AGENDA

UW-GREEN BAY FACULTY SENATE MEETING NO. 3
Wednesday, November 11, 2020
3:00 p.m.
Presiding Officer: Mark Klemp, Speaker
Parliamentarian: Steve Meyer

1. **CALL TO ORDER**

2. **APPROVAL OF MINUTES OF FACULTY SENATE MEETING NO. 2**
   October 14, 2020 [page 2]

3. **CHANCELLOR'S REPORT**

4. **OLD BUSINESS**
   a. No Old Business

5. **NEW BUSINESS**
   a. Request for Authorization to Implement a Bachelor of Science in Community Health Education at the University of Wisconsin-Green Bay [page 7]
      Presented by Susan Gallagher-Lepak, Dean, CHESW
   b. Proposal for New Collaborative Online Graduate Certificate in Applied Bioinformatics [page 24]
      Presented by Lisa Grubisha
   c. Memorial Resolution for Dennis Bryan, Professor Emeritus [page 44]
      Presented by Scott Ashmann, Associate Dean, CHESW
   d. Resolution to Delay Implementation of Biweekly Pay for Faculty and Academic Staff in the UW System [page 45]
      Presented by Jon Shelton, UWGB Faculty Representative
   e. Update on Center for Civic Engagement
      Presented by Alison Staudinger
   f. Update on the Emergency Family Medical Leave Act
      Presented by Christopher Paquette and Megan Noltner
   g. Request for Future Business

6. **INTERIM PROVOST'S REPORT**

7. **OTHER REPORTS**
   a. Graduate Academic Affairs Report – Submitted by Gail Trimberger, Chair [page 46]
   b. University Committee Report – Presented by UC Chair Julie Wondergem
   c. Faculty Rep Report – Presented by Jon Shelton
   d. Academic Staff Report – Presented by Sherri Arendt [page 47]
   e. University Staff Report – Presented by Kim Mezger [page 48]
   f. Student Government Report – Presented by Guillermo Gomez

8. **ADJOURNMENT**

[draft]

MINUTES 2020-2021
UW-GREEN BAY FACULTY SENATE MEETING NO. 2
Wednesday, October 14, 2020

Presiding Officer: Mark Klemp, Speaker of the Senate
Parliamentarian: Steve Meyer, Secretary of the Faculty and Staff

PRESENT: Mike Alexander (Chancellor, *ex-officio*), Mandeep Bakshi (ALTERNATE-NAS), Devin Bickner (NAS-UC), Kate Burns (Interim Provost, *ex-officio*), Thomas Campbell (TND), Vallari Chandna (ALTERNATE-M&M), Gary Christens (A&F), Marecelo Cruz (PEA), Greg Davis (RSE), William Gear (HUB), Richard Hein (Manitowoc), Amy Kabrhel (NAS), Mark Karau (HUS), Mark Kiehn (EDUC), Mark Klemp (Marinette-UC), Jim Loebl (A&F-UC), Ann Mattis (HUS), Eric Morgan (DJS), Paul Mueller (HUB), Val Murrenus-Pilmaier (HUS), Rebecca Nesvet (HUS), Matthew Raunio (Sheboygan), Stephanie Rhee (SOCW), Bill Sallak (MUSIC), Jolanda Sallmann (SOCW), Jon Shelton (DJS-UC), Courtney Sherman (MUSIC), Heidi Sherman (HUS-UC), Alison Staudinger (DJS-UC), Patricia Terry (RSE), Praneet Tiwari (ALTERNATE-BUA), Katie Turkiewicz (CIS), Christine Vandenhouten (NURS), Kris Vespia (PSYCH), Dean VonDras (PYSCH), Sam Watson (AND), Brian Welsch (NAS), and Julie Wondergem (NAS-UC)

NOT PRESENT: Kristy Deetz (AND), Tetyana Malysheva, and Tom Nesslein (PEA)

REPRESENTATIVES: Sherri Arendt (ASC) and Theresa Mullen (USC)

GUESTS: Scott Ashmann (Assoc. Dean, CHESW), Caroline Boswell (Director, CATL), Pieter deHart (Assoc. VC for Grad Studies), Matt Dornbush (Dean, AECSOB), Alison Gates (Prof., AND), Susan Grant Robinson (Cabinet Liaison, Internal Affairs), Ben Joniaux (Chief of Staff), John Katers (Dean, CSET), Holly Keener (Provost Asst.), Corey King (Vice Chancellor for University Inclusivity & Student Affairs), Susan Machuca (Exec. Officer Asst., Sheboygan), Amanda Nelson (Assoc. Dean, CSET), Megan Olson Hunt (Assoc. Prof., RSE), Mary Kate Ontaneda (SOFAS Asst.), Jessica Van Slooten (Assoc. Prof., HUS), Sherry Warren (Asst. Prof., SOCW), Amanda Wildenberg, Dean Asst., CAHSS), and Mike Zorn (Assoc. Dean, CSET)

1. CALL TO ORDER.

With professional abandon, Speaker of the Senate Mark Klemp got the afternoon's proceedings started with a rap of his mighty gavel, thus calling to order the second Faculty Senate meeting of the 2020-2021 academic year at 3:02 p.m. I guess you could refer to Mark as a "rap" star.

2. APPROVAL OF MINUTES OF FACULTY SENATE MEETING NO. 1, September 16, 2020

September's flavor-of-the-month, "Pumpkin Spice Faculty Senate minutes," were passed by consensus.

3. CHANCELLOR'S REPORT

Chancellor Alexander began his comments by welcoming two new cabinet members. Dr. Corey King, Vice Chancellor for Inclusivity and Student Affairs, has hit the ground running and is already making an impact on our campus. Susan Grant Robinson, Cabinet Liaison for Internal Affairs, is diving right in helping to directly support faculty and staff.

UW System announced that it will keep the academic calendar for the year as originally published. Individual campuses have been given the flexibility to choose the route they would like to follow. At this point, UWGB will maintain course and not make any calendar changes as administration feels we are somewhat unique in that our residential students often travel home on weekends. Therefore, keeping the integrity of the calendar is important, which includes semester breaks which are vital to the mental health of the students, faculty, and staff. Safety protocols are being put into place for students living in the residence halls who exit and return to campus following weekends and semester breaks. Chancellor Alexander expressed his gratitude to Amy Henniges and her staff who are working on the frontlines conducting the testing/contact tracing and keeping us safe.

The Chancellor once again expressed his pleasure in the growth that has taken place on campus, this has allowed us to think strategically about how to move forward. Our next biggest potential challenge, in terms of budget, occurs when the legislature reconvenes. But because of the growth that has occurred, we are feeling confident in our fiscal position (fingers crossed).

Chancellor Alexander next took a moment to discuss Incentive-Based Budgeting (IBB), a traditional source of stress among anyone on campus who has ties to the institution's purse strings (regarding budgets of any other kind, the rest of us must be content with ties to shoe strings). COVID has delayed our implementation of the model. When it is employed, the IBB is intended to be a constructive tool to help us get better and assist us in using data in a way to inform our decision-making (but not lock us into decisions). IBB should never be used in a fiscally punitive manner.

4. OLD BUSINESS

Apparently, Faculty Senate is already thinking ahead to 1 January 2021 with an "out with the old, in with the new" philosophy, as there was no old business to attend to.

5. NEW BUSINESS

a. Resolution in Support of the Guidelines for the Administration and Use of Student Evaluations of Teaching during the Fall 2000-Summer 2021 Academic Year

Speaker Klemp first called for a motion to support the resolution; an eager **Senator Vespia moved acceptance of the resolution (seconded by Senator Cruz).** After taking into account feedback from faculty and students, Professors Van Slooten and Boswell brought forward an adaptation of the course evaluation process and Student Feedback Form that was implemented during the Spring 2020 semester. Recognizing that COVID continues to cause classroom disruption and assorted challenges to instructional faculty and staff, Profs.Van Slooten and Boswell proposed that this process and form be used for the 2020-21 academic year. It was suggested that Profs. Boswell and Van Slooten work with the SOFAS to encourage faculty to include an "instructor self-reflection and reporting" section in the teaching component of their 2020-21 PAR. Questions from faculty senators addressed: units that need data on instruction for self-study reports and accreditation [it would be difficult to customize the form for individual units]; how this data collection method might impact probationary faculty who need data on teaching effectiveness for use in contract renewal and tenure decisions [the goal of this process is to provide instructors feedback (to improve their instruction given they may be using techniques and methods they may have never used before) while also allowing students to voice their opinions; then faculty could use self-reflection as a different method of reporting on their teaching]; it was also mentioned that this may be a good time to encourage more peer observation of probationary faculty. **The motion was approved 34-1-0.**

b. Update on Child Care Access Means Parents in Schools (CCAMPIS)
Prof. Staudinger provided some background to what seems like the continuing saga that is Child Care on the UWGB campus. In November 2016, the day after the Presidential election, the faculty senate voted to support a resolution encouraging the university to take steps to support student parents. This support included encouragement to pursue grant funding. This month, Prof. Staudinger received word that her Department of Education grant ($80K/year for four years) was funded. The bulk of the funding will go toward stipends supporting students who have dependents, perhaps using the CARES grant infrastructure as a model for providing the stipends. The stipends are paired with student success-related programming and additional incentives to encourage participation in high impact practices. The funding also supports the establishment of a Provost-appointed advisory board. If anyone wants to become involved, this board may be a good place to start. If anyone knows of a student-parent who would like to be a board member, they should nominate that student. Prof. Staudinger asks that anyone who has a desire to collaborate in the planning or programming of CCAMPIS should contact her. She also requested assistance in publicizing this program to students. [The chatroom "switchboard lights" were lighting up with congratulatory notes to Prof. Staudinger].

