

2019-20

Instructional Program Review

Science

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First part of a three-term sequence for students majoring in biology and the sciences, including pre-medical, pre-dental, pre- veterinarian, chiropractic, pharmacy, and related fields. Includes introduction to science, biochemistry, metabolism, the cell, molecular biology, and reproduction.	27
Second part of a three-term sequence designed for students majoring in biology and the sciences, including pre-medical, pre- dental, pre-veterinarian, chiropractic, pharmacy, and related fields. Includes life cycles, reproduction, molecular biology, moc and classical genetics, evolution, diversity, and systematic.	lern 27
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1. PROGRAM/DISCIPLINE MISSION/GOALS AND LINK TO STRATEGIC PLAN

1A. DESCRIBE PROGRESS TOWARD GOALS SET IN PREVIOUS REVIEW, ANNUAL BUDGET PRESENTATIONS, AND/OR STRATEGIC BUDGET PLANNING.

General Education consists of courses in a variety of disciplines that form a supportive core for college degree programs. Collectively, General Education courses promote student success in program courses by developing foundational skills in thinking, communicating, computation, and scientific method. General Education courses also offer access to specialized instruction in subject areas not encompassed in other programs. While preparing students for success in college degree programs, General Education departments also seek to promote student community and career success with training in civic awareness, leadership, "soft skills", and professionalism. By combining skills development and interdisciplinary instruction with avenues for transfer to university degrees, the General Education departments support students' successful futures.

GOAL 1 (ENHANCE REPUTATION FOR EXCELLENCE): IMPROVE LAB SAFETY BY INCREASING CLEANLINESS, ACCESSIBILITY, SAFETY STANDARDS, AND ASSISTANCE TO ALL SCIENCE FACULTY. STANDARDIZE STUDENT SAFETY TRAINING.

ACTION: HIRE A PART-TIME LAB ASSISTANT TO MAINTAIN CLEANLINESS, ACCESSIBILITY OF MATERIALS, SAFETY STANDARDS, INVENTORY, AND ASSIST FACULTY.

- I. Progress a new lab coordinator was hired in January 2019 to assist faculty.
- II. Progress The lab coordinator received access in May 2019 to supply accounts, enabling lab ordering support.
- III. Progress College wide Safety Committee Meetings reinstituted December 6, 2017 with Michael Homfeldt, Director of Facilities, presiding as chair. Transparency: President → College Committees → Safety → Meetings
- IV. Progress 550 Items have been inventoried in Quartzy, <u>https://www.quartzy.com/</u>, providing web-based inventory and hyperlinked SDS (Safety Data Sheet) access as of Spring 2019
- V. Progress Per OSHA regulations, paper SDSs are available at the entrance of the preparation laboratory as of Spring 2019.
- VI. Progress Per OSHA regulations, archived SDSs (materials not in inventory, but having been used within 30 years) are available at the entrance of the preparation laboratory.
- VII. Progress Electronic redundancy of current and archived SDS are available on SharePoint at: President \rightarrow College Committees \rightarrow Safety \rightarrow SDS (MSDS) \rightarrow Science
- VIII. Progress Standard Operating Procedure (SOP) for inventorying incoming materials and archiving materials coming out of inventory added to the Chemical Hygiene Plan available on SharePoint at: President → College Committees → Safety → Policy and Procedure → Science → Chemical Hygiene Plan—Science
- IX. Progress Per Oregon Health Authority, radiation leak tests are performed every 6 months.
- X. Progress Per OSHA regulations, Chemical Hygiene Officer's Check Sheet performed monthly.

ACTION: OBTAIN LAB SAFETY TRAINING FOR ALL SCIENCE FACULTY.

- i. Progress- SafeColleges Online Training has been adopted to provide lab safety training for all faculty. Topics include:
 - a. Automated External Defibrillators (AED)

- b. Chemical Spills
- c. Fire Extinguisher Safety
- d. First Aid
- e. Hazard Communication
- f. Health Emergencies
- g. Safety Data Sheets (SDS)

Note: As there have been issues with SafeColleges, Science faculty and staff are using OSHA training modules and are documenting them on SharePoint: President \rightarrow College Committees \rightarrow Safety \rightarrow Trainings

ACTION: STANDARDIZE LAB INCIDENT REPORTS AND ACTION PLAN.

 Progress – New lab incident report forms and action plan reviewed and adopted by safety committee; incident sheets available at entrance of preparation laboratory and on SharePoint at: President → College Committees → Safety → Policy and Procedure → Injury Accident Report

ACTION: GROUP FACULTY INSPECTIONS OF LABS AND PREP ROOM EVERY TERM.

- i. Progress Science faculty agreed that the labs and prep room are in good shape and items were readily accessible for fall term 2018.
- Progress Annual OSHA inspection of Laboratories and Preparation Laboratory completed November 12, 2019
- iii. Progress Annual Safety Committee inspection of Laboratories and Preparation Laboratory available on SharePoint at: President \rightarrow College Committees \rightarrow Safety \rightarrow Inspections \rightarrow 2018 \rightarrow Science Lab

GOAL 2 (ENHANCE REPUTATION FOR EXCELLENCE): REPAIR AND PURCHASE ANATOMY AND PHYSIOLOGY MODELS FOR A SERIES THAT SERVICES AROUND 300 STUDENTS PER YEAR. PURCHASE WINDOWS 10 COMPATIBLE MICROSCOPES FOR A&P AND DISTANCE EDUCATION. GENERAL SCIENCE LAB EQUIPMENT PURCHASES AS NEEDED.

ACTION: REPAIR AND PURCHASE A&P MODELS.

i. Progress- Anatomy and Physiology Lab resources have been queued for purchase on an annual basis. Please refer below for an itemization of resources ordered throughout the last three fiscal years:

	Requisition	Quantity	Catalog	Item	Unit Price	Amount
	74 06.08.17	2	G60 [1008493]	Pulmonary Lobule with Surrounding Blood	\$304.00	\$608.00
	74 06.08.17	2 L01 [1000320] Stages of Fertilization and of the Embryo- 2-times Magnification		\$342.00	\$684.00	
İ	74 06.08.17	2	L10 [1018627]	3B Scientific [®] Pregnancy Series	\$927.00	\$1854.00
Ī	74 06.08.17	2	L15 [1014207]	Human Embryo Model - 25 Times Life Size	\$79.00	\$158.00
	74 06.08.17	2	VG391 [1001257]	Embryonic Development Model in 12 stages	\$613.00	\$1226.00
	74 06.08.17	2	W33351 [1019559]	Breast Cross-Section Model	\$72.50	\$145.00
	75 06.08.17	2	LS03802U	BioQuest [®] Dual Lungs Comparison Kit	\$350.00	\$700.00
	78 06.09.17	15	LABQ2	LabQuest 2	\$329.00	\$4935.00
						\$10,310.00
L	31 04.19.18	6	SPR-BTA	Spirometer	\$ 199.00	\$1,194.00
l	32 04.30.18	1	A58/9	58/9 Didactic Flexible Spine Model with Femur Heads		\$240.00
	32 04.30.18	1	A59/8	3/8 Stand for Spinal Columns and Skeletons, 3 part		\$65.00
l	32 04.30.18	1	A81/1	Deluxe Functional Hip Joint Model	\$144.00	\$144.00
l	32 04.30.18	1	A82/1	Deluxe Functional Knee Joint Model	\$144.00	\$144.00
L	32 04.30.18	1	F11	Eye, 5 times full-size, 7 part	\$286.00	\$286.00
l	32 04.30.18	4	G60	Pulmonary Lobule with Surrounding Blood	\$319.00	\$1276.00
l				Vessels		
	33 04.30.18	2	1589297	EISCO Dual Sex Torso Model, Open Back, 28 Parts	\$698.99	\$1397.98
I	36 05.25.18	2	1000200 [B35]	Deluxe Dual Sex Torso with Opened Back, 28-part	\$1,231.00	\$2,462,00

Kiamath Community Colle	ege instructional	Program Review:			
37 05.31.18	1	BS 16	SOMSO Nerves and Blood-Vessels on the Facial	\$1,492.23	\$1,492.23
27.05.21.19	1	DC 24	SKUII	¢66.15	¢66.15
37 05.31.18	1		SOMSO Model of Prain Stom in 12 parts	15.00¢ 17 د רד ל	00.15 71 د ر ج
37 05.31.10	1	D3 23/2-1	SOMSO Holder of Brain Stein in 12 parts	\$775.71	\$775.71
37 05.31.18	1	BS 9	SOMSO Field of the Head	\$092.11	\$092.11
37 05.31.18	4	03 10	Cochlea	\$381.12	\$1,524.48
37 05.31.18 1 DS 14 SOMSO Labyrinth		\$393.47	\$393.47		
37 05.31.18	1	DS 5	SOMSO Ear	\$414.73	\$414.73
37 05.31.18	1	GS 5	SOMSO Larynx with Trachea	\$1,132.88	\$1,132.88
37 05.31.18	1	HS 6/1	SOMSO Heart with Conducting System	\$824.21	\$824.21
37 05.31.18	1	JS 11	SOMSO Pancreas with Spleen and Duodenum	\$213.20	\$213.20
37 05.31.18	1	JS 8/1	SOMSO Vascular Architecture of the Liver	\$305.79	\$305.79
37 05.31.18	1	LS 9	SOMSO Kidney, Nephron and Glomerulus	\$435.00	\$435.00
37 05.31.18	1	NS 10	SOMSO Muscles of the Leg with Base of Pelvis	\$1,739.50	\$1,739.50
37 05.31.18	1	NS 15	SOMSO Muscles of the Arm with Shoulder Girdle	\$1,541.00	\$1,541.00
37 05.31.18	3	QS 65/7	SOMSO Neuroanatomy Head Model	\$1,746.25	\$5,238.75
					\$23,996.19
18 03.18.19	1	1020157 [A05/1]	Disarticulated Full Human Skeleton with 3 part skull	\$460.00	\$460.00
18 03.18.19	1	1000129 [A58/9]	Didactic Flexible Spine Model with Femur Heads	\$249.00	\$249.00
18 03.18.19	1	1000132 [A59/8]	Stand for Spinal Columns and Skeletons, 3 part	\$67.00	\$67.00
18 03.18.19	1	1000160 [A80/1]	Deluxe Functional Shoulder Joint Model	\$145.00	\$145.00
18 03.18.19	1	1000162 [A81/1]	Deluxe Functional Hip Joint Model	\$145.00	\$145.00
18 03.18.19	1	1000164 [A82/1]	Deluxe Functional Knee Joint Model	\$145.00	\$145.00
18 03.18.19	1	1000256 [F11]	Eye, 5 times full-size, 7 part	\$296.00	\$296.00
18 03.18.19	3	1000320 [L01]	Stages of Fertilization and of the Embryo- 2-times	\$360.00	\$1.080.00
			Magnification	,	, ,
18 03.18.19	1	1018627 [L10]	3B Scientific [®] Pregnancy Series	\$983.00	\$983.00
18 03.18.19	4	1014207 [L15]	Human Embryo Model - 25 Times Life Size	\$86.00	\$344.00
18 03.18.19	1	1001257 [VG391]	Embryonic Development Model in 12 stages	\$679.00	\$ 679.00
18 03.18.19	4	1019559 [W33351]	Breast Cross-Section Model	\$70.60	\$ 282.40
19 03.18.19	1	BS 25/1	Model of Brain with Indicated cytoarchitectural Areas	\$860.91	\$860.91
19 03.18.19	1	BS 25/2-T	Transparent Brain Stem	\$833.62	\$833.62
19 03.18.19	1	HS 6/1	Heart with Conducting System	\$824.21	\$824.21
19 03.18.19	1	JS 8/1	Vascular Architecture of the Liver	\$311.81	\$311.81
19 03.18.19	1	NS 10	Muscles of the Leg with Base of Pelvis	\$2,023.90	\$2,023.90
19 03.18.19	1	NS 15	Muscles of the Arm with Shoulder Girdle	\$1,849.82	\$1,849.82
20 03.18.19	2	QS 65/7	Neuroanatomy Head Model	\$2,320.86	\$4,641.72
20 03.18.19	2	QS 9/5	Artificial Bauchene Skull of an Adult	\$1,081.88	\$2,163.76
22 03.19.19	1	249842	Heavy-Duty Rod-Supported Skeleton Stand	\$193.00	\$193.00
26 03.29.19	2	AS 23/2	Torso with Head and Open Back	\$4322.82	\$8645.64
26 03.29.19	1	BS 25/1	Model of Brain with Indicated cytoarchitectural \$7 Areasn		\$745.40
26 03.29.19	1	BS 25/2-T	Transparent Brain Stem	\$686.74	\$686.74
26 03.29.19	1	HS 6/1	Heart with Conducting System	\$743.75	\$743.75
26 03.29.19	1	JS 8/1	Vascular Architecture of the Liver	\$279.43	\$279.43
26 03.29.19	1	NS 10	Muscles of the Leg with Base of Pelvis	\$1741.54	\$1741.54
26 03.29.19	1	NS 15	Muscles of the Arm with Shoulder Girdle	\$1571.42	\$1571.42
26 03.29.19	2	QS 65/7	Neuroanatomy Head Model	\$1675.84	\$3351.68
26 03.29.19	2	QS 9/5	Artificial Bauchene Skull of an Adult	\$912.02	\$1824.04
29 04.15.19	6	312106	Digestive Tract Microscope Slide Set	\$58.00	\$348.00
					\$38,515.79
				Grand Total	\$72,821.98

