

ACU Dallas Approval Chart for Curriculum Changes

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

Degree Plan(s):

Please see the attached application. The PCM Program is proposing a new certificate entitled PCM Certificate: Analytics.

Graduate Certificate in Precision Medicine - Analytics

The Certificate in Precision Medicine - Analytics is designed for future medical/research professionals seeking introductory experience applicable to the evolving clinical advances in precision medicine from the analytics point of view. Where this certificate differs from the other PCM credentials is that students will be drawn from individuals working in undergraduate computing fields, mathematical fields, and biomathematical fields -- all of whom would benefit from the convenience of a fully online program. The certificate is a 15-credit-hour program.

Admission Requirements

The admission requirements for the Certificate in Precision Medicine Administration are:

1. A completed application for admission with a nonrefundable application fee;
2. An official transcript(s) in English (or translated to English) from the regionally-accredited college or university that awarded the baccalaureate degree to the applicant.;
3. A 3.0 or better cumulative undergraduate GPA (on a 4.0 scale). A GPA of 2.5 to 2.99 may be considered for probationary admission;
4. Purpose statement addressing career goals and fit with the program, including the Christian identity of the university and program.
5. Resume or Curriculum Vitae.

		Program	Dean	College Academic	President	Board of Trustees
	Change to a Degree Plan					
12.	Degree — Add	A	A	A	A	I

Program Director/Department Chair



June 20, 2023

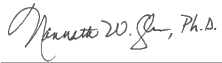
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Dean(s)



Jun 23, 2023

Signature

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College Academic Council

Chair's Signature

Date

Chair's signature

Date

University General Education Council

Chair's signature

Date

Undergraduate Academic Council

Chair's signature

Date

Provost

Signature

Date

Faculty

Faculty Senate Chair's signature

Date

President

Signature

Date

New Program Application

Certificate Precision Medicine Analytics

1. Program Identification

- a. Program title: Certificate in Precision Medicine Analytics
- b. Degree 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: Jon R. Wiener, Ph.D., Microbiology, Program Director, PCM
- e. Where program will be offered and delivery method: ACU Dallas, Online
- f. Proposed date of implementation: TBD

2. Program Details

- a. The Certificate in Precision Medicine Analytics, a fully online program, provides foundational training in theory and techniques for development of targeted therapies through genetics/genomics, machine learning, artificial intelligence, and algorithmic development, as applied through the field of precision medicine.
- b. Program mission statement. In this certificate program, students receive an introduction to how computer programming, machine language, artificial intelligence, and tumor biomarker analysis can be used to better diagnose and treat patients.
- c. Program outcomes. We plan to monitor these programmatic outcomes:
 - i. ***Students will learn the theory and practice supporting techniques and skills necessary in a clinical precision medicine laboratory performing molecular tests and evaluating analytical test results.***
 - ii. ***Students will learn to critically evaluate this research literature, identify an important problem in precision medicine, and plan/conduct research to address research problems.***
 - iii. ***Students will apply ethical and professional standards including responsibility to the patient and community both personally and professionally within the organization.***
- d. Description of target audience.: The Certificate in Precision Medicine Analytics is designed for future medical/research professionals seeking introductory experience applicable to the evolving clinical advances in precision medicine from the analytics point of view. Where this certificate differs from the other PCM credentials is that students will be drawn from individuals working in undergraduate **computing fields, mathematical fields, and biomathematical fields** -- all of whom would benefit from the convenience of a fully online program.
- e. Admission requirements. The Admission requirements for this certificate are the same as for the other certificates and masters degree: Admission Requirements: application and processing fee, official transcripts in English of all previous colleges attended. The transcripts must indicate an earned Bachelor's degree from

- a regionally accredited college or university. An undergraduate GPA of 3.0 and no work experience OR an undergraduate GPA between 2.5-2.99 with quality full-time work experience. The program director will evaluate applications on a case-by-case basis. Purpose statement addressing career goals. Resume or CV.
- f. 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
 - g. CIP code: 51.1005

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 Analytics 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 basic scientists 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. 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. 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. The uniqueness of the Analytics certificate is that it fills a huge void in the advancement of Precision Medicine for the future of diagnostic medicine: the middle stage of PCM is analysis of huge amounts of basic science data is necessary to give to the end users, the physicians, for better diagnosis and