c. Results of the Workload Survey Data
Speaker Klemp temporarily handed over control of the gavel to Deputy Speaker Heidi Sherman so that he could present preliminary results of the faculty/staff survey on workload. The University Committee has been working on this since summer when it became apparent there were concerns regarding stresses related to dependent care (childcare and aged care) during COVID. Positive conversations with the Chancellor and the Provost demonstrated an interest on their part to help with the issue. Some thoughts discussed among the various entities included adjustments to the tenure clock, annual review criteria, teaching reassignments, and scholarship and service expectations. As a result, a survey was developed, sent to faculty, and 142 responses were received (87 tenured faculty, 27 tenure-track faculty, and 28 instructional academic staff). Prof. Klemp briefly summarized the survey results (graphed data could be found in the Faculty Senate agenda, starting on page 13). What was most impactful to the UC were the open-ended comments that respondents shared. From these comments it was immediately recognized that, 1) childcare is a huge issue, and 2) everyone is hurting in some way (e.g., anxiety, depression, loneliness). After reviewing the survey data, the UC was surprised how broad the levels of anxiety and workload stress spanned.

Questions and comments from senators brought out issues of inequity in workload during these times of COVID. Examples included: enrollment caps on internet courses were set at 45 students, yet when COVID forced all courses to go online the courses that enrolled 90 or more students meant we were teaching the equivalent of two online courses but only receiving credit for teaching one course; whether brand new lecturers, beginning employment just two weeks before the start of the semester, teaching 27 credits, and having to learn all the technology was fair especially under these circumstances; while the tenure clock extension was applauded for its intent to help untenured faculty, it also means those individuals are kept in lower paid, lower status positions for a longer period of time, instead should we reconsider the expectations for tenure during these times.

d. University of Wisconsin-Green Bay Need-Based Grant Aid and Merit-Based Scholarship Award Policy (GB21-19-1)
Interim Provost Kate Burns mentioned this was the first scholarship policy the University has adopted. There were three reasons for developing a policy. First, the risk management aspect. We currently have criteria for some scholarships that would be problematic when scrutinized under a

legal microscope. Having this document in place allows us to have conversations with donors about changing criteria to make sure we are on good legal standing, we are using an equitable selection process, and we are covered from a liability perspective. Second, there is more of a focus on need-based scholarships (addressing the access emphasis of our mission) and less on merit-based scholarships. Third, UWGB invested in an award management software package. Questions from senate included: my unit awards scholarships, so does my unit now select a number of candidates for the scholarship but not the actual recipient? (it's a work-in-progress; the software would free up time and workload involved in the selection process); should the "domicile of student as determined by County of high school attended" not get any more specific than the "County" level? (we have certain scholarships associated with some of our Additional Locations that wish to award scholarships to local students)

e. Request for future business
There was an old ghost who moaned "Boooooo"
It's trying its best to scare you
No cause for alarm
It can do you no harm
Unlike this strange year we've been through
(there was no new business brought forward by the senators this month)

7. PROVOST'S REPORT
Interim Provost Kate Burns began with an enrollment update, stating we are working to finalize our College Credit in High School (CCIHS) numbers in order to determine a final Fall semester headcount. Currently, we officially have 7,649 enrolled students, but we expect to have about 1,300 CCIHS students, which would bring our total enrollment up to an estimated 8,957 students, an increase of 215 students over last year.

The Comprehensive Program Review (CPR) team is meeting every other week and is making great progress. They have solidified the metrics they will be using, keeping in mind the new mission, how we align ourselves with that mission, and using a forward-looking approach. The team is now determining data needs, both quantitative and qualitative. To that end, on 29 October 2020 the team will meet with unit and program chairs to discuss the types of information needed from the units. The team is shooting for an 8-week turnaround on this information gathering exercise so that Spring semester can be used to provide feedback (open forums, listening sessions, Faculty Senate review) on the CPR itself. For HLC accreditation it is important to have those feedback mechanisms.

Provost Burns completed her report by mentioning the workload change conversations she has had with the UC; specifically, how can we make changes in terms of workload (shared advising model, reduced service load/committee meeting frequency, personnel reviews within units). Regarding caregiver concerns, we do have Emergency Family and Medical Leave (EFMLA) for COVID leave tied to caregiving (that expires 31 December 2020, but Provost Burns will check with HR regarding whether it will be extended beyond that date).

When fielding questions, several senators asked for additional information or clarity on the Professional Advising Model. Questions and concerns related to advising centered on overburdening various faculty/staff groups with an increased advising load, the need to hire advisors who would better relate to our growing underrepresented student population, adding bilingual advisors and

academic coaches, taking advising out of the hands of the people who know the respective units the best (the faculty who teach in those programs), and whether the model is a one-size-fits-all or can it be "customized" based on the size of the unit.

8. OTHER REPORTS

a. Academic Affairs Report. Found on page 23 of the agenda.

b. University Committee Report. Chair Wondergem was left with nothing to add as everything the UC has been working on was already presented at this meeting. But she did solicit suggestions on the workload issue; please share with any UC member.

c. Faculty Rep Report. Jon Shelton reported that the UW Faculty Reps recently held a joint meeting which included an audience with Interim UW President Tommy Thompson. Thompson mentioned he is working on several initiatives, including: more University outreach to prisons, restructuring of administrative functions at the UW System level, moving to a cloud-based computer system, and a new standardized bimonthly (1st and 15th) payroll system. Rep. Shelton mentioned that faculty may hear something regarding a change to sabbatical policy; this is nothing about which faculty should be overly alarmed. The change basically removes the requirement that the Board of Regents has to update the administrative guidelines every two years; instead it allows System and individual campuses to set the guidelines. Reviews of programs arrays at UW-Whitewater and UW-Platteville are leading to their respective administrations to push for proposed changes in programs offered (possible cuts). Pushback from Whitewater's Faculty Senate Chair led to their administration backing off on their proposals. Similar conversations of restructuring are reported at other campuses. The Title and Total Compensation (TTC) has been pushed back (old news), but this Fall TTC will work with HR units. The earliest implementation of TTC would be March 2021, but likely later than that.

d. Academic Staff Committee Report. Sherri Arendt, Chair of the ASC, related to Senate that the ASC will be discussing the new scholarship policy discussed earlier, as much of the work described in the policy will fall on the shoulders of academic staff. Sherri also offered her thanks regarding faculty's concern about the workload being carried by academic staff.

e. University Staff Committee Report. USC representative Theresa Mullen had no additions to the USC written report on page 25 of the agenda.

f. Student Government Association Report. SGA President Guillermo Gomez was not available to provide a report.

9. ADJOURNMENT at 4:37 p.m.

Respectfully submitted,

Steve Meyer, Secretary of the Faculty and Staff

REQUEST FOR AUTHORIZATION TO IMPLEMENT A BACHELOR OF SCIENCE IN COMMUNITY HEALTH EDUCATION

AT UNIVERSITY OF WISCONSIN-GREEN BAY

PREPARED BY UW-GREEN BAY

ABSTRACT

Program and student learning outcomes for this major align with the National Commission for Health Education Credentialing (NCHEC) competencies for health education practice. This program is based on coursework from a variety of disciplines and culminates in the completion of a semester-long practicum at a community-based agency where students will apply their knowledge and skills in a workplace setting. High impact practices that increase rates of student retention and engagement are included within the major. Graduates will be able to assess, plan, implement, and evaluate health education programs for a variety of populations and communities. They will work collaboratively with community partners/stakeholders to advocate for programs that address community needs. Content in didactic courses as well as field experiences will offer students opportunities to engage with diverse individuals in the community, receive feedback on strategies and practices specific to diverse populations, and reflect on their learning relative to their own experiences and cultures. Similar types of community health programs regionally and across the country have shown significant enrollment growth in the past decade and the employment outlook for students is very good. In addition, findings from EAB reports suggest growing student demand for a Community Health Education program. According to the Bureau of Labor Statistics, overall employment of community health educators is projected to grow 11% from 2018 to 2028, which is much faster than the average for all occupations. Graduates will find jobs in health care (e.g., hospitals, public health departments, health insurance), non-profit organizations, and private businesses.