ACTION: PURCHASE NEW WINDOWS 10 COMPATIBLE MICROSCOPES.

i. Progress – in the last three fiscal years, sixty-nine new microscopes were ordered for Anatomy and Physiology

Laboratory, Biology Laboratory, and Distance Education. Please refer to itemized list below:

Requisition Quar Number and Date	ntity Catalog	Item	Unit Price	Amount
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46 09.27.16	24	M837SL-C30U	40X-2000X Trinocular Compound LED	\$ 385.99	\$9,263.76
			Microscope with 3MP Digital Camera		
38 06.03.18	13	M837SL-C30U	OMAX 40X-2000X Trinocular Compound LED	\$385.99	\$5,017.87
			Microscope With 3MP Digital Camera		
01 09.14.18	16	M837SL-C30U	OMAX 40X-2000X Trinocular Compound LED	\$424.99	\$6799.84
			Microscope With 3MP Digital Camera		
34 05.27.19	16	M837SL-C30U	OMAX 40X-2000X Trinocular Compound LED	\$ 446.99	\$ 7,151.84
			Microscope With 3MP Digital Camera		
	69				\$28,233.31

ACTION: MAKE GENERAL SCIENCE LAB EQUIPMENT PURCHASES, AS NEEDED TO MAINTAIN AND INCREASE EXCELLENCE.

i. Progress – departmental purchases reflecting the last seven fiscal year's big-ticket items and their resulting totals are itemized below:

Requisition Number and Date	Quantity	Catalog	Item	Unit Price	Amount
19 05.28.13	1	U41500	Isotope Generator Kit. 10 uCi	\$ 238.00	\$ 238.00
19 05.28.13	1	U41512	Set of 5 sources	\$259.00	\$259.00
					\$497.00
28 01.01.14	1	CS15000	MagnaRack™ Magnetic Separation Rack	\$347.00	\$347.00
30 01.03.14	2	F144563	PIPETMAN Neo P20N, 2–20 uL	\$280.50	\$561.00
30 01.03.14	6	F144561	PIPETMAN Neo P2N, 0.2–2 uL	\$266.48	\$1598.88
30 01.03.14	3	F144565	PIPETMAN Neo P200N, 20–200 uL	\$280.50	\$841.50
31 01.04.14	3	BMK250A	Mini BLUEMAXX™ III Forensic Light Kit	\$149.00	\$447.00
53 04.05.14	2	EXPS	Extech Digital DC Power Supply	\$199.00	\$398.00
53 04.05.14	2	MG-BTA	Magnetic Field Sensor	\$58.00	\$116.00
53 04.05.14	2	PAMP	Power Amplifier	\$199.00	\$398.00
53 04.05.14	2	DVP-BTA	Differential Voltage Probe	\$39.00	\$78.00
53 04.05.14	2	DCP-BTA	Current Probe	\$39.00	\$78.00
53 04.05.14	2	VCB	Vernier Circuit Board	\$89.00	\$178.00
53 04.05.14	2	IND	Inductor	\$40.00	\$80.00
54 04.06.14	1	OS-8546C	Basic Optics System II	\$1064.00	\$1064.00
54 04.06.14	1	OS-8477A	Human Eye Model	\$232.00	\$232.00
67 05.12.14	1		Graphite Head	\$1200.00	\$1200.00
67 05.12.14	1	SB-4102	Antimony lamp	\$250.00	\$250.00
67 05.12.14	1	BA-4104	Barium lamp	\$250.00	\$250.00
67 05.12.14 1 AS-4103 Arsenic lamp		\$325.00	\$325.00		
67 05.12.14 1 CD-4108 Cadmium lamp		\$250.00	\$250.00		
					\$8,692.38
12 11.07.14	1	G3170-89025	EXCH-Duo 2.5 RVP 110V	\$2,414.75	\$2,414.75
					\$2,414.75
13 11.27.15	12	COL-BTA	Colorimeter	\$115.00	\$1,380.00
13 11.27.15	6	MD-BTD	Motion Detector	\$79.00	\$474.00
13 11.27.15	4	VPG-BTD	Photogate	\$45.00	\$180.00
13 11.27.15	4	DFS-BTA	Dual-Range Force Sensor	\$109.00	\$436.00
19 01.22.16 Esky Bluet		Esky Bluetooth Wireless Barcode Scanner with			
	2		256K Storage	\$69.99	\$139.98
19 01.22.16			Inateck Adjustable Goose Neck Stand for Symbol		
			Scanner Barcode Scanner Scan Gun Label Reader		
	2		Automatic, Hands Free Adjustable Stand	\$8.99	\$17.98
27 03.23.16	6	982007	Troemner Talboys, 982007 Small Inoculating Turntable	\$127.40	\$764.40
45 06.12.16	1	08968	Orion SkyQuest XX16g GoTo Truss Tube Dobsonian Telescope	\$3,699.99	\$3,699.99
45 06.12.16	2	52098	Orion StarShoot All-In-One Astrophotography	\$379.99	\$759.98
45 06.12.16	2	08890	Orion 1.25" Premium Telescope Accessory Kit	\$169.99	\$339 98
45 06.12.16	2	15101	Orion Light Shroud for SkyQuest XX16 Truss Tube	\$155.99	\$311.98
	-		Dobsonian	÷±33.33	<i>J</i> JJJJJJJJJJJJJ
45 06.12.16	1	05691	Orion LaserMate Deluxe II Telescope Laser	\$69.99	\$69.99
			Collimator		
					\$8,574.28
53 02.15.17	2	612078	Universal Celestial Globe	\$233.05	\$466.10
64 05.22.17	3		Celestron NexStar 6 SE Telescope	\$699.00	\$2097.00

Klamath Community College Instructional Program Review:

Riamath Community Com	ege moti detional				
65 05.28.17	2	LB-CE-FEFEDD- C2400-B	Labnet Spectrafuge 24D complete with 24 x 1.5ml rotor, 120V, blue accents Model: Labnet Spectrafuge 24D complete with 24 x 1.5ml rotor, 120V, blue accents	\$1,469.00	\$2,938.00
65 05.28.17	6	LB-CE-ADDDBC- C1301-B	Labnet Spectrafuge Mini Centrifuge with 1.5/2.0 ml rotor, strip tube rotor, 0.5 and 0.4 ml adapters, 120V blue lid Model: Labnet Spectrafuge Mini Centrifuge with 1.5/2.0 ml rotor, strip tube rotor, 0.5 and 0.4 ml adapters, 120V blue lid	\$253.99	\$1,523.94
66 05.28.17	3	BV1000	BenchMixer Vortex Mixer	\$194.00	\$582.00
67 05.28.17	2	B2000-4, US, 110V 60Hz(+\$190.40)	Benchmark Scientific MyBath 2L, 4L, 12L Water Baths, B2000	\$666.62	\$1,333.24
70 05.29.17	1	Cs	CESIUM (CS) HOLLOW CATHODE LAMP 1.5" & 2"	\$325.00	\$325.00
70 05.29.17	1	Eu	EUROPIUM (EU) HOLLOW CATHODE LAMP 1.5" & 2"	\$325.00	\$325.00
70 05.29.17	1	Th	THORIUM (TH) HOLLOW CATHODE LAMP 1.5" &	\$325.00	\$325.00
71 05.29.17	1	10" Slab saw	Configuration: with saw vise. Electricity supply: 110 volt	\$719.99	\$719.99
77 06.09.17	1	ME580T-PZ-2L	40X-500X Trinocular Dual-light Polarized Metallurgical Microscope	\$788.98	\$788.98
77 06.09.17	1	MU300-CK	3MP USB2.0 Microscope Digital Camera + Calibration Kit	\$117.75	\$117.75
79 06.09.17	9	LABQ2	LabQuest 2	\$329.00	\$2961.00
					\$14,503.00
02 07.31.17	1	162576260511	Eppendorf Mastercycler 5333 Thermal Thermocycler	\$500.00	\$500.00
					\$500.00
06 10.30.18	5		Corning 6795-420D PC-420D Stirring Hot Plate with Digital Display and 5" x 7" Pyroceram Top, 5 to 550 Degree C, 120V/60Hz	\$488.34	\$2,441.70
07 11.06.18	8	SPX222	Ohaus SPX222 Scout SPX Portable Scale	\$264.00	\$2,112.00
11 01.15.19	5		Corning 6795-420D PC-420D Stirring Hot Plate with Digital Display and 5" x 7" Pyroceram Top, 5 to 550 Degree C, 120V/60Hz	\$417.29	\$2,086.45
16 02.22.19	2	T9FB807389	SCILOGEX Levo Plus Motorized Pipette Filler, 74020002	\$201.60	\$403.20
27 03.31.19	2	Use link above	Quincy Lab 12-140E Digital Acrylic Door Incubator, 2 Cu. Ft. Capacity, 115V	\$723.47	\$1,446.94
					\$8,490.29
					\$43,671.70

GOAL 3 (IMPROVE USE OF THOUGHTFUL PLANNING): TO INCREASE SCIENCE FACULTY NETWORKING, EXPAND PROFESSIONAL RELATIONSHIPS, AND KEEP UP WITH CURRENT TRENDS IN OUR STATE.

ACTION: ENCOURAGE ALL FULL-TIME FACULTY TO HAVE SCIENTIFIC ASSOCIATION MEMBERSHIPS.
 i. Progress- Barbara Mann and Eleazar Gutierrez joined the American Chemical Society.
 ACTION: ENCOURAGE ALL FULL-TIME FACULTY TO ATTEND STATEWIDE PROFESSIONAL MEETINGS IN THEIR

ACTION: ENCOURAGE ALL FULL-TIME FACULTY TO ATTEND STATEWIDE PROFESSIONAL MEETINGS IN THEIR FIELD.

i. Progress - Mark Cassady attended a Human Anatomy and Physiology conference and the Edward Tufte seminar on presenting data and information.

ACTION: INCORPORATE GAINED INSIGHT INTO CURRICULUM, OUTCOMES, ASSESSMENT, AND/OR PLANNING.

- i. Progress Dodi Wilson's BIO 213L is collaborating with Keith Duren in Agriculture Science to augment the butterfly garden; there are also future plans for restoration ecology activities
- ii. Progress in an effort to facilitate Student Learning Outcomes (SLO) assessment; Institutional Learning Outcomes (ILO) assessment, planning, and reporting; and Program Review—Course Content and Outcomes Guides (CCOGS) and syllabi of the department have been updated by various Science faculty. CCOGs are reviewed on a three-year cycle. This list comprises those courses that are most frequently taught in the science department.

0	
Courses with updated CCOGs and syllabi	Faculty
BIO 101	Dodi Wilson
BIO 102	Dodi Wilson
BIO 103	Dodi Wilson
BIO 211	Dodi Wilson
BIO 212	Dodi Wilson
BIO 213	Dodi Wilson
BIO 231	Eleazar Gutierrez
BIO 232	Eleazar Gutierrez
BIO 234	Eleazar Gutierrez
CHE 104	Barbara Mann
CHE 105	Barbara Mann
CHE 106	Barbara Mann
CHE 221	Barbara Mann
CHE 222	Barbara Mann
CHE 223	Barbara Mann
CHE 241	Barbara Mann
CHE 242	Barbara Mann
CHE 243	Barbara Mann
ENV 170	Eleazar Gutierrez
PHY 211	Eleazar Gutierrez
PHY 212	Eleazar Gutierrez
PHY 213	Eleazar Gutierrez

Source: https://www.klamathcc.edu/About/Institutional-Assessment/Academic-Assessment/Course-Content-and-Outcomes

ACTION: BUILD NEW RELATIONSHIPS AND PARTNERSHIPS IN SCIENCE.