- treatment of patients. This certificate provides students with the basics of the science necessary to fill that void.
- c. Employment demand and career possibilities.:
 - i. Identify jobs that graduates would be qualified to pursue.: Healthcare computer programmer; data analyst; biotechnologist; medical researcher, and others.
 - ii. According to Lightcast data, there were 23,699 jobs nationally for Masters and 130,518 jobs nationally for Bachelor's degreed professionals in this market mapped to CIP 51.1005. ACU Dallas, however, is experiencing direct demand from its direct-to-business partner, CARIS Life Sciences, where the staff are incentivized to earn additional certificates. This certificate in Data Analytics is a response to direct need, and will also provide a foundation for additional programs at the graduate level in Precision Medicine.
 - iii. Lightcast's cross-list for CIP 51.1005 is to two SOC codes: 19-1042 and 29-2018. These two occupations combined have an average annual compensation of \$64,817. The majority of these jobs are reported in General Medical and Surgical Hospitals (31.7%), Medical and Diagnostic Laboratories (14.6%), and Scientific Research and Development Services (11.9%). There are currently 59,978 positions in California, and 35,489 positions in Texas; Massachusetts is third largest with 29,049.
 - d. Prospective student interest. The Certificate in Precision Medicine Analytics 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, computer programmers, biomathematicians, and potentially doctors, nurses, nurse practitioners, pharmacists, and genetic counselors could benefit from this certificate.
 - e. 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%. As far as can be determined, this certificate is not offered at any other institution of higher education. It compares to the other certificates in the PCM program in that it uniquely stresses and focuses on analytics, i.e. machine learning, algorithmic development, and artificial intelligence, whereas the other two certificates focus on administration or the biology of PCM.

4. Curriculum

- a. Degree plan. The certificate will consist of 15 required graduate credit hours, as follows:

1. PCM 601 (3 credit hours; ch)
2. PCM 605 (3ch)
3. PCM 641 (3ch)
4. PCM 644 (3ch)
5. HCAD 656 (3ch)

- b. Courses.

- i. **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 tumor 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 is also being used in all the other PCM credentials.)
- ii. **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 is also being used in all the other PCM credentials.)
- iii. **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. ((This course is also being used in all the other PCM credentials.)
- iv. **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. (This course is also being used in all the other PCM credentials.)
- v. **HCAD 656 - Healthcare Informatics**
An introduction to the field of healthcare analytics with emphasis on the application of statistical concepts, procedures, and tools to add value to healthcare leaders in making clinical and management decisions (This course is also being used in the HCA program)

Course	Req'd or Menu	Rotation and Frequency	Faculty Credentialed to Teach
PCM 601	Required	Every other session, 3x/yr	Femina Rauf, Ph.D. Rebecca Feldman, Ph.D.
PCM 605	Required	Every other session, 3x/yr	Rebecca Feldman, Ph.D. Le Huang, Ph.D.
PCM 641	Required	Every other session, 3x/yr	Allison Sherier, Ph.D.
PCM 644	Required	Every other session, 3x/yr	David Arguello, M.D.
HCAD 656	Required	Every other session, 3x/yr	Suzanne Hitchins, Ph.D.

c. New courses. NO new courses are to be utilized in this certificate.

5. **Assessment Plan**

a. Curriculum map.

Course	Program Outcomes	I,R,A
PCM 601	<i>i, ii</i>	I, R
PCM 605	<i>i, iii</i>	I, R,A
PCM 641	<i>i, ii, iii</i>	I, R, A
PCM 644	<i>i, ii, iii</i>	I, R, A
HCAD 656	<i>i, ii, iii</i>	I, R, A

b. **Program outcomes (from 2c). We plan to monitor these programmatic outcomes:**

i. ***Students will learn the theory and practice supporting techniques and skills necessary in a clinical precision medicine laboratory performing molecular tests and evaluating analytical test results.***

Measure 1: PCM 605 Week 7 Assignment 1: Mock Molecular Tumor Board Presentation.

a. Competency target: 80% of students will earn 70% or higher.

b. Ideal target: 90% of students will earn 80% or higher.

c. Responsible personnel: Program Director and Adjunct Faculty.

d. Timeline: Data will be collected each term the course is taught.

Measure 2: HCAD 656: Week 3 Assignment 1: Precision Medicine.

- a. Competency target: 80% of students will earn 70% or higher.
 - b. Ideal target: 90% of students will earn 80% or higher.
 - c. Responsible personnel: Program Director and Adjunct Faculty.
 - d. Timeline: Data will be collected each term the course is taught.
- ii. ***Students will learn to critically evaluate this research literature, identify an important problem in precision medicine, and plan/conduct research to address research problems.***

Measure 1: PCM 641 Week 6 Assignment 1: Evaluating Survival Data.

- a. Competency target: 80% of students will earn 70% or higher.
- b. Ideal target: 90% of students will earn 80% or higher.
- c. Responsible Personnel: Program Director and Adjunct Faculty.
- d. Timeline: Data will be collected each term the course is taught.

Measure 2: PCM 644 Week 1 Assignment 1: Exploring a Potential Biomarker.

- a. Competency target: 80% of students will earn 70% or higher.
- b. Ideal target: 90% of students will earn 80% or higher.
- c. Responsible Personnel: Program Director and Adjunct Faculty.
- d. Timeline: Data will be collected each term the course is taught.

- iii. ***Students will apply ethical and professional standards including responsibility to the patient and community both personally and professionally within the organization.***

Measure 1: PCM 644 Week 2 Assignment 1: Clinical Trial Development Poster.

- a. Competency target: 80% of students will earn 70% or higher.
- b. Ideal target: 90% of students will earn 80% or higher.
- c. Responsible Personnel: Program Director and Adjunct Faculty.
- d. Timeline: Data will be collected each term the course is taught.

Measure 2: HCAD 656: Week 7 Assignment 1: Individual Security versus Public Need.

- a. Competency target: 80% of students will earn 70% or higher.
- b. Ideal target: 90% of students will earn 80% or higher.
- c. Responsible Personnel: Program Director and Adjunct Faculty.
- d. Timeline: Data will be collected each term the course is taught.

6. Required Institutional Support

- a. Faculty requirements and availability.

- i. Describe the new program's impact on faculty workload. There should be no additional impact on faculty workload, with the minor exception of a few more students in already existing sections being run for the other credentials.
 - ii. If program delivery requires a faculty hire, provide an expected salary range and forecast potential faculty availability.: N/A
 - iii. Part-time instructors: Faculty at the present time, with the exception of PCM 633, are all adjunct faculty who are compensated by Caris.
- b. Impact on existing programs. None, should only add students for this particular certificate.
- c. Program director. Jon R. Wiener, Ph.D. Expertise: Microbiology, Molecular Biology, and Cancer Biology.
- d. Staff requirements. At this time, no additional staff are required for this program.
- e. Library resources. The ACU Library holds and licenses academic information resources that are adequate to meet the needs of the M.S. in Precision Medicine. The ACU Library provides these current library resources supporting the proposed program. For students in healthcare related fields, the ACU Library licenses a number of discipline-specific databases:
 - i. **MEDLINE/PubMed (EBSCO)** - Comprehensive bibliographic index to journal articles in the fields of medicine and health. Coverage begins in 1966. Contains the full text of some articles that are open access via PubMed.
 - ii. **CINAHL Complete** - Provides indexing for 1,835 journals from the fields of nursing and allied health. Contains searchable cited references for more than 930 journals and provides full text for hundreds of journals, plus legal cases, clinical innovations, critical paths, and more. PDF backfiles to 1982 are also included.
 - iii. **Proquest Nursing and Allied Health Source** - Provides users with reliable healthcare information covering nursing, allied health, alternative and complementary medicine, and much more. Provides abstracting and indexing for more than 850 titles, with over 715 titles in full-text, plus more than 12,000 full-text dissertations representing the most rigorous scholarship in nursing and related fields.
 - iv. **Health Source: Nursing/Academic Edition** - Provides nearly 550 scholarly full text journals focusing on many medical disciplines. Features abstracts and indexing for nearly 850 journals.
Gale OneFile: Health and Medicine - Up-to-date information on the complete range of health care topics. With more than 2,500 full-text periodicals, reference books, pamphlets, and hundreds of videos demonstrating medical procedures and live surgeries.
 - v. **Proquest Sci-Tech Premium Collection** - The SciTech Premium Collection includes the Natural Science Collection and the Technology Collection and provides full-text titles from around the world, including

scholarly journals, trade and industry journals, magazines, technical reports, conference proceedings, government publications, and more.

- vi. **Alternative Health Watch** - This alternative health database provides full text for 180 publications in the collection (many are peer-reviewed). Provides in-depth coverage across many subject areas covered by complementary and alternative medicine. In addition to these and other aggregated, full-text databases, the ACU Library also subscribes to more than 10,000 electronic journals from publishers including Wiley, Springer, ScienceDirect, Oxford, Cambridge, and Brill. There are over 800 health-related journals included in our subscriptions with these publishers. Some of these significant journals include:

1. *Cancer Immunology, Immunotherapy*
2. *Therapeutic Advances in Vaccines and Immunotherapy*
3. *Diagnostic Histopathology*
4. *Journal of Photochemistry and Photobiology B: Biology*
5. *Journal of Cardiovascular Magnetic Resonance*
6. *Rare Tumors*
7. *Histochemistry and Cell Biology*
8. *Tumor Biology*
9. *SLAS Technology*
10. *Molecular Diagnosis and Therapy*

7. All courses are delivered in the Canvas Learning Management System and most, if not all texts and resources are made available electronically through the Canvas course navigation menu. For ACU library resources, each online course has a link to the ACU Library Distance Education Portal and the resources available in the university library. Students are supported in the use of textbooks and learning resources available in the Canvas LMS by a dedicated team of Student Services Advisors, in addition to the faculty. The ACU Brown Library provides two full-time librarians dedicated to assisting ACU online students.

- a. Physical resources. None required. All courses are 100% online delivery.
- b. Scholarships. Will the unit provide any unique scholarships to students in the program?: No scholarships, but the program still utilizes Caris reimbursements for Caris employees who successfully complete the courses.
- c. Recruiting. The Certificate in Precision Medicine Analytics should be marketed to students graduating from academic programs in computer science, biomathematics, biology, and genetics. In addition, career professionals in medicine, clinical research, and artificial intelligence are prime candidates for this program. The cost of digital marketing will be set and budgeted within the marketing plan for ACU Dallas. In addition, direct recruiting contact will be established through precision medicine industry partners. Recruiting expenses will be included with marketing for the M.S. in Precision Medicine.
- d. Additional cost to deliver the program. None

8. Additional Information Required for Substantive Changes

- a. Student support services. Describe specific programs, services, and activities that will support students enrolled in the program. Some examples of academic support services are teaching and resource centers, tutoring, academic advising, counseling, disability services, diversity and inclusion offices, teaching laboratories, career services, testing centers, student life, and information technology.:
- b. Describe financial resources available to support the new program, including a budget for the first year of the program; projected revenues, expenditures, and cash flow; amount of resources going to external institutions or organizations contracted to provide support services for the program; the operational, management, and physical resources available for the change.:
- c. Provide contingency plans in the event required resources do not materialize.
- d. All applications are required to include Section VIII. Please compile this documentation after the initial review by the provost's office.:

9. Supporting Documentation

- a. Approval Chart for Curriculum Changes:
- b. Memo of support from the department chair of each department outside the home department that will provide a course for the program.:
- c. When the new program application is complete, provide the full proposal to the following individuals for review. Each will provide a memo to attach to the proposal.:
 - i. Assistant provost for institutional effectiveness and SACSCOC liaison for substantive change review.:
 - ii. Dean of the library for library resources review.:
 - iii. Dean of the college of the program for a statement of commitment to the items in Required Institutional Support.:
 - iv. Assistant provost for curriculum and assessment for review of the program outcomes, curriculum map, and assessment plan and evaluation of compliance with academic policies.

memo

To: Jon Wiener, Program Director
From: Jessica Smith, Associate Provost for Curriculum and Assessment
Date: June 20, 2023
Re: New Certificate Application — Precision Medicine Analytics, graduate

Focusing on analytics has the potential to draw researchers and healthcare workers with different backgrounds and expertise than have been attracted to our existing precision medicine programs. Enrollment in our two existing precision medicine certificates remains small compared to the master's program in the area. However, these certificates and the proposed new one offer students multiple entry points and distinct skill sets. Partnership with CARIS Life Sciences has been key to our investment in this area.

The small number of programs offering a comparable program nationally is both an opportunity and an encouragement to monitor our investment in this area closely. We have the opportunity to help students meet real needs in the healthcare industry. And as with any new and growing area, we will need to compare our offerings against industry standards as it advances in order to continue to serve students beyond the initial need as it presents today. Data analytics broadly is an area of significant interest for Texas students today.

The program requires no new courses. The course offerings are mapped out well, and the specificity of assessment plan should allow you to continually improve the program. 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. *nwg*
Dean, CGPS

DATE: June 22, 2023

RE: Required Institutional Support
PCM Certificate

I have examined the items detailed as required institutional support for the creation, implementation, and maintenance of the PCM Certificate. I hereby acknowledge the obligation of this initiative and commit to providing the institutional support, as set forth.

ABILENE CHRISTIAN UNIVERSITY
LIBRARY

M E M O R A N D U M

DATE: June 20, 2023
TO: Dr. Jon Wiener
FROM: Mark McCallon, Library Associate Dean for Library Information Services
RE: New Program Application - Certificate in Precision Medicine Analytics

Thank you for the opportunity to review the application for the proposed Certificate in Precision Medicine Analytics. Since no new courses are to be utilized for the certificate, the Library can support the proposed program. Thank you for letting us review the program application.