

SOUTH DAKOTA BOARD OF REGENTS

Academic and Student Affairs
Consent

AGENDA ITEM: 4 – G

DATE: May 9-11, 2017

SUBJECT: New Certificate: SDSU Undergraduate Certificate in Unmanned Aircraft Systems

South Dakota State University (SDSU) requests authorization to offer an undergraduate certificate in Unmanned Aircraft Systems (UAS). The certificate will provide a credential to students with competency in the planning and operation of UAS and provide the knowledge necessary to attain the FAA Part 107 small Unmanned Aircraft Systems license. The certificate is applicable to a variety of disciplines, including, but not limited to, precision agriculture, geographic information systems, construction, and engineering. The certificates consists of 12 credit hours and utilizes all existing courses.

DRAFT MOTION 20170509_4-G: I move to approve SDSU’s undergraduate certificate in Unmanned Aircraft Systems as described in Attachment I.



SOUTH DAKOTA BOARD OF REGENTS ACADEMIC AFFAIRS FORMS

New Certificate

UNIVERSITY:	SDSU
TITLE OF PROPOSED CERTIFICATE:	Unmanned Aircraft Systems
INTENDED DATE OF IMPLEMENTATION:	8/15/2017
PROPOSED CIP CODE:	45.0701
UNIVERSITY DEPARTMENT:	Geography
UNIVERSITY DIVISION:	Arts & Sciences

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.

Institutional Approval Signature

President or Chief Academic Officer of the University

3/23/2017

Date

1. Is this a graduate-level certificate or undergraduate-level certificate?

Undergraduate Certificate Graduate Certificate

2. What is the nature/purpose of the proposed certificate?

The proposed certificate in Unmanned Aircraft Systems (UAS) will provide a credential to students and/or individuals who have demonstrated competency in the planning and operation of UAS. The certificate will provide the knowledge and skills necessary to apply this technology to a field of study or field of work. This certificate will also provide the knowledge necessary to attain the FAA Part 107 small Unmanned Aircraft Systems license.

The proposed certificate will attract students to South Dakota State University, and it builds upon the university's reputation as a regional leader in education. Providing students with the knowledge and skills to utilize UAS technology helps produce the most competitive students entering the job market.

The certificate is designed to make use of courses with no pre-requisites to be applicable to the widest range of students and community members. The certificate will feature three required courses, that relate to small UAS for any use, with one elective course that relates to small UAS and the student's particular area of interest. The certificate will be 12 credits in total.

3. Provide a justification for the certificate program, including the potential benefits to students and potential workforce demand for those who graduate with the credential.¹

UAS is a technology with many applications across campus and the community, some of which include remote sensing, geographic information systems (GIS), precision agriculture, construction, resource management, engineering, cinematography, and emergency services. In 2014 the US Senate Committee on Commerce, Science and Transportation predicted that by 2025, there will be 50,000 plus² private sector UAS jobs in the United States, which will indirectly create an additional 100,000 jobs. By 2025, UAS is predicted to contribute \$75.6 billion in economic activity, in agriculture alone³.

In 2016 Goldman Sachs predicted⁴ a UAS market of \$100 billion between then and 2020. For example, \$11 billion in construction; \$6 billion in agriculture; \$1.5 billion in the insurance industry; \$1.5 billion in gas, refining & mining; \$480 million in journalism; \$265 million in real estate; 21 million in cinematography. This report shows that the upcoming UAS job market will be considerable. A UAS certificate and related courses at SDSU will mean that the university can train students with the best techniques and with the latest technology, leading to their future success in the job market. Having UAS at SDSU will establish the university as a regional leader in this technology, particularly in the fields of precision agriculture, GIS and remote sensing.

Regionally, \$2.2 billion in economic activity is predicted to be generated by UAS between 2015 and 2025. By 2025 roughly 4,300 jobs will be directly or indirectly associated with UAS, in the region¹. The proposed certificate will allow the university, local community, and regional community to take advantage of this growth.

4. Who is the intended audience for the certificate program (including but not limited to the majors/degree programs from which students are expected)?

This certificate will differ from other regional programs, such as the University of North Dakota, in that it will deal specifically with FAA classified small unmanned aircraft systems (systems under 55 pounds). Small unmanned aircraft systems are more likely to be used by small to medium sized businesses and communities, than larger UAS. The certificate will appeal to students from geography, aviation, GIS, agriculture, engineering, and related majors. The certificate will also benefit community members as various industries can use this technology. It will be especially attractive to students who wish to make use of this technology, and to those wanting to market themselves as being skilled with the latest technology.