PROGRAM IDENTIFICATION

Institution Name: University of Wisconsin-Green Bay

Title of Proposed Academic Program: Community Health Education

Degree Designation(s): Bachelor of Science

Mode of Delivery

Single Institution - degrees for the Community Health Education major will be awarded by UW-Green Bay. The program will be primarily in-person with some hybrid and online courses and learning experiences, utilizing many existing courses from a variety of disciplines along with a field experience and capstone project completed at appropriate community organizations.

Department or Functional Equivalent: Nursing and Health Studies

College, School, or Functional Equivalent: College of Health, Education and Social Welfare

CIP Code: 51.22 Public Health

Proposed Date of Implementation: Fall 2021

Projected Enrollments and Graduates by Year Five

The expected enrollment pattern (Table 1) is based on the timely nature of this major (i.e., pandemic), knowledge of enrollments in professional programs at UW-Green Bay, and the enrollment pattern from similar programs. This program will draw from recent high school graduates, non-traditional career changers, transfer students, and students transitioning from another major. Continuing students in Year 1 (Table 1) reflect anticipated interest from students already enrolled at UW-Green Bay. This major is not a cohort model and students can enter the major in fall, spring, or summer.

Table 1: Five-Year Academic Program Enrollment Projections

Students/Year	Year 1	Year 2	Year 3	Year 4	Year 5
New Students	12	24	28	32	34
Continuing	6	14	29	43	51
Total Enrollment	18	38	57	75	85
Graduating				8	11

A retention rate of 75% was used, which is based on UW-Green Bay data provided by the University of Wisconsin System (2019). This rate is approximately the Full-Time First-Time class of Fall 2017 from year 1 to year 2. In the above projection, initial enrollment of 18 students in Year 1 steadily increases yearly resulting in a total student enrollment of approximately 85 students in year 5. By the end of year 5, 19 graduates of the program are anticipated.

Tuition Structure

The current UW-Green Bay tuition is $262.43/credit for resident students. No tuition increase is anticipated. The cost and revenue model presented anticipates 100% residential students. Tuition and fees for a full-time Wisconsin resident is $7,874 for the academic year. The nonresident tuition rate is $670.47/per credit/per semester (includes segregated fees). No additional program or course fees are planned. Segregated Fees are assessed for all credits up to a maximum of 12 credits for undergraduate students. The current full-time segregated fee is $787.56 per semester. A standard distance education fee of $25.00 per credit is applied to online courses. Additional costs students need to cover include books/supplies (estimate of $800); housing, if used ($4,020); and a meal plan ($2,790) for the academic year.

DESCRIPTION OF PROGRAM

Overview of the Program

This major is planned within the 120-credit requirement for graduation. Based on the proposed curriculum, this includes 65 credits for the major (48 upper level credits). With proper planning, all but 15 credits of the general education requirements are covered by this major. General education requirements that are not covered include First Year Seminar (3 cr), Fine Arts (3 cr), Humanities (6 cr), and Natural Science (3 cr). Courses with a CHE prefix on Table 2 are the only courses that need to be developed; All other courses currently exist at UW-Green Bay.

The Association of American Colleges & Universities identifies many high impact practices that have been widely tested and shown to be beneficial for college students from many backgrounds. This major will include the following practices that educational research suggests increase rates of student retention and student engagement:

- Learning communities –During the students' junior year, a sequence of Community Health Education courses is required and culminates with capstone and field practicum courses in the senior year. Throughout this course sequence, students will learn together and be exposed to real-life examples in the field of Community Health Education.
- Writing-intensive courses – Each course will require assignments and activities that will enhance the written communication skills of students. Effective communication is a key component of being a successful community health educator.
- ePortfolios – This allows students to collect their work over time, reflect upon their growth, and share selected items with others (e.g., instructors, potential employers).
- Community-based learning – Field-based experiential learning (9 credits) with community partners will be a culminating activity for students in this major. Students will have the opportunity to apply what they are learning in a real-world setting.
- Capstone course – This course will require students to create a project that integrates and applies the knowledge and skills they have learned across the program.

Student Learning and Program Outcomes

Program outcomes align with the NCHEC responsibilities, competencies, and sub-competencies for health education specialist practice.[1] By the end of the program, students will:

1. Understand the structure of contemporary healthcare including public, non-governmental, and health systems.

[1] National Commission for Health Education Credentialing (NCHEC) (n.d.). Responsibilities and Competencies for Health Education Specialists. Retrieved from https://www.nchec.org/responsibilities-and-competencies

2. Use an interdisciplinary approach to addressing complex population health issues and factors that influence health.
3. Apply the steps of assessment, planning, implementation, and evaluation in the design of community health campaigns.
4. Gather, analyze, and synthesize multiple sources of community/public information.
5. Identify and engage priority populations, partners, and stakeholders to design and implement health education programming.
6. Apply established ethical principles and principles of cultural humility, inclusion, and diversity in the development of community/population health campaigns.
7. Apply education and communication theories and/or models in developing community/population health campaigns.
8. Evaluate communication channels and current emerging technologies most appropriate for the audience and message.
9. Promote the health education profession to stakeholders, the public, and others.

Upon completion of the program, graduates will be able to assess, plan, implement, and evaluate health education programs for a variety of populations and communities. Graduates will work collaboratively with community partners/stakeholders to advocate for programs that address community needs (e.g., access to oral health care for uninsured adults).

Program Requirements and Curriculum

Table 2: Program Curriculum

Courses	Credits	Gen Ed
Supporting Courses	***23***	
BIOL 201/202 Principles of Biology: Cellular and Molecular Processes w/lab	4	BS
CHEM 207 Laboratory Safety	1	
COMM 133 Public Address or COMM 166 Interpersonal Communication	3	
COMM SCI 205 Social Science Statistics	4	QL
MATH 101 Advanced Algebra	2	
PSYCH 102 Introduction to Psychology	3	SS1
PSYCH 203 Lifespan Development	3	SS1
WF 105 Research and Rhetoric	3	WE-LL

Lower Level Courses in the Major	***17***	
HUM BIOL 215 Personal Health and Wellness	3	SP
HUM BIOL 240/241 Anatomy & Physiology w/lab	5	
NURSING 200 Fundamentals of Healthcare Terminology	3	
NUT SCI 202 Ethnic Influences on Nutrition	3	ES
SOC WORK 275 Foundations of Social Welfare Policy	3	SS2
Upper Level Courses in the Major	***48***	
CHE ### Foundations of Community Health Education	3	WE-UL
CHE ### Methods and Strategies for Health Education	3	WE-UL
CHE ### Program Planning in Community Health Education	2	
CHE ### Grant Writing	2	
CHE ### Capstone Seminar	3	
CHE ### Field Practicum	9	
HLTH MGT 301 Healthcare Systems	3	
HLTH MGT 302 Healthcare Management	3	
HLTH MGT 401 Healthcare Economics & Policy	3	
HLTH MGT 402 Population Healthcare Management	3	
HUM BIOL 322 Epidemiology	3	GC, SP
NURSING 340 Quality Improvement	2	
PSYCH 310 Drugs & Behavior	3	
PU EN AF 428 Public and Non-Profit Program Evaluation	3	
SOC WORK 340 Strengths Based Group Facilitation	3	
General Education Courses not met by the Major	***15***	
First Year Seminar 198	3	WE-LL

Fine Arts general education course	3	FA
Humanities general education courses	6	H1, H2
Natural sciences (e.g., CHEM 108/109)	3	NS
Electives	***17***	
Total Credits	***120***	

Assessment of Outcomes and Objectives

Student learning outcomes will be aligned with the NCHEC areas of responsibilities and competencies for Health Education Specialist Practice.2 The chair of the program, in collaboration with the program faculty via a curriculum committee, will have responsibility for the assessment of student learning. The assessment plan will identify student learning outcomes covered by each course (and threaded across the curriculum) and how each outcome will be assessed. Both direct and indirect assessments of learning outcomes will be utilized. Direct assessment will include embedded course assignments related to learning outcomes, ePortfolios, and performance evaluation in practicum courses. Indirect assessment methods, including student course evaluations, will also be used. Assessment data will be used to inform program changes and continuous improvement (e.g., revision of course content and teaching methods), and aid in monitoring program quality over time. The assessment plan will be implemented during the first year of the program and compiled annually. The program assessment plan will align with the University Plan for the Continuous Assessment of Student Learning.3 The Plan requires program-specific assessment of student learning, regular reporting of assessment outcomes and how data are used for program improvement, and alignment of program-specific assessment with the five-year cycle of program review.

