduate

6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).

Doang K. Nguyen, Assistant Professor, Ph.D.

Marco Ciarcia, Assistant Professor, Ph.D.

7. Note whether adequate facilities are available and list any special equipment needed for the course.

The current facilities are adequate for offering this course. No additional facilities are required.

8. Note whether adequate library and media support are available for the course.

Adequate library and media support are available for this 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