

**ACADEMIC AFFAIRS COUNCIL**

**AGENDA ITEM: 3 – C (1)**

**DATE: October 5, 2016**

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**SUBJECT: New Program: DSU AS in Web Development**

Dakota State University (DSU) requests authorization to offer an Associate of Science (AS) in Web Development. The program will prepare graduates to develop, modify and maintain general software applications or specialized software for use on computers, handheld and mobile devices based on analysis of user needs, design specifications, development, testing, deployment, management and maintenance. The degree can lead to a wide range of career opportunities in business and industry including but not limited to positions such as applications developer, IT consultant, information systems manager, systems analyst, database administrator, and network engineer. The program allows students who complete the 60 credits of coursework to seek immediate employment in the field or to use the degree towards completion of the baccalaureate degree in Computer Information Systems. All 60 credits stack into the baccalaureate degree, meaning AS graduates can complete the BS with an additional 60 credit hours.

The Executive Director waived the Intent to Plan due to the program consisting of existing courses and the relationship to an existing baccalaureate program offered by the institution.

**University Mission and Priorities**

SDCL 13-59-2.2 provides the statutory mission for DSU as including “instruction in computer management, computer information systems, electronic data processing and other related undergraduate and graduate programs. The secondary purpose is to offer two-year, one-year and short courses for application and operator training in the areas authorized by this section.” Board Policy 1:10:5 authorizes DSU to provide associate degrees in “allied health care, business, general studies, and information technology.”

**System Strategic Goals**

The proposed program aligns with Board of Regents’ Strategic Plan 2014-2020 to grow the number of undergraduate degrees awarded, expand educational access, and design clear pathways for degree completion. In addition, the proposed program aligns with system initiatives to grow associate degree programs at the University Center-Sioux Falls.

(Continued)

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**RECOMMENDED ACTION**

Move forward. Provide comments and concerns to the Board office.

### **Workforce Need, Student Demand, Projected Graduates**

DSU reports estimates from the US Bureau of Labor Statistics that employment of web developers will grow by 27% through 2024. DSU conservatively estimates graduating 5 students per year after full implementation.

### **Development**

DSU developed the program in relationship to their existing Computer Information Systems baccalaureate program using existing approved courses.

### **Board Policy**

Per the Memorandum of Understanding for the University Center-Sioux Falls (approved [April 2016](#)), a university may request approval from the Board for use of the standard self-support tuition rate (\$333.35/hour) rather than the UC-SF self-support tuition rate (\$270/hour) for high cost programs. DSU is requesting the standard self-support tuition for the 100- and 200-level courses in the program that use the CSC and CIS prefixes. Approval of this exemption means program students receive 30 credits at the UC-SF self-support rate and 30 credit hours at the standard self-support rate.

### **Off Campus and Distance Delivery**

DSU is requesting authorization to offer the program through online distance delivery and at the University Center-Sioux Falls. The University of South Dakota (USD) serves as the lead institution at the University Center-Sioux Falls and has recommended the addition of this program.

### **Budget and Resources**

DSU is not requesting any new State resources to implement or maintain the proposed program.

**South Dakota Board of Regents  
New Undergraduate Degree Program**

<b>University:</b>	<b>Dakota State University</b>
<b>Major:</b>	<b>Web Development</b>
<b>Existing or New Major (s):</b>	<b>New</b>
<b>Degree:</b>	<b>Associate of Science (A.S.)</b>
<b>Existing or New Degree (s):</b>	<b>Existing</b>
<b>Intended Term of Implementation</b>	<b>Fall 2017</b>
<b>Proposed CIP code:</b>	<b>11.0801</b>
<b>University Department</b>	<b>Computer Information Systems</b>
<b>University Division</b>	<b>College of Business and Information Systems</b>

**University Approval**

To the Board 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.



September 7, 2016

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 President of the University

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 Date

After approval by the President, a signed copy of the proposal should be transmitted to the Executive Director. Only after the Executive Director's review should the proposal be posted on the university web site and the Board staff and the other universities notified of the URL.

**1. What are the purposes of the proposed program?**

Dakota State University (DSU) requests authorization to offer an Associate of Science (A.S.) in Web Development. Web Development is an academic discipline that teaches graduates to develop, modify and maintain general software applications or specialized software for use on computers, handheld and mobile devices based on analysis of user needs, design specifications, development, testing, deployment, management and maintenance. The Web Development degree will prepare students in a wide range of career opportunities in business and industry including applications developer, IT consultant, information systems manager, systems analyst, systems developer, database administrator, network engineer, and systems support to name a few.

DSU offers a Software & Web Specialization in the B.S. in Computer Information Systems degree. This A.S. degree will prepare graduates for entry-level work in a variety of fields as well as provide transfer options into the baccalaureate program. The curriculum for this degree has been designed to allow students who complete the 60 credits of coursework to seek immediate employment in the field or to use the degree towards completion of the baccalaureate degree in Computer Information Systems. All 60 credits of this A.S. degree stack into the baccalaureate degree in the following manner: general education requirements (24 credits), core requirements (30 credits), and courses within the Software & Web Specialization (6 credits).

The University does not request new state resources. All courses are currently being offered on-campus or online. All but four courses (CSC 245, CIS 332, CIS 484 & CSC 206-208) are offered at University Center-Sioux Falls. For UC-SF students, these four courses can be taken online. If enrollment substantiates adding another faculty or adjunct faculty to teach those courses, then DSU will consider adding additional faculty as needed.

### *Workforce Demand for Graduates*

Web developers design and create websites. They are responsible for the look of the site as well as the site's technical aspects including performance and capacity, which are measures of a website's speed and how much traffic the site can handle. They also may create content for the site. About one in seven web developers were self-employed in 2014. Non-self-employed developers work primarily in the computer systems design and related services industry. The typical education needed to become a web developer is an associate degree in web development or related field. Web developers need knowledge of both programming and graphic design. The median annual wage for web developers was \$64,970 in 2015. Employment of web developers is projected to grow 27 percent from 2014 to 2024, faster than the average for all occupations.<sup>1</sup> Demand will be driven by the growing popularity of mobile devices and e-commerce.

The US Department of Labor also provides the following wage information for web developers:<sup>2</sup>

<b>Employment (1)</b>	<b>Employment RSE (3)</b>	<b>Mean hourly wage</b>	<b>Mean annual wage (2)</b>	<b>Wage RSE (3)</b>
127,070	1.5 %	\$33.97	\$70,660	0.7 %

Percentile wage estimates for this occupation:

<b>Percentile</b>	<b>10%</b>	<b>25%</b>	<b>50% (Median)</b>	<b>75%</b>	<b>90%</b>
Hourly Wage	\$16.71	\$22.40	\$31.23	\$43.00	\$56.07
Annual Wage (2)	\$34,770	\$46,600	\$64,970	\$89,430	\$116,620

(1) Estimates for detailed occupations do not sum to the totals because the totals include occupations not shown separately. Estimates do not include self-employed workers.

(2) Annual wages have been calculated by multiplying the hourly mean wage by a "year-round, full-time" hours figure of 2,080 hours; for those occupations where there is not an hourly wage published, the annual wage has been directly calculated from the reported survey data.

(3) The relative standard error (RSE) is a measure of the reliability of a survey statistic. The smaller the relative standard error, the more precise the estimate.

### *University Mission and Priority*

The statutory mission statement for Dakota State University is provided in SDCL 13-59-2.2:

*The primary purpose of Dakota State University in Madison in Lake County is to provide instruction in computer management, computer information systems, electronic data*

<sup>1</sup> <http://www.bls.gov/ooh/computer-and-information-technology/web-developers.htm>

<sup>2</sup> <http://www.bls.gov/oes/current/oes151134.htm>

*processing and other related undergraduate and graduate programs. The secondary purpose is to offer two-year, one-year and short courses for application and operator training in the areas authorized by this section.*

*This authorization includes the preparation of elementary and secondary teachers with emphasis in computer and information processing.*

*Except for degree programs in existence during the 1983-1984 academic year, the unique baccalaureate programs authorized for Dakota State University shall not be duplicated by the Board of Regents.*

Board Policy 1:10:5 Dakota State University Mission Statement provides the degrees authorized:

*A. Undergraduate Programs:* Associate degree programs are approved in allied health care, business, general studies, and information technology.

*Baccalaureate programs:* allied health care, business, education, information technology, mathematics, and sciences.

*B. Graduate Programs:* Master's degree programs are approved in education and information technology as well as a Doctor of Science degree in Information Systems.

### ***University Priority and Strategic Plan***

The most recent DSU Strategic Plan includes goals that are directly related to this program request:

- Offer innovative and robust academic programs that link to our mission.
- Infuse innovative technology in the delivery of academic programs.
- Optimize undergraduate and graduate enrollments.

The proposed program aligns with the Board of Regents Strategic Plan 2014-2020, including but not limited to the following goals:

- Grow undergraduate and graduate degrees awarded.
- Increase the number of graduates from STEM programs.
- Encourage campuses to increase recruitment and retention of undergraduate STEM majors.
- Encourage development of academic programs and certificates that align with existing and future state workforce needs.

## **2. Rationale**

### **A. What is the rationale for the curriculum?**

The curriculum is designed to offer courses that will prepare students for a variety of entry-level jobs and careers in Web Development for business and industry, in the public and/or private sector. Also, all courses/credits stack into the B.S. in Computer Information Systems degree offered by DSU.

**B. Demonstrate that the curriculum is consistent with current national standards.**

Complete the tables below and explain any unusual aspects of the proposed curriculum.

There are currently no national standards for Web Development, however, standard associate degrees in the discipline include basic and web programming, security fundamentals, and database.

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

This is not a new degree. DSU is already authorized to deliver the Associate of Science degree.

**D. Summary of the Degree Program**

<i>AS in Web Development</i>	Credit Hours	Credit Hours	Percent
System General Education Requirements	24		
Subtotal, Degree Requirements		24	40%
Required Support Courses (not included above)	6		
Major Requirements	30		
Major Electives			
Subtotal, Program Requirements		36	60%
Electives			
Degree Total	60	60	100%

\*If the proposed undergraduate degree program is to be available in more than one degree and the number or distribution of credits will vary, provide a separate table for each degree.

**Required Support Courses outside the Major** (*NOT general education, institutional graduation or technology literacy requirements*)

Prefix	Number	Course Title	Credit Hours	New (yes, no)
ACCT	210	Principles of Accounting I	3	no
BADM	220	Business Statistics	3	no
		Subtotal	6	

**Major Requirements**

Prefix	Number	Course Title	Credit Hours	New (yes, no)
CIS	130	Visual Basic Programming	3	no
CIS	251	Business Applications Programming	3	no
CIS	275	Web Application Programming I	3	no
CIS	332	Structured Systems Analysis & Design	3	no
CIS	375	Web Application Programming II	3	no
CIS	484	Database Management Systems	3	no
CSC	105	Introduction to Computers	3	no
CSC	206/207/208	Advanced Applications:	3	no
CSC	245	Information Security Fundamentals	3	no
CSC	363	Hardware, Data Communication, & Networking	3	no
		Subtotal	30	

**Major Electives:** List courses that may be taken as electives in the program. Indicate any new courses to be added specifically for the major. (If the list of existing courses is long, it may be provided as an appendix.)

Prefix	Number	Course Title	Credit Hours	New (yes, no)

**3. Student Outcomes & Demonstration of Individual Achievement**

**A. What specific knowledge and competencies, including technology competencies, will all students be able to demonstrate before graduation?** *The knowledge and competencies should be specific to the program and not routinely expected of all university graduates.* Complete Appendix A – Outcomes using the system form. *Outcomes discussed below should be the same as those in Appendix A.* The knowledge and competencies specific to the program must be related to the proposed assessments in B and C below.

See Appendix A.

**B. What national instruments (examinations) are available to measure individual student achievement in this field?**

Not applicable.

**C. How will mastery by individual students be demonstrated?** Describe the specific examinations or processes to be used. This is to include external measures.<sup>3</sup> **What will be the consequences for students who do not demonstrate mastery?**

<sup>3</sup> What national examination, externally evaluated portfolio or student activity, etc. will be used to verify that individuals have attained a high level of competence and identify those who need additional work?

Students will demonstrate mastery by passing all courses within the program with a minimum GPA of 2.0. Students will be monitored using Starfish. Students failing to meet minimum standards may be required to retake course work and any student on academic probation will be required to attend a one-on-one probation counseling session. Additionally, tutoring will be made available to all students. Enrollment and retention in the program will be monitored.

**4. What instructional approaches and technologies will be used to teach courses in the program?** *This refers to the instructional technologies used to teach courses and NOT the technology applications students are expected to learn.*

All courses in this proposed degree are existing courses and are taught on the DSU campus as well as online. Four courses (12 of the 60 credits) are not taught at UC-Sioux Falls, but online options are available for those courses. Depending on enrollment numbers at UC-SF for the program, the courses not being offered may be added to the rotation when enrollment in the program warrants. The courses are supplemented with D2L courseware for virtual networking, submitting assignments, and class discussions. Class presentations may be recorded and videos posted to campus video servers to facilitate online delivery.

DSU has invested heavily in a virtualized infrastructure to allow for technical, hands-on experiences for students in the classroom and at a distance. This VMware environment has been instrumental in the online delivery of all undergraduate majors. Educational experiences for students are greatly enhanced through these applied, hands-on, technology-based activities.

All of the courses in this degree program will apply towards the B.S. in Computer Information Systems, Software and Web Specialization as noted in the table below.

<b>Course by Course Comparison and Delivery</b>			
<b>AS in Web Development</b>	<b>B.S. in Computer Information Systems</b>	<b>UC-SF</b>	<b>Online</b>
CSC 105 Introduction to Computers	Core	X	X
CIS 130 Basic Programming	Core	X	X
CSC 206/207/208 Advanced Computer Applications	Elective	XX	X
ACCT 210 Principles of Accounting I	Core	X	X
BADM 220 Business Statistics	Core	X	X
CSC 245 Information Security Fundamentals	Core	XX	X
CIS 251 Business Application Programming	Core	X	X
CIS 275 Web Application Programming I	Software/Web Specialization	X	X
CIS 332 Structured Systems Analysis & Design	Core	XX	X
CSC 363 Hardware, Data Communication & Networking	Core	X	X
CIS 375 Web Application Programming II	Software/Web Specialization	X	X
CIS 484 Database Management Systems	Core	XX	X

X – on rotation schedule

XX – not currently on rotation at this location



**5. Did the University engage any developmental consultants<sup>4</sup> to assist with the development of the curriculum? Were any professional or accrediting associations consulted during the development of the curriculum? What were the contributions of the consultants and associations to the development of curriculum?**

No.

**6. Are students in the program expected to be new to the university, redirected from other programs or both? Complete the table and explain how the estimates were developed. If authorization for off-campus or distance delivery is requested in Section 9, add lines to the table for off-campus/distance students, credit hours, and graduates.**

	Fiscal Years*			
	1st	2nd	3rd	4th
Estimates	FY17	FY18	FY19	FY20
Students new to the university	5	5	5	5
Students from other university programs	0	0	0	0
Continuing students		5	5	5
= Total students in the program (fall)	5	10	10	10
Program credit hours (major courses)**	150	300	300	300
Graduates		5	5	5

\* Do not include current fiscal year.

\*\* This is the total number of credit hours generated by students in the program per year in the required or elective program courses. The same numbers are used in Appendix B – Budget.

The B.S. in Computer Information Systems major is offered at University Center-Sioux Falls, online and on-campus. The enrollment for that major in Fall 2015 was 55 students (67% online; 24% campus & 9% UC-SF). We see three potential scenarios that may occur with adding this AS degree. One, students will enroll and graduate with the AS degree; two, because all 60 credits of the AS degree stack into the BS, students may complete the AS degree and then decide to enroll in the BS in Computer Information Systems, thereby completing two degrees; and three, others may declare the bachelor's degree and then decide to finish with an associate degree because of extenuating circumstances.

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

Accreditation does not exist for this program.

**8. Does the University request any exceptions to any Board policy for this program? Explain any requests for exceptions to Board Policy. If no exceptions are requested, enter "None."**

<sup>4</sup> Developmental consultants are experts in the discipline are hired by the university to assist with the development of a new program (content, courses, experiences, etc.). Universities are encouraged to discuss the selection of developmental consultants with Board staff.

Section 6 of the Memorandum of Understanding for the University Center-Sioux Falls (approved by the Board of Regents at the April 2016 Board meeting) stipulates that the tuition rate for lower division associate degree courses is \$270/credit hour. DSU is requesting an exception under section 6.2 of the MOU that allows the Board to approve use of the established self-support rate of \$333.35 for high cost programs. DSU specifically requests an exemption to use the \$333.35/credit hour rate for 100- and 200-level courses using the CSC and CIS prefixes.

## 9. Program Delivery

**A. Does the University request authorization to deliver this entire program at any off-campus locations? If yes, list location(s) and intended start date(s).**

Yes, Fall 2017 – University Center-Sioux Falls. We propose to make the program available at UC-SF with the caveat that the four courses presently not offered can be taken online until enrollment in the program warrants adding additional faculty. On August 12, 2016, this proposal was approved to move forward for delivery at UC-SF by the UC-SF Coordinating Group. At this meeting, DSU was also given approval to offer all 100- and 200-level CSC and CIS courses at the non-reduced tuition rate due to the cost of faculty in these disciplines.

**B. Does the University request authorization to deliver this entire program by distance technology? If yes, identify delivery method(s) and intended start date(s).**

Yes, Fall 2017 – Distance Delivery

**C. Include off-campus tuition and site or delivery costs in the next section and in Appendix B. If off-campus or distance delivery authorization is not requested, enter "None."**

## 10. Costs, 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 O&M, facilities, etc needed to implement the proposed major. Address off-campus or distance delivery separately. Complete Appendix B Budget and Resources and briefly summarize.**

DSU currently offers multiple sections of the courses online and on the DSU campus using as well as offering all but four courses at UC-SF by full-time and adjunct faculty. Twelve of the required 60 credits (20%) will need to be taken online or on the DSU campus. No additional costs for faculty, equipment, or facilities will be incurred when this program is implemented since all courses are presently offered.

DSU is not submitting a budget worksheet (appendix B). Since all of the courses in the program are already offered at UCSF or online through DSU, no additional faculty or resources are required and the costs of offering the programs are already embedded in DSU's budget. It is anticipated that the program will enroll 5 new students per year. Half of the credit hours in the program are offered under the reduced UCSF rate of \$270/credit hour and half under the self-support rate of \$333.35/credit.

The following conservative revenue projections below are based on the following assumptions:

- 5 students enroll in the program per year
- Each student takes a full credit load of 15 hours per semester (30 per year)
- Tuition rates remain the same from year-to-year

<b>Year 1</b>	<b>Total</b>	<b>HEFF</b>	<b>NET</b>
(75 credits @ \$270)	\$20,250	\$2,328.75	\$17,921.25
(75 credits @ \$333.35)	\$25,001.25	\$2,875.50	\$22,125.75

<b>Year 2 and beyond</b>	<b>Total</b>	<b>HEFF</b>	<b>NET</b>
(150 credits @ \$270)	\$40,500	\$4,657.50	\$35,842.50
(150 credits @ \$333.35)	\$50,002.50	\$5,751	\$44,251.50

**11. Additional Information.** *Additional information is optional. Use this space for information not requested above. Limit the number and length of additional attachments. Identify with capital letters. Letters of support are not necessary and are rarely included with Board materials. In some cases, response to questions from the Board or the Executive Director may be provided as appendixes to the original proposal. This item may be deleted if it is not used.*

#### **Appendix A: Individual Student Outcomes and Program Courses**

Individual Student Outcome	Program Courses that Address the Outcomes				
Demonstrate the ability to write code using sequence, selection and repetition.	CIS 130	CIS 251	CIS 275	CIS 375	CIS 361
Understand and effectively manage the process of developing designing, testing, and delivering a program or web page.	CIS 130	CIS 251	CIS 275	CIS 375	CIS 361
Manipulate data efficiently to make optimal use of computing resources.	CIS 251	CIS 375	CIS 363	CIS 484	CIS 383
Identify, analyze, and take user needs into account in the programming process.	CIS 332	CIS 130	CIS 251	CIS 275	CIS 375
Write, test, and maintain computer programs and/or web applications in at least three languages.	CIS 130	CIS 251	CIS 275	CIS 375	CIS 361