Diversity

UW-Green Bay is committed to being an access-oriented university in a diverse urban and rural area across a 16-county footprint with campuses in Green Bay, Marinette, Manitowoc, and Sheboygan. To accomplish this, the University has reshaped its operations to focus both on recruiting and supporting under-represented groups. The results of these efforts speak for themselves – the freshman cohort diversity continues to increase, and the University is attracting more first-generation

2 National Commission for Health Education Credentialing (NCHEC) (n.d.). Responsibilities and Competencies for Health Education Specialists. Retrieved from https://www.nchec.org/responsibilities-and-competencies

3 University Plan for the Continuous Assessment of Student Learning (2015). Retrieved from https://www.uwgb.edu/assessment/university-assessment-plan/

college students, many of whom are from disadvantaged socioeconomic backgrounds. For example, the Fall 2019 freshman class is 24% non-White compared to the previous year's 13%, and 53% first generation college students compared to 49% in the prior year.4 Approximately 34% are Pell-grant eligible students. Yet, the University's diversity profile remains lower than found in the Green Bay Area Public School District (GBAPSD) District, which is a minority-majority school district, with 54% of its student body non-White.5

UW-Green Bay's strategic plan is focused on creating a diverse university that better reflects the community. Attracting a diverse student population is a desired goal for this program. Robust recruitment from communities in the UW-Green Bay footprint and beyond will be used to attract diverse students. Unique initiatives, such as the Phuture Phoenix Program, are providing opportunities for recruitment of diverse students in the region. An annual Helping Professions event brings hundreds of students from the GBAPSD to learn about careers (e.g., nursing, social work), and many students schedule subsequent individual advising sessions. Professional development for faculty/staff related to diversity, equity and inclusivity is a high priority in the College. Faculty/staff are encouraged to complete the Inclusivity and Equity Certificate Level 1 and set annual goals in this area. Recruitment practices of faculty/staff reflect a commitment to equity in hiring including mandatory implicit bias training required for all individuals who serve on a search committee. All applicants for positions are asked about their commitment to inclusivity and equity during the interview process.

Enrollment in this program will not be limited to a select number of students thru a secondary admission process. University support services (e.g., GPS first year program, tutoring, advising with EAB Navigate) and program advising services, will support retention of students in this program. The proposed program curriculum and learning outcomes will directly prepare students with knowledge and skills related to cultural humility, inclusion, equity, and diversity. Content in didactic and field courses will provide opportunities to engage with diverse individuals in the community, receive feedback on strategies and practices specific to diverse populations, and reflect on learning relative to their own experiences and cultures.

Collaborative Nature of the Program

The Community Health Education major relies heavily on existing courses at UW-Green Bay. Given the multi-disciplinary nature of the field of community health, it makes sense to draw upon relevant courses in the sciences, psychology, health management, nursing, and social work. The inclusion of new courses in foundations, methods and strategies, and program planning that are specific to

4 UW-Green Bay Fact Sheet (2019). Retrieved from https://www.uwgb.edu/UWGBCMS/media/ise/files/FactBook-Fall-2019.pdf

5 Green Bay Area Public School District (2020). Our District. Retrieved from https://www.gbaps.org/our_district.

community health will ensure that graduates meet important outcomes and competencies to begin work in the field upon graduation.

The major culminates in the completion of a semester-long practicum at a community-based agency where students will apply their knowledge and skills in a workplace setting. This practicum will be based upon the four components of learning objectives: specific skills, competencies and activities (that will be fostered during the practicum), place (which can be highly varied given the wide range of settings where community health education is practiced), person (mentors who act as a guide into the beginning phase of the profession), and time (an entire semester with opportunities to experience many different situations). Student activities will involve essential community health education services and allow students to develop community health education core competencies. Such activities could include collection of health data or other surveillance activities, community assessment, policy development, advocacy, program planning, program evaluation, and/or health education activities.

Students will enter this major due to a keen interest in helping others in health-related settings. These students might be new freshmen who come to UW-Green Bay because of this major or transfer students from other post-secondary institutions who find this major appealing. In particular, graduates from the Health Navigator associates degree program at Technical Colleges will find this major to be a natural progression in their career plans.

Projected Time to Degree

Students who declare this major will be able to complete the degree in four years, which could be accelerated by taking summer and J-term courses. With proper planning, all but 15 credits of general education requirements are covered by this major. Students can be enrolled in these general education courses for the first year of their college career without delaying their time to degree. It is not until their junior year that students will need to enroll in core curriculum courses, the capstone, and field practicum courses.

Program Review

UW-Green Bay's Academic Affairs Council (AAC) is charged with oversight of all undergraduate programs, including review and approval of all coursework and academic program development. In compliance with UW-Green Bay's Academic Program Review and Student Learning Outcome Policy and Procedures, the major in Community Health Education will be reviewed on a five-year cycle by the department, Dean, AAC, and the Provost. The AAC forwards recommendations to Faculty Senate and provides advice regarding issues of undergraduate-level education policy and implementation.

In addition, program chairs are responsible for coordinating an annual student learning outcome assessment and submitting a report for review to the Academic Program Assessment Subcommittee of the University Accreditation and Assessment Committee. All feedback from this review process will be used in making recommendations for improvements to the major.

Accreditation

The Community Health Education major will not be an accredited program. However, at the completion of the major, students will be prepared to sit for the Certified Health Educator Specialist exam.

JUSTIFICATION

Rationale and Relation to the Mission

This program is consistent with the University's strategic vision of serving as an "access-driven, urban-serving comprehensive university that provides a world-class education and promotes economic growth and sustainability as well as health, wellness and social equity in Green Bay and the surrounding areas".6 This vision involves significantly increasing access to post-secondary education in an area with one of the lowest degree attainment rates in the country, and reshaping the academic program portfolio to meet current and future workforce needs in the region. Programs in the College of Health, Education, and Social Welfare impact communities through our well-prepared graduates in areas such as nursing, social work, and teacher preparation. There is a need for community health educators in Green Bay, the third largest urban area in the State, and in the region. Unlike nearly every other county in Wisconsin, the Brown County population is growing and getting younger. The Wisconsin Department of Administration predicts Brown County will grow by over 25% between 2010 and 2040 (average state growth is 14%). The percentage of 25-55 years of age is projected to grow only 2% statewide. This cohort is expected to grow by more than 10% in only Kenosha and Brown counties.

UW-Green Bay's Academic Affairs Strategic Plan identifies seven priorities with the following three priorities directly linked to this new degree proposal.7 These include student success, distinctive

6 University of Wisconsin – Green Bay [UW-Green Bay] (2020). Strategic Vision. Retrieved from https://www.uwgb.edu/chancellor/university-mission/strategic-vision/

7 University of Wisconsin – Green Bay [UW-Green Bay] (2020). Academic Affairs Strategic Priorities. Retrieved from https://www.uwgb.edu/academic-affairs-strategic-priorities/

programs, and community relationships. This unique program will create new career opportunities for students. Through coursework and field experience, students will have knowledge and relationships with community organizations that create solid employment opportunities in this career field. This program will foster further partnerships with community agencies and supply these agencies with qualified employees.

This new program and its outcomes connect well with elements of the University mission, especially related to problem focused learning, social justice, and educational opportunity. UW-Green Bay "provides a problem focused educational experience that promotes critical thinking and student success".8 Through this program, students will be prepared to investigate and respond to complex community health problems. A recent example is the essential work that community health workers are doing as part of contact tracing programs across the country to help reduce the spread of COVID-19.9 Guided by the mission, the University has a "deep commitment to diversity, inclusion, social justice, civic engagement, and educational opportunity at all levels". [6] This program will prepare students to communicate and advocate for health in communities through activities such as assessment of needs, planning of health education and designing research to better understand community issues. Students will be prepared to work with a variety of population demographics, cultural perspectives, and service settings.

Institutional Program Array

UW-Green Bay has numerous undergraduate and graduate degrees in health related areas.10 Consistent with the core value of cross-disciplinary collaboration in UW-Green Bay's mission, this major has been developed in collaboration with the academic departments of Nursing & Health Studies and Social Work. Courses from existing majors will be incorporated into this major. This degree will use courses offered from various Colleges and majors including Communications, Human Biology, Nutrition Science, Health Management, Psychology, Nursing, and Social Work. This creates an efficiency in developing and offering this new program and will foster greater collaboration and sharing of perspectives in these courses among students from differing majors. Faculty in Nursing, Social Work, and Nutrition Science, for example, have expertise in areas such as community health, community resources and services, and nutrition and food security in communities.

