

Update

Program (GIS) - Geographic Information Systems AS.1520

Program Catalog Summary:

Associate in Science:

SC Program: AS.1520

PROGRAM DESCRIPTION: The Associate of Science degree in Geographic Information Systems (AGIS) provides students with skills, knowledge and experience in the application of GIS. Students complete courses in the technical aspects of GIS and information technologies, along with courses in fields to which GIS is commonly applied, including earth and social sciences, natural resources and engineering. Students gain knowledge of maps, geographic data, and imagery, while developing skills in data collection, analysis and map creation. As students progress through the program the applied field courses provide direction for learning about the application of GIS, which gives direction to GIS project work. Worksite learning allows students to gain GIS workplace experience in their chosen field and to develop contacts among the community of GIS professionals. Successful students will have strong computer and critical thinking skills. Refer to <http://www.shastacollege.edu/gis> for more information.

This degree is pending approval through the California Community College Chancellor's Office. Upon satisfactory completion of all degree requirements and filing an application for graduation with Admissions and Records, the student's transcript will reflect completion of this degree.

PROGRAM LEARNING OUTCOMES:

Upon successful completion of this degree, the student should be able to:

1. Explain and summarize key GIS concepts, applications and societal implications.
2. Perform GIS data acquisition, capture, editing, and attributing.
3. Manage GIS data through file management, database design, geo-referencing and conversion.
4. Perform GIS analysis using queries, overlay functions, and models.
5. Produces a portfolio of maps demonstrating effective communication, design aesthetics, application of GIS tools and use of cartographic standards.
6. Employs best practices for GIS project design, planning, and implementation.
7. Effectively engages with community through projects, volunteer activities, user meetings and worksite learning.
8. Articulates key opportunities and challenges related to the application of GIS for a chosen application discipline.
9. Performs customization of GIS applications through programming and web map services.
10. Demonstrates effective written and oral communication as it pertains to a chosen application discipline.

DEGREE REQUIREMENTS:

CORE COURSES:

GEOG 5* Digital Planet: GIS and Society 3

GEOG 9 Map and Geospatial Principles 3

GEOG 10 Introduction to Geographic Information Systems 3

GEOG 12 GIS Data Design and Capture 3

GEOG 94 GIS Worksite Learning 1

CONCENTRATION OPTIONS: (Choose 8 units) 8

GEOG 13 GIS Spatial Analysis (3)

GEOG 14 GIS Cartography and Visualization (3)

GEOG 15 Intro to Remote Sensing (3)

GEOG 21 GIS-CAD Integration (1)

GEOG 24 Customizing GIS (1)

GEOG 25 GIS Projects (1)

INFORMATION TECHNOLOGIES: (Choose 9-10 units) 9-10

CIS 2* Introduction to Computer Science (4) OR

CIS 23 Database Management Systems (3)

CIS 61* C++ Programming (3) OR

CIS 62* Java Programming (3) OR

CIS 64 Web Programming using Java/ PHP/Flash (3)

CIS 14 Manage & Maintain Windows Desktop OS (3) OR

CIS 15 Install and Configure Microsoft Server (3)

APPLICATION DISCIPLINES: (Choose 6-8 units) 6-8

AGNR 1* Intro to Natural Resources (3)

AGNR 50 Natural Resource Measurements (3)

ENGR 1A Measurements and Plane Surveying (3)

ENGR 27 Map and Computer-aided Drafting (3)

ESCI 10* Environmental Geology (4)

GEOG 1A* Physical Geography (3)

GEOG 1AL Physical Geography Lab (1)

GEOG 1B* Human Geography (3)

GEOG 2A Physical Field Geography (1)

GEOG 2B Human Field Geography (1)

GEOG 7* California Geography (3)

GEOG 8* World Regional Geography (3)

*May be used to fulfill General Education requirements. See a counselor.

ASSOCIATE IN SCIENCE DEGREE REQUIREMENTS:

Major	36-39
Additional General Education	14-18
General Electives	3-10
Degree Total	60*

*Note: Calculation assumes a student will double-count the Multicultural graduation requirement with either a social science or humanities G.E. requirement and that the student will fulfill computer literacy through a test. If students plan well and see a counselor, they may be able to double count the Multicultural and Computer Literacy units. If these graduation requirements are added, the number of units is increased by 6 units.

Fall 2017

Prepared by: Dan Scollon

Improvements needed? Reference Items from program review - e.g. equipment, software, or personnel: The principle recommended program improvement is the increase emphasis on online course delivery. This is reflected in the GEOG/GIS Area Plan and corresponding initiatives. This program improvement will also relate to the AS Degree in GIS.