5. List the courses required for completion of the certificate in the table below (if any new courses are proposed for the certificate, please attach the new course requests to this

¹ For workforce related information, please 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.

² Senate Committee on Commerce, Science, and Transportation (2014)

http://www.commerce.senate.gov/public/index.cfm?p=Hearings&ContentRecord_id=a4f35af1-be81-454f-9fa5-5bae600dd474

³ AUVSI – Association for Unmanned Vehicles International (2013)

<http://www.auvsi.org/auvsiresources/economicreport>

⁴ Goldman Sachs (2016)

<http://www.goldmansachs.com/our-thinking/technology-driving-innovation/drones/>

form):⁵

Prefix	Number	Course Title	Credit Hours	New (Yes, No)
AVIA	200	Aviation Safety	3	No
GEOG	270	Introduction to Small Unmanned Aircraft Systems	3	No
GEOG	483-483L	Aerial Remote Sensing	3	No
Select one of the following:				
AST	426-426L	Emerging Technologies in Agriculture and Lab	3	No
CM	400	Risk Management & Construction Safety	3	No
GEOG	372-372L	Intro to GIS and Lab	3	No
GEOG	473-473L	GIS: Data Creation & Integration and Lab	3	No
GEOG	484-484L	Remote Sensing and Lab	3	No
Subtotal			12	

6. Student Outcome and Demonstration of Individual Achievement.⁶

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

Students will demonstrate knowledge and competency in small UAS; laws, safety, mission planning, operation, data acquisition, data use, data analysis.

B. Complete Appendix A – Outcomes using the system form.

Students will be able to:

1. Describe small UAS design, component and current applications.
2. Describe and apply small UAS laws, safety and ethical considerations.
3. Demonstrate relevant knowledge to pass FAA 107 small UAS commercial pilot test.
4. Plan and execute small UAS mission in order to collect, process, and analyze small UAS data.
5. Identify, discuss and summarize research applications, commercial applications, and limitations of small UAS.
6. Demonstrate the ability to work independently, and as part of a team.

7. On-line and Off-campus Delivery.⁷

A. Complete the following charts to indicate if the university seeks authorization to deliver the entire certificate at any off-campus location (e.g., UC Sioux Falls, Capital University Center, Black Hills State University-Rapid City, etc.) or seeks authorization to deliver the entire certificate through distance technology (e.g., as an on-line program)?

⁵ Regental system certificate programs typically are a subset of the curriculum offered in degree programs, include existing courses, and involve 9-12 credits for completion. Deviations from these guidelines require justification and approval.

⁶ Board Policy 2:23 requires certificate programs to “have specifically defined student learning outcomes.”

⁷ The accreditation requirements of the Higher Learning Commission (HLC) require Board approval for a university to offer programs off-campus and through distance delivery.

	Yes/No	<i>If Yes, list location(s), including the physical address</i>	<i>Intended Start Date</i>
Off-campus	No		Click here to enter a date.

	Yes/No	<i>If Yes, identify delivery methods</i>	<i>Intended Start Date</i>
Distance Delivery	No		Click here to enter a date.

B. Complete the following chart to indicate if the university seeks authorization to deliver more than 50% but less than 100% of the certificate through distance learning (e.g., as an on-line program)?

	Yes/No	<i>If Yes, identify delivery methods</i>	<i>Intended Start Date</i>
Distance Delivery	No		Click here to enter a date.
Delivery Method (if applicable)			

Appendix A
Unmanned Aircraft Systems Certificate - Student Learning Outcomes

	Program Courses that Address the Outcomes							
	Required Coursework			Electives				
Individual Student Outcomes	AVIA 200	GEOG 270	GEOG 483-483L	AST 426-426L	CM 400	GEOG 372-372L	GEOG 473-473L	GEOG 484-484L
Describe UAS design, its components, and its current applications.	X	X	X	X	X			
Describe and apply small UAS laws, safety, and ethical considerations.	X	X	X	X	X			
Demonstrate relevant knowledge required to pass FAA 107 small UAS commercial pilot test.	X	X						
Plan and execute UAS mission in order to collect, process, and analyze UAS data.	X	X	X	X	X	X	X	X
Identify, discuss, and summarize research applications, commercial applications, and limitations of small UAS	X	X	X	X	X	X	X	X
Demonstrate the ability to work independently and as part of a team.	X	X	X	X	X	X	X	X