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8 University of Wisconsin – Green Bay [UW-Green Bay] (2020a). Mission Statement. Retrieved from https://www.uwgb.edu/chancellor/university-mission/mission-statement/

9 Institute for Healthcare Improvement (IHI) (May 26, 2020). Why States may Fall Short on Contact Tracing. Retrieved from IHITeam@ihi.org

10 UW-Green Bay Health Related Programs (n.d.). Retrieved from https://www.uwgb.edu/chesw/

Other Programs in the University of Wisconsin System

This program falls in CIP code 51 Health Professions and Related Programs, subcode of 51.22 Public Health. In terms of undergraduate programs, UW-La Crosse is the only other UW System school with a similar program, a Bachelor of Science in **Public Health and Community Health Education** (CIP 51.2208). This program has a strong foundation in public health and is accredited by the Council on Education for Public Health, (CEPH). The UW-La Crosse program uses a cohort model for admission and progression through the curriculum. The curriculum is divided into five blocks and students must complete block 1 before they can proceed to block 2, etc .UW-Green Bay's **Community Health Education** program (CIP 51.2207) will not use a cohort model, block requirement plan or seek accreditation. The UW-Green Bay program will have a strong emphasis on understanding the intersection of governmental and non-governmental healthcare organizations and how economics and policy influence health.

Related undergraduate degrees in the UW System include UW-Milwaukee's BS Community Engagement and Education program (CIP 13.0410), which is different from this proposed program in that there is not a focus on health, and UW-Eau Claire's BS in Environmental Public Health (CIP 512208), focused on managing hazards in the environment. Several UW institutions have related graduate degrees (UW-Madison Public Health MPH; UW-Milwaukee Public Health MPH and PhD; UW-La Crosse Community Health Education MPH and MS).

Need as Suggested by Current Student Demand

Three methods were used to evaluate potential student demand: 1) Enrollment patterns in a similar program, 2) Enrollment patterns in related programs, and 3) EAB market research reports. Personal communication with Dan Duquette, a Professor in the Public Health and Community Health Education program at UW-La Crosse (March 2020), provided information that their program has had enrollment growth of 37% since 2018. They admit approximately 35-45 students per term (i.e., fall and spring). Per Dr. Duquette, students interested in health programs are attracted to this major for two reasons: 1) Some students switch after initially planning careers in physical therapy, occupational therapy, physician assistant, or other professional programs, and 2) Some students have interest in this major because it has less science than areas like nursing or pre-med yet involve work with people.

Helping professions majors, such as nursing and social work, have secondary admission processes. Admission is not available to all students who desire these programs given limited program capacity. The 4-year nursing program at UW-Green Bay is new and 147 pre-nursing students enrolled in fall

2019. These pre-nursing students applied for 48 seats in the Nursing major for fall 2020. Across the UW System, baccalaureate nursing programs are currently denying admission to 50-80% of their qualified applicants annually, which is consistent with national trends.11 The Community Health Education major will be an option for students who are not accepted into the Nursing program or prefer a non-clinical program. Also, an EAB 201912 report on bachelor's-level community engagement programs indicated that students interested in an education degree without licensure requirements are often attractive. This finding suggests that there will be some interest from students who want broad opportunities in education.

EAB13 evaluated demand for a bachelor's-level public health program in the northeast area of the U.S. and reported growing enrollments (more than doubling in the past five years at 3 of 4 profiled institutions) and strong student interest in bachelor's-level public health programs. Qualitative interviews by EAB with university administrators attributed growing enrollments, in part, to increased awareness of public health jobs. In 2020, EAB14 reported student demand for a bachelor's-level public health program in the southeast area of the U.S. and reported that program completions grew 10-13% per year on average between the 2013-2014 and 2017-2018 academic years. These findings show growing student demand for a Community Health Education program. Student demand is currently being captured by only a few undergraduate programs in Wisconsin and surrounding states. Existing student recruitment and advising processes at UW-Green Bay, combined with targeted marketing of this program, will be used to grow and sustain program enrollment.

Need as Suggested by Market Demand

As more organizations and communities focus on wellness and prevention, and with growth in the health industry, community health educators are sought after and in high demand. Graduates with a major in community health education find jobs in the health care industry (e.g., hospitals, public health departments, health insurance), non-profit organizations, government agencies, and private

11 Young, L. K., Alasagheirin, M., Aschenbrenner, A., Marcyjanik, D., Hanson Brenner, G., Sohn, K., & Adams J. L. (2020). 2018 Wisconsin nursing education and nurse faculty survey report. Milwaukee, WI: Wisconsin Center for Nursing, Inc. Retrieved from https://drive.google.com/file/d/1DF8JPt9Du5OJND8RLjlfhoUFK1dVi99Z/view

12 EAB (2019). Market Viability of a bachelor's-level community engagement program [customized research report completed by EAB]. Link: file:///C:/Users/Owner/Downloads/Market%20Viability%20of%20a%20Bachelor's-Level%20Community%20Engagement%20Program.EAB%20(2).pdf

13 EAB (2017). Market Viability of a bachelor's-level public health program [customized research report completed by EAB]. Link: file:///C:/Users/Owner/Downloads/Market%20Viability%20of%20a%20Bachelor's-Level%20Public%20Health%20Program_EAB.pdf

14 EAB (2020). Market Pulsecheck [customized research report completed by EAB]. Link: file:///C:/Users/Owner/Downloads/Feasibility%20of%20a%20Bachelor's%20in%20Public%20Health.pdf

businesses. According to the Bureau of Labor Statistics,15 overall employment of community health educators is projected to grow 11% from 2018 to 2028, which is much faster than the average for all occupations. Employment (number of jobs) for this occupation nationally in 2018 was 123,800.16 Wisconsin employment volume (number of jobs) is rated as fair for health education specialists and moderate for community health workers.17 Border states, such as Minnesota and Illinois for health educators and Illinois and Michigan for community health workers, have high employment volume. The annual mean wage in Wisconsin is $55,130 for Health Education Specialists and $47,440 for community health workers.18 A review of jobs posted monthly at the Wisconsin Public Health Association Job Center during the period of August 2019-January 2020 averaged 9 jobs per month.19 Graduates of a Community Health Education program qualify for many of the posted positions. Examples of job titles include public health educator, health educator, prevention specialist, community health educator, HIV outreach specialist, and community health navigator. Several examples of specific jobs with an educational requirement of a community health education or health education degree preferred or required include public health educator (Green County Public Health), health educator (Rock County), and public health supervisor (Winnebago County). Through personal communication with Professor Duquette, UW-La Crosse Public Health and Community Health Education (March 2020), the employment outlook for students is very good. Of their 34 students in the program capstone course in spring 2020, seven students plan to attend graduate school and 19 have already been hired in positions two months before their graduation. Locally, the Brown County Health Department employs 40 people of various disciplines. Of the 40, 11 (27%) staff members occupy positions that can be filled with a community health education degree or previous experience in community health education. Two of the four (50%) management team members have a background in community health education (A. Steinberger, personal communication, June 18, 2020).

15 Bureau of Labor Statistics, [BLS], U.S. Department of Labor (2020a). Occupational Outlook Handbook, Health Educators and Community Health Workers, retrieved from https://www.bls.gov/ooh/community-and-social-service/health-educators.htm

16 Bureau of Labor Statistics, [BLS], U.S. Department of Labor (2020a). Occupational Outlook Handbook, Health Educators and Community Health Workers, retrieved from https://www.bls.gov/ooh/community-and-social-service/health-educators.htm

17 Bureau of Labor Statistics [BLS], US Department of Labor (2020b). Occupational Outlook Handbook, Occupational employment statistics, May 2019, Employment of health educators by State: https://www.bls.gov/oes/current/oes211091.htm#st; Employment of community health workers by State: https://www.bls.gov/oes/current/oes211094.htm#st

18 Bureau of Labor Statistics [BLS], US Department of Labor (2020b). Occupational Outlook Handbook, Occupational employment statistics, May 2019, Employment of health educators by State: https://www.bls.gov/oes/current/oes211091.htm#st; Employment of community health workers by State: https://www.bls.gov/oes/current/oes211094.htm#st

19 Wisconsin Public Health Association [WPHA] (2020). WPHA Career Center. Retrieved from https://www.wpha.org/page/Career_center

UNIVERSITY OF WISCONSIN-GREEN BAY

COST AND REVENUE PROJECTIONS NARRATIVE

BACHELOR OF SCIENCE IN COMMUNITY HEALTH EDUCATION

One table accompanies this narrative: Table 1- Cost & Revenue Projections for Newly Proposed UW-Green Bay Program in Community Health Education (below)

Introduction

The Community Health Education major relies heavily on existing courses at UWGB, drawing upon relevant courses in the sciences, psychology, health management, nursing and social work. Given this, the infrastructure and budget are relatively low to begin this new program.