- Progress Dodi Wilson and Lloyd Parratt, Associate Professor and Associate Department Chair of Natural Sciences Department at Oregon Tech agreed on a seamless transfer of the BIO 211-213 series per course rather than per series, and CCOGs and course descriptions have been updated to reflect this work.
- ii. Progress community partnerships have been pursued vigorously by the Astronomy club and then the Science club; these efforts have been overseen and facilitated by the Academic Advisors of the clubs: Eleazar Gutierrez and Barbara Mann:

Event	Community Partner	Date
[tnorecon] Occultation ~ 10 events	Research and Education Collaborative Occultation Network (RECON)	Sunday, May 31, 2015-Wednesday, May 25, 2016
Sunriver Observatory Field Trip	Sunriver Nature Center & Observatory	Saturday, July 30, 2016
Search for Extraterrestrial Intelligence (SETI) Hat Creek Radio Observatory Field Trip	Stanford Research Institute International	Saturday, August 13, 2016
Lava beds Star party	Lava Beds National Monument	Saturday, August 20, 2016
Trans Neptunian Objects (TNO) Occultations	Research and Education Collaborative Occultation Network (RECON)	Tuesday, April 11, 2017
Shapley Lecture: ASTEROID THREATS TO EARTH How You Can Make Discoveries!	The American Astronomical Society Keynote speaker: Dr. Patrick Miller International Astronomical Search Collaboration	Friday, April 21, 2017
Patrick Miller Professor of Mathematics	The Team America Rocketry Challenge (TARC) National Association of Rocketry (NAR)	Friday, April 21, 2017

Holland School of Sciences & Mathematics		
 Astronomy for Everyone: Size & Scale of the Universe. Raffle of: Orion StarBlast 4.5 Astro Reflector Telescope 2 Brass sextants 3 Orion Star Target Planisphere 	Keynote speaker: Kevin Manning, career astronomer and former consultant for NASA Raised \$126.53	Saturday, May 6, 2017
Sunriver Observatory Field Trip	Sunriver Nature Center & Observatory	Saturday, August 5, 2017
SETI Hatcreek Field Trip	Stanford Research Institute International	Saturday, August 19, 2017
Eclipse Party	Klamath County Museum	Monday, August 21, 2017
Sunriver Observatory Field Trip	Sunriver Nature Center & Observatory	Saturday, November 4, 2017
SETI Hatcreek Field Trip	Stanford Research Institute International	Saturday, November 18, 2017
Search for Bigfoot	Oregon Parks and Recreation Department	Saturday, August 18, 2018
Collier Memorial State Park		
33rd Annual rock, gem, mineral and fossil show	Klamath Rock and Arrowhead Club	Saturday and Sunday, March 09 and 10, 2019
P.A.L.M. Dinners (Provide A Loving Meal)	Klamath Falls First United Methodist Church	Sunday, March 17, 2019
Cwaam Ceremony	Klamath Tribes	Saturday, March 23, 2019
Spring Club Fair	Student Life Center	Wednesday, April 24, 2019
Home Brewing	Community, General	Saturday, April 27, 2019
Chiloquin Skies Star Party	Klamath County Museum and the City of Chiloquin	Saturday, April 6, 2019
Cinco de Mayo	Lutheran Community Services Northwest	Saturday, May 4, 2019
Rockets	Shasta Elementary Cub Scouts	Saturday, May 18, 2019
Rockets, Elephant toothpaste, Potato guns, and Alka-Seltzer rockets.	Shasta Elementary 5 th Grade	Wednesday, June 12, 2019

GOAL 4 (IMPROVE ACCESS): PROVIDE STUDENTS WITH MATERIALS TO BE SUCCESSFUL IN SCIENCE.

ACTIONS: MAKE PRACTICE QUIZZES FOR SCIENCE LECTURES IN CANVAS OR OTHER ONLINE FORMAT.

i. Progress – Canvas practice quizzes were fully implemented in all A&P, general biology, and microbiology courses.

ACTIONS: MAKE RESOURCES AVAILABLE FOR SCIENCE COURSES IN CANVAS.

- Progress- BIO 231L-233L has many Canvas resources for students, including many pictures of anatomical structures. TAs and student workers dedicated approximately a year on these online resources—the resource is ample, comprehensive, and extremely beneficial to students
- Progress first distance education BIO 234 and BIO 234L were offered. The course was intended for our Lakeview partner, but was alternatively taken advantage of by distance and local students employed at local medical clinics with demanding schedules. Out of twenty-five students enrolled, eighteen earned an A, and six earned a B

GOAL 5 (IMPROVE USE OF THOUGHTFUL PLANNING): TO IMPROVE GRADUATION RATES, WE WILL TAKE ACTIONS TO IMPROVE ADVISING.

ACTION: DEVELOP SCIENCE FACTSHEETS FOR ADVISING.

i. Progress – a new pre-nursing advising tool was shared with advisors to maximize success in science prerequisites

ACTION: DEVELOP CURRICULUM OPTIONS FOR THE AS DEGREE THAT WILL HELP EMPHASIZE A STUDENT INTEREST AND INCREASE TRANSFERABILITY.

 Progress – in conjunction with the science advisory committee, the general education committee, and advising circles; several Associate of Science advising options have been created including an advising option for an AS geared towards Environmental Science, Biology, Chemistry, and Physics

GOAL 6 (IMPROVE PROSPERITY): TO IMPROVE SUSTAINABILITY, WE WILL TAKE ACTIONS TO IMPROVE RECRUITMENT AND MARKETING OF SCIENCE COURSES.

ACTION: DISTRIBUTE MAILERS FOR THE SCIENCE DEPARTMENT, HIGHLIGHTING TRANSFERABILITY, SPECIALIZED EQUIPMENT, AND RELATED PROGRAMS.

i) Progress – the summer schedule mailer featured current science students conducting a chemistry experiment; the inner cover featured the A&P lab and information on the science department

ACTION: PARTICIPATE IN K-8 SCIENCE ACTIVITIES.

- i) Progress 23 outdated microscopes were donated to Ponderosa, Brixner, Henley Middle School, and Bonanza Junior/Senior High School
- ii) Progress Dodi Wilson had a science booth at the Henley Elementary science night on May 9, 2019, where attendees could view microorganisms through a microscope

ACTION: INCREASE THE NUMBER OF LOCAL HIGH SCHOOLS OFFERING AT LEAST ONE SCIENCE COURSE AS DUAL CREDIT.

i. Progress – in an effort to perpetuate new partnerships with high schools and increase access, a great amount of effort has been invested in dual credit recruitment; please refer to the articulated dual credit course offerings listed below:

Term/Year	Course	Title	School	Instructor	Number of Students
WI/2015	CHE 104 02	General Chemistry I	MAZHS	Lamb, Michael	16
WI/2015	CHE 104L 02	Gen Chem I Lab	MAZHS	Lamb, Michael	16
FA/2015	CHE 104 02	General Chemistry I	YKAHS	Thompson, Joshua	12
FA/2015	CHE 104L 03	Gen Chem I Lab	YKAHS	Thompson, Joshua	12
FA/2015	PHY 201 01	General Physics I (Algebra-based)	YKAHS	Thompson, Joshua	8
FA/2015	PHY 201L01	Gen Physics I Lab	YKAHS	Thompson, Joshua	8
WI/2016	BIO 101 03	Biology I	LRHS	Beekman, Teresa	13
WI/2016	BIO 101L 03	Bio I Lab	LRHS	Beekman, Teresa	13
WI/2016	CHE 105 02	General Chemistry II	YKAHS	Thompson, Joshua	12
WI/2016	CHE 105L 02	Gen Chem II Lab	YKAHS	Thompson, Joshua	12
WI/2016	PHY 101 01	Fundamentals of Physics I	CHLHS	Glidden, Tanner	9
WI/2016	PHY 101L01	Fundamentals of Physics I Lab	CHLHS	Glidden, Tanner	9
WI/2016	PHY 202 01	General Physics II (Algebra-based)	YKAHS	Thompson, Joshua	7
WI/2016	PHY 202L01	Gen Physics II Lab	YKAHS	Thompson, Joshua	7
SP/2016	BIO 101 03	Biology I	LVHS	Counts, Dustin	14
SP/2016	BIO 101L 03	Bio I Lab	LVHS	Counts, Dustin	14
SP/2016	BIO 101 04	Biology I	LVHS	Counts, Dustin	11
SP/2016	BIO 101L 04	Bio I Lab	LVHS	Counts, Dustin	11
SP/2016	BIO 101 05	Biology I	LVHS	Counts, Dustin	9
SP/2016	BIO 101L 05	Bio I Lab	LVHS	Counts, Dustin	9
SP/2016	BIO 102 01	Biology II	LRHS	Beekman, Teresa	11

SP/2016	BIO 102L 01	Bio II Lab	LRHS	Beekman, Teresa	11
SP/2016	CHE 104 01	General Chemistry I	LVHS	Counts, Dustin	18
SD/2016		Con Chom Linh		Counts, Dustin	10
SP/2010	CHE 104L 01	Gen Chem I Lab	LVHS	Counts, Dustin	18
SP/2016	CHE 106 02	General Chemistry III	YKAHS	Thompson, Joshua	12
SP/2016	CHE 106L 02	Gen Chem III Lab	YKAHS	Thompson, Joshua	12
SD/2016	ENIV 170 02	Environmental Science		Olson Scott	2
3P/2010			копз	Oisell, Scott	5
SP/2016	ENV 170 02	Environmental Science	KUHS	Olsen, Scott	3
SP/2016	ENV 170 02	Environmental Science	KUHS	Olsen. Scott	3
SD/2016	ENIV 1701 02	Environmental Science Lab		Olson Scott	2
3F/2010			KUIIS	Oiseil, Scott	5
SP/2016	ENV 170L 02	Environmental Science Lab	KUHS	Olsen, Scott	3
SP/2016	ENV 170L 02	Environmental Science Lab	KUHS	Olsen, Scott	3
SP/2016	ENV/ 170 03	Environmental Science	KUHS	Olsen Scott	10
51/2010	ENV 170 05		KOHS		10
SP/2016	ENV 170 03	Environmental Science	KUHS	Olsen, Scott	10
SP/2016	ENV 170 03	Environmental Science	KUHS	Olsen, Scott	10
SP/2016	ENV 1701 03	Environmental Science Lab	KUHS	Olsen Scott	10
CD /2010	ENV 170L 03		KULIC	Olean Coatt	10
SP/2016	ENV 170L03	Environmental Science Lab	KUHS	Olsen, Scott	10
SP/2016	ENV 170L 03	Environmental Science Lab	KUHS	Olsen, Scott	10
SP/2016	ENV 170 04	Environmental Science	LVHS	Counts, Dustin	7
SD/2016	ENIV 1701 04	Environmental Science Lab		Counts, Dustin	7
3P/2010			LVIIS	Counts, Dustin	/
SP/2016	GEL 201 01	Physical Geology I	LVHS	Counts, Dustin	8
SP/2016	GEL 201L 01	Physical Geology I Lab	LVHS	Counts, Dustin	8
SD/2016	DUV 102 01	Eundomontals of Physics II		Gliddon Tannor	6
3F/2010			CHEHS		0
SP/2016	PHY 102L 01	Fundamentals of Physics II Lab	CHLHS	Glidden, Tanner	6
FA/2016	CHE 104 04	General Chemistry I	YKAHS	Thompson, Joshua	1
FA/2016	CHE 104 04	General Chemistry I	γκδης	Thompson Joshua	1
TA/2010		Car Chara Llak	VKALIC		1
FA/2016	CHE 104L 04	Gen Chem I Lab	YKAHS	Thompson, Joshua	1
FA/2016	CHE 104L 04	Gen Chem I Lab	YKAHS	Thompson, Joshua	1
FA/2016	GEO 105 02	Physical Geography	TRIAD	Waite. Colonel Curtis	12
FA/2016	DUV 201 02	Conorol Dhysics I (Algobra based)	VKALIC	Thompson Joshua	
FA/2010	PHY 201 02	General Physics I (Algebra-based)	ткапз	rnompson, Joshua	9
FA/2016	PHY 201 02	General Physics I (Algebra-based)	YKAHS	Thompson, Joshua	9
FA/2016	PHY 201L 02	Gen Physics I Lab	YKAHS	Thompson, Joshua	9
EA/2016		Con Physics Llab	VKVIC	Thompson, Joshua	0
FA/2010		Gen Physics I Lab	ткапз		9
FA/2016	PHY 201 03	General Physics I (Algebra-based)	YKAHS	Thompson, Joshua	10
FA/2016	PHY 201 03	General Physics I (Algebra-based)	YKAHS	Thompson, Joshua	10
EN/2016	DHV 2011 03	Gen Physics Llah	VKVHC	Thompson, Joshua	10
T A/ 2010	FITT 201L 03		TRAITS		10
FA/2016	PHY 201L 03	Gen Physics I Lab	YKAHS	Thompson, Joshua	10
WI/2017	CHE 104 901	General Chemistry I	NHCS	Hamilton, Anthony	2
WI/2017	CHF 104I 901	Gen Chem LLah	BI DG6	Hamilton Anthony	2
MU/2017		Canadal Chamistry II	VKAUC	The manager leading	-
VV1/2017	CHE 102 901	General Chemistry II	ткапз	inompson, Joshua	T
WI/2017	CHE 105 901	General Chemistry II	YKAHS	Thompson, Joshua	1
WI/2017	CHE 105L 901	Gen Chem II Lab	YKAHS	Thompson, Joshua	1
\\/\/2017	CHE 1051 001	Con Cham II Lah	VEALC	Thompson, Joshua	1
VVI/2017		Gen Chemin Lab	TRAITS		1
WI/2017	PHY 101 901	Fundamentals of Physics I	CHLHS	Glidden, Tanner	6
WI/2017	PHY 101L 901	Fundamentals of Physics I Lab	CHLHS	Glidden, Tanner	6
SP/2017	BIO 101 901	Biology I	I VHS	Counts, Dustin	9
CD /2017	DIO 101 001	Biology		Counts, Dustin	0
SP/2017	BIO 1011 901	BIOTLdD	LVHS	Counts, Dustin	9
SP/2017	BIO 101 902	Biology I	LVHS	Counts, Dustin	6
SP/2017	BIO 101L 902	Bio I Lab	LVHS	Counts, Dustin	6
CD /2017	BIO 101 002	Biology		Counts, Dustin	1 5
3F/2017	BIO 101 903	BIOIOgy I	LVIIS	Counts, Dustin	15
SP/2017	BIO 101L 903	Bio I Lab	LVHS	Counts, Dustin	15
SP/2017	BIO 231 901	Anatomy & Physiology I	HOCS	Johnston, Keith	12
SP/2017	BIO 2311 901	Anat & Phys I I ah	BI DG6	Johnston Keith	12
51/2017			DEDGO		12
58/2017	CHE 104 901	General Chemistry I	CHIHS	Glidden, Tanner	б
SP/2017	CHE 104L 901	Gen Chem I Lab	CHIHS	Glidden, Tanner	6
SP/2017	CHE 105 901	General Chemistry II	NHCS	Hamilton, Anthony	2
CD /2017		Con Charry II Jah		Lomiton Artheres	-
58/2017	CHE 105L 901	Gen Chem II Lab	REDGO	Hamilton, Anthony	2
SP/2017	CHE 106 901	General Chemistry III	YKAHS	Thompson, Joshua	1
SP/2017	CHE 106 901	General Chemistry III	YKAHS	Thompson, Joshua	1
SD/2017	CHE 1061 001	Con Chom III Lah	VVALIC	Thompson Joshua	1
57/201/	CHE TOOF ANT		TNANS		T
SP/2017	CHE 106L 901	Gen Chem III Lab	YKAHS	Thompson, Joshua	1
SP/2017	ENV 170 901	Environmental Science	THS	Waite, Colonel Curtis	11
SD/2017	ENIV 1701 001	Environmental Science Lab	тыс	Waite Colonal Curtic	11
35/201/	LINV 1/UL 901		ιns	waite, colonel cultis	TT

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,	0	0			
SP/2017	ENV 170 903	Environmental Science	KLUHS	Olsen, Scott	5
SP/2017	ENV 170L 903	Environmental Science Lab	KLUHS	Olsen, Scott	5
SP/2017	ENV 170 903	Environmental Science	KLUHS	Olsen, Scott	5
SP/2017	ENV 170L 903	Environmental Science Lab	KLUHS	Olsen, Scott	5
SP/2017	ENV 170 903	Environmental Science	KLUHS	Olsen, Scott	5
SP/2017	ENV 170L 903	Environmental Science Lab	KLUHS	Olsen, Scott	5
SP/2017	ENV 170 904	Environmental Science	KLUHS	Olsen, Scott	6
SP/2017	ENV 170L 904	Environmental Science Lab	KLUHS	Olsen, Scott	6
SP/2017	ENV 170 904	Environmental Science	KLUHS	Olsen, Scott	6
SP/2017	ENV 170L 904	Environmental Science Lab	KLUHS	Olsen, Scott	6
SP/2017	ENV 170 904	Environmental Science	KLUHS	Olsen, Scott	6
SP/2017	ENV 170L 904	Environmental Science Lab	KLUHS	Olsen, Scott	6
SP/2017	GEL 201 901	Physical Geology I	LVHS	Counts, Dustin	7
SP/2017	GEL 201L 901	Physical Geology I Lab	LVHS	Counts, Dustin	11
SP/2017	GEL 201 902	Physical Geology I	LVHS	Counts, Dustin	7
SP/2017	GEL 201L 902	Physical Geology I Lab	LVHS	Counts, Dustin	11
SP/2017	PHY 202 901	General Physics II (Algebra-based)	YKAHS	Thompson, Joshua	8
SP/2017	PHY 202L 901	Gen Physics II Lab	YKAHS	Thompson, Joshua	8
SP/2017	PHY 202 901	General Physics II (Algebra-based)	YKAHS	Thompson, Joshua	8
SP/2017	PHY 202L 901	Gen Physics II Lab	YKAHS	Thompson, Joshua	8
SP/2017	PHY 202 902	General Physics II (Algebra-based)	YKAHS	Thompson, Joshua	8
SP/2017	PHY 202L 902	Gen Physics II Lab	YKAHS	Thompson, Joshua	8
SP/2017	PHY 202 902	General Physics II (Algebra-based)	YKAHS	Thompson, Joshua	8
SP/2017	PHY 202L 902	Gen Physics II Lab	YKAHS	Thompson, Joshua	8
FA/2017	PHY 201 931	General Physics I (Algebra-based)	YKAHS	Thompson, Joshua	13
FA/2017	PHY 201L 931	Gen Physics I Lab	YKAHS	Thompson, Joshua	13
FA/2017	PHY 201 931	General Physics I (Algebra-based)	YKAHS	Thompson, Joshua	13
FA/2017	PHY 201L 931	Gen Physics I Lab	YKAHS	Thompson, Joshua	13

ii. Progress- Following the same spirit of partnership addressed above, many dual credit courses have been taught both on a volunteer and paid basis;

as an example, the following is a brief list of the dual credit courses taught by Barbara Mann and Eleazar Gutierrez:

	Barbara Mann Dual Credit Instruction with Triad and Henley									
Term/Year Course		Course	Title	Number of students						
	FA/15	CHE 221 02	General Chemistry I (Preprofessional)	12						
	FA/15	CHE 221L 02	Gen Chem I Lab	12						
	WI/16	CHE 222 02	General Chemistry II (Preprofessional)	11						
	WI/16	CHE 222L 02	Gen Chem II Lab	11						
	SP/16	CHE 223 02	General Chemistry III (Preprofessional)	10						
	SP/16	CHE 223L 02	Gen Chem III Lab	10						
	FA/16	CHE 221 02	General Chemistry I (Preprofessional)	8						
	FA/16	CHE 221L 02	Gen Chem I Lab	8						
	WI/16	CHE 222 901	General Chemistry II (Preprofessional)	4						
	WI/16	CHE 222L 02	Gen Chem II Lab	4						
	SP/16	CHE 223 901	General Chemistry III (Preprofessional)	4						
	SP/16	CHE 223L 02	Gen Chem III Lab	4						
	FA/17	CHE 221 901	General Chemistry I (Preprofessional)	5						
	FA/17	CHE 221L 901	Gen Chem I Lab	5						
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WI/18	CHE 222 901	General Chemistry II (Preprofessional)	5
WI/18	CHE 222L 901	Gen Chem II Lab	5
SP/18	CHE 223 901	General Chemistry III (Preprofessional)	4
SP/18	CHE 223L 901	Gen Chem III Lab	4
FA/18	CHE 221 01	General Chemistry I (Preprofessional)	2
FA/18	CHE 221L 01	Gen Chem I Lab	2
WI/19	CHE 222 01	General Chemistry II (Preprofessional)	2
WI/19	CHE 222L01	Gen Chem II Lab	2
SP/19	CHE 223 01	General Chemistry III (Preprofessional)	2
SP/19	CHE 223L 01	Gen Chem III Lab	2
FA/19	CHE 221 01	General Chemistry I (Preprofessional)	4
FA/19	CHE 221L 01	Gen Chem I Lab	4

iii. Progress – to facilitate resources for dual credit, the Science Department scheduled various courses at KCC, so that instructors may have access to laboratory resources such as Anatomy & Physiology models, Chemistry lab equipment, Microscopes, and Physics equipment.

Term/Year	Course	Title	School	Instructor	Number of Students
WI/2017	CHE 104L 901	Gen Chem I Lab	BLDG6	Hamilton, Anthony	2
SP/2017	BIO 231L 901	Anat & Phys I Lab	BLDG6	Johnston, Keith	12
SP/2017	CHE 105L 901	Gen Chem II Lab	BLDG6	Hamilton, Anthony	2

iv. Progress – dual credit courses were taught at KCC, by KCC instructors to promote student engagement and instructor confidence in the topic:

Term/Year	Course	Title	School	Instructor	Number of Students
WI/2017	PHY 101 901	Fundamentals of Physics I	CHLHS	Glidden, Tanner	6
WI/2017	PHY 101L 901	Fundamentals of Physics I Lab	CHLHS	Glidden, Tanner	6

1B. HAVE YOU MET YOUR PREVIOUSLY SET GOALS? IF NOT, HOW DO YOU PLAN TO MEET THEM?

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\boxtimesYes
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□No

SEVERAL GOAL SUCCESSES HAVE BEEN ACHIEVED:

- A new lab coordinator was hired to assist in lab safety and accessibility
- An A&P model set was purchased in both 2017-2018 and 2018-2019 academic years
- Thirty-two new microscopes were purchased to support distance education and face-to-face courses
- Science contributions to advising have been implemented, but assessment on graduation rates will take time
- Science faculty has increased their participation in professional communities and partnerships
- Canvas resources are plentiful amongst all science faculty
- Our marketing campaign and increased exposure has begun

STRATEGIES TO MEET STRATEGIC GOALS:

INCREASED DEAN OVERSIGHT:

The science department has some consensus issues. Neutral leadership support and facilitation has been requested and granted. The Dean of Instruction is investing a greater amount of time with the science department and has taken over some lead duties.

COMMUNICATION:

Group discussion of lab status and accessibility takes place every term. Further communication is warranted in this area to fully achieve the goal of "Improve lab safety by increasing cleanliness, accessibility, safety standards, provide assistance to all science faculty, and standardize student safety training." Continued communication and Dean support will be vital to maintaining successes in this area.

ENCOURAGEMENT:

Group discussion surrounding the goal of "Increase participation in scientific associations, professional communities, and creating partnerships" takes place every term. This is a long-term goal and increasing communication and encouragement is essential to its full implementation.

COORDINATION:

For the goal "Improve sustainability by improving recruitment and marketing of science courses," conveyance of materials and expectations to the marketing team is a first step. This process has begun. Coordination for the science web page is in the beginning stages. Communication needs to continue with the marketing team on recruitment efforts in the high schools, social media platforms, and marketing of advanced sciences.

NEW DUAL CREDIT LEAD:

Science dual credit has been increasing, but not in Klamath Falls and its surrounding suburbs. Barb Mann has been appointed to increase those connections.

2. PROGRAM/DISCIPLINE DESCRIPTION AND OVERVIEW

2A. PROVIDE THE CATALOG DESCRIPTION OF THE PROGRAM.

General education science courses do not constitute a program, but they share the following mission with other general education courses:

GENERAL EDUCATION MISSION

Collectively, general education courses promote student success in program courses by developing foundational skills in thinking, communication, computation, computer literacy, information literacy, and the scientific method. General education courses offer access to specialized instruction in subject areas not encompassed in other programs.

By preparing students for success in college degree programs, general education departments promote community and career success with training in civic awareness, leadership, communication skills, and professionalism. Furthermore, by combining skills development and interdisciplinary instruction for transfer to university degrees, the general education departments support students' future success.

2B. DESCRIBE HOW AND TO WHAT DEGREE THE PROGRAM DESCRIPTION REFLECTS THE PROGRAM'S OVERALL GOALS. IF IT DOES NOT, REVISE PROGRAM DESCRIPTION.

Not applicable to program review for general education disciplines.

2C. COMMUNITY LABOR MARKET NEED ANALYSIS AND PROJECTION

Not applicable to program review for general education disciplines.

2C.I. HAS THE DEMAND FOR GRADUATES CHANGED IN THE PAST FIVE YEARS? IF SO HOW AND TO WHAT DEGREE?

□Yes

⊠No

Not applicable to program review for general education disciplines.

2C.II. WHAT IS THE EXPECTED MARKET DEMAND FOR THE FUTURE? HOW MIGHT THE PROGRAM ADJUST TO THESE PROJECTIONS?

Not applicable to program review for general education disciplines.

2D. DESCRIBE THE SPECIFIC CURRICULAR, INSTRUCTIONAL, OR OTHER CHANGES MADE IN THE PREVIOUS FIVE YEARS.

- As further detailed in Section 4A.1.3, several CCOGs have been updated.
- BIO 211-213 had CCOG updates due to statewide agreement on majors-biology learning outcomes.
- Canvas has been fully embraced by science faculty. Practice quizzes, video resources, PowerPoints, and reviews
 have been uploaded to almost all science courses.
- Open labs for A&P tutoring have been successful and highly utilized. They have been linked to a significant decrease in BIO 231L's DFW rate. Where DFW rates were over 50% just a few years ago, they are now below 30%.
- The science department prides itself on its hands-on laboratories. New equipment purchases and engaging protocols are regularly made and created.

3. RESOURCES

3A. DESCRIBE FACULTY COMPOSITION, QUALIFICATIONS, AND PROFESSIONAL DEVELOPMENT.

3A.I. WHAT PERCENT OF FACULTY ARE FULL-TIME? PART-TIME?

The science department has four full-time faculty (67%) and two part-time faculty (33%).

3A.II. WHAT ARE THE MINIMUM DEGREE QUALIFICATIONS? WHAT PERCENT OF FACULTY EXCEED MINIMUM DEGREE QUALIFICATIONS?

The minimum degree qualification for science faculty is a Master's degree (or higher) in the general science subject area, a Master's degree (or higher) in a general science related area, or a bachelor's degree and 20 graduate level credits in the discipline.

For laboratory instruction only, the minimum degree qualification for science faculty is a Bachelor's degree (or higher) in the general science subject area or a Bachelor's degree (or higher) in a general science related area.

Two of the four full-time faculty (50%, or 33% of all faculty) exceed the minimum degree qualifications, with one Ph.D. and one MD. All full time and adjunct faculty meet or exceed minimum qualifications.

3A.III. LIST THE SPECIFIC PROFESSIONAL DEVELOPMENT PROGRAM FACULTY ATTENDED INCLUDING BOTH ON-SITE AND OFF-SITE TRAININGS; HOW DID THE PROFESSIONAL DEVELOPMENT IMPACT INSTRUCTION, DESIGN, AND DELIVERY?

