KLAMATH
Community College

2023-24

Instructional Program Review

Laboratory Technician

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CONTENTS

1. PROGRAM/DISCIPLINE MISSION/GOALS AND LINK TO STRATEGIC PLAN

The two-year Laboratory Technician AAS degree Notice of Application was submitted to the Klamath Community Leadership February 15th, 2019.

Currently, the program offers an Associates of Applied Science (AAS); a One-Year; and a Less Than-One Year Pathways Certificate as Laboratory Technician. There are two emphases: Biology and Biotechnology and Medical and Clinical. The program involves a purposeful curriculum intended to provide the educational requirements, knowledge, skills, abilities, and work activities necessary to satisfy a wide berth of introductory laboratory-centered occupations.

The program is meant to focus on students with an interest in science and aspirations of working in a field (Fish and Wildlife), research, or clinical laboratory environment. Prerequisites to enter the program are a minimum (WRI 95, MTH 95) in order to recruit the broadest student population possible. Ideally, recruitment would include high school graduates, non-traditional (older than average) students, Klamath Center for Education and Training (K-CET), and High school Equivalency Program (HEP) students.

The intentional curriculum and Cooperative Work Experience (CWE) are steered by an Advisory Committee composed of accomplished community partners that represent local employers. The guidance gleaned from these local leaders maximize employability.

The educational requirements for these entry-level opportunities are an Associate's degree. Essential knowledge in the program is provided by principally by Pre-professional Biology, Pre-professional Chemistry, Technical Writing Precalculus, and Statistics. Skills and ability are provided by the Technical Core and CWE of the Program. These include application of the scientific method, reading comprehension of primary literature (scientific research), critical thinking, and public writing and speaking.

The technical core for the Medical and Clinical emphasis includes Anatomy and Physiology, Human Genetics, Microbiology, Biotechnology, and Cooperative Work Experience. The technical core for Biology and Biotechnology emphasis includes Human Genetics, Microbiology, Biotechnology, Geographical Information Systems, and Cooperative Work Experience.

The sum of these courses is meant to target job titles with cross-disciplinary skills generally entitled by the Labor Market as Laboratory Technician such as Food Science Technicians; Biological Technicians; Chemical Technicians; Environmental Science Technicians; and Laboratory Technicians, Medical emphasis.

Articulations have been formed with Oregon Institute of Technology. The program has been optimized for transferability to a Bachelor's of Science at Oregon State University.

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

Goal 1: Student Success

Improve access by building one-year and pathways certificates.

Goal 1 involve building Pathway and One-year certificates. These additional certificates were successfully created and approved by Academic Council March 18, 2021 and Curriculum Committee April 8th, 2021.

Goal 2: Future-focused education and services

The forensic emphasis will be accredited by the American Society of Crime Laboratory Directors (ASCLD). Laboratory accreditation would allow the laboratory to process forensic samples.

ASCLD was contacted on November 4th, 2022. Debbie Leben, a laboratory scientist and officer of ASCLD, the accrediting agency, directed the program to their ASCLD accreditation tool kit to facilitate laboratory accreditation.

Additionally, Ms. Leben also provided a contact with Marshal University. Marshall University is accredited with ANAB ISO 17025. ANAB stands for ANSI National Accreditation Bord. ANSI is the American National Standards Institute. ISO stands for International Organization for Standardization. ANAB ISO 17025 is the internationally recognized standards that oversee and ensure that participating laboratories use best practices and provide valid (reliable) results.

The ANAB ISO 17025 standards designed and applied by Marshall University are specifically for the accreditation of Capillary Electrophoresis in the Genetic Analysis of forensic samples. Successful achievement of this goal would allow KCC to run real-life forensic samples. Successful completion of this goal would provide real-world validation to the forensic emphasis of this program. Marshal University has been approached. The institution is deciding if they are wiling to make these resources available to KCC.

Goal 3: Student Success

Adapt technologies to promote student success

Appropriation of an Ion GeneStudio S5.

KCC has prided itself in having and maintaining state-of-the-art equipment. Currently, the Biotechnology/DNA Forensics (BIO 240) and Human Genetics (BIO 207) courses run an Applied Biosystems 310 Genetic Analyzer. The 310 Genetic Analyzer is used in these courses to carry out forensic DNA fragment analysis and DNA sequencing.

This genetic analyzer will not be supported in the near future. The replacement of this instrument is being sought out. The intended replacement is a **GeneStudioS5 system**. This is the next step in Solid-State Genetic Analysis. The applications of this technology is vast. The instrument has become democratized by simplicity of use and by cost of application.

The instrument may sequence exomes (Genes) specific to cancer, inheritance, gene expression, reproduction genetics, and microbial genetics. This means that this instrument may be used in contextualized research, forensics, and field work. In addition to the Lab Tech program, the instrument may be used in all relevant courses emphasizing genetics such as Pre-professional Biology, Medical Genetics, Microbiology, and Biotechnology/DNA Forensics. The goal is to provide our graduates relevant application of technology that may be used in Medical, Forensics, Research, or Field lab within our Eastern Cascades local area.

As addressed in the previous section, considerable effort is being devoted to the validation of our facility as a certificated forensic laboratory with formal governmental, law-enforcement, and scientific validation. This would be a significant benefit to our local underprivileged demography.

Part of our original Strategic Plan was to provide attractive, Flag-Ship courses that would attract distant students to Klamath Community College. Programs with these Flag-ship courses were designated Destination Programs because of their potential ability to attract students from outside of our local service area. The optics associated with a program that uses cutting-edge technology to run forensic samples from local Cold Cases would definitely meet the criteria of a Flag-ship course.

Finally, Southern Oregon University dropped their Forensic Program due to Faculty attrition. KCC and SOU had proposed cooperating on a Bachelors of Applied Science with an emphasis in Forensics. If this possibility is viable, it would open additional academic channels for KCC.

Progress here involves submission of a template Grant Application for Equipment to Peter Lawson on November 17th, 2022. The template included information regarding details of the new instrument, GeneStudio S5 system and a fresh quote from Thermo Fisher Scientific for the instrument and perishables for five (5) years.

Additionally, KCC leadership met on February 25th, 2024 with Brian Medlock, Director, Oregon State Police Forensic Services Division regarding the prospect of mutual cooperation between KCC and the Oregon Forensic Services Division. KCC is seeking to prove forensic lab training for the police academy.

Director Medlock's criteria for forensic technicians described a Bachelor's of Science in Biology and not an emphasis in forensic science. Mr. Medlock elaborated that the Forensic Division uses Capillary Electrophoresis. This is the same method employed at KCC.

The meeting was followed by an email thanking Director Medlock for his candor. The communication further elaborated on our program and technology aspirations. That as of 2019, community colleges such as ours have been approved to offer Bachelor of Applied Science degrees. And that we would whole-heartedly invite him to participate as part of our Laboratory Technician Program Advisory Committee to help steer these future accreditation efforts.

Future efforts to appropriate this technology focus on a few factors. First, obtaining a letter of commitment from Detective Dan Towery from the Klamath County Sheriff's Office stating that the Sheriff's department would be willing to work in partnership with KCC to run forensics samples associated with open Cold Cases. The letter of commitment will, as previously discussed, reflect that this partnership is contingent on the procurement of this the GeneStudioS5 system.

Additional critical elements include:

- Job Market trends forecasting continuing need in the East Cascades region.
- Marketing efforts to increase student recruitment into the Program.
- Be able to demonstrate partnership/alignment with allied programming.
    - The main alignment involves the Criminal Justice Program. The forensic courses of the Laboratory Technician Program may provide as many as four traditional, contextualized science courses for the Criminal Justice Program.
    - The program serves as a feeder of science-centered, laboratory-experienced graduates to our local clinics and Sky Lakes.

Goal 4: Future-focused education and services

Future program expansion. This expansion involves building pathways and one-year certificates in Geographical Information Systems (GIS) as a feeder to the College of Earth, Ocean, and Atmospheric Sciences at Oregon State University. Currently a one-year certificate may be built with Geographic Information Systems I (GIS 234/L), Geographic Information Systems II (GIS 235/L), Geographic Information Systems III (GIS 236/L), Physical Geograhy (GEO 105/L), GPS, Map & Compass (ENV 105), Tree & Shrub Identification (ENV 141), Environmental Science (ENV 170/L), and Forest Ecology (ENV 241/L) courses.

Geographical Information Systems (GIS) was introduced into the Lab Tech Program as a means of increasing employability of students aspiring to work in field-centered professions. Examples of these are Fish and Wildlife, United States Geological Survey (USGS), and United States Forest Service. These are coveted and competitive careers that require skills in water, earth, biological, and civilian mapping.

KCC currently has 50 licenses to use ArcGIS PRO, the industry standard in mapping software. Environmental Systems Research Institute, Inc (ESRI) is the authors and sole proprietor of this amazing software. ArcGIS is used to author all the maps that we are accustomed to working with every day. Whenever we seek to find geographically-associated information, it is very likely that it was designed and published by ArcGIS.

The main attraction to ArcGIS is twofold. First, the software is very interactive and fun to use. It is attractive to students that are interested in computer games because the program interphase is very interactive, highly graphical, and intuitive. Second, and perhaps more importantly, the demand for GIS graduates is increasing significantly. Because all the work is done by computer, most of the work is done remotely. This means that a graduate of GIS would not need to relocate to apply and obtain employment opportunities in other states and countries. Any discipline that requires geographical analysis uses GIS. This includes Natural Resources, City Planning, Forestry, Meteorology, Oceanography, etc.

Progress in this endeavor involves the contact of Andrea Nelson, academic advisor for the College of Earth, Ocean, and Atmospheric Sciences (CEOAS) at Oregon State University. CEOAS is interested in using the aforementioned courses as a feeder for their **Geography & Geospatial Science B.S. and Environmental Sciences B.S. degrees**. Oregon State University works very well with KCC. The department is asking for the syllabi and CCOGs for these courses to coordinate transfer with KCC. Most of them have been sent. Some of the courses have not been taught in a while. The syllabi and CCOGS of these course are being updated. OSU has been very specific about this list of courses for the population of a transferable certificate to OSU.

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

☐Yes

☒No

Goal 1

Improve access by building one-year and pathways certificates.

Has been met in April 2021.

Goal 2

Accredited by the American Society of Crime Laboratory Directors (ASCLD) is in progress. Contact has been made with Marshal University to obtain a copy of their ANAB ISO 17025 protocol as directed by ASCLD. This material may then be modified with the assistance of ASCLD and their accreditation toolkit to better meet the needs of the laboratory at KCC.

Goal 3

Adapt technologies to promote student success

Appropriation of an Ion GeneStudio S5.Is in progress. A template Grant Application for Equipment was populated and sent to Peter Lawson on November 17th, 2022. The template included information regarding the GeneStudio S5 system, a fresh quote from Thermo Fisher Scientific for the instrument and perishables for five (5) years.

II. KCC leadership met on February 25th, 2024 with Brian Medlock, Director, Oregon State Police Forensic Services Division regarding the prospect of mutual cooperation between KCC and the Oregon Forensic Services Division. KCC is seeking to prove forensic lab training for the police academy.

Director Medlock's criteria for forensic technicians described a Bachelor's of Science in Biology and not an emphasis in forensic science. Mr. Medlock elaborated that the Forensic Division uses Capillary Electrophoresis. This is the same method employed at KCC.

The meeting was followed by an email thanking Director Medlock for his candor. The communication further elaborated on our program and technology aspirations. That as of 2019, community colleges such as ours have been approved to offer Bachelor of Applied Science degrees. And that we would whole-heartedly invite him to participate as part of our Laboratory Technician Program Advisory Committee to help steer these future accreditation efforts.

III. Meeting with Peter Lawson on February 14, 2024. The meeting recapped the efforts to secure grants for the GeneStudioS5 system. Subsequent efforts include obtaining a letter of commitment from Detective Dan Towery from the Klamath County Sheriff's Office stating that the Sheriff's department would be willing to work in partnership with KCC forensics as a resource to for open Cold Cases. The letter of commitment will, as previously discussed, reflect that this partnership is contingent on the procurement of this the GeneStudioS5 system.

Additional critical elements include:

- ✓ This meeting focused strongly on the absence of previous marketing effort. Specifically, that any grant award would be contingent on student impact. This means that it is important to focus on marketing and project future student participation. In short, it is important to focus on institutional support and recruitment.
- ✓ Be able to demonstrate partnership/alignment with allied programming. The main alignment involves the Criminal Justices Program. The forensic courses of the Laboratory Technician Program may provide as many as four traditional, contextualized science courses for Criminal Justice. The program serves as a feeder of science-centered, laboratory-experienced graduates to our local clinics and Sky Lakes.
- ✓ Job Market forecasts for the program need to demonstrate growth in demand.

Goal 4

Future-focused education and services

Future program expansion. This expansion involves building Pathways and One-year Certificates in Geographical Information Systems (GIS) as a feeder to the College of Earth, Ocean, and Atmospheric Sciences at Oregon State University.

Is in progress.

Contacted Andrea Nelson, academic advisor for the College of Earth, Ocean, and Atmospheric Sciences (CEOAS) at Oregon State University. CEOAS is interested in using the aforementioned courses as a

feeder for their Geography & Geospatial Science B.S. and Environmental Sciences B.S. degrees. The majority of the syllabi and CCOGs were provided. Some of the syllabi and CCOGS of courses that have not been taught, are being updated so that they may be provided to the COEAS at OSU.

2. PROGRAM/DISCIPLINE DESCRIPTION AND OVERVIEW

The intentionality of this programs provides both current and aspiring students with a structured cohort modality with a purposeful end in mind: Laboratory and/or field research employment opportunities.

While the flexibility of degrees such as the Associate of Science (AS) attracts students with the specific intention of transfer, this Laboratory Technician degree is intended to optimize employability without sacrificing transferability. Every course in the program is selected and guided by the Program Advisory Committee to optimize employment opportunities by our Community Partners. The purposeful selection of courses maximizes knowledge, skill, and abilities in the occupation range.

2A. PROVIDE THE CATALOG DESCRIPTION OF THE PROGRAM.

Two-Year Associate of Applied Science Degree

The Laboratory Technician Associate of Applied Science degree is offered to students seeking employment in scientific fields and laboratory environments. The degree offers options in Medical and Clinical Laboratory Technician or Biological and Biotechnology Laboratory Technician.

To earn the Laboratory Technician AAS degree, students must satisfactorily complete all the requirements of the degree. The general education requirement allows the flexibility to continue professional development later by applying the basic skills gained to more in-depth study.

Successful pursuit of this degree requires students to possess collegiate skills in reading, communication, computation, and critical thinking. To acquire that competency, it is highly recommended that students complete pre-collegiate courses to gain these skills prior to their entry into the program.

The first year of the AAS degree program offers technical emphasis coursework and completion of prerequisites. The second year covers a broad range of skills, including those necessary for diversification and upward mobility within the occupational area.

One-Year Certificate of Completion

Students seeking employment in occupations involving research in a field or laboratory setting may complete a stand-alone certificate in Medical and Clinical Laboratory Technician or Biological and Biotechnology Laboratory Technician. Alternatively, a student may choose to apply these courses towards an AAS degree. The one-year certificate is an option for students seeking an entry-level occupation.

To earn the Laboratory Technician One-Year Certificate, students must satisfactorily complete all the requirements of the certificate including a minimum of 48 credits for the Medical and Clinical Laboratory Technician emphasis or a minimum of 47 credits for the Biological and Biotechnology Laboratory Technician emphasis.

This certificate program focuses on the fundamental areas of biology, anatomy and physiology, genetics, histology, hematology, biotechnology, contemporary instrumentation, and Geographic Information Systems. Theory, application, and internship in contemporary and relevant clinical, laboratory, and field research are fully explored.

Biological and Biotechnology Laboratory Technician Career Pathway Certificate

Less-Than-One-Year Certificate of Completion

The Biological and Biotechnology Laboratory Technician Career Pathway Certificate will prepare students for entry-level research work in a field or laboratory setting. The pathway certificate may be earned with a total of 33 credits over two to three terms. The student may then choose to continue to the one-year certification or AAS degree.

This certificate is targeted towards individuals that are passionate about science and technology but do not have the luxury of a lengthy time investment. This target audience may include traditional students, GED graduates, and career retraining.

Medical and Clinical Laboratory Technician Career Pathway Certificate

Less-Than-One-Year Certificate of Completion

The Medical and Clinical Laboratory Technician Career Pathway Certificate will prepare students for entry-level research in a field or laboratory setting. The pathway certificate may be earned with a total of 33 credits over two to three terms. The student may then choose to continue to the one-year certification or AAS degree.

This certificate is targeted towards individuals that are passionate about science and technology, but do not have the luxury of a lengthy time investment. This target audience may include traditional students, GED graduates, and individuals seeking career retraining.

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

As asserted in the program description, the intent is pragmatic. The purposeful selection of courses such as human genetics, anatomy and physiology, microbiology, geographical information systems, ecology, and the contextualized forensic and biotechnology courses provides students with the widest scope of scientific and field and laboratory skills possible at our institution at this time.
The curriculum is guided by an advisory committee of community partners that include:

- ✓ Sky Lakes Medical Center
- ✓ Klamath Falls Fish and Wildlife
- ✓ Fremont-Winema National Forest
- ✓ Jeld-Wen Research and Development
- ✓ Shasta View Animal Clinic
- ✓ Klamath Open Door
- ✓ Environmental Systems Research Institute (ESRI)

This advisory committee does not only function as a steering committee for the curriculum, they also double as providers of relevant Cooperative Work Experience (CWE).

Graduates of the program have been hired at Sky Lakes and Fish and Wildlife after completing CWE at both institutions respectively.
If students choose to transfer, all contextualized courses have been migrated from a lecture-lab to a traditional lecture with a lab format to facilitate student transfer these courses as traditional science courses.

2C. COMMUNITY LABOR MARKET NEED ANALYSIS AND PROJECTION

Food Science Technicians (194013)

East Cascades (Crook, Deschutes, Gilliam, Hood River, Jefferson, Klamath, Lake, Sherman, Wasco, Wheeler)

Description

Work with food scientists or technologists to perform standardized qualitative and quantitative tests to determine physical or chemical properties of food or beverage products. Includes technicians who assist in research and development of production technology, quality control, packaging, processing, and use of foods.

Projections

Area	2022 Employment	2032 Employment	Annual Growth Openings	Annual Replacement Openings	Total Annual Openings
Oregon	537	581	4	75	79
East Cascades	No projections data is available for this occupation.				

Wages

No wage data available for this occupation.

Current Job Openings

There are 1 current job listings for this occupation.

Job Title	Location	Order Number	Date Posted
QC Lab Technician D7	The Dalles	3961654	03/01/2024

Statewide Employment Analysis

Employment in this occupation in 2022 was similar to most occupations across the state. The total number of job openings is projected to be similar to job openings for most occupations in Oregon through 2032. This occupation is expected to grow at a somewhat slower rate than the statewide average growth rate for all occupations through 2032.

Reasonable employment opportunities exist.

Area Employment Analysis

Employment in this occupation in 2022 was similar to most occupations in the region. The total number of job openings is projected to be similar to job openings for most occupations in the region through 2032. This occupation is expected to grow at about the regional average growth rate for all occupations through 2032.

Educational Requirements

The typical entry level education for this occupation is a **Associate's degree**.

Biological Technicians (194021)

East Cascades (Crook, Deschutes, Gilliam, Hood River, Jefferson, Klamath, Lake, Sherman, Wasco, Wheeler)

Description

Assist biological and medical scientists. Set up, operate, and maintain laboratory instruments and equipment, monitor experiments, collect data and samples, make observations, and calculate and record results. May analyze organic substances, such as blood, food, and drugs.

Projections

Area	2022 Employment	2032 Employment	Annual Growth Openings	Annual Replacement Openings	Total Annual Openings
Oregon	2,858	3,131	27	366	393
East Cascades	196	214	2	24	26

Wages

Area	Median Hourly	Avg Annual	Middle Range
Oregon	$23.89	$53,864	$19.77 - $27.54
East Cascades	$22.27	$47,320	$18.03 - $24.85

Current Job Openings

There are 4 current job listings for this occupation.

Job Title	Location	Order Number	Date Posted
P04644CT - Biological Sciences Research Technician 3: Bat Hub Field Technician (Seasonal Pool)	Bend	3943603	02/07/2024
P04644CT - Biological Sciences Research Technician 3: Bat Hub Field Technician (Seasonal Pool)	Bend	3942793	02/06/2024
P04642CT - Biological Sciences Research Technician 2: Bat Hub Field Technician (Seasonal Pool)	Bend	3942790	02/06/2024
P04643CT - Biological Sciences Research Technician 1: Bat Hub Field Technician (Seasonal Pool)	Bend	3942784	02/06/2024

Statewide Employment Analysis

Employment in this occupation in 2022 was somewhat larger than most occupations across the state. The total number of job openings is projected to be somewhat larger than most occupations in Oregon through 2032. This occupation is expected to grow at about the statewide average growth rate for all occupations through 2032.

Reasonable employment opportunities exist.

Area Employment Analysis

Employment in this occupation in 2022 was somewhat larger than most occupations in the region. The total number of job openings is projected to be somewhat larger than most occupations in the region through 2032. This occupation is expected to grow at a somewhat slower rate than the regional average growth rate for all occupations through 2032.

Educational Requirements

The typical entry level education for this occupation is a **Associate's degree**. Those with a Bachelor's degree have a competitive advantage in the labor market.

Chemical Technicians (194031)

East Cascades (Crook, Deschutes, Gilliam, Hood River, Jefferson, Klamath, Lake, Sherman, Wasco, Wheeler)

Description

Conduct chemical and physical laboratory tests to assist scientists in making qualitative and quantitative analyses of solids, liquids, and gaseous materials for research and development of new products or processes, quality control, maintenance of environmental standards, and other work involving experimental, theoretical, or practical application of chemistry and related sciences.

Projections

Area	2022 Employment	2032 Employment	Annual Growth Openings	Annual Replacement Openings	Total Annual Openings
Oregon	327	379	5	40	45
East Cascades	23	27	0	2	2

Wages

Area	Median Hourly	Avg Annual	Middle Range
Oregon	$25.30	$54,255	$22.07 - $29.43

Current Job Openings

There are 1 current job listings for this occupation.

Job Title	Location	Order Number	Date Posted
Intern, Product Development	Bend	3956721	02/23/2024

Statewide Employment Analysis

Employment in this occupation in 2022 was similar to most occupations across the state. The total number of job openings is projected to be similar to job openings for most occupations in Oregon through 2032. This occupation is expected to grow at a somewhat faster rate than the statewide average growth rate for all occupations through 2032.

Reasonable employment opportunities exist.

Area Employment Analysis

Employment in this occupation in 2022 was similar to most occupations in the region. The total number of job openings is projected to be similar to job openings for most occupations in the region through 2032. This occupation is expected to grow at a somewhat faster rate than the regional average growth rate for all occupations through 2032.

Educational Requirements

The typical entry level education for this occupation is a **Associate's degree**. Those with a Bachelor's degree have a competitive advantage in the labor market.

Environmental Science and Protection Technicians, Including Health (194042)

East Cascades (Crook, Deschutes, Gilliam, Hood River, Jefferson, Klamath, Lake, Sherman, Wasco, Wheeler)

Description

Perform laboratory and field tests to monitor the environment and investigate sources of pollution, including those that affect health, under the direction of an environmental scientist, engineer, or other specialist. May collect samples of gases, soil, water, and other materials for testing.

Projections

Area	2022 Employment	2032 Employment	Annual Growth Openings	Annual Replacement Openings	Total Annual Openings
Oregon	305	350	4	33	37
East Cascades	28	31	0	2	2

Wages

No wage data available for this occupation.

Current Job Openings

There are 3 current job listings for this occupation.

Job Title	Location	Order Number	Date Posted
Leak Detection Specialist	Bend	3964426	03/05/2024
Lab Technician	Condon	3935067	01/27/2024
Lab Technician	Arlington	3935057	01/27/2024

Statewide Employment Analysis

Employment in this occupation in 2022 was similar to most occupations across the state. The total number of job openings is projected to be similar to job openings for most occupations in Oregon through 2032. This occupation is expected to grow at a somewhat faster rate than the statewide average growth rate for all occupations through 2032.

Reasonable employment opportunities exist.

Area Employment Analysis

Employment in this occupation in 2022 was similar to most occupations in the region. The total number of job openings is projected to be similar to job openings for most occupations in the region through 2032. This occupation is expected to grow at about the regional average growth rate for all occupations through 2032.

Educational Requirements

The typical entry level education for this occupation is a **Associate's degree**. Those with a Bachelor's degree have a competitive advantage in the labor market.

Medical and Clinical Laboratory Technicians (292012)

East Cascades (Crook, Deschutes, Gilliam, Hood River, Jefferson, Klamath, Lake, Sherman, Wasco, Wheeler)

Description

Perform routine medical laboratory tests for the diagnosis, treatment, and prevention of disease. May work under the supervision of a medical technologist.

Projections

Area	2022 Employment	2032 Employment	Annual Growth Openings	Annual Replacement Openings	Total Annual Openings
Oregon	3,353	3,651	30	223	253

Area	2022 Employment	2032 Employment	Annual Growth Openings	Annual Replacement Openings	Total Annual Openings
East Cascades	176	187	1	12	13

Wages

Area	Median Hourly	Avg Annual	Middle Range
Oregon	$37.60	$75,829	$25.47 - $45.00
East Cascades	$38.88	$75,909	$27.93 - $45.38

Current Job Openings*

There are 2 current job listings for this occupation.

Job Title	Location	Order Number	Date Posted
Clinical Laboratory Assistant - Part Time Nights	The Dalles	3479902	09/30/2022
Clinical Laboratory Assistant - Full Time Varied shift	The Dalles	3168099	02/22/2022

* There are over 250 Lab Technician jobs with an **Associate's degree** as an entry level in the state of Oregon according to Zippia.

Statewide Employment Analysis

Employment in this occupation in 2022 was somewhat larger than most occupations across the state. The total number of job openings is projected to be somewhat larger than most occupations in Oregon through 2032. This occupation is expected to grow at a somewhat slower rate than the statewide average growth rate for all occupations through 2032.

Reasonable employment opportunities exist.

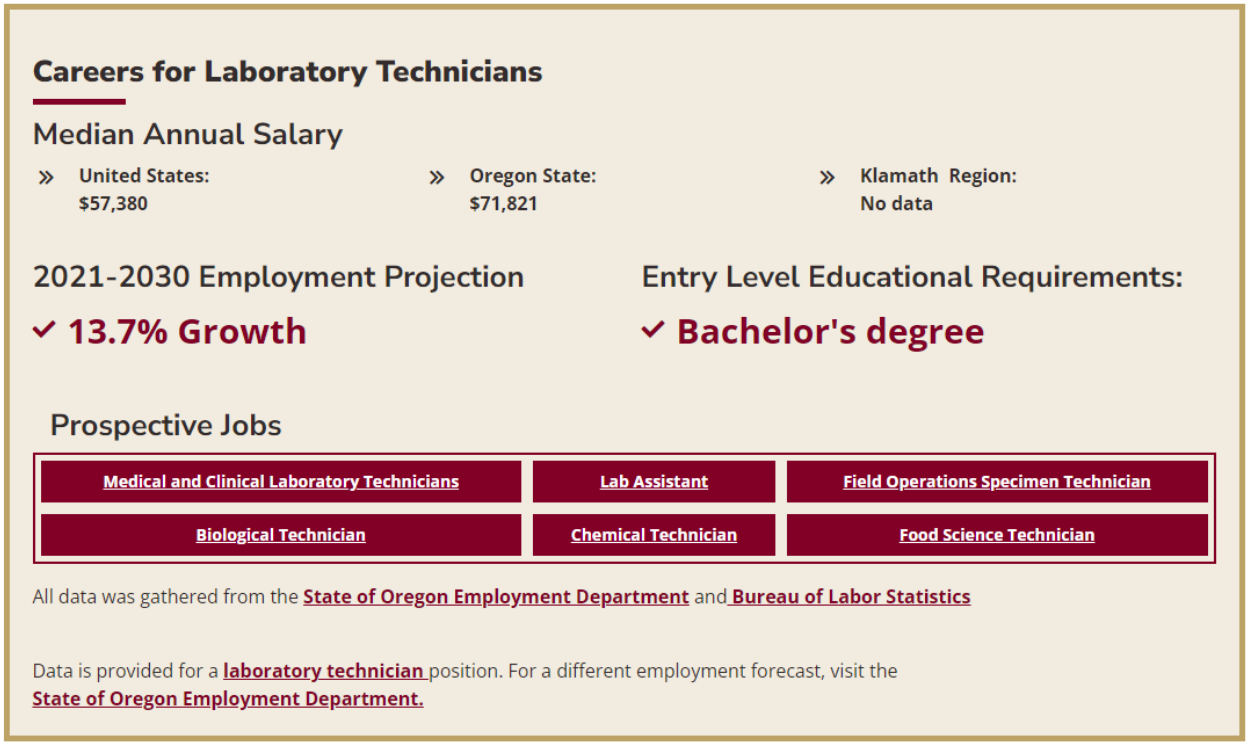
Area Employment Analysis

Employment in this occupation in 2022 was similar to most occupations in the region. The total number of job openings is projected to be similar to job openings for most occupations in the region through 2032. This occupation is expected to grow at a somewhat slower rate than the regional average growth rate for all occupations through 2032.

Educational Requirements

The typical entry level education for this occupation is a **Bachelor's degree**.

. https://www.qualityinfo.org/jc-oprof/?at=1&t1=Agricultural%20and%20Food%20Science%20Technicians~194011~4117000008~1~true~false~true~true~false~true~false~true~true~true~false~false~true~none~0~1~1



https://www.klamathcc.edu/en-US/academics/academic-programs/index.html

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

☒Yes

☐No

	Demand 2019				
Title	**Local Jobs**	**East cascades**	**Oregon**	**Increase**	**Wage**
Food Science Technicians (19-4013)	0	0	110	9.3	32.26
Biological Technicians (19-4021)	4	155	2730	11.8	20.27
Chemical Technicians (19-4031)	0	22	307	12.4	22.51
Environmental Science Technicians (19-4091)	0	7	277	12.3	25.40
Laboratory Technicians, Medical emphasis (29-2012)	2	2	225	20.4	33.01
Total	**6**	**186**	**3649**	**13.24**	**26.69**

	Demand 2024				
Title	**Local Jobs**	**East cascades**	**Oregon**	**East cascades**	**Oregon**
Food Science Technicians (19-4013)	0	0	537		
Biological Technicians (19-4021)	0	196	2,858	$18.03 - $24.85	$19.77 - $27.54
Chemical Technicians (19-4031)	0	23	327		$22.07 - $29.43
Environmental Science Technicians (19-4091)	0	28	305		
Laboratory Technicians, Medical emphasis (29-2012)	2	176	3,353	$27.93 - $45.38	$25.47 - $45.00
Total	**2**	**423**	**7380**		

As depicted above, Local (Klamath Falls) Demand has fallen. Local demand is hard to forecast because it is changes drastically month to month. Demand in the East cascades and Oregon has increased has increased by **127% and 102% respectively**.

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

Title	Area	Projections 2024 2022 Employment	2032 Employment	Annual Growth Openings	Annual Replacement Openings	Total Annual Openings
Food Science Technicians (19-4013)	East Cascades	No projections data is available for this occupation.				
Biological Technicians (19-4021)	East Cascades	196	214	2	24	26
Chemical Technicians (19-4031)	East Cascades	23	27	0	2	2
Environmental Science Technicians (19-4091)	East Cascades	28	31	0	2	2
Laboratory Technicians, Medical emphasis (29-2012)	East Cascades	176	187	1	12	13
Total		**423**	**459**	**3**	**40**	**43**

Title	Area	Projections 2024 2022 Employment	2032 Employment	Annual Growth Openings	Annual Replacement Openings	Total Annual Openings
Food Science Technicians (19-4013)	Oregon	537	581	4	75	79
Biological Technicians (19-4021)	Oregon	2,858	3,131	27	366	393
Chemical Technicians (19-4031)	Oregon	327	379	5	40	45
Environmental Science Technicians (19-4091)	Oregon	305	350	4	33	37
Laboratory Technicians, Medical emphasis (29-2012)	Oregon	3,353	3,651	30	223	253
Total		**7380**	**8092**	**70**	**737**	**807**

In the **East Cascades** there is an expected 9% growth over the next ten years. It is projected that there should be a 10% annual demand between new and replacement openings.

In **Oregon** there is an expected 10% growth over the next ten years. It is projected that there should be an 11% annual demand between new and replacement openings.

Until marketing for the program improves, there will not be need for any program adjustments due to demand.

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

Pathway and One-year certificates were successfully created. They were approved by Academic Council March 18, 2021 and Curriculum Committee April 8th, 2021.

The Advisory Committee has asked to replace CGS 100 and CAS 133/L with the CHE 241 – 243, Organic Chemistry series.

There are two reasons driving this change. First, a more robust background in chemistry would better prepare the student for the laboratory environment.

Second, it would improve the transferability to Oregon State University. The KCC CHE 241-243 Organic Chemistry series transfers to OSU as a CHE 331, 331, and 337 Organic Chemistry. This is contingent on the student passing the ACS Organic Chemistry Exam. However, the components of the ACS Exam have been incorporated into the lecture portion of the class by Dr. Mann to improve student success.

Organic Chemistry is a traditional gatekeeper course at OSU. The typical student attrition reaches 70%. Klamath Community College is in a unique position to offer this course to students with a much lower student to professor ratio. This gives our students a significant advantage that would allow them to get 300-level credit for this course. This would give our transfer graduates a significant advantage in completing a Bachelor's of Science at Oregon State University.

This curriculum change was submitted to the Curriculum Committee last year. Because the number of credit changes was greater than what is allowed without the resubmission of a new program application, this curriculum change must take place in two stages. The first stage will be submitted this Spring term.

3. RESOURCES

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

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

First Name	Last Name	Email Address	Status
Eleazar	Gutierrez	gutierreze@klamathcc.edu	Full time
Barbara	Mann	mann@klamathcc.edu	Adjunct - Retired
Tatiana	McVay	Tatiana.McVay@klamathcc.edu	Full time
Michael	West	west@klamathcc.edu	Part time

The program is composed of only two full time instructors. Dr. McVay and Eleazar. Dr. Mann retired last year and is teaching chemistry as an adjunct Professor.

https://ssrs-s19.klamathcc.edu/Reports/report/Academic%20Affairs/Instructor%20email%20List%20by%20CMA%20code

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

Instructor Name	Sub Group	School	Degree	Major
Gutierrez, Eleazar	F12MO	Oregon State University	Bachelor of Science	Biochem. & Biophysics
Gutierrez, Eleazar	F12MO	Saint Joseph University	Masters of Science	Biochem. - 2025
Mann, Barbara	ADJCR	University of Illinois	Doctorate	Chemistry
Mann, Barbara	ADJCR	Northland College	Bachelor of Arts	Mathematics & Chemistry
McVay, Tatiana	ADJCR	First Moscow State Medical University	Doctorate	Medicine
West, Michael	REGPT	University of Oregon	Bachelor of Science	

The minimum qualifications for a laboratory are a Bachelor's degree. For science lecture, the minimum requirement is a Bachelor's degree, half of the Graduate work completed, and working towards completion. As such, all faculty meet expectations and two exceed expectations with a Doctorate.

https://ssrs-s19.klamathcc.edu/Reports/report/Academic%20Affairs/Instructor%20Degrees

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?

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
- Attended courses in Geographic Information Systems (GIS) through ESRI to better prepare and teach summer GIS courses for the Biological and Environmental Science emphasis of the program.
- Participated in the ScienceBridge program to better prepare the delivery of biotechnology to the program. This developed the curriculum involved with the BIO 212 (Biology) and the BIO 240 (DNA forensics) laboratories.

BARBARA MANN

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

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.

☒Yes

☐No

☐Somewhat

Science faculty composition and qualifications are diverse and fulfill our current instructional needs. The department has two full time instructors. Dr. Mann retired last year and is working as an adjunct Professor of Chemistry. The Program and the Science Department should develop a contingency plan in the even that Dr. Mann chooses not to teach for KCC.

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.

☒Yes

☐No

☐Somewhat

Excellent teaching facilities and technology. Three well-equipped teaching laboratories and computer laboratories are available. Continuing modifications will be suggested through the strategic plan.

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

☒Yes

☐No

☐Somewhat

Klamath Community College is an amazing college. All science labs are saturated with technology. We have excellent student computers, smart boards, and Zoom cameras. Further, the labs are well equipped with chemical and biological fume hoods, microscopes, and the best experimental probes available.

We currently have excellent scientific equipment such as Thermal Cyclers for amplifying DNA; 310 Genetic Analyzer for forensic and sequencing studies of DNA; UV-Vis spectrophotometer to quantify DNA; Gas Chromatograph-Mass Spectrophotometer for analysis of organic (carbon containing) compounds; and an Atomic Absorption Spectrophotometer for the analysis of metals.

Right now, the science lab wants for nothing. In the future the 310 genetic analyzer will cease to be supported. Perishables will no longer be available and alternate instrumentation will be needed.

This is the reason for the effort for the appropriation of the GeneStudio S5 Genetic analyzer. It would be ideal if this technology or one similar to it may be acquired within the next five years.

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

☒Yes

☐No

☐Somewhat

As stated at the beginning of this review, the student access goal of access in the strategic plan is being met by the implementation of Open Education Resources (OER). Further, engaging and affordable resources are being implemented to provide students with the best resources and the most flexible delivery method possible.

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

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

LRC holdings have been reviewed recently. As stated in 3B III (above), the majority of resources are OER. This means that the LRC does not need to spend time and effort curating program resources.

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

The KCC Tutoring Center provides supplemental instruction for students on a drop-in basis for all subjects taught at Klamath Community College.

LRC tutors and TutorMe.com combined provide tutoring for students twenty-four hours, seven days a week. Additionally, students are encouraged to make appointments with their instructors for additional supplemental help. Science and Anatomy & Physiology labs have open hours throughout the week and on Saturdays.

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

Testing services are used exclusively to provide students a flexible testing schedule that does not take time away from lecture.

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

Advising has been taking place through the discipline lead and Trio. Trio provides additional tutoring resources to students. The Klamath Community College Science Club functions to promote both science and the program to students and the Klamath Falls Community. This is done by providing science outreach to elementary schools in the immediate area.

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 Laboratory Technician Program uses Canvas for all of its courses. Canvas resources are used to improve student access and success. OER resources are directly linked on Canvas. Additionally, discussions, quizzes, assignments, PowerPoints, and videos are provided weekly to optimize student engagement and success.

4. EFFECTIVENESS

4A. STUDENT LEARNING OUTCOMES ASSESSMENT

The purpose of CLO assessment is:

- ✓ To ensure student proficiency in course learning outcomes.
- ✓ 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.

LIST OF EVALUATED CLOS

ADV REQ CDE	Course	Learning Outcome Type	Number of assessments
BIO231	Anatomy & Physiology I	CLO	2
BIO234	Microbiology I	CLO	2
		ILO	2
BIO234L	Microbiology I Lab	PLO	1
BIO240	Forensic DNA Biology	CLO	1
		PLO	1
CHE221	General Chemistry I	CLO	1
		ILO	1
CHE221L	Gen Chem I Lab	CLO	1
		PLO	2
CHE222L	Gen Chem II Lab	PLO	1

CHE223L	Gen Chem III Lab	PLO	1

https://ssrs-s19.klamathcc.edu/reports/report/Assessment/Pending%20Reports/Number%20Of%20Assessments%20By%20CMA%20And%20Course

4A.I. COURSE LEARNING OUTCOMES (CLO)

Course Code Key	
	Has Plan Submitted
	Has Result Submitted
	Has Plan And Result Submitted

HTTPS://SSRS-S19.KLAMATHCC.EDU/REPORTS/REPORT/ASSESSMENT/ALL%20CLO%20ILO%20PLO

CLOs		
Course Code	**Term Year**	**Instructor**
BIO 213 01 HX	SP2023	Gutierrez, Eleazar 522611
BIO 231 01	WI2020	Cassady, Mark 510307
BIO 232 01	SP2018	Cassady, Mark 510307
BIO 232 01	WI2020	Cassady, Mark 510307
BIO 232 01	WI2022	Cassady, Mark 510307
BIO 232 01	SP2022	Cassady, Mark 510307
BIO 232 02	WI2019	Cassady, Mark 510307
BIO 232 02	WI2020	Cassady, Mark 510307
BIO 233 01	SP2022	Cassady, Mark 510307
BIO 233 02	SP2022	Cassady, Mark 510307
BIO 233L 01	FA2020	West, Michael 569111

BIO 234 01	SP2019	Gutierrez, Eleazar 522611
BIO 234 01 DE	SP2019	Gutierrez, Eleazar 522611
BIO 240 01	WI2020	Gutierrez, Eleazar 522611
CHE 104 01	FA2018	Mann, Barbara 524940
CHE 104 01	SP2019	Mann, Barbara 524940
CHE 106 01 HX	SP2023	Mann, Barbara 524940
CHE 221 01	FA2020	Mann, Barbara 524940
CHE 221L 01	FA2020	Mann, Barbara 524940
ENV 170 01	WI2018	Gutierrez, Eleazar 522611
ENV 170 01	FA2021	Gutierrez, Eleazar 522611
HIM 210 01 H	SP2022	West, Michael 569111
HPE 225 01 DE	SP2023	McVay, Tatiana 508825
MDA 101 01	FA2019	West, Michael 569111
PHY 211 01	FA2018	Gutierrez, Eleazar 522611

ILOs		
Course Code	**Term Year**	**Instructor**

BIO 101 01	SP2019	Gutierrez, Eleazar 522611
BIO 103 01	SP2023	Cassady, Mark 510307
BIO 227 01	FA2019	Gutierrez, Eleazar 522611
BIO 232 01	SP2020	Cassady, Mark 510307
BIO 233 01	SP2020	Cassady, Mark 510307
BIO 234 01	SP2020	Gutierrez, Eleazar 522611
BIO 234 01 DE	SP2022	Gutierrez, Eleazar 522611
CHE 104 01	SP2018	Mann, Barbara 524940
CHE 104 01	SP2020	Mann, Barbara 524940
CHE 104L 01 DE	FA2021	Mann, Barbara 524940
CHE 105 01	WI2018	Mann, Barbara 524940
CHE 221 01	FA2019	Mann, Barbara 524940
HIM 210 01 DE	SP2023	West, Michael 569111
PHY 213 01	SP2018	Gutierrez, Eleazar 522611

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

Typical criteria for the evaluation of CLO, ILO, and PLOs is 80% of the students reaching a proficiency of 90% or better. The evidence includes summative and formative assessments. These typically include a discussion, essay, quiz, exam, and laboratory report. The analysis is meant to be comprehensive and inclusive.

Assessments across the last year range from 74 to 100%. The lowest assessment is the 2019 lecture of microbiology (BIO 234). Students had significant opportunities to meet with me and tutors.

Additional efforts were implemented to provide the students with expectations earlier and provide succinct videos for asynchronous delivery.

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 diverse set of community members, receptive to the academic needs of the program, meet to steer academic requirements, possible certifications, and Cooperative Work Experience.

The advisory committee follow the template agenda and the Advisory Committee Handbook provided by KCC leadership. Frequently, current Curriculum Committee, OHECC, and technology appropriation modifies the basic agenda template.

The Advisory Committee currently consists of:

Last name	First name	Title	Institution	Telephone	email
Terri	Bloomfield	Doctor of Veterinary Medicine	Shasta View Animal Clinic	541.883.3874	shastaview@fireserve.net
Russell	Danner	Technical Operations Supervisor	Sky Lakes Medical Center	541.274.4002	rdanner@skylakes.org
Melanie B.	Fullman	District Ranger	Fremont-Winema National Forest	541.885.3406	melanie.fullman@usda.gov
Shane	Mitchell	Patrol Sergeant, Sheriff-Campus Liaison	Klamath County Sheriff's Office	541-882-3521 / 541-880-2314	mitchell@klamathcc.edu
Miguel A.	Montes	MD Anatomic and Clinical Pathology	Sky Lakes Medical Center	541.274.6243/541.882.6311	
Zach	Tiemann	Fish Biologist	USFWS	541.885.2513X117	zachary_tiemann@fws.gov
Daniel	Towery	Detective	Klamath County Sheriff's Office	541.883.5130	civil@co.klamath.or.us

Current efforts are focused in recruiting Committee members from Jeld-Wen, DaVita dialysis center, Hope pregnancy center, and Klamath Falls Open door.

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

At the inception of the program various curriculum changes have suggested for GIS 280 (Cooperative Work Experience); BIO 270 (Ecology); and BIO 207 (Human Genetics).

This term (Winter 2024) the advisory committee precipitated a meeting between KCC leadership and Brian Medlock, Senior Forensic Scientist, Bend Forensic Lab for the possible appropriation of technology in BIO 240 (DNA Forensics).

The greatest curricular change proposed by the Advisory Committee has not been implemented yet. This involves the omission of CGS 100 and CAS 133/L and their subsequent replacement with the CHE 241 – 243, Organic Chemistry series. This change will be brought up to the Curriculum Committee this coming Spring term.

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.

Additional resources were added for Cooperative Work Experience. These resources are not easy to attain. Frequently, they are only accessible due to the networking available by the Advisory Committee. An example of this is an amazing shadowship offered by the local USGS.

Mr. Tiemann focused on the recruitment of field technicians for USFWS. He suggested a broad number of field experiences that were implemented into the laboratory portion of BIO 270 (Ecosystems). The first suggestion was to transition the course from the ambiguous Lecture-Lab delivery to a traditional lecture with a lab format. Then you proceeded to provide various relevant field exercises for the laboratory portion. Finally, he suggested that students could participate in additional CWE contact hours during the summer as part of the laboratory component.

Mr. Danner suggested introducing concepts of hematology in BIO 207 (Human genetics) as a means of helping students pass the Medical Laboratory Technician Certification after six months of employment at SkyLakes Medical Center.

Detective Towery, the Klamath County Cold Case Detective, provided rigorous minimums for DNA detection in BIO 240 (DNA forensics). These suggestions were provided and implemented in Winter term of 2024.

This is not a comprehensive list. The Advisory Committee is very involved. They feel an ownership of the program, as they should, and provide ample opportunity for improvement and student success.

4A.II PROGRAM LEARNING OUTCOMES (PLO)

HTTPS://SSRS-S19.KLAMATHCC.EDU/REPORTS/REPORT/ASSESSMENT/PENDING%20REPORTS/PLOS%20BY%20DEGREE

Course Code Key	
	Has Plan Submitted
	Has Result Submitted
	Has Plan And Result Submitted

PLOs		
Course Code	**Term Year**	**Instructor**
BIO 234L 01	SP2023	Gutierrez, Eleazar 522611
BIO 240 01	WI2022	Gutierrez, Eleazar 522611

4A.II.1 Describe evidence of student proficiency in PLOs. If there is no evidence, describe plans to address this.

The proficiency demonstrated in the PLOs are 94 and 83% success in proficiency. The PLOs target courses in the emphasis or technical core, as they should. The assessment of these courses suggest that the programs are exceeding expectations in achieving the Program Learning Outcomes.

https://ssrs-s19.klamathcc.edu/reports/report/Assessment/All%20CLO%20ILO%20PLO

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.

To date PLO assessment demonstrates student achievement of the outcomes. There have not been program changes due to PLOs. This may change in the future.

4B. STUDENT SUCCESS

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

If there is a weakness to be addressed. It is enrollment. Challenges are typically associated with little or no marketing. This concern has been addressed multiple times in Science Discipline meetings, meetings with leadership, and marketing itself.

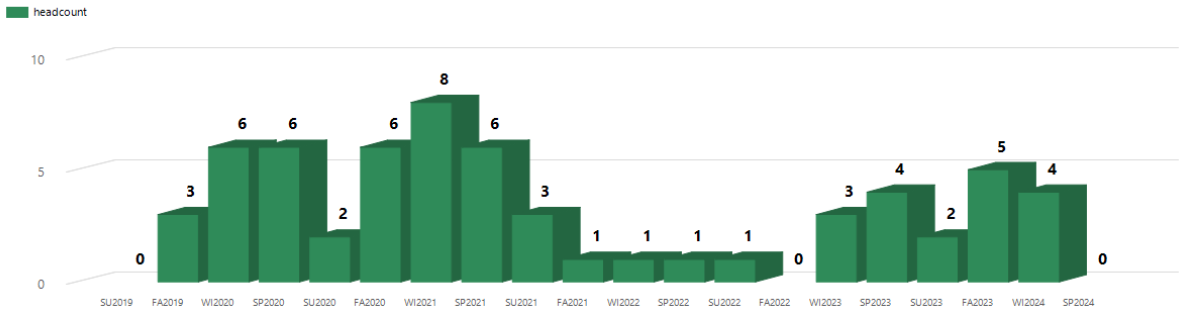
Historically, Program Leads have been tasked with recruitment. If faculty have an everchanging course load with duties as assigned, the time necessary for outside recruitment is not available.

Recently a link has been provided for marketing. It is hopeful that this will change awareness of this program in the community.

https://ssrs-s19.klamathcc.edu/Reports/report/Dashboards/5%20Year%20Comparison%2020%20bar%20graph%20chronological

5 Year Headcount Comparison

Academic Year	Term Year	Headcount
AY 2019-20	Total	15
AY 2020-21	Total	22
AY 2021-22	Total	6
AY 2022-23	Total	8
AY 2023-24	Total	11
Total		**62**



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

Degrees awarded have been **Laboratory Technician ASS** emphasis in Medical and Emphasis in Biological and Biotechnology. Graduates have been employed in fields of their choice.

https://ssrs-s19.klamathcc.edu/reports/report/Enrollment/Program%20Enrollment%20By%20Term%20v2

4B.III. REVIEW TRANSFERABILITY OF PROGRAM.

To improve transferability, the delivery method of technical core courses has been changed from Lecture-Lab to traditional Lecture with a Lab. If the student chooses not to pursue a career in the laboratory, the traditional courses transfer as general science courses in biology.

Students may transfer to OSU without loss of credit. They may also transfer to the OIT Bachelor of Applied Science in Technology and Management without loss of credit.

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

Dual credit is aligning all high school courses. Part of the work is confirming that High Schools CLO and ILOs meet with KCC's expectations.

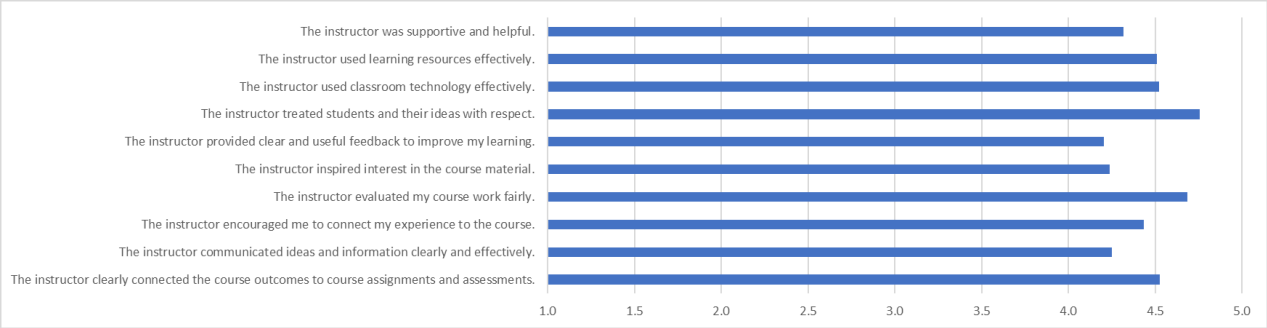
The transferability to the OUS is as either an Associate of Science (AS) or Associate of Applied Science (AAS). The transferability to OIT is as an Associate of Applied Science in Laboratory Technician.

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

Articulations in program and course transfer has not changed significantly in the past five years.

4C. STUDENT ENGAGEMENT AND SATISFACTION

4C.I. COURSE EVALUATIONS DATA AND ANALYSIS



Students have confidence in the course delivery, communication, fairness, and learning outcomes. This trend has been consistent and correlates well with student success.

https://survey.klamathcc.edu/etw/etalus.htm

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.

There have been a couple changes made to instruction due to course evaluations. First, course outlines are provided and updated for each section in the Canvas modules.

Along the same lines, sample assignments and laboratories have been uploaded to provide a better understanding of minimum expectations.

The section on plagiarism and the use of Turnitin has been updated. Students are informed of the use of Turnitin, how it assesses plagiarism, minimum expectations, and consequences of plagiarized material.

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

Along the same lines as the section above, concerns typically focus around expectation. An outcome of both student evaluation and dean assessment is the need for uniform grading rubrics. Grading rubrics are being built for assignments and laboratories.

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

No placement data is available at this time. There have been some magnificent successes in the program. Students that may be placed in the spotlight are Fernando Torres and Emilee Terence Biele. They both distinguished themselves in their respective Cooperative Work Experience. As a result, they

were both hired in the career of their choice. Mr. Torres is a Medical Laboratory Technician at SkyLakes Medical Center and Mrs. Biele was hired by Fish and Wildlife.

Mr. Torres continues to distinguish himself at SkyLakes. I occasionally hear from some of my prospective lab students that they are here because Mr. Torres is very satisfied with his current employment and directs his peers to follow his path through the Lab Tech. Program.

5. BUDGET

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

Gen Ed Science					
Academic Year	AY 2018-19	AY 2019-20	AY 2020-21	AY 2021-22	AY 2022-23
Tuition	$505,853	$450,250	$509,578	$371,242	$402,658
Registrations	1867	1688	1878	1408	1440
Cost In Progress	$359,825	$456,456	$531,274	$493,747	$526,327
Margin In Progress	$146,028	$(6,206)	$(21,696)	$(122,505)	$(123,669)
FTE	121.65	113.15	126.56	95.07	96.52

The Lab Tech. program budget is part of Gen Ed Science. Although the Lab Tech. Program is its own entity, the budget is driven by the Gen Ed Science Discipline.

https://ssrs-s19.klamathcc.edu/reports/report/Sandbox/CMA%20work%20spot/Annual%20CMA%20Budget%20By%20Degree

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 in this initial program review.

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

There is a drive to move laboratories to distance education and dry (paper) labs. This does not necessarily provide the academic rigor for student success. It is understood that distance education is necessary for Klamath Community College to remain competitive in an academic World of online course and program offerings. However, it is only the well-prepared and disciplined student that excels in this online environment.

Academic rigor and the assimilation of essential laboratory technique that will benefit the student in their employment come directly from wet (physical manipulation), face-to-face laboratory offerings and contextualized Cooperative Work Experience. It follows that; although wet labs are more challenging to prepare, take longer to set up and run; they provide the student with the best academic experience and laboratory proficiency. Wet labs are more expensive than dry labs. Despite this fact, they should be central to a robust and purposeful academic curriculum.

Although wet labs are more expensive than dry labs, currently there is enough budget to provide the supplies and basic instruments for all wet labs in the program. The budget is provided by laboratory fees that have kept the academic environment sustainable.

6. CONCLUSION

6A. DESCRIBE PROGRAM STRENGTHS.

The program strengths originate from the motivation behind its inception. No new courses were built or designed for the laboratory program. Budgetarily, this is desirable because there is no expenditure associated with the building of new courses, hiring of new instructors, or acquisition of additional instrumentation.

The flag-ship courses associated with this program were initially developed to provide contextualized science courses for the Criminal Justice Program. One of the requirements imposed on these courses was that they should be function as stand-alone courses without math or science prerequisites. This constraint was imposed so that Pathway and One-year Criminal Justice students could take these contextualized courses without having to fulfill a lengthy laundry list of math and science prerequisites.

These courses had been built prior to the inception of the program and, therefore, were available to be provided as part of the Lab Tech Technical Core.

Three important traits characterize the program. First, a negligible margin for ancillary, non-essential material. Second, purposeful selection of courses to maximize knowledge, skill, and abilities in the occupation range. Last, the fastidious selection of courses necessary to glean specific skill set for employability.

Guided by an accomplished panel of community partners that provide relevant Cooperative Work Experience and help design a curriculum that will produce the most employable graduate.

6B. DESCRIBE PROGRAM WEAKNESSES.

The three pillars of success in a necessary program are marketing, advising, and financial aid. This program has suffered from all three. But, in particular, from lack of marketing and visibility. It is hard to make a program viable and sustainable without visibility. Occasional visibility is gleaned from community and foundation walk-throughs. During walk-throughs, community members are always surprised the Klamath Community College offers certain programs, is saturated with technology, and preoccupies itself with employment and transferability.

Advising is a second challenge. Students typically come after a term to a year of the incorrect courses for their initial advising meeting. Students frequently become frustrated during their initial advising meeting to find out that they have spent time, money, and effort in courses that are not part of the curriculum.

The Program needs to continue to develop. It is a constantly changing entity. Essential course changes need to take place. Assistance is need to facilitate these changes that have been promulgated by the Program Advisory Committee through the Curriculum Committee and Cabinet.

6C. DESCRIBE SUPPORT NEEDED.

Support is most needed in marketing of the program. If student numbers increase, subsequent goals would become easier to realize.

Early identification and advising of prospective students.

Help is needed in bringing about changes that have been proposed by the Program Advisory Committee.

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

Support involves the aforementioned challenges.

- ✓ Marketing. This needs to be a priority.
- ✓ Identifying Lab Tech. students and guiding them to the Discipline leas to promote a cohort advising environment.
- ✓ Facilitate essential curricular changes through Curriculum Committee and Cabinet.

https://klamathccedu.sharepoint.com/sites/SP/Lists/Department%20Plans/AllItems.aspx

8. APPENDICES

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**