Section I – Enrollment

Table 1 (I.a-e) depicts an expected enrollment pattern for Community Health Education based on the nature of this major and job demand, interest in professional programs at UW-Green Bay, and enrollment from similar programs at other Universities. In this projection, the initial enrollment of 18 new and transfer students (headcount) in fall 2021 gradually increases with resultant total student enrollment of approximately 85 in year 5. Student FTE (I. c-d) is calculated based on 15 credits per semester/30 credits per year. An average of 25 credits per year was used to calculate FTE for this program. Total student FTE is 71 in year 5.

Section II – Credit Hours

The proposed curriculum for Community Health Education includes 65 credits in the major, 38 credits of support courses and general education courses, and 17 credits of electives. Of the 65 major credits, 22 credits are new Community Health Education (CHE) that need to be developed and 43 credits exist (courses such as Epidemiology, Healthcare Systems, etc).

New credit hours (courses or sections not previously offered by University attributable to the major) and existing credit hours (existing courses attributable to major) are shown in Table 1 (II.a-c). Credit hours were calculated from a table of new courses/course sections and existing courses/course sections in the major based on available course capacity and student projected enrollment.

Section III – Faculty and Staff Appointments

Instructional FTE required for this program is shown in Table 1 (III.a-b). A 24-credit load was used to calculate instructional FTE although a combination of lecturers and tenure-track faculty will be used in this major (27 credit and 24 credit loads, respectively). In Year 1, the proposed cohort size is small, and students take few courses in the major, so little faculty FTE will be needed for the Community Health Education program. In Year 2, 0.67 FTE (16 credits) will be needed for new courses/sections in Community Health Education course (e.g., Human Biology and Nutrition Science courses). In subsequent years, new FTE of 0.46 (year 3) and 0.63 (year 4) will be required and will reflect expertise from various disciplines. A 3-credit reassignment is included each year for program management by a faculty member. Total FTE for the program at Year 5 is 2.9 FTE.

Administrative staff FTE is shown in Table 1 (III.c-d). Day-to-day coordination of the program (.10 FTE) will come from existing staff, so no new administrative FTE is required in year 1 and 2 of the program. In Year 3, 0.25 FTE (advisor and program coordination) will be needed due to growing student enrollment.

Section IV – Program Revenues

Students enrolled in the program will pay the standard UW-Green Bay undergraduate tuition rate, which for the 2020-2021 Academic Year is $262.43 per credit or $3,149.16 per semester for students within the plateau (12-18 credits). In addition to tuition, student segregated fees are $65.83 per credit or $790.00 per semester for full-time students; these funds are not directly available to the program (so not reflected on budget). Students who opt to take a course via distance education pay an additional $25 per credit; these funds are not directly available to the program and are used to support distance education infrastructure at UW-Green Bay. Revenue projections assume institutional revenue of 24 credits times $262.43 per credit multiplied by FTE student enrollment. For this calculation, revenue for 24 credits is used given the tuition plateau for full-time students. No other revenue sources apply (e.g., program/course fee, extramural funding).

Section V – Program Expenses

Instructional salary lines assumes $60,000 plus fringe (43% of salary) which is based on the lower end of salary for the CIP code for Public Health at Carnegie Masters-Granting Medium/Large (all ranks) and consistent with salaries at UW-Green Bay for faculty/lecturers in related areas (e.g., Human Services, Human Biology). Administrative staff (advisor) FTE used an FTE salary of $44,000 with fringe of 43%, based on current hiring for this position title in the College of Health, Education, and Social Welfare. An increase of 2% in salary was included in years 2 and 4.

Other program costs include supplies & expenses, marketing, professional development, and indirect costs. S & E costs include $6000 in the first two years and $12,000 in subsequent years to cover general expenses (e.g., phone, printing, consumables) and technology (e.g., computer/computer replacement). Program marketing includes $7,000 per year in years 1 and 2, and a lower amount ($4000) in subsequent years given that marketing materials and efforts will be established. Professional Development provides $2000 in year 1 and $4,000 in subsequent years. Indirect costs reflect 25% of gross tuition revenue to cover indirect institutional costs (e.g., library subscriptions, facilities, administration, systems support).

Section VI – Net Revenue

Net revenues will be directed to support continued growth within the College of Health, Education and Social Welfare and cover any unexpected program costs.

University of Wisconsin - Green Bay							
Table 1: Cost and Revenue Projections For Community Health Education							
		Items	Projections				
		Academic Year	2021/22	2022/23	2023/24	2024/25	2025/26
			Year 1	Year 2	Year 3	Year 4	Year 5
I	a	**Enrollment (New Student) Headcount**	12	24	28	32	34
	b	**Enrollment (Continuing Student) Headcount**	6	14	29	43	51
		Enrollment (total student) headcount	18	38	57	75	85
	c	**Enrollment (New Student) FTE**	10	20	23	27	28
	d	**Enrollment (Continuing Student) FTE**	5	12	24	36	43
	e	**TOTAL FTE**	15	32	47	63	71
II	a	**Total New Credit Hours**	18	264	121	144	0
	b	**Existing Credit Hours**	72	66	564	873	1184
	c	**Total Credit Hours**	90	330	685	1017	1184
III	a	**FTE of New Faculty/Instructional Staff**	0.17	0.67	0.46	0.63	0
	b	**FTE of Current Fac/IAS**	0.17	0.29	1.54	2.25	2.9
	c	**FTE of New Admin Staff**	0	0	0.25	0	0
	d	**FTE Current Admin Staff**	0.1	0.1	0	0.25	0.25
IV		**Revenues**					
	a	*From Tuition - ($262.43/cr @24 cr per FTE X Total FTE)*	$94,475	$201,546	$296,021	$396,794	$447,181
	b	*From Fees*					
	c	*Program Revenue (Grants)*					
	d	*Program Revenue - Other*					
	e	*GPR (re)allocation*					
	f	**Total New Revenue**	$94,475	$201,546	$296,021	$396,794	$447,181
V		**Expenses**					
		Salaries plus Fringes					
	a	*Faculty/Instructional Staff (w/fringe at 43%)*	$29,172	$84,015	$175,032	$258,872	$258,872
	b	*Other Staff*	$6,292	$6,418	$16,045	$16,365	$16,365
		Other Expenses					
	c	*Facilities*					
	d	*Equipment*					
	e	*S & E*	$6,000	$6,000	$12,000	$12,000	$12,000
	f	*Marketing*	$7,000	$7,000	$4,000	$4,000	$4,000
	g	*Professional development*	$2,000	$4,000	$4,000	$4,000	$4,000
	h	*Indirect expenses (25%)*	$23,619	$50,387	$74,005	$99,199	$111,795
		Total Expenses	$74,083	$157,820	$285,082	$394,436	$407,033
VI	a	**Net Revenue**	$20,392	$43,726	$10,939	$2,358	$40,148

UW Extended Campus

Proposal for New Collaborative Online Certificate

Name of Proposed Program: Graduate Certificate in Applied Bioinformatics (offered through the established collaborative online M.S. in Applied Biotechnology Program)

Collaborative Partners: UW-Green Bay, UW-Madison, UW-Oshkosh, UW-Parkside, UW-Platteville, UW-Stevens Point, UW-Whitewater

Mode of Delivery: Distance Education (100% Online)

Department or Functional Equivalent: Department of Natural and Applied Sciences

Desired Implementation Term and Year: Fall 2021

CIP Code: 26.1201 - Biotechnology

Program Description:
The Graduate Certificate in Applied Bioinformatics is being offered through the established collaborative online MS in Applied Biotechnology and will include both existing and new courses. The degree represents a fully online, asynchronous curriculum comprised of 12 credits to include four courses. As is the case with the MS in Applied Biotechnology degree, UW-Green Bay, UW-Madison, UW-Oshkosh, UW-Parkside, UW-Platteville, UW-Stevens Point, and UW-Whitewater will offer the certificate jointly. The program will serve as both an in-program learning opportunity and additional credential for MS-ABT degree-seeking students as well as a freestanding certificate program for non-degree (certificate-only) seeking students who may or may not elect to continue to the MS degree program. Students will select and enroll at a home campus from which they will receive academic supports and the certificate is conferred.

Background and Rationale:
Based on a study by the University Professional and Continuing Education Association Center for Research and Strategy Studies commissioned by UW Extended Campus in 2019, occupations related to bioinformatics are predicted to show strong growth over the next 10 years. The average annual salary for related occupations within the state and region was approximately $80,000. In addition, a focus group conducted during the curriculum development process comprised of bioinformatics industry professionals confirmed the current need for more scientists with bioinformatics skills and their support for the certificate as designed. The Graduate Certificate in Applied Bioinformatics will be targeted toward working biotechnology professionals who wish to work in the area of bioinformatics but do not possess the required skillset. Completion of the certificate will provide the core competencies needed to gain entry into bioinformatics positions.

Program Requirements and Curriculum:

Admission requirements for the Graduate Certificate in Applied Bioinformatics program will include a Bachelor's degree and a 3.0 undergraduate GPA. Program prerequisite will include General Biology with lab.

Table 1 outlines the 12-credit curriculum for the proposed certificate. Students must successfully complete all four courses to earn the certificate. Course syllabi have been included for informational purposes (see Attachment A). NOTE: Syllabi provided contain the basic information of the courses/course content.

Table 1: Graduate Certificate in Applied Bioinformatics Program Curriculum

Course Number & Title	**Description**	**Course Status & Campus**	**Credits**
ABT 720: Experimental Design and Analysis in Biotechnology	Principles of descriptive and inferential statistics with applications in biotechnology including experimental design, quantitative data analysis, and bioinformatic evaluation of complex molecular and biological data sets.	Existing - Whitewater	3
ABT 730: Python for Bioinformatics	Introduce diverse strategies for computational analysis of macromolecular data using Python including sequence alignment, genome annotation, data retrieval from databases, phylogenetic analysis, and molecular evolution. Experiential learning is emphasized; confidence in practical skills is developed through persistent application of course content to projects focused on current problems in bioinformatic research.	New - Whitewater	3
ABT 780: Bioinformatic Inquiry	Advances the development of competencies promoting efficient analysis of biological data. Emphasizes matching a research problem with the most effective tools for its completion, balancing use of existing software and de novo software development. Advanced aspects of Python and R, algorithmics, machine learning, simulations, and effective communication of results are emphasized. *Prerequisites: ABT 720, 730*	New - Platteville	3
ABT 785: Applications of Bioinformatics	Exploration and application of existing bioinformatic tools. Implementation of pre-coded solutions to data acquisition, wrangling, analysis, visualization, and structural modeling problems. Students will complete a project that generates a multi-system workflow to solve bioinformatic problems. *Prerequisites: ABT 720, 730*	New - Parkside	3

Program Competencies and Learning Outcomes:
Students completing the Graduate Certificate in Applied Bioinformatics will gain the following core competencies and learning outcomes:

ABT 720: Experimental Design and Analysis in Biotechnology

- Competency A: Demonstrate professional and scientific communication appropriate for biotechnology settings
    - Program Outcome 1: Select the most appropriate modalities, methodologies, tools, and practices to communicate complex ideas effectively across diverse audiences.
- Competency C: Distinguish among diverse methods and technologies and their applications in biotechnology
    - Program Outcome 9: Exhibit strong technical knowledge to evaluate and choose appropriate technologies
    - Program Outcome 10: Demonstrate the ability to read, interpret and apply scientific literature
    - Program Outcome 11: Demonstrate competency in data analyses and statistics used in biotechnology

ABT 730: Python for Bioinformatics

- Competency C: Distinguish among diverse methods and technologies and their applications in biotechnology
    - Program Outcome 9: Exhibit strong technical knowledge to evaluate and choose appropriate technologies
    - Program Outcome 10: Demonstrate the ability to read, interpret and apply scientific literature
    - Program Outcome 11: Demonstrate competency in data analyses and statistics used in biotechnology
- Additional Outcomes:
    - Demonstrate competency in use of python programming strategies to solve problems in bioinformatics
    - Demonstrate the ability to integrate python programming strategies with complementary resources, especially UNIX, GitHub, and libraries.

ABT 780: Bioinformatic Inquiry

- Competency A: Demonstrate professional and scientific communication appropriate for biotechnology settings

    - Program Outcome 1: Select the most appropriate modalities, methodologies, tools, and practices to communicate complex ideas effectively across diverse audiences
    - Program Outcome 3: Construct and deliver effective, professional presentations
- Competency C: Distinguish among diverse methods and technologies and their applications in biotechnology
    - Program Outcome 8: Compare and contrast emerging with existing technologies
    - Program Outcome 11: Demonstrate competency in data analysis and statistics

<u>ABT 785: Applications of Bioinformatics</u>

- Competency B: Demonstrate comprehensive understanding of organizational processes and product development pipelines
    - Program Outcome 4: Evaluate and describe systems of product research, development, and production
- Competency C: Distinguish among diverse methods and technologies and their applications in biotechnology
    - Program Outcome 8: Compare and contrast emerging with existing technologies
    - Program Outcome 9: Exhibit strong technical knowledge to evaluate and choose appropriate technologies
    - Program Outcome 11: Demonstrate competency in data analyses and statistics

Plan for Program Assessment:

The MS in Applied Biotechnology program assessment team, comprised of academic program directors from each partner institution as well as the UW Extended Campus program manager, will manage the assessment of student learning outcomes for the Certificate in Applied Bioinformatics. This assessment team will identify and define measures and establish a rubric to evaluate how well students are demonstrating attainment of program learning outcomes. The team will also identify and collect data needed to complete the assessment. As a part of the course development and review process, the assessment team will determine which examples of student work will be most appropriate to demonstrate competency.

The team will receive data collected from institutions by UW Extended Campus each semester. UW Extended Campus will also monitor data on new enrollments, retention rates, and graduation rates. The assessment team will compile these various sources of data and complete annual reports summarizing the data, the assessment findings, and decisions regarding improvements to the curriculum, structure, and program delivery. The report will be shared with the faculty of the program and other stakeholders at each partner institution. The assessment team is responsible for ensuring that recommendations for improvement are implemented.

Tuition Structure:

Consistent with the MS in Applied Biotechnology program, tuition for the Certificate in Applied Bioinformatics will be set at $850/credit for 2021-2022 and will be identical at all seven partner institutions. The tuition rate is based on market demand estimates as well as comparisons with other master's level online programs offered by the University of Wisconsin (UW) System and nationally, and will be charged outside the credit plateau. The pricing structure will follow the UW

System pricing guidelines for distance education programs provided in UW System Administrative Policy (SYS) 130. Segregated fees for students enrolled in this program would be waived by all of the partner institutions, Students will not be required to pay any additional fees as part of the program, except for the cost of their books. There is no tuition differential for out-of-state students.

Enrollment Projections and Funding:
The Graduate Certificate in Applied Bioinformatics and related courses represent an in-program offering and enhancement of the MS in Applied Biotechnology program. Funding levels for new courses (i.e. course development, revision and instruction) will be supported by UWEX following the current Memorandum of Understanding for the MS-ABT degree program. Consistent with standard UWEX practice, the MS-ABT Financial Model will be updated annually to reflect previous year actual data and will include certificate activity.

As defined, we are anticipating two primary audiences will access the certificate program – current MS-ABT students and certificate-only (non-degree seeking) students. It is estimated that 15% of degree-seeking students will choose to complete the optional certificate program and the program will attract at least 10 new certificate-only students per year. The certificate is designed to be completed within two to four semesters. Similar to the MS-ABT program, it is assumed that most of certificate-only students will enroll part-time.

Table 2 represents enrollment and completion projections for both audiences over the next five years. As shown, we are anticipating strong enrollments with approximately 100 students completing the program by the end of year five. Based on experience with similar collaborative online graduate-level programs, it is anticipated that the annual attrition rate will be moderate—approximately 20 percent—for students moving through the certificate program.

Table 2: Five-Year Certificate Program Student Enrollment Projections

Students/Year	2021-22	2022-23	2023-24	2024-25	2025-26
New Certificate-only Students	10	15	20	25	30
MS-ABT Degree-seeking Students Enrolling in Certificate	9	11	11	11	11
Continuing Students	19	35	42	43	43
Total Course Enrollments	48	86	104	107	106
Certificate Completions	0	9	21	31	36

Attachment A: Graduate Certificate in Applied Bioinformatics Course Syllabi

ABT 720: Experimental Design and Analysis in Biotechnology

INSTRUCTOR: Robert Kuzoff

PHONE(s): (262) 472-5142

EMAIL: kuzoffr@uww.edu

EMAIL COMMUNICATION: During the week, expect a response from me within 24 hours. Please expect that my response time on weekends may be up 48 hours.

COURSE DELIVERY MODE: Online

COURSE DESCRIPTION: Principles of descriptive and inferential statistics with applications in biotechnology including experimental design, quantitative data analysis, and bioinformatic evaluation of complex molecular and biological data sets.

COURSE CREDITS: 3

COURSE ALIGNMENT WITH PROGRAM OUTCOMES: This course addresses the following competencies and program outcomes of the Master of Science in Applied Biotechnology:

1. Competency A: Demonstrate professional and scientific communication appropriate for biotechnology settings
    a. Program Outcome 1: Select the most appropriate modalities, methodologies, tools, and practices to communicate complex ideas effectively across diverse audiences.

2. Competency C: Distinguish among diverse methods and technologies and their applications in biotechnology
    a. Program Outcome 9: Exhibit strong technical knowledge to evaluate and choose appropriate technologies
    b. Program Outcome 10: Demonstrate the ability to read, interpret and apply scientific literature
    c. Program Outcome 11: Demonstrate competency in data analyses and statistics used in biotechnology

COURSE LEARNING OBJECTIVES: In general, we will learn to apply methods of exploratory data analysis, experimental design, and statistical inference that are applicable to problems in biotechnology and suitable for rigorous evaluation of molecular and biological data. At the end of this course, students will be able to:

1. Evaluate and apply experimental and statistical methods that are commonly used in biotechnology research;
2. Explain the rationale behind experimental and statistical procedures used in biotechnology research;
3. Select an appropriate experimental and statistical method for a given research question;
4. Implement statistical procedures using software, especially R and RStudio;
5. Implement bioinformatic methods using a set of software tools; and
6. Communicate statistical findings in biotechnology research to stakeholders.

TEXTS:

- Baldi, B. and D. S. Moore. 2018. The Practice of Statistics in the Life Sciences, 4th Ed. W. H. Freeman and Co., New York, NY, USA.

- Wickham, H. and G. Grolemund. 2017. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data. O'Reilly Media, Inc., Sebastopol, CA, USA.

COURSE GRADING:

List of assessments, exercises, and assignments (*1050 points possible*)

Online topical discussions (*10 x 6*)	60 pts
Exercise Sets (*16 x 10*)	160 pts
Short Essay Responses (2 x 40)	80 pts
Critical Commentaries (4 x 40)	160 pts
Software Practicals (*6 x 40*)	240 pts
Unit I to V Multiple-choice In-home Exams (*5 x 50*)	250 pts
Unit VI In-home Essay Exam	100 pts

- All assessments, exercises, and assignments will be posted to the course webpage, in CANVAS, and will be accompanied by due dates and times.
- Assignments will be completed either individually or in small groups (this will be clarified when each in class assignment is posted to the course webpage).
- Completed assessments, exercises, and assignments will be turned in to the appropriate drop-boxes on CANVAS.
- It is expected that work will be completed prior to the posted deadlines.
- A late penalty will be assessed for work completed after the due date (*initially 20%, but increasing by 20% per day from the due date and time*).
- Make-up assignments will be given only with proper written justification and prior consent of the instructor.
- Careful review of all assigned videos is required.
- Thoughtful completion of all assigned reading is required.

GRADE SCALE:

Letter grades will be based on the following scale:

A:	93-100	**B-:**	80-82.9		
A-:	90-92.9	**C+:**	76-79.9		
B+:	86-89.9	**C:**	73-75.9		
B:	83-85.9	**C-:**	70-72.9	**F:**	<70

FINAL EXAM: Yes– A comprehensive final learning evaluation will be completed online.

CREDIT STANDARD: The credit standard for this course is met by an expectation of a total of 135 hours of student engagement with the course learning activities (*at least 45 hours per credit*), which include:

- Careful review of assigned (1) video lectures, (2) chapters in course texts, (3) review articles, and (4) research articles;
- Completion of assigned (5) writing, (6) problem sets, and (7) software practicals;
- Reflective participation in (8) online discussions; and
- Additional work as described in the syllabus.

COURSE OUTLINE:

Unit [Course objectives]	**Readings in Baldi & Moore**	**Topics**	**Videos & r4ds Chs**
Primer	Review article	Introduction to RStudio and the tidyverse	
Unit 1 - Exploratory Data Analysis (*Weeks 1-3; 9/8 – 9/26*) [**Obj. 1, 3, 4, 6**]	Ch 1, 5 – 30	Visualizing data	5, Ch 1
	Ch 2, 39 – 60	Summarizing data	10, Ch 3
	Ch 3, 65 – 80,	Data wrangling and exploratory data analysis	7, Ch. 9
	Learning Evaluation & Software Practical I		
Unit 2 - Designing Observational and Experimental Studies (*Weeks 4-5; 9/27 – 10/10*) [**Obj. 1, 2, 3, 6**]	Ch 4, 89 – 111	Regression	9, Ch. 5
	Ch 7, 155 – 72,	Design strategies for observational studies	3
	Ch 8, 177 – 201	Design strategies for experimental studies	5
	Learning Evaluation & Software Practical II		
Unit 3 - Probability and Diagnostic Test Evaluation (*Weeks 6-7; 10/11 – 10/24*) [**Obj. 2, 4**]	Ch 9, 207 – 258	General rules of probability	2, Ch. 18
	Ch 10, 235 – 258	Conditional probabilities and diagnostic test evaluation	3
	Ch 11, 263 – 283	Normal and discrete probability distributions	5
	Ch 13, 313 – 387	Sampling distributions and the central limit theorem	6
	Learning Evaluation & Software Practical III		

Unit [Course objectives]	Readings in Baldi & Moore	Topics	Videos & r4ds Chs
Unit 4 - Statistical Inference (*Weeks 8-9; 10/25 – 11/7*) [**Obj. 1, 2, 3, 4, 6**]	Ch 15, 363 – 387	Statistical inference	6, Ch. 19
	Ch 17, 411 – 430	Inference about a population mean	5
	Ch 18, 437 – 455	Comparing two means	5
	Learning Evaluation & Software Practical IV		
Unit 5 - Chi Square, ANOVA and Nonparametric Tests (*Weeks 10-11; 11/8 – 11/21*) [**Obj. 1, 2, 3, 4, 6**]	Ch 21, 511 – 526	Chi square tests	4, Ch. 22
	Ch 24, 597 – 622	Analysis of variance	4
	Ch 27, 27-1	Nonparametric tests	13
	Learning Evaluation & Software Practical V		
Unit 6 - Introducing Bioinformatic Strategies (*Weeks 12-15; 11/22 – 12/18*) [**Obj. 2, 3, 5**]	Review article, Research article	Genome sequencing	10
	Review article, Research article	Genome assembly and annotation	8
	Review article, Research article	Comparative genomics	4
	Review articles, Research article	Applied genomics	8
	Learning Evaluation & Software Practical VI		

Final Learning Evaluation (date and time TBD)

ABT 730: Python for Bioinformatics

PROFESSOR: Robert Kuzoff

PHONE: (262) 472 - 5142

EMAIL: kuzoffr@uww.edu

EMAIL COMMUNICATION: During the week, expect a response from me within 24 hours. Please expect that my response time on weekends may be up 48 hours.

COURSE DELIVERY MODE: Online

COURSE DESCRIPTION: Introduce diverse strategies for computational analysis of macromolecular data using Python including sequence alignment, genome annotation, data retrieval from databases, phylogenetic analysis, and molecular evolution. Experiential learning is emphasized; confidence in practical skills is developed through persistent application of course content to projects focused on current problems in bioinformatic research.

COURSE CREDITS: 3

COURSE ALIGNMENT WITH PROGRAM OUTCOMES: This course addresses the following competencies and program outcomes of the Master of Science in Applied Biotechnology:

- Competency C: Distinguish among diverse methods and technologies and their applications in biotechnology
    - Program Outcome 9: Exhibit strong technical knowledge to evaluate and choose appropriate technologies
    - Program Outcome 10: Demonstrate the ability to read, interpret and apply scientific literature
    - Program Outcome 11: Demonstrate competency in data analyses and statistics used in biotechnology
- Additional Outcomes:
    - Demonstrate competency in use of python programming strategies to solve problems in bioinformatics
    - Demonstrate the ability to integrate python programming strategies with complementary resources, especially UNIX, GitHub, and libraries.

COURSE LEARNING OBJECTIVES: Contemporary research in biotechnology frequently employs computers for a variety of tasks including storing, managing, formatting, mining, and analyzing data sets, some of astonishing size.

In this course you will be introduced to computational strategies that are used in the analysis of genomic, transcriptomic, proteomic, and metabolomic data. The course entails lectures, discussions, readings, and programming assignments intended to help you develop an understanding of algorithms commonly used in bioinformatics. Through hands-on experience you will have an opportunity to acquire a working knowledge of an array of computational strategies used in contemporary research in biotechnology.

You will learn to implement analyses of large datasets and model relationships among elements of very complex systems (*e.g., genes in a genome, proteins in a cell, individuals in a population, or interacting populations in an ecosystem*). Because bioinformatics analyses now permeate contemporary literature in a broad range of disciplines, it's especially strategic for contemporary students of biology and computer science to understand the strategies used and opportunities inherent in this field.

Subject we will explore include:

- Strategies for sequencing a genome
- UNIX commands and Bash shell scripting
- Version Control using Git and GitHub
- Characteristics of human genomes
- Mining genomic and proteomic databases
- Managing and manipulating biological data
- Effective programming strategies
- Using regular expressions to dissect genomes
- Methods for aligning homologous sequences
- Methods of phylogenetic inference
- Scientific computing using NumPy, SciPy, and Pandas
- Medically significant variation among human genomes
- Public health genomics
- Pharmