

New Certificate Application

Certificate in Precision Medicine

(CER-PCMC)

1. Program Identification

- a. Title of certificate: Certificate in Precision Medicine
- b. Program type: Certificate
- c. Home department or unit: Precision Medicine, School of Health and Human Services, College of Graduate and Professional Studies
- d. Program developer(s) and credentials: Russell Kruzelock, Ph.D. in Molecular Genetics
- e. Where program will be offered and delivery method: ACU Dallas, Online
- f. Proposed date of implementation: Spring 1, 2022

2. Program Details

- a. Description. Summarize this course of study in 50 to 200 words.

The Certificate in Precision Medicine, a fully online program, provides foundational training in theory and techniques for development of targeted therapies through genetics/genomics, immunohistochemistry, and histopathobiology as applied through the field of precision medicine.

- b. Description of target audience.

The Certificate in Precision Medicine is designed for medical professionals, clinical researchers, and healthcare administrators seeking foundational scientific and operations expertise applicable to the evolving clinical advances in precision medicine. Students will be drawn from individuals working in administration and research fields, as well as individuals who seek to enter this emerging field -- all of whom would benefit from the convenience of a fully online program. A distinct part of the target audience will be employees from CARIS Life Sciences who desire to earn a credential for promotion in the precision medicine field.

- c. Projected total enrollment for each of the first five years.

- i. Year 1: 10
- ii. Year 2: 12
- iii. Year 3: 15
- iv. Year 4: 20
- v. Year 5: 25

3. Rationale and Need for Program

a. Mission fit.

The mission of ACU is “to educate students for Christian service and leadership throughout the world.” The Certificate in Precision Medicine will be part of the University’s expanding programs in healthcare and healthcare-related fields. As healthcare and allied health issues create additional opportunities for service, ACU is enlarging its vision to serve through developments in research and teaching. In addition, the opportunity to partner with a recognized commercial venture in precision medicine opens the door to ACU preparing leaders in this emerging scientific field.

Specifically, the Certificate in Precision Medicine will prepare medical professionals, clinical researchers, and healthcare administrators for the unique challenges and opportunities precipitated by new technology applications in the healthcare industry.

b. Societal need.

Cancer diagnosis and treatment have advanced dramatically over the years, especially in the realm of precision medicine and genetic research. Precision medicine is opening the door to a new era in healthcare through revolutionizing the way cancer is treated based on a person’s genetics. According to a recent report, the global cancer profiling market is expected to witness strong growth, registering 17.7% in its compound annual growth rate (CAGR) during the forecast period 2017-2026.¹ In addition, data from the American Cancer Society suggests there will be an “estimated 1.9 million new cancer cases diagnosed and 608,570 cancer deaths in the United States” in 2021 alone.² Further, precision medicine and the emerging treatments it provides have broad application in addressing other chronic disease systems. Educational institutions must collaborate with healthcare providers and industry leaders to address the societal needs related to cancer and other diseases. As a fully online program, the Certificate in Precision Medicine provides students the opportunity to gain foundational knowledge and skills in this rapidly-evolving field while continuing in their current professions.

¹ See Global Cancer Profiling Market to Grow at 17.7% CAGR During 2017-2026 | Roche Holdings, Caris Life Sciences, GenScript *retrieved from* <https://ksusentinel.com/2021/04/08/global-cancer-profiling-market-to-grow-at-17-7-cagr-during-2017-2026-roche-holdings-caris-life-sciences-genscript/>

² See Cancer Facts and Figures 2021 *retrieved from* <https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/cancer-facts-figures-2021.html>

c. Prospective student interest.

The Certificate in Precision Medicine will draw new students to the university, including career professionals and students recently graduating from bachelor's degree programs. Healthcare leaders and professionals, including clinical researchers, medical technologists, doctors, nurses, nurse practitioners, pharmacists, and genetic counselors could benefit from this degree. In addition, those with specific industry knowledge in the areas of primary care, oncology, radiation therapy, hematology, surgery, clinical research, policy, and many others would benefit from the knowledge gained in this program.

d. Disciplinary benchmarking.

Only 12 institutions in the United States offer a similar program. Seven of those institutions have greater than zero-percent market-share: University of Maryland, Baltimore; University of Georgia; George Washington University; University of Arizona; University of Southern California; Case Western Reserve University; Indiana University-Purdue University-Indianapolis. The two Texas schools (UTHSCSA and Baylor) have conferred no degrees in 2015-19, and have zero percent of the market-share. University of Maryland, Baltimore, has the largest percentage of market share at 44.44%. George Washington University has the largest share of the market among private institutions at 11.11%.³

4. Curriculum

a. Course of study.

Required Courses:

PCM 601 - Histopathology and Molecular Biology of Cancer, 3 hours
PCM 605 - Molecular Targets in Precision Medicine, 3 hours

Total Required Courses: 6 Hours

Electives (select 9 hours):

PCM 611 - Essential Clinical Laboratory Operations/Management Skills, 3 hours
PCM 622 - Applied Next Generation Sequencing (NGS) and Analysis, 3 hours
PCM 626 - Applied Medical Genetics/Pharmacogenomics, 3 hours
PCM 633 - Regulatory and Operational Compliance, 3 hours
PCM 637 - Advanced Strategies in Clinical Biomarker Development/Use, 3 hours
PCM 641 - Introduction to Machine Learning and Artificial Intelligence, 3 hours
PCM 644 - Clinical Research Designs / Statistics / Data Analytics, 3 hours

³ Source: <https://bit.ly/3boHwVy>

PCM 652 - The Immune System and its Role in Precision Medicine, 3 hours

Total Electives: 9 Hours

Total Major: 15 Hours

b. Courses.

Course	Req'd or Menu	Rotation and Frequency	Faculty Credentialed to Teach
PCM 601	Required	Every other session, three times per year. First term offered: Fall 1, 2021	Hassan Ghani, MD; Russell Kruzelock, Ph.D.
PCM 605	Required	Every other session, three times per year. First term offered: Fall 2, 2021	Rebecca Feldman, Ph.D. ; YeRussell Kruzelock, Ph.D.
PCM 611	Menu	Every other session, three times per year. First term offered: Spring 1, 2022	Russell Kruzelock, Ph.D.; Rebecca Feldman, Ph.D., TBD
PCM 622	Menu	Every other session, three times per year. First term offered: Spring 2, 2022	Russell Kruzelock, Ph.D.; Rebecca Feldman, Ph.D., TBD
PCM 626	Menu	Every other session, three times per year. First term offered: Summer 1, 2022	Russell Kruzelock, Ph.D.; Rebecca Feldman, Ph.D., TBD
PCM 633	Menu	Every other session, three times per year. First term offered: Summer 2, 2022	Russell Kruzelock, Ph.D.; Rebecca Feldman, Ph.D., TBD
PCM 637	Menu	Every other session, three times per year. First term offered: Fall 1, 2022	Russell Kruzelock, Ph.D.; Rebecca Feldman, Ph.D., TBD
PCM 641	Menu	Every other session, three times per year. First term offered: Fall 2, 2022	Russell Kruzelock, Ph.D.; Rebecca Feldman, Ph.D., TBD
PCM 644	Menu	Every other session, three times per year. First term offered: Spring 1, 2023	Russell Kruzelock, Ph.D.; Rebecca Feldman, Ph.D., TBD
PCM 652	Menu	Every other session, three times per year. First term offered: Spring 2, 2023	Russell Kruzelock, Ph.D.; Rebecca Feldman, Ph.D., TBD

c. New courses. For new courses included in the program/major requirements, list:

PCM 601 - Histopathology and Molecular Biology of Cancer

This course introduces fundamental cancer theory and image analysis techniques in cancer histopathology. Students will explore topics in slide preparation and changes in tumorion cell morphology as it relates to image interpretation. An introduction to the application of digital image processing techniques for feature extraction and disease classification is provided. (This

course will also be used in the Graduate Certificate in Precision Medicine Administration.)

PCM 605 - Molecular Targets in Precision Medicine

The identification of drug targets for disease is central to pharmaceutical research. This course provides students a historical understanding of key targets of drug development by reviewing one of the most important aspects of drug discovery – the identification of drug targets for precision medicine. (This course will also be used in the Graduate Certificate in Precision Medicine Administration.)

PCM 611 - Essential Clinical Laboratory Operations / Management Skills

Training in genetics laboratory operations and management is an essential component in a laboratory leader's professional's toolkit. This program covers the best practices in many areas of laboratory management and reporting, including financial considerations in sustainable laboratory operations, accreditation and quality control issues, HIPAA, ethics in molecular pathology, effective communication strategies, and how to manage and report bioinformatics results.

PCM 622 - Applied Next Generation Sequencing (NGS) and Analysis

Since the completion of the Human Genome Project, next generation sequencing (NGS) has become the leading technology platform driving advances in Precision Medicine. This course provides fundamental training in the most advanced NGS platforms, methods and their applications to healthcare practice and medical research.

PCM 626 - Applied Medical Genetics / Pharmacogenomics

This course presents fundamental concepts, laboratory techniques and skills employed in the rapidly growing field of applied medical genetics. With an emphasis in cancer genetics, this class explores how patient genetic data are used to better diagnose diseases, assess risk and select optimal treatment strategies based on an individual's genetic profile.

PCM 633 - Regulatory and Operational Compliance

Diagnostic laboratories are subject to unique regulatory and payment guidelines. This course explores key clinical laboratory practices needed to demonstrate knowledge, intent and processes that comply with important safety and legal regulations. Also discussed will be practices to help remain current with ongoing changes in relevant laws and regulations.

PCM 637 - Advanced Strategies in Clinical Biomarker Development/Use

Biomarkers are used to objectively measure and evaluate biological processes, or responses to a therapeutic intervention. This course explores how to identify, verify and validate biomarkers in molecular medicine and explores nine ways that

precision medicine can benefit patients and the healthcare system.

PCM 641 - Introduction to Machine Learning and Artificial Intelligence

This course provides an introductory explanation of data analysis techniques including machine learning, data mining, and statistical analysis used to generate clinically useful molecular information for clinicians to make diagnostic, prognostic and/or therapeutic decisions.

PCM 644 - Clinical Research Designs / Statistics / Data Analytics

This course examines key research design principles pertinent to health care, clinical laboratory operations and drug development. Students will learn classical and adaptive clinical trial study designs, common statistical methods and quality assurance techniques used to interpret clinical data and platforms used to analyze online clinical data sets.

PCM 652 - The Immune System and its Role in Precision Medicine

Due to the important role immunology plays in infectious disease, autoimmune disorders, chronic disease, cancer and more, major pharmaceutical research focuses on precision medicine strategies that target the immune system. This course provides an advanced study of clinical immunology including physiology of the immune system, the immune response to infection and disease, pathophysiology of infectious disease and current diagnostic and immune targeted strategies used in drug development and disease treatment.

Based on the course offering plan, the deadlines below will ensure that each course is reviewed by the CGPS Academic Council in the term prior to its first offering in order to allow sufficient time to build the course. The courses should be presented to the academic council by the following dates:

- PCM 601, June 2021
- PCM 605, July 2021
- PCM 611, October 2021
- PCM 622, October 2021
- PCM 626, February 2022
- PCM 633, February 2022
- PCM 637, June 2022
- PCM 641, June 2022
- PCM 644, October 2022
- PCM 652, October 2022

Initial Review and Required Signatures

This proposal complies with curricular requirements of the university and addresses all required questions for institutional review.

Assistant Provost for Curriculum and Assessment

Date

This proposal does not require additional review for institutional accreditation purposes.

SACSCOC Liaison

Date

Supporting Documentation

1. Approval Chart for Curriculum Changes
2. Memo of support from the department chair of each department outside the home department that will provide a course for the program. (Not Applicable)
3. Letters of Review:
 1. Dean of the library for library resources review.
 2. Dean of the college of the program for a statement of commitment to the items in Required Institutional Support.

ABILENE CHRISTIAN UNIVERSITY
LIBRARY

M E M O R A N D U M

DATE: June 14, 2021
TO: Dr. Joey Cope
FROM: Mark McCallon, Library Associate Dean for Library Information Services
RE: New Program Application for Certificate in Laboratory Precision Medicine

Thank you for the opportunity to review the new program application for the proposed Certificate in Laboratory Precision Medicine.

The Brown Library can provide a provisional endorsement of the new program with the agreement that the Library will have the opportunity to review and comment on each course as it is adapted or created for the online modality. This review will be made as part of instructional design process prior to the presentation of these courses to the CGPS Academic Council, whether for approval or as an information item or added to the course schedule.bulletin.

memo

To: Rusty Kruzelock, Program Director and Vice President for Research
From: Jessica Smith, Associate Provost for Curriculum and Assessment
Date: June 18, 2021
Re: New Program Application — Precision Medicine M.S.;
New Certificate Application — Precision Medicine, graduate

The proposals for the master's degree and graduate certificate in precision medicine carry forward the trajectory begun by the recent introduction of the precision medicine administration track of the healthcare administration program. The two new online programs under consideration capitalize on the new expertise that you have brought to the university and the encouragement and partnership of CARIS Life Sciences.

These programs will prepare students to work in the lab settings where they will conduct patient diagnostics and developing and researching treatments and interventions for patients with cancer and other chronic diseases. The career preparation that it offers students has a strong university mission fit.

The program will introduce 15 new courses. All will need to be approved by your academic council before they will be available for a functioning degree audit for your program. They may be introduced beginning at any time and each have the latest deadline for submission in the proposal, so in any case, all courses in this degree plan will be submitted by October 2022.

The course offerings are mapped out well, and the specificity of assessment plan should allow you to continually improve the program. The master's offers the opportunity for individual research by students, which is appropriate at the post-graduate level and provides the opportunity for students to customize their focus based on their interests. The curriculum for the certificate maps well with the master's degree so that students who complete the certificate have the option to continue or come back later for the additional credential of a graduate degree if they desire. The picture of the need for institutional commitment is clear.

Thank you for your work toward this addition to our curriculum.

MEMORANDUM

TO: Academic Council
College of Graduate and Professional Studies

FROM: Nannette W. Glenn, Ph.D., Dean

DATE: June 15, 2021

RE: Required Institutional Support
Certificate in Precision Medicine

I have examined the items detailed in the application as required institutional support for the creation, implementation, and maintenance of the new certificate, Certificate in Precision Medicine. I hereby acknowledge the obligations of this initiative and commit to providing the institutional support, as set forth.

Nannette W. Glenn, Ph.D.

M E M O R A N D U M

TO: CGPS Council
FROM: Chris Riley, Assoc. Provost for IE / SACSCOC Liaison
DATE: June 18, 2021
RE: Masters and Graduate Certificate in Precision Medicine

I have reviewed the above applications as well as applicable SACSCOC Substantive Change Policies and Procedure. Because over both of these new programs consist of 50% or more new content that is not currently offered by ACU at these instructional levels, these programs constitute a substantive change requiring a full prospectus, due July 1, and approval by SACSCOC's Executive Council prior to implementation.

ACU Dallas Approval Chart for Curriculum Changes

A = Approve I = Information Item R = Advise & Respond

Course Number:

or Degree Plan(s): Certificate in Precision Medicine

		Program	Dean	College Academic	Provost	President
	Change to a Course					
1.	Title (description unchanged)	A	A	I	I	I
2.	Description (not affecting content)	A	A	I	I	I
3.	Course term(s)	A	A	I	I	I
4.	Content (substantive change)	A	A	A	A	I
5.	Number of credit hours	A	A	A	A	I
6.	Course number within the hundred	A	A	I	I	I
7.	Course number beyond the hundred	A	A	A	A	I
8.	Prerequisites	A	A	A	A	I
9.	Course fee(s)	A	A	--	A	I
10.	From U to G <i>or</i> G to U	A	A	A	A	I
11.	Cross list with another program or department	A	A	A	A	I
12.	Program/department of record	A	A	A	A	I
13.	Open or close a course	A	A	A	A	I
14.	New course (application required)	A	A	A	A	I

		Program	Dean	College Academic	Provost	President	Board of Trustees
	Change to a Degree Plan						
1.	Major/Program — Revision	A	A	A	A	A	--
2.	Major/Program — Adopt or change admission requirements	A	A	A	A	A	--
3.	Major/Program — Add	A	A	A	A	A	--
4.	Major/Program — Offer existing university program on campus	--	A	A	A	A	--
5.	Major/Program — Discontinue (proposed by Program or College)	A	A	A	A	A	I
6.	Major/Program — Discontinue (proposed by Provost)	R	R	A	A	A	I
7.	GPA — Revise major/program or cumulative requirement	A	A	A	A	A	--
8.	Minor — Revise course selection	A	A	I	I	I	--
9.	Minor — Add	A	A	A	A	A	--
10.	Minor — Discontinue (proposed by Program or College)	A	A	A	A	A	--
11.	Minor — Discontinue (proposed by Provost)	R	R	A	A	A	--
12.	Degree — Add	A	A	A	A	A	I
13.	Degree — Discontinue (proposed by Program or College)	A	A	A	A	A	I
14.	Degree — Discontinue (proposed by Provost)	R	R	A	A	A	I

		Program	Dean	College Academic	UGEC	UUAC	Provost	Faculty	President
	Change to Undergraduate University Requirements								
15.	University Requirements — Change in approved course content	A	A	A	A	A	A	--	A
16.	University Requirements — Add or drop a required course from the University Requirements chart	A	A	A	A	A	A	A	A
17.	University Requirements — Add or drop a course from a menu within the University Requirements chart	A	--	--	A	A	A	--	A
18.	University Requirements — Change hours within a menu on the University Requirements chart	A	A	A	A	A	A	A	A
	Change to Catalog Information For Campus								
1.	General requirements for graduation including course requirements that are common to all majors for all degrees	--	--	A	--	--	A	--	A
2.	Admission requirements	--	--	A	--	--	A	--	A
3.	Policies governing academic probation and suspension	--	--	A	--	--	A	--	A
4.	Requirements for graduating with honors	--	--	A	--	--	A	--	A

Program Director/Department Chair

Dr. Russell Kruzelock

Date

Signature

Date

Dean(s)

Dr. Nannette Glenn

Date

Signature

Date

College Academic Council

Dr. Nannette Glenn

Date

Chair's signature

Date

University General Education Council

Chair's signature

Date

Undergraduate Academic Council

Chair's signature

Date

Provost

Dr. Robert Rhodes

Date

Faculty

Faculty Senate Chair's signature

Date

President

Dr. Phil Schubert

Date