FULL-TIME FACULTY

ELEAZAR GUTIERREZ

- MEMBER OF THE AMERICAN CHEMICAL SOCIETY
- OSHA CERTIFICATION
- CENTER FOR TEACHING AND LEARNING:
 - ✓ CREATING ENGAGING VIDEOS AND THE NEUROSCIENCE BEHIND LEARING
 - ✓ INSTRUCTOR PRESENCE TRAINING COURSE
 - ✓ INSTRUCTOR PRESENCE II TRAINING COURSE
- RESEARCH AND EDUCATION COLLABORATIVE OCCULTATION NETWORK (RECON)TRANS NEPTUNIAN OBJECTS (TNO) OCCULTATIONS

MARK CASSADY

- MEMBER OF THE HUMAN ANATOMY AND PHYSIOLOGY SOCIETY (HAPS)
- ATTENDED HUMAN ANATOMY AND PHYSIOLOGY CONFERENCE IN 2019
- ATTENDED EDWARD TUFTE SEMINAR ON PRESENTING DATA AND INFORMATION IN 2019

DODI WILSON

• NORTHWEST BIOSCIENCES CONSORTIUM WINTER WORKSHOP IN FEBRUARY 2018. This workshop had eighty biology instructors from Oregon and Washington to discuss biology COGs. CCOGs for BIO 211-213 were updated.

BARBARA MANN

 MEMBER OF THE AMERICAN CHEMICAL SOCIETY. This membership allows CHE 241-243 consideration for transfer to OSU.

PART-TIME FACULTY

JULIA NICHOLAS

- Mental First Aid course at KCC, Summer 2019
- California teaching credential current (single subject life science)
- Completed all SafeColleges trainings including safety data sheets, chemical spills, CPR, First Aid, AED, Health Emergencies, Fire Extinguisher Safety, Blood Borne Pathogens, Hazard Communications, and FERPA
- Excellence in Online teaching certificate through WSU

Klamath Community College Instructional Program Review: MICHAEL WEST

- Completed two Canvas courses during adjunct orientation: Early Alerts, and 10 Things you didn't know Canvas Could do
- Graduated with a Bachelor's degree in June 2018
- ATI proctor certification for the nursing program

3A.IV. ARE FACULTY COMPOSITION, QUALIFICATIONS, AND PROFESSIONAL DEVELOPMENT MEETING INSTRUCTIONAL NEEDS? IF NOT, DESCRIBE ANY PLANS THAT WILL ADDRESS THIS.

 \boxtimes Yes

□No

□Somewhat

Science faculty composition and qualifications are diverse and fulfill our current instructional needs. Increased professional development and increased participation in scientific communities is in the science strategic plan. Sufficient resource allocation supports this goal. Increased communication and encouragement should address the current professional development deficit.

3B. DESCRIBE THE SPECIFIC FACILITIES, EQUIPMENT, AND MATERIALS USED BY THE PROGRAM.

3B.I. ARE FACILITIES MEETING INSTRUCTIONAL NEEDS? IF NOT, DESCRIBE ANY PLANS THAT WILL ADDRESS THIS.

 \boxtimes Yes

□No

□Somewhat

The science department is fortunate to have excellent teaching facilities. There are three designated instructional labs for A&P, chemistry, and biology. Facilities are sufficient for current and future needs.

3B.II. IS EQUIPMENT MEETING INSTRUCTIONAL NEEDS? IF NOT, DESCRIBE ANY PLANS THAT WILL ADDRESS THIS.

⊠Yes

□No

□Somewhat

The science department has higher specialized equipment needs than most departments. Our current course fee structure has enabled the department to meet many of those needs now and in the future. Needs not met by student course fees, are generally met by the college via budgetary requests. The department is grateful for administrative support in this area.

3B.III. ARE INSTRUCTIONAL MATERIALS MEETING PROGRAM NEEDS? IF NOT, DESCRIBE ANY PLANS THAT WILL ADDRESS THIS.

⊠Yes

□No

□Somewhat

The science department continues to be proactive in procuring/creating instructional materials to serve students.

3C. DESCRIBE THE INSTRUCTIONAL SUPPORT SERVICES THE PROGRAM USES.

3C.I. REVIEW LRC HOLDINGS FOR RELEVANCY AND CURRENCY TO PROGRAM.

KCC's Learning Resource Center (LRC) has the resources necessary to support science faculty and their students.

As a member of the Sage Library Consortium, the LRC provides students and faculty access to the holding of 77 member libraries in 15 counties of eastern and central Oregon. The KCC Library is also a member of Orbis Cascade Alliance, which provides students access to the holdings of 38 academic libraries in Oregon and Washington. Additionally, the LRC currently has 9,513 physical holdings and 7 database suites, which provide science faculty and students access to millions of articles and journals for homework and research. Science textbooks and handbooks are also available for student use.

Films on Demand has a fair selection of science documentaries. Many seem outdated and it would be beneficial to add current BBC, PBS, etc. science documentaries.

3C.II. REVIEW PROGRAM STUDENT USE OF TUTORING AND E-TUTORING.

The KCC Tutoring Center provides supplemental instruction for individual students and study groups on a drop-in basis for all subjects taught at Klamath Community College. The LRC also offers student access to TutorMe.com, a 24 hour, seven day per week tutoring service for those students needing supplemental instruction while off campus or after Tutoring Center operating hours.

For the 2018-2019 academic year, science students visited science tutors over 2,000 times. This traffic is not fully visible in the tutoring center, due to A&P tutors stationed in the A&P lab for open labs.

For the 2018-2019 academic year, science students utilized e-tutoring 15 times.

3C.III. REVIEW PROGRAM STUDENT USE OF TESTING SERVICES.

Testing services are used by several science courses as a sole source of test taking and for makeup exams.

3C.IV. REVIEW OTHER INSTRUCTIONAL SUPPORT SERVICES (STUDENT CLUBS, ADVISING, TRIO, VETERANS SERVICES, ETC.) IF APPLICABLE.

Although students in the sciences use many programs such as Advising, TRiO, and Veterans Services, those are largely invisible to the Science faculty because they work efficiently. The primary student club that affects the Science program is the Science Club. Not only does this club encourage student engagement with the sciences, it provides a vehicle for outreach to the community, encouraging future generations of science students. Please see the section BUILD NEW RELATIONSHIPS AND PARTNERSHIPS IN SCIENCE above for a complete list of activities.

3D. DESCRIBE TO WHAT DEGREE THE PROGRAM USES THE COLLEGE'S LEARNING MANAGEMENT SYSTEM (CANVAS) FOR ALL METHODS OF DELIVERY (FACE-TO-FACE, ONLINE, SYNCHRONOUS, HYBRID).

The science department uses Canvas for all its courses. A goal of "Improve access to resources available to students through Canvas" is on the science strategic plan, which is in progress. Canvas practice quizzes have been implemented in biology courses and many resources are available in A&P courses.

4. EFFECTIVENESS

4A. STUDENT LEARNING OUTCOMES ASSESSMENT

Course learning outcomes (CLO) assessment is scheduled so that each instructor participates at least once each year.

The purpose of CLO assessment is:

- To ensure student proficiency in course learning outcomes.
- \circ To provide a structure for the assessment practices that faculty regularly perform.
- To encourage reflection by faculty and departments based on meaningful data.
- To use assessment to improve instruction, while providing valid data that demonstrates this improvement to our community.
- To help enable the sharing of relevant assessment information between faculty.
- To document assessment efforts in accordance with accreditation standards, balancing the process of assessment between the requirements of external compliance, and a meaningful and thoughtful practice, which is part of what educators do regularly.

SEE APPENDIX 7.B FOR THE CLOS IN SCIENCE COURSES.

4A.I. COURSE LEARNING OUTCOMES (CLO)

Science classes that assessed CLOs last year include:

- Spring 2018: BIO 103 (Dubois), BIO 232 (Cassady), ENV 170 (Nicholas)
- Fall 2018: CHE 104 (Mann), ENV 170 (Nicholas), PHY 211 (Gutierrez)
- Winter 2019: BIO 232 (Cassady)

4A.I.1 DESCRIBE EVIDENCE OF STUDENT PROFICIENCY IN CLOS. IF THERE IS NO EVIDENCE, DESCRIBE PLANS TO ADDRESS THIS.

Results from the courses assessed in the past year had student proficiency percentages ranging from 69% of the class to 100%. Seven of the eight sections (87.5%) reported over 75% of students displaying proficiency in their selected outcome. Instructors are working to increase student success through the use of open labs, Canvas materials, and attention to outcomes when planning classes.

4A.I.2 DESCRIBE THE SPECIFIC PROCESS FOR ADVISORY COMMITTEES FOR REVIEWING COURSE CONTENT AND OUTCOMES GUIDES (CCOGS). IF THERE IS NO PROCESS, DESCRIBE PLANS TO ADDRESS THIS.

Every term a science advisory committee is held, which includes all KCC science faculty and the co-chair of the natural resource department at Oregon Tech. Due to the volume of courses offered in science, the most commonly offered courses have been updated as needed. Individual faculty with specific knowledge of course content have reviewed CCOGs independently and in conjunction with the faculty discipline lead. During advisory committee meetings, updated CCOGs are reviewed as a group, with comments and concerns incorporated.

4A.I.3 WHICH COURSES HAD LEARNING OUTCOMES REVISED/UPDATED AND WHY?

In 2017, several courses updated their CCOGs due to outdated learning outcomes. They include:

- BIO 103, 231, and 232
- CHE 104-106, 221-223, 241, and 243

In 2018, several courses updated their CCOGs due to outdated learning outcomes. They include:

• BIO 101, 102, 212, 234

- ENV 170
- PHY 211-213

In 2019, the following courses updated their CCOGs due to statewide agreement on majors-biology learning outcomes. They are:

• BIO 211, 212, and 213

4A.I.4 IDENTIFY AND GIVE EXAMPLES OF CHANGES MADE IN INSTRUCTION THAT OCCURRED AS THE RESULT OF CLO ASSESSMENT. IF THIS HAS NOT OCCURRED, DESCRIBE PLANS TO ADDRESS THIS.

Science faculty gave excellent insight into instruction improvements during their CLO assessment:

- BIO 103 is working to improve the 77% student proficiency with a great emphasis on vocabulary
- CHE 104 improved the 69% student proficiency percentage with more in-class problem solving and group work
- ENV 170 is improving the 79% student proficiency by increasing the points offered for the artifacts collected. Not all students completed the assessed essay, so this percentage may not be a true reflection of student proficiency of the selected CLO. More points will be assigned in the future.

4A.II PROGRAM LEARNING OUTCOMES (PLO)

Not applicable to program review for general education disciplines.

4A.II.1 DESCRIBE EVIDENCE OF STUDENT PROFICIENCY IN PLOS. IF THERE IS NO EVIDENCE, DESCRIBE PLANS TO ADDRESS THIS.

Not applicable to program review for general education disciplines.

4A.II.2 IDENTIFY AND GIVE EXAMPLES OF CHANGES MADE IN INSTRUCTION THAT OCCURRED AS THE RESULT OF PLO ASSESSMENT. IF THIS HAS NOT OCCURRED, DESCRIBE PLANS TO ADDRESS THIS.

Not applicable to program review for general education disciplines.

4B. STUDENT SUCCESS

4B.I. DESCRIBE ENROLLMENT TRENDS AND PLANS TO ADDRESS THEM.

As shown in Table 4.1 below, enrollment has remained relatively stable. Variation in enrollment for specific courses may be attributed to pre-nursing prerequisites, hidden prerequisite changes, advising, OT dual credit, and distance education offerings.

- There is strong enrollment in pre-nursing prerequisites, BIO 231-234 (representing 30%, 35%, 35%, and 36% of total enrollment for respective academic years).
- Hidden prerequisites for the pre-nursing program are BIO 102 and CHE 104. This may explain their respective increases of 31% and 41% over the last four years.

Table 4.1. Enrollment Trends in Science Courses over the Last Four Academic Years.

	Enrollment			
	AY 2015-2016	AY 2016-2017	AY 2017-2018	AY 2018-2019
BIO 101	112	110	71	105

, .	0			
BIO 102	58	31	42	76
BIO 103	48	38	35	20
BIO 207	6	14	6	0
BIO 211	23	20	34	20
BIO 212	18	14	25	18
BIO 213	13	13	17	13
BIO 231	108	140	112	119
BIO 232	65	83	89	83
BIO 233	54	70	67	74
BIO 234	49	38	35	53
BIO 270	3	7	1	0
CHE 104	34	79	63	82
CHE 105	17	19	12	13
CHE 106	7	7	0	4
CHE 221	24	12	13	14
CHE 222	11	11	12	7
CHE 223	9	10	6	5
CHE 241	8	0	4	0
CHE 242	6	0	2	0
CHE 243	2	0	2	0
ENV 170	126	101	142	123
GEL 201	10	13	0	0
GEL 202	8	4	0	0
GEL 203	9	13	0	0
GSC 107	17	36	21	18
GSC 108	15	10	19	0
GSC 109	8	11	0	0
PHY 101	7	0	9	11
PHY 102	9	12	7	23
PHY 103	5	12	0	11
PHY 211	10	9	8	11
PHY 212	6	8	9	6
PHY 213	5	8	6	6
Total	910	953	869	915

As shown in Table 4.2 below, science courses have excellent success rates.

- Pass rates over the last four terms range from 100%, seen in CHE 105 and PHY 101, to 69.6% in BIO 234
- BIO 231L, which historically has shown low success rates, improved to 71.8%. Higher support for this course may have positively affected student success

Table 4.2. General science pass rates for the last four terms.

ADV REQ CDE	СМА	CRS Enrollment	Count Pass	Pass Rate	Count DFNP	Count W	WRate
BIO101	GSC	83	72	86.75%	7	4	4.82%
BIO101L	GSC	85	74	87.06%	6	5	5.88%
BIO102	GSC	31	30	96.77%	1	0	0.00%
BIO102L	GSC	31	29	93.55%	2	0	0.00%

Klamath Community College Instructional Program Review:

BIO103	GSC	35	33	94.29%	2	0	0.00%
BIO103L	GSC	35	32	91.43%	3	0	0.00%
BIO211	GSC	20	19	95.00%	1	0	0.00%
BIO211L	GSC	20	19	95.00%	1	0	0.00%
BIO212	GSC	18	17	94.44%	0	1	5.56%
BIO212L	GSC	18	17	94.44%	0	1	5.56%
BIO213	GSC	17	14	82.35%	2	1	5.88%
BIO213L	GSC	17	13	76.47%	3	1	5.88%
BIO231	GSC	131	112	85.50%	6	13	9.92%
BIO231L	GSC	142	102	71.83%	15	25	17.61%
BIO232	GSC	93	86	92.47%	4	3	3.23%
BIO232L	GSC	95	80	84.21%	10	5	5.26%
BIO233	GSC	70	65	92.86%	3	2	2.86%
BIO233L	GSC	71	64	90.14%	5	2	2.82%
BIO234	GSC	46	32	69.57%	7	7	15.22%
BIO234L	GSC	44	37	84.09%	3	4	9.09%
CHE104	GSC	79	65	82.28%	7	7	8.86%
CHE104L	GSC	76	64	84.21%	4	8	10.53%
CHE105	GSC	15	15	100.00%	0	0	0.00%
CHE105L	GSC	15	15	100.00%	0	0	0.00%
CHE221	GSC	14	10	71.43%	2	2	14.29%
CHE221L	GSC	14	10	71.43%	2	2	14.29%
CHE222	GSC	7	6	85.71%	1	0	0.00%
CHE222L	GSC	7	6	85.71%	1	0	0.00%
CHE223	GSC	6	5	83.33%	1	0	0.00%
CHE223L	GSC	6	5	83.33%	1	0	0.00%
ENV170	GSC	140	122	87.14%	14	4	2.86%
ENV170L	GSC	141	125	88.65%	12	4	2.84%
GSC107	GSC	18	13	72.22%	3	2	11.11%
GSC107L	GSC	17	13	76.47%	2	2	11.76%
PHY101	GSC	11	11	100.00%	0	0	0.00%
PHY101L	GSC	11	11	100.00%	0	0	0.00%
PHY102	GSC	23	19	82.61%	4	0	0.00%
PHY102L	GSC	23	21	91.30%	2	0	0.00%
PHY211	GSC	11	10	90.91%	1	0	0.00%
PHY211L	GSC	11	10	90.91%	1	0	0.00%
PHY212	GSC	6	6	100.00%	0	0	0.00%
PHY212L	GSC	7	6	85.71%	1	0	0.00%
PHY213	GSC	6	5	83.33%	1	0	0.00%
PHY213L	GSC	6	5	83.33%	1	0	0.00%

4B.II. DESCRIBE DEGREE AWARDED TRENDS AND PLANS TO ADDRESS THEM.

Not applicable to program review for general education disciplines.

4B.III. REVIEW TRANSFERABILITY OF PROGRAM.

KCC science courses are highly transferrable. Table 4.3 below illustrates the high transferability to OSU and our core courses to OIT, SOU, and U of O.

Table 4.3. KCC Science Course Transferability.

KCC Course	OIT	SOU	U of O	OSU
BIO 101-103	Х	Х	Х	Х
BIO 207				Х
BIO 211-213	Х	Х	Х	Х
BIO 231-233	Х	Х	Х	Х
BIO 234	Х	Х		Х
BIO 270	Х			Х
CHE 104	Х			Х
CHE 105-106			Х	Х
CHE 221-223	Х	Х	Х	Х
CHE 241	Х			Х
CHE 242-243				Х
ENV 170	Х		Х	Х
GEL 201-203			Х	Х
GSC 107-108				Х
GSC 109		Х		Х
PHY 101			X	Х
PHY 102-103				Х
PHY 211-213	Х	Х	Х	Х

4B.III.1 DESCRIBE TRANSFERABILITY FROM HIGH SCHOOL TO KCC TO OUS.

Many of KCC's science courses are offered as dual credit and would enjoy the same transferability as illustrated in Table 4.3

4B.III.2 HAS THIS CHANGED OVER THE LAST FIVE YEARS? IF SO, WHY? WHAT ARE THE IMPACTS ON STUDENTS AND THE PROGRAM?

No significant changes in transferability have occurred.

4C. STUDENT ENGAGEMENT AND SATISFACTION

4C.I. COURSE EVALUATIONS DATA AND ANALYSIS

Overall, students are highly satisfied with their science courses, and numbers have remained consistent over the past five years. See Appendix 7.C for details.

4C.I.1 DESCRIBE CHANGES MADE IN INSTRUCTIONAL METHODS BASED ON STUDENT COURSE EVALUATION DATA. IF THIS HAS NOT OCCURRED, DESCRIBE PLANS TO ADDRESS THIS.

Instructors make changes individually based on responses within their own courses. An example is provided in section 4.C.i.2 below.

4C.I.2 DESCRIBE CHANGES MADE TO THE COURSE BASED ON STUDENT COURSE EVALUATION DATA.

Instructors address changes individually based on responses within their own courses, as indicated in the following example.

EXAMPLE: BIO 102

In one example, some students in Dodi Wilson's BIO 102 indicated they would appreciate Canvas practice quizzes and more resources. Canvas practice quizzes and video resources were implemented in this course and eventually all of the instructor's courses. It has also become a goal for the whole department.

4C.II JOB PLACEMENT DATA AND ANALYSIS (IF AVAILABLE)

Not applicable to program review for general education disciplines.

5. BUDGET

5A. PROVIDE FIVE-YEAR COST MARGIN DATA AND ANALYSIS.

The Science department finally had a positive CMA for academic year 2017-2018 and appears set to have another for 2018-2019. This is due to the increased cost of tuition for laboratories to better reflect actual instructor cost.

The 2015-2016 academic year had the greatest negative CMA. One factor that may have contributed to this loss was the offering of multiple advanced and signature science courses that academic year. Without an increased student count, this led to fewer students per science course and increased instructor payout. Care should be taken to not repeat history.

	AY 14-15	AY 15-16	AY 16-17	AY 17-18	AY 18-19
Credit Inst Load	304.625		304.75	288	
Oversize	0		0.5	0	
Lecture Credits			301	282	
Lab Credits			94	86	
Combined For Cr.			6	4	
Facility Fee	23124	21978	22518	28274.4	31533.6
Tuition	345346.5	335584	355932.5	448337	492578.5
Technology Fee	15416	14880	15708	28200	30128
Course Fee	40400	46225	46440	41505	55105
Distance Fee	5659.5	8761.5	9982.5	12837	20167
StudentGov Fee	9635	9300	9817.5	8812.5	9415
TotalTuition Fees	441023	498879.1	463964.5	571974.7	638927.1
Reimbursable FTE	119.04	113.45	136.55	137.97	118.91
Headcount	1888	1803	2170	2090	1820

Table 5.1. Cost Margin Analysis for the past five academic years.

ADJ Pay	89968.32		57954.11	73886.12
FT Pay	289197.1		396743.5	344039
СЕ рау	0			105
Total Pay	379165.4		454697.6	418030.1
Pay Per Credit Load	1244.7		1492.03	1451.49
Margin	-33818.9	-163295	-98765.1	30306.92
Margin/Tuition	-10%	-49%	-28%	7%

5B. SUMMARIZE PREVIOUS ANNUAL PROGRAM VIABILITY STUDY RESULTS AND EXPLAIN HOW CHANGES IMPACTED STUDENT LEARNING OUTCOME PROFICIENCY. IF THIS HAS NOT OCCURRED, DESCRIBE PLANS TO ADDRESS THIS.

Not applicable to this program review.

5C. EXPLAIN ANY BUDGETARY CHALLENGES AND ANY PLANS TO ADDRESS THEM.

Budgetary challenges have been addressed with the support of administration. With the increased laboratory tuition and increased course fees, the science department is more viable and sustainable. The large course fee collection allows necessary supply and equipment purchases on a yearly schedule.

6. CONCLUSION

6A. DESCRIBE PROGRAM STRENGTHS.

- In the science disciplines, we have experienced, qualified faculty who love their work and are dedicated to student success. We provide solid instruction and operate from a student success mindset.
- Student success rates are generally higher than other schools.
- The science department has state-of-the art facilities and equipment that ensure students are trained in the best environment possible
- Science faculty proactively searches out opportunities to align curricula with other schools and to provide training that meets industry needs.
- Outreach to the community through the Science Club and school visits is dynamic and active.

6B. DESCRIBE PROGRAM WEAKNESSES.

In the science department, there are some consensus issues. With a new Dean of Instruction committed to long-term stability, these issues are being lessened.

Low enrollment courses and a high course offering have hindered our CMA in the past. A conservative approach to new course offerings will help stabilize the science CMA over the long run.

6C. DESCRIBE SUPPORT NEEDED.

Neutral leadership support and facilitation is important. The Dean of Instruction is currently performing department lead functions. Continuation and development of this support will allow faculty to focus on what they do best: teach.

6D. CREATE NEW GOALS AND LINK THEM TO THE STRATEGIC PLAN.

IMPROVE PROSPERITY GOAL: IMPROVE SUSTAINABILITY BY IMPROVING RECRUITMENT AND MARKETING OF SCIENCE COURSES.

IMPROVE USE OF THOUGHTFUL PLANNING GOAL: INCREASE PARTICIPATION IN SCIENTIFIC ASSOCIATIONS, PROFESSIONAL COMMUNITIES, AND CREATING PARTNERSHIPS.

7. APPENDICES

APPENDIX 7.A. COURSE DESCRIPTIONS FOR SCIENCE CLASSES CURRENTLY OFFERED

BIO 101-BIOLOGY I

A laboratory science course designed for non-biology majors. The first term of a three-term sequence. Includes introduction to science, biochemistry, metabolism, the cell, molecular biology and reproduction.

BIO 102-BIOLOGY II

A laboratory science course designed for non-biology majors. The second term of a three-term sequence. Presents protein syntheses, cell divisions, animal reproduction, genetics, embryology and the basic doctrines of evolution.

BIO 103-BIOLOGY III

A laboratory science course designed for non-biology majors. The last term of a three-term sequence. Presents the evolutionary relationships among the five kingdoms and their major phyla. The last half of this term covers human systems.

BIO 207- MEDICAL GENETICS

Principles of heredity, chromosome mechanisms and molecular genetics applied to disease processes in humans. Review of case histories of selected inherited disorders. Discussion of genetic intervention therapies.

BIO 211-PRINCIPLES OF BIOLOGY I (PRE-PROFESSIONAL)

First part of a three-term sequence for students majoring in biology and the sciences, including pre-medical, pre-dental, pre-veterinarian, chiropractic, pharmacy, and related fields. Includes introduction to science, biochemistry, metabolism, the cell, molecular biology, and reproduction.

BIO 212-PRINCIPLES OF BIOLOGY II (PRE-PROFESSIONAL)

Second part of a three-term sequence designed for students majoring in biology and the sciences, including pre-medical, pre-dental, pre-veterinarian, chiropractic, pharmacy, and related fields. Includes life cycles, reproduction, molecular biology, modern and classical genetics, evolution, diversity, and systematic.

BIO 213-PRINCIPLES OF BIOLOGY III (PRE-PROFESSIONAL)

Third part of a three-term sequence designed for students majoring in biology and the sciences, including pre-medical, pre-dental, pre-veterinarian, chiropractic, pharmacy, and related fields. Includes plant and animal anatomy and physiology, and individual, population, community, and ecosystem ecology.

Klamath Community College Instructional Program Review: BIO 231-ANATOMY & PHYSIOLOGY I

First term of a three-term sequence covering chemistry, cells, tissues, and the skin, skeletal, and muscular systems. Laboratory experiences will be used to elaborate on concepts presented in lecture

BIO 232-ANATOMY & PHYSIOLOGY II

Second term of a three-term sequence. Courses may not be taken out of sequence. Covers nervous, endocrine, cardiovascular, and immune systems. Laboratory experiences will be used to elaborate on concepts and presented in lecture.

BIO 233-ANATOMY & PHYSIOLOGY III

Third term of a three-term sequence. Courses may not be taken out of sequence. Covers digestive, respiratory, urinary, and reproductive systems; fluid and electrolyte balance; metabolism; embryology; and genetics. Laboratory experiences will be used to elaborate on concepts presented in lecture.

BIO 234-MICROBIOLOGY I

Lecture, recitation, and laboratory will cover: bacterial genetic recombination; bacterial, viral and parasitic relationships with human health and disease; immune system and allergy; water and sewage treatment; soil microbes; and microbiology of foods. Laboratory stresses aseptic technique, bacterial identification and physiology using a variety of media, culturing techniques, and staining techniques.

BIO 270-ECOSYSTEMS

An overview of ecological principles and types of ecosystems, energy dynamics, resource flow, chemical and biological cycles, and human ecology. Descriptive modeling of environmental systems and resource analysis.

CHE 104-GENERAL CHEMISTRY I

Includes general principles of chemistry, including atomic structure, mole concept, chemical reactions stoichiometry, and gas laws.

CHE 105-GENERAL CHEMISTRY II

Includes stoichiometry, gases, oxidation-reduction, acid-base concepts, equilibrium, and physical and chemical properties of solutions.

CHE 106-GENERAL CHEMISTRY III

Includes fundamental principles of organic chemistry, biochemical processes, and nuclear chemistry.

CHE 221-GENERAL CHEMISTRY I (PRE-PROFESSIONAL)

Includes fundamentals of chemistry, atomic structure, chemical bonding, nomenclature, physical states of matter, properties of gases, and chemical equations. Recommended for chemistry and other laboratory science majors, preprofessional major in engineering, medicine, and dentistry.

CHE 222- GENERAL CHEMISTRY II (PRE-PROFESSIONAL)

Includes chemical stoichiometry, acid and base solutions, oxidation-reduction, chemical kinetics, and thermodynamics.

CHE 223- GENERAL CHEMISTRY II (PRE-PROFESSIONAL)

Includes chemical kinetics, ionic equilibria, nuclear chemistry, thermodynamics, and descriptive chemistry.

ENV 170-ENVIRONMENTAL SCIENCE

Examines major environmental questions facing the world today. Includes population growth, matter and energy resources, ecosystems, pollution, and environment and society. Explores a broad range of environmental issues including sustainability, the interconnection of the economy with ecosystem, short-term versus long-term gains, and the trade-offs in balancing problems and solutions.

GSC-107-ASTRONOMY

Surveys astronomy to include historical development of the Universe, Earth as a planet, Earth's moon, planets of the Solar System, the Sun, stars, and galaxies.

PHY 101-FUNDAMENTALS OF PHYSICS I

Laboratory science course designed for non-science majors. First term of a three-term series. A conceptual study of physics. Includes introduction to the scientific method, study of motion, mechanics, vectors, energy, simple machines, satellite motion, and atomic structure.

PHY 102- FUNDAMENTALS OF PHYSICS II

Laboratory science course designed for non-science majors. First term of a three term series. A conceptual study of Physics. Includes introduction to the scientific method, study of motion, mechanics, vectors, energy, simple machines, satellite motion, and atomic structure.

PHY 103- FUNDAMENTALS OF PHYSICS III

Laboratory science course designed for non-science majors. Third term of a three term series. A conceptual study of physics. Topics include waves and sound, electricity and magnetism, and light and optics.

PHY-211-GENERAL PHYSICS I (CALCULUS-BASE)

Topics include concepts in mechanics and their relationship to practical applications for science and engineering majors.

PHY 212- GENERAL PHYSICS II (CALCULUS-BASE)

Second term of a three-term series. Topics include concepts in thermodynamics, waves, optics, electricity, magnetism, and their practical application. Recommended for laboratory science majors, engineering majors, and pre-professional students in all medical fields.

PHY 213- GENERAL PHYSICS III (CALCULUS-BASE)

Third term of a three-term series. Topics include concepts in resistance, inductance, capacitance, and their application in RLC circuits; magnetic and electromagnetic fields; relativity; quantum mechanics; atomic physics; nuclear physics and their practical application. Recommended for laboratory science majors, engineering majors, and pre-professional students in all medical fields.

APPENDIX 7.B. COURSE LEARNING OUTCOMES FOR SCIENCE

BIO 101-BIOLOGY I

- 1. Practice biological scientific methods to test hypotheses.
- 2. Apply bioinformatics to form charts and laboratory data.
- 3. Interpret biological information to form unbiased, independent conclusions.
- 4. Apply knowledge of the structures and functions of biological molecules and cells to solve problems.
- 5. Use appropriate biological vocabulary to express informed positions on biological issues.

6. Relate anabolic (photosynthesis) and catabolic (respiration) pathways emphasizing the transformation of energy and matter.

BIO 102-BIOLOGY II

- 1. Apply concepts of the cell cycle, genetics, and evolution to novel problems, discern their meaning, and communicate their understanding to others.
- 2. Develop informed positions or opinions of a responsible citizen on contemporary issues in genetics, evolution and reproduction.
- 3. Apply course concepts in genetics and evolution to their lives and to the world about them.
- 4. Use the vocabulary necessary to communicate effectively in an academic and scientific setting.

BIO 103-BIOLOGY III

- 1. Use the vocabulary necessary to communicate effectively in an academic and scientific setting.
- 2. Analyze species characteristics for an understanding of evolutionary relationships.
- 3. Separate scientific evidence and personal views in analyzing current global health issues.
- 4. Relate anatomy to the physiology of humans, plants, and fungi.

BIO 207- MEDICAL GENETICS

- 1. Discuss human genetics, including genes, transmission to offspring, genetic technology and ethics.
- 2. Identify cells and cell division, including basics of mitosis and meiosis.
- 3. Discuss Mendel's studies, and transmission of traits from one generation to next.
- 4. Understand pedigree analysis, including sex-linked traits and maternal inheritance.
- 5. Discuss the interactions of the genes and environment
- 6. Identify and understand cytogenetics, including karyotypes and chromosome aberrations.
- 7. Discuss human reproduction, fetus development and sex determination.
- 8. Discuss gene expression, the process of genes to proteins, mutations, and cancer.
- 9. Discuss cloning and recombinant DNA, other biotechnology and ethics of biotechnology.
- 10. Identify genetics of behavior.
- 11. Discuss population genetics and human evolution.

12. Gather information, assess its validity, and differentiate factual information from opinion and pseudo-science by

learning and practicing methods used

by geneticists;

- 13. Apply genetic principles and generalizations to novel problems;
- 14. Practice application of genetic information in their lives (personal, work and career);
- 15. Develop informed positions or opinions on contemporary issues;
- 16. Communicate effectively (including using the metric system to communicate)
- 17. Read and interpret scientific information (including information in the metric system)
- 18. Students will demonstrate an understanding and awareness of group processes and project development.

BIO 211-PRINCIPLES OF BIOLOGY I (PRE-PROFESSIONAL)

- 1. Describe the building blocks and synthesis of the major classes of biomolecules and the contribution of their three-dimensional structure to their functions.
- 2. Diagram cell components, emphasizing them as a system of interacting parts
- 3. Predict how a molecule's movement is affected by its thermal energy, size, electrochemical gradient, and biochemical properties.
- 4. Describe the flow of energy and the cycling of matter in ecosystems in the biosphere at human and geologic time scales.

- 5. Describe and relate anabolic (photosynthesis) and catabolic (respiration and fermentation) pathways emphasizing the transformation of energy and matter.
- 6. Explain mechanisms by which cells receive and respond to internal and external signals that vary through space and time.
- 7. Explain how mutations and genetic recombinations contribute to genetic variation in a population.
- 8. Articulate how cells store, use, and transmit genomic information.

BIO 212-PRINCIPLES OF BIOLOGY II (PRE-PROFESSIONAL)

- 1. Trace the flow of information from DNA (alleles) to phenotype and describe how genetic information is transmitted from generation to generation.
- 2. Explain how different allele combinations can influence fitness depending on abiotic and biotic selective pressures, which can vary over time and space.
- 3. Illustrate how conservation of the genetic code and the varying effects of mutations facilitate evolution.
- 4. Provide morphological, molecular and developmental evidence of the common ancestry of life.
- 5. Model the processes by which evolution allows for the emergence of cell complexity and diversity.
- 6. Explain how different selective pressures determine whether a random mutation increases decreases or has no effect on fitness.
- 7. Describe how the environment leads to evolutionary changes.
- 8. Describe evolutionary processes that impact biodiversity.
- 9. Describe how interactions between structure and function influence ecosystems at multiple scales.
- 10. Use multiple representations to model the relationships between species/population abundance and distribution in relation to biotic and abiotic factors. Model the processes by which evolution allows for the emergence of cell complexity and diversity.

BIO 213-PRINCIPLES OF BIOLOGY III (PRE-PROFESSIONAL)

1. Use phylogenies to explore the evolutionary relationships among, and map distinguishing characters of, taxonomic groups.

2. Compare and contrast solutions to shared homeostatic challenges across various forms of life.

3. Describe how biological systems detect and respond to different internal/external environmental conditions through feedback.

4. Explain how structure relates to physiology and transfer these concepts to a new situation.

5. Explain how evolutionary, developmental, and environmental processes influence the evolution of structures,

functions, and behaviors that impact

fitness.

6. Explain how biotic and abiotic interactions influence and are influenced by morphological, physiological and behavioral traits.

7. Describe the interconnectedness of organisms and their environment at different temporal and spatial scales.

BIO 231-ANATOMY & PHYSIOLOGY I

- 1. Use correct terminology to communicate anatomical features and physiological processes.
- 2. Explain the correlation between the structure and function as it relates to cytology, histology, integumentary, musculoskeletal, nervous and endocrine systems.
- 3. Explain the interdependence within and between the physiological systems.
- 4. Extend knowledge of anatomy and physiology to clinical application.
- 5. Define homeostasis and describe how negative and positive feedback maintains this balance
- 6. Evaluate case studies in anatomy and physiology through verbal, written and/or multimedia means.

BIO 232-ANATOMY & PHYSIOLOGY II

- 1. Use correct terminology to communicate anatomical features and physiological processes.
- 2. Explain the correlation between the structure and function as it relates to nervous, cardiovascular, and immune systems.
- 3. Explain the interdependence within and between the physiological systems.
- 4. Extend knowledge of anatomy and physiology to clinical application.
- 5. Define homeostasis and describe how negative and positive feedback maintains this balance
- 6. Evaluate case studies in anatomy and physiology through verbal, written and/or multimedia means.

BIO 233-ANATOMY & PHYSIOLOGY III

- 1. Be able to communicate effectively in ways appropriate to a given situation or cultural context
- 2. Be able to comprehend and respectfully respond to the ideas of others
- 3. Be able to collaborate with others to achieve shared goals
- 4. Know how to select an effective and appropriate medium (such as face-to-face, written, broadcast, or digital) for conveying knowledge, information, or ideas.
- 5. Be able to obtain and apply information in order to problem-solve in practical situations
- 6. Know how to identify and define key issues
- 7. Know when and how to deploy thinking skills such as comprehension, application, analysis, synthesis, and evaluation
- 8. Apply logical reasoning to draw conclusions and identify appropriate actions
- 9. Be able to demonstrate competency in their field of study
- 10. Know how to obtain increasingly complex knowledge via rapidly changing technologies
- 11. Be able to apply skills appropriate to performing effectively in the workplace
- 12. Be able to recognize consequences of decisions
- 13. Meet deadlines and complete tasks
- 14. Know how to recognize and evaluate individual strengths and weaknesses
- 15. Demonstrate personal conduct and behavior that is appropriately respectful
- 16. Know how to recognize and evaluate personal and diverse cultural values and perspectives
- 17. Understand and know how to participate in democratic values and practices
- 18. Demonstrate honesty, openness to alternative views, and respect for others' freedom to dissent

BIO 234-MICROBIOLOGY I

- 1. Interpret the classification of microorganisms based on the following microscopy staining techniques: gram stain, acid-fast stain, endospore stain, negative stain, and flagellar stain.
- 2. Elucidate microbial genetics and recombinant DNA technology as it applies to replication, transcription, translation, regulation, and in-vitro synthesis.
- 3. Assess control of microbial growth in the body by antimicrobial drugs based on the most effective mechanism of interaction.
- 4. Outline innate immunity, adaptive immunity, and immune disorders based on the mechanisms of lymphocytes and complement.
- 5. Outline the traits of pathogenic gram-positive and gram-negative bacteria.
- 6. Outline the traits of pathogenic DNA and RNA viruses.

BIO 270-ECOSYSTEMS

- 1. Read, interpret and communicate scientific information using the scientific method.
- 2. Gather information, assess its validity, and differentiate factual information from opinion and pseudo-science by learning and practicing methods used by scientists.
- 3. Apply scientific principles and generalizations to novel problems.
- 4. Practice application of scientific information in their lives (personal, work and career).

- 5. Understand the exponential function and its implications to human population growth, extraction and use of natural resources, and the increasing rate of change of environmentally destructive processes occurring today.
- 6. Develop informed positions or opinions on contemporary issues.
- 7. Describe the basic components of ecosystems.
- 8. Demonstrate an understanding and awareness of group processes in environmental studies and project development.
- 9. Discuss major environmental issues that affect our world.
- 10. Understand ecological principles and types of ecosystems including, energy dynamics, resource flow, chemical and biological cycles, and human ecology.

CHE 104-GENERAL CHEMISTRY I

- 1. Apply dimensional analysis in terms of SI conversion, dilution, titration calculations, and stoichiometric calculations.
- 2. Solve chemical problems using the mole concept and balanced chemical equations (stoichiometry).
- 3. Build a quantum mechanical model of an atom.
- 4. Explain trends of the periodic table.
- 5. Visualize the geometry of molecules using Lewis structures and VSEPR theory.
- 6. Investigate gasses in terms of the ideal gas law.

CHE 105-GENERAL CHEMISTRY II

- 1. Apply concepts of thermodynamics (ΔH , ΔS , and ΔG) to chemical reactions.
- 2. Classify liquids and solids in terms of intermolecular forces.
- 3. Discuss solutions in terms of concentration, colligative properties, and intermolecular forces.
- 4. Explain the rate of a chemical reaction in terms of rate laws, activation energy, and reaction mecanisms.
- 5. Analyze the amount of products obtained in a reaction, including acid-base equilibria, in the context of chemical equilibrium.
- 6. Discuss nuclear chemical reactions in terms of chemical equations, half-life, and biological impact.

CHE 106-GENERAL CHEMISTRY III

- 1. Classify simple hydrocarbons and hydrocarbons containing heteroatoms compounds by functional group.
- 2. Describe carbohydrates as simple or complex, including their chirality and equilibrium forms.
- 3. Classify proteins including enzymes according to complexity and function.
- 4. Classify the general class of lipids according to function.
- 5. Explain the replication process for DNA and the transcription process for making proteins.
- 6. Correlate organic reactions of simple functional groups to the reactions of complex biomolecules.

CHE 221-GENERAL CHEMISTRY I (PRE-PROFESSIONAL)

- 1. Apply dimensional analysis in terms of SI conversion, dilution, titration calculations, and stoichiometric calculations.
- 2. Solve chemical problems using the mole concept and balanced chemical equations (stoichiometry).
- 3. Write chemical formulas for binary inorganic compounds and acids including polyatomic ions.
- 4. Identify reactions by type and be able to predict the products of simple acid-base, precipitation, and redox reactions.
- 5. Calculate enthalpy changes using calorimetry and Hess's law.
- 6. Investigate gasses in terms of the ideal gas law.

- 1. Build a quantum mechanical picture of an atom and use it to explain periodic trends.
- 2. Visualize the geometry of a molecule using Lewis structures, VSEPR theory, and MO theory.
- 3. Identify the intermolecular, attractive forces that exist between molecules based on their composition and molecular structure.
- 4. Describe solids in terms of the type (metallic, ionic, molecular, or covalent-network) and the simple unit cells.
- 5. Describe solutions in terms of concentration, colligative properties, and intermolecular forces.
- 6. Describe the rate of a chemical reaction in terms of rate laws, activation energy, and reaction mechanisms.

CHE 223- GENERAL CHEMISTRY II (PRE-PROFESSIONAL)

- 1. Relate the equilibrium constant to the relative amounts of reactants and products present.
- 2. Analyze aqueous equilibria in terms of the equilibrium constant, including pH, pKa, Ksp.
- 3. Apply knowledge of chemical principles to environmental concerns.
- 4. Use ΔH , ΔS and ΔG to determine the spontaneity of a reaction and position of the equilibrium.
- 5. Write balanced nuclear reactions for the three common forms of nuclear decay.
- 6. Balance REDOX reactions using the half-reaction method.

ENV 170-ENVIRONMENTAL SCIENCE

- 1. Explain environmental systems in terms of matter flow and energy capture.
- 2. Convey population dynamics in terms of growth models: exponential, Lotka-Volterra, logistic, and demographic transition.
- 3. List the composition of terrestrial biomes and aquatic ecosystems in terms of temperature, precipitation, geology, elevation, and biodiversity.
- 4. Discuss mechanisms that impact food security and agriculture such as soil, biological flora, fertilizer, water, climate, pest control, technology (genetic engineering), education, and affluence.
- 5. Apply environmental health and toxicology as it relates to air, water, and soil pollution.
- 6. Describe earth and energy resources in terms of economy, urbanization, sustainability, and environmental policy.

GSC-107-ASTRONOMY

- 1. Use the vocabulary of science to speak and write about our solar system and planets, the Milky Way Galaxy, and the Universe.
- 2. Use the scientific method to answer questions about our solar system, our galaxy, and the Universe.
- 3. Be proficient in the electromagnetic spectrum including wavelength and frequency.
- 4. Understand the differences between the terrestrial and Jovian planets.
- 5. Understand both the temporal and spatial aspects of space.
- 6. Explain how the heavy elements in the Universe came into existence.
- 7. Understand that we are learning new things about our moon, the planets, stars, and the Universe at ever increasing rates.

PHY 101-FUNDAMENTALS OF PHYSICS I

1. The student, as a function of their collaboration with their laboratory partners, will be inculcated and must assimilate the communication skills necessary to function as a part of a thinking collective in order to effectively resolve scientific inquiries via empirical validation.

- 2. The student will be challenged to convey complex concepts in simple terms for the maximal engagement of his/her scientific audience as a consequence of exercising the scientific method in the laboratory journal and in the writing intensive word processing of their formal laboratory report in the laboratory component of this course.
- 3. Understanding of the scientific method
- 4. Understanding of basic physics and scientific language
- 5. Demonstrate a basic knowledge of the fundamental laws of physics (Newton's laws, energy conservation, thermodynamics)
- 6. Demonstrate the ability to relate concepts of physics to everyday life and natural phenomena
- 7. Demonstrate the ability to objectively collects, analyze, and present data
- Scientific method, graphing and vectors, velocity and acceleration, Patterns of Motion and Equilibrium, Measurement and Data Collection, Newton's Laws of Motion, Forces, Friction, Simple Machines, Momentum and Energy, Hooke's Law, Gravity, Projectiles, and Satellites, Pendulums, and Atomic structure
- 9. The student will be made aware of contemporary topics of global impact and local significance correlated to the topic at hand. To this end, the students will be asked to provide a Powerpoint presentation and provide a formal word processed report addressing the topic of their choice.

PHY 102- FUNDAMENTALS OF PHYSICS II

- 1. The student, as a function of their collaboration with their Laboratory partner(s), will be inculcated and must assimilate the communication skills necessary to function as a part of a thinking collective in order to effectively resolve scientific inquiries via empirical validation.
- The student will be challenged to convey complex concepts in simple terms for the maximal engagement of his/her scientific audience as a consequence of exercising the Scientific Method in the Laboratory Journal and in the writing-intensive word-processing of their Formal Laboratory Report in the Laboratory component of this course.
- 3. Understanding of the scientific method
- 4. Understanding of basic physics and scientific language
- 5. Demonstrate a basic knowledge of the fundamental laws of physics (Newton's laws, energy conservation, thermodynamics)
- 6. Demonstrate the ability to relate concepts of physics to everyday life and natural phenomena
- 7. Demonstrate the ability to objectively collect, analyze, and present data
- 8. Matter
- 9. Heat and Thermodynamics
- 10. Specific Heat Capacity
- 11. Static and Kinetic Electricity
- 12. Magnetism and Electromagnetic Induction
- 13. The student will be made aware of contemporary topics of global impact and local significance correlated to the topic at hand. To this end, the students will be asked to provide a PowerPoint presentation and provide a formal word-processed report addressing the topic of their choice.

PHY 103- FUNDAMENTALS OF PHYSICS III

- 1. The student, as a function of their collaboration with their Laboratory partner(s), will be inculcated and must assimilate the communication skills necessary to function as a part of a thinking collective in order to effectively resolve Scientific Inquiries via empirical validation.
- 2. The student will be challenged to convey complex concepts in simple terms for the maximal engagement of his/her scientific audience as a consequence of exercising the Scientific Method in the Laboratory Journal and in the writing-intensive wordprocessing of their Formal Laboratory Report in the Laboratory component of this course.
- 3. Understanding of the scientific method

- 4. Understanding of basic physics and scientific language
- 5. Demonstrate a basic knowledge of the fundamental laws of physics (Newton's laws, energy conservation, thermodynamics)
- 6. Demonstrate the ability to relate concepts of physics to everyday life and natural phenomena
- 7. Demonstrate the ability to objectively collect, analyze, and present data
- 8. Students will demonstrate that they have learned facts and theories appropriate to the subject.
- 9. The student will be made aware of contemporary topics of global impact and local significance correlated to the topic at hand. To this end, the students will be asked to provide a PowerPoint presentation and provide a formal word-processed report addressing the topic of their choice.

PHY-211-GENERAL PHYSICS I (CALCULUS-BASE)

- 1. Analyze Newton's laws of motion in terms of position, velocity, acceleration, and force through application of one- and two-dimensional kinematic equations.
- 2. Manipulate vector quantities via graphical (Cartesian coordinate), analytical (trigonometric), and experimental results.
- 3. Analyze conservation laws in terms of work, kinetic energy, and potential energy.
- 4. Investigate conservation laws in terms of impulse and momentum.
- 5. Analyze Newtonian mechanics in terms of rotational energy, moment of inertia, torque, and angular momentum.
- 6. Analyze gravitational forces in terms of potential and kinetic energy.
- 7. Analyze Newtonian mechanics in terms of pressure, buoyancy, fluid dynamics, and elasticity.

PHY 212- GENERAL PHYSICS II (CALCULUS-BASE)

- 1. Analyze waves in terms of oscillations, traveling waves, and superposition.
- 2. Analyze thermodynamics in terms of work, heat, and the first law.
- 3. Analyze electricity and magnetism in terms of Gauss's Law and the fundamentals of circuits.

PHY 213- GENERAL PHYSICS III (CALCULUS-BASE)

- 1. Analyze direct and alternating current RLC circuits in terms of resistance, inductance, and capacitance.
- 2. Examine magnetic and electromagnetic fields via Biot-Savart law, Ampere's law, and the right-hand rule.
- 3. Investigate relativity by means of Lorentz transformations, space, time, momentum, energy, and mass-energy equivalence.
- 4. Examine quantum mechanics by way of wave function and probability density, Heisenberg uncertainty principle. and Schrodinger's equation.
- 5. Investigate atomic physics in terms of atomic spectra, lifetimes of excited states, and the quantum mechanical contributions of energy, angular momentum, and the z-component of angular momentum.
- 6. Investigate nuclear physics in terms of radioactive decay, binding energy, and nuclear forces.

APPENDIX 7.C: COURSE EVALUATION FEEDBACK FROM STUDENTS IN SCIENCE COURSES



INSTRUCTIONAL PROGRAM REVIEW RUBRIC						
	Highly Developed	Developed	Emerging	Initial		
1—Accomplishments in Achieving Goals	Exhibits ongoing and systematic evidence of goal achievement.	Exhibits evidence of goal achievement.	Exhibits some evidence that some goals have been achieved.	Minimal evidence that progress has been made toward achieving goals		
2—Labor Market Projection	Thoroughly explains projected market demand and potential effects on program; presents highly developed plan to address projection.	Explains projected market demand and discusses several possible actions to address projection.	Minimally explains projected market demand and lists one or two actions to address projection.	Presents labor market demand without analysis/explanation and fails to list possible actions to address projection.		
3—Resources						
Professional Development	Exhibits ongoing and systematic support of professional development opportunities.	Exhibits support of regular professional development opportunities.	Evidence of intermittent professional development opportunities.	Minimal evidence of professional development opportunities.		
Faculty Meeting Instructional Needs	Employs a sufficient number of highly qualified faculty to meet instructional needs.	Employs an adequate number of qualified faculty to meet instructional needs.	Has a plan to employ an adequate number of qualified faculty to meet instructional needs.	Faculty numbers and/or qualifications are insufficient to meet instructional needs.		
Facilities and Equipment	Facilities and resources meet current and future needs.	Facilities and resources meet current needs.	Evidence of a plan to have facilities and resources meet current and future needs.	Minimal evidence that facilities and resources meet current and future needs.		
4—Effectiveness						
Student Learning Outcomes Assessment	Exhibits ongoing and systematic SLO assessment to adjust instruction.	Exhibits student learning outcomes assessment and uses results to change instruction.	Has a plan to engage in ongoing and systematic SLO assessment, including using results to change instruction.	Minimal evidence of SLO assessment.		

Student Success	Thoroughly analyzes trends in enrollment, degrees awarded, time-to- completion rates, and formulates comprehensive plans to address them.	Describes trends in enrollment, degrees awarded, time-to- completion rates, and formulates plans to address them.	Describes trends in enrollment, degrees awarded, time-to- completion rates, and makes an attempt to plan to address them.	Minimal description of trends and/or fails to formulate plan to address them.
5—Budget	Financial resources meet current needs and are projected to meet future needs.	Financial resources meet current needs.	Evidence of a plan to acquire financial resources to meet current needs.	Minimal evidence that financial resources meet current needs.
6—Strengths and Weaknesses	Strengths and weaknesses are described accurately and thoroughly.	Most strengths and weaknesses are described accurately and thoroughly.	Some strengths and weaknesses are described accurately and thoroughly.	Minimal evidence that strengths and weaknesses are described accurately and thoroughly.
7—New Goals and Plan	Multiyear planning process with evidence of use of assessment data in planning.	Multiyear planning process with some assessment data.	Short-term planning process recently implemented.	Minimal evidence of planning process.
8—Overall Evaluation	Evidence of ongoing systematic use of planning in selection of programs and services.	Exhibits evidence that planning guides program and services selection that supports the college.	There is evidence that planning intermittently informs some selection of services to support the college.	Minimal evidence that plans inform selection the of services to support the college.
	Highly Developed	Developed	Emerging	Initial