Who completed this form: Dan Scollon

Participation in the report: Area Faculty (list in the next box), Advisory Committee (if one exists)

Summarize Participation comments: In meetings with Adjunct GIS faculty (Shoemaker, Hedemark, Hansen) and the GIS Advisory Committee, there was a recognition that community and job market factors warrant a shift towards increased online course delivery. Online course delivery is well-suited information technology.

Recommendation for Discontinuance: N/A

Analyze Overall PLO achievement: This review is taking place after a period during which PLOs were not being assessed at Shasta College, as part of the wider institutional evaluation of the learning outcome process.

What changes could be (or have been) made to improve the program: Fully online course delivery. Presently only one course in the GIS Certification program has been offered fully online (GEOG 5). Two courses, GEOG 9 and 10, have been piloted online with limited success. This year's initiatives will lead to a more formal approach to online course design, including OEI compatibility, and best practices for course design for student success.

Resources needed to implement the changes noted above: Per area plan initiatives, funding resources are needed for online advertising (search engine marketing or SEM) at \$5000 per semester (\$10,000 for two semesters). In addition, \$2000 is requested for two adjunct faculty to work on the migration of GEOG 10 to online, OEI -approved delivery. Total funds requested: \$12,000.

Labor Market Demand: The U.S. Department of Labor (19% increase from 2016-2026; much higher than average; for Cartographers and Photogrammetrists), California Employment Development Dept. (44% increase from 2014-2024; for Cartographers and Photogrammetrists), the press (Wired Magazine in a Nov. 2017 article titled MAPPING THE FUTURE: CARTOGRAPHY STAGES A COMEBACK citing at 30% projected growth to 2024 and local advisers ("we don't look at applicants w/o GIS", Justin Barrett, Alpine Information Systems).

Duplication of training: Shasta College is unique in offering an A.S. Degree in GIS. It is widely recognized that there are abundant opportunities for online education in a wide array of disciplines, GIS included. As such, there are online GIS certificate programs available (e.g., Humboldt State) and GIS degree and certificate programs available at Community Colleges (e.g., Southwestern Community College, American River College). There are also online training options available from private vendors such as Esri. Shasta College's GIS Program has several unique assets that differentiate us from the competition: robust course offerings; strong connections with regional partners in industry and government, affordability, C-ID alignment, expertise in OEI that may result in statewide approval and statewide student recruiting.

Program effectiveness: Shasta College GIS graduates are employed in businesses, government and non-profit organizations across the North State. These include Shasta County, City of Redding, Vestra Resources, Enplan, CalTrans, Cal Fish and Wildlife, Stantec (formerly North State Resources) and others. Program Awards data (Tableau) shows Two GIS AS Degree program awards, one each in 2014-15 and another in 2015-16. This is a new degree approved by the Chancellor's Office in 2013/14. Since this is a two-year program, there is a lag between student enrolling and those completing the degree. Currently there are 3 to 4 students working toward AS degree completion. Increasing awareness of GIS opportunities, coupled with more online delivery, is hoped to result in an increase in program awards.

Other data indications for program improvement: The following analysis of course information data related to course section offerings, enrollments, success and retention is based on data provided through Tableau. The focus is on core courses in the current GIS Certificate program, which excludes several earlier courses (GIS 1, GIS 11) which are no longer offered. Several course are unique in the program. GEOG 5 is a GE course (CSU pattern, D5: Geography) is offered fully online. GEOG 9 is required for NR and Horticulture majors, as well as GIS students (articulates to CSU and C-ID aligned). GEOG 10 is required for Forestry majors, as well as GIS students (articulates to CSU and C-ID aligned). All courses were offered one section per semester with a few exceptions (GEOG 9, 2 sections each in 2013/14, 2014-15) and GEOG 10 (2 sections in 2015), GEOG 5 (2 section in 2015-16). For GEOG 5, average enrollments ranged from a low of 18 to a high of 32, which is supported by online delivery and late-start

offering. Online delivery is also reflected in success and retention figures. This course had a range of success from 55% to 69%, and a range of retention from 66% to 87%. For GEOG 9, average enrollment per section ranged from 22 to 31. Retention for this course ranged from 70% to 95%, and success at 67% to 85% respectively. Lower retention and success resulted when this course was offered fully online (NR students in particular tend to prefer in-class offerings). For GEOG 10, average enrollment per section ranged from 13 to 26. Challenges in getting stronger enrollments in this course or partly driving the decision to shift to a fully online delivery, as the emphasis for course offering. Retention and success numbers for this course are quite similar ranging from the mid-70% to the high 80% range. Review of the second semester courses, in particular the GEOG 12, 13 and 14, all show average enrollments in the range of 12 to 17 (with one outlier being enrollment of 26 similarly retention and success in these courses is quite strong. Again, online delivery is hoped to increase these numbers. With numbers in the 90% range for many of the courses. GEOG 15, remote sensing, showed the lowest success rate with 76%, and the GEOG 13 class showed hundred percent retention and success.

Replicating community college programs north of Sacramento?: No

CSU and UC Transfer impact analysis:: Alignment of GEOG 9 and GEOG 10 to C-ID, as well as articulation of these courses, plus GEOG 15, to Humboldt State and CSU Chico, represent transfer benefit to Certificate program students. UC articulation has not yet be achieved, since GIS is not currently accepted for articulation. Students transferring with an AS degree will be well-served by having background in Information Technology, and Application Discipline (Geography, Engineering, etc), as well as GIS experience which many students don't get until the last year of their 4-year degree program.

Influence on related programs and services: Related Shasta College Programs: AS Degree in GIS, Geography AAt, and AS Degree in Natural Resources.

Specific additional program reflections: GIS skills continue to be in demand across different industry sectors. This is reflected in the projections from the U.S. Department of Labor (19% increase from 2016-2026; much higher than average; for Cartographers and Photogrammetrists), California Employment Development Dept. (44% increase from 2014-2024; for Cartographers and Photogrammetrists), the press (Wired Magazine in a Nov. 2017 article titled MAPPING THE FUTURE: CARTOGRAPHY STAGES A COMEBACK citing at 30% projected growth to 2024 and local advisers ("we don't look at applicants w/o GIS", Justin Barrett, Alpine Information Systems).

Other factors for consideration: Industry level certification is emerging, especially driven by the GIS Certification Institute which is moving towards Technician Certification (Professional Certification is only current option).

PROGRAM AWARDS

Award Type	Program Type	2012-13	2013-14	2014-15	2015-16	2016-17
Associate of Arts Degree	Geographic Information Systems	0	0	1	1	0
Grand Total		0	0	1	1	0

COURSE STATISTICS

		Academic Year				
		2012-13	2013-14	2014-15	2015-16	2016-17
AGNR-1	# of Sections	2	2	1	1	2
	Enrollment	49	47	20	23	44
	FTES	7.7	7.5	3.0	3.2	6.5
	FTEF	0.57	0.57	0.28	0.28	0.28
	WSCH	230	225	90	95	193
	Avg Enrl/Section	25	24	20	23	22
	Avg FTES FTEF	13.54	13.24	10.59	11.19	14.12
	Avg WSCH FTEF	406	397	318	335	424
	AGNR-50	# of Sections	1	1	1	1
Enrollment		25	19	13	20	19
FTES		6.4	4.5	3.5	4.3	5.1
FTEF		0.43	0.43	0.43	0.43	0.43
WSCH		192	136	104	128	152
Avg Enrl/Section		25	19	13	20	19
Avg FTES FTEF		14.77	10.45	8.01	9.85	11.70
Avg WSCH FTEF		443	314	240	295	351
CIS-2		# of Sections	8	8	8	11
	Enrollment	264	261	237	302	326
	FTES	32.7	31.9	30.0	38.1	41.5
	FTEF	2.14	2.14	2.14	1.87	1.87
	WSCH	990	968	910	1,130	1,224
	Avg Enrl/Section	33	33	30	27	27
	Avg FTES FTEF	15.31	14.94	14.07	15.86	17.00
	Avg WSCH FTEF	464	454	427	482	516
	CIS-14	# of Sections				
Enrollment						19
FTES						3.0
FTEF						0.28
WSCH						90
Avg Enrl/Section						19
Avg FTES FTEF						10.59
Avg WSCH FTEF						318
CIS-15		# of Sections				
	Enrollment					20
	FTES					3.0
	FTEF					0.28
	WSCH					90
	Avg Enrl/Section					20
	Avg FTES FTEF					10.59
	Avg WSCH FTEF					318
	CIS-23	# of Sections		1	1	1
Enrollment			27	32	33	30

	FTES		3.3	2.8	3.1	3.0
	FTEF		0.24	0.24	0.24	0.24
	WSCH		100	115	128	123
	Avg Enrl/Section		27	32	33	30
	Avg FTES FTEF		13.78	11.58	12.83	12.41
	Avg WSCH FTEF		414	476	530	509
CIS-61	# of Sections	2	2	2	2	2
	Enrollment	69	74	79	70	73
	FTES	10.8	9.3	7.6	6.8	7.1
	FTEF	0.57	0.57	0.57	0.57	0.57
	WSCH	325	355	391	350	365
	Avg Enrl/Section	35	37	40	35	37
	Avg FTES FTEF	19.13	16.47	13.41	12.00	12.53
	Avg WSCH FTEF	574	627	690	618	644
CIS-62	# of Sections	1	1	1	1	1
	Enrollment	33	38	32	31	34
	FTES	5.5	6.2	3.0	5.2	5.5
	FTEF	0.28	0.28	0.28	0.28	0.28
	WSCH	165	185	154	155	165
	Avg Enrl/Section	33	38	32	31	34
	Avg FTES FTEF	19.41	21.78	10.59	18.25	19.41
	Avg WSCH FTEF	582	653	544	547	582
CIS-64	# of Sections	1	1	1	1	1
	Enrollment	31	29	33	27	30
	FTES	5.2	4.5	4.8	4.0	4.5
	FTEF	0.28	0.28	0.28	0.28	0.28
	WSCH	155	135	145	120	135
	Avg Enrl/Section	31	29	33	27	30
	Avg FTES FTEF	18.25	15.88	17.05	14.12	15.88
	Avg WSCH FTEF	547	477	512	424	477
ENGR-1A	# of Sections	1	1	1	1	1
	Enrollment	10	14	8	15	10
	FTES	1.7	2.2	1.3	2.3	1.5
	FTEF	0.28	0.28	0.28	0.28	0.28
	WSCH	50	65	40	70	45
	Avg Enrl/Section	10	14	8	15	10
	Avg FTES FTEF	5.89	7.66	4.69	8.22	5.29
	Avg WSCH FTEF	176	229	141	247	159
ENGR-27	# of Sections	1				
	Enrollment	9				
	FTES	1.3				
	FTEF	0.28				
	WSCH	40				
	Avg Enrl/Section	9				
	Avg FTES FTEF	4.69				

	Avg WSCH FTEF	141				
ESCI-10	# of Sections	4			1	
	Enrollment	20			9	
	FTEF	2.0			1.8	
	FTEF	0.35			0.35	
	WSCH	60			54	
	Avg Enrl/Section	5			9	
	Avg FTES FTEF	2.86			5.14	
	Avg WSCH FTEF	86			154	
GEOG-1A	# of Sections	1	1	1	5	4
	Enrollment	32	32	27	75	99
	FTEF	2.9	2.9	2.4	6.8	9.0
	FTEF	0.20	0.20	0.20	0.54	0.80
	WSCH	87	87	72	204	274
	Avg Enrl/Section	32	32	27	15	25
	Avg FTES FTEF	14.50	14.50	12.00	9.83	11.25
	Avg WSCH FTEF	435	435	360	295	343
GEOG-1AL	# of Sections					1
	Enrollment					21
	FTEF					2.0
	FTEF					0.15
	WSCH					60
	Avg Enrl/Section					21
	Avg FTES FTEF					13.33
	Avg WSCH FTEF					400
GEOG-1B	# of Sections	1	1	2		2
	Enrollment	20	22	63		60
	FTEF	1.7	2.1	5.5		5.6
	FTEF	0.20	0.20	0.40		0.40
	WSCH	51	63	170		173
	Avg Enrl/Section	20	22	32		30
	Avg FTES FTEF	8.50	10.50	13.75		14.00
	Avg WSCH FTEF	255	315	425		433
GEOG-2A	# of Sections					1
	Enrollment					27
	FTEF					1.9
	FTEF					0.11
	WSCH					56
	Avg Enrl/Section					27
	Avg FTES FTEF					16.62
	Avg WSCH FTEF					517
GEOG-2B	# of Sections	1	1	1	2	
	Enrollment	17	21	15	40	
	FTEF	1.1	0.8	0.7	2.4	
	FTEF	0.11	0.11	0.11	0.22	

	WSCH	32		22	21	72
	Avg Enrl/Section	17		21	15	20
	Avg FTES FTEF	9.51		6.93	6.74	10.90
	Avg WSCH FTEF	295		203	194	332
GEOG-5	# of Sections	1	1	1	2	1
	Enrollment	32	27	18	57	22
	FTES	2.6	1.8	1.7	5.3	1.9
	FTEF	0.20	0.20	0.20	0.40	0.20
	WSCH	80	56	52	163	59
	Avg Enrl/Section	32	27	18	29	22
	Avg FTES FTEF	13.00	9.00	8.50	13.25	9.50
	Avg WSCH FTEF	400	280	260	408	295
GEOG-7	# of Sections	13	6	9	10	9
	Enrollment	247	191	183	189	168
	FTES	22.2	17.6	17.3	16.9	15.6
	FTEF	1.40	1.20	1.20	1.37	1.20
	WSCH	673	534	526	513	474
	Avg Enrl/Section	19	32	20	19	19
	Avg FTES FTEF	13.93	14.67	13.58	10.86	11.50
	Avg WSCH FTEF	423	445	413	330	350
GEOG-8	# of Sections	3	8	5	4	2
	Enrollment	104	85	162	89	44
	FTES	8.4	7.3	14.4	8.6	4.3
	FTEF	0.60	0.57	1.00	0.80	0.40
	WSCH	254	222	444	263	131
	Avg Enrl/Section	35	11	32	22	22
	Avg FTES FTEF	14.00	7.50	14.40	10.75	10.75
	Avg WSCH FTEF	423	230	444	329	328
GEOG-9	# of Sections		2	2	1	1
	Enrollment		49	39	31	24
	FTES		6.8	4.2	2.9	4.0
	FTEF		0.57	0.57	0.28	0.28
	WSCH		205	157	144	120
	Avg Enrl/Section		25	20	31	24
	Avg FTES FTEF		12.05	7.36	10.24	14.12
	Avg WSCH FTEF		362	277	508	424
GEOG-10	# of Sections		1	2	1	1
	Enrollment		26	25	19	17
	FTES		1.8	3.8	2.5	2.8
	FTEF		0.28	0.57	0.28	0.28
	WSCH		93	115	75	85
	Avg Enrl/Section		26	13	19	17
	Avg FTES FTEF		6.35	6.76	8.82	9.99
	Avg WSCH FTEF		328	203	265	300
GEOG-12	# of Sections			1	2	1

	Enrollment		11	23	12
	FTES		1.7	2.2	0.0
	FTEF		0.28	0.57	0.28
	WSCH		50	90	0
	Avg Enrl/Section		11	12	12
	Avg FTES FTEF		5.89	3.85	0.00
	Avg WSCH FTEF		176	159	0
GEOG-13	# of Sections		1	1	
	Enrollment		13	13	
	FTES		2.1	2.2	
	FTEF		0.28	0.28	
	WSCH		62	67	
	Avg Enrl/Section		13	13	
	Avg FTES FTEF		7.06	7.66	
	Avg WSCH FTEF		219	236	
GEOG-14	# of Sections	1	1	1	
	Enrollment	14	12	13	
	FTES	1.7	2.0	2.2	
	FTEF	0.28	0.28	0.28	
	WSCH	50	60	65	
	Avg Enrl/Section	14	12	13	
	Avg FTES FTEF	5.89	7.06	7.66	
	Avg WSCH FTEF	176	212	229	
GEOG-15	# of Sections		1	1	1
	Enrollment		12	17	12
	FTES		1.7	1.7	2.1
	FTEF		0.28	0.28	0.28
	WSCH		50	87	62
	Avg Enrl/Section		12	17	12
	Avg FTES FTEF		5.89	6.00	7.06
	Avg WSCH FTEF		176	307	219
GEOG-21	# of Sections				1
	Enrollment				16
	FTES				0.9
	FTEF				0.11
	WSCH				27
	Avg Enrl/Section				16
	Avg FTES FTEF				8.03
	Avg WSCH FTEF				249
GEOG-25	# of Sections		1	1	1
	Enrollment		14	11	19
	FTES		0.9	0.7	1.0
	FTEF		0.11	0.11	0.11
	WSCH		26	22	28
	Avg Enrl/Section		14	11	19

	Avg FTES FTEF			8.03	6.74	9.33
	Avg WSCH FTEF			240	203	259
GEOG-94	# of Sections	4	3	6	4	
	Enrollment	6	5	13	16	
	FTES	0.3	0.2	0.7	0.9	
	FTEF	0.00	0.00	0.00	0.00	
	WSCH	34	26	56	116	
	Avg Enrl/Section	2	2	2	4	
	Avg FTES FTEF					
	Avg WSCH FTEF					
Grand Total	# of Sections	37	42	49	57	56
	Enrollment	831	787	823	900	925
	FTES	110.1	111.7	111.1	125.8	136.9
	FTEF	7.54	8.29	9.94	9.95	9.98
	WSCH	3,324	3,513	3,671	4,116	4,373
	Avg Enrl/Section	22	19	17	16	17
	Avg FTES FTEF	14.06	13.01	11.20	11.27	12.15
	Avg WSCH FTEF	425	406	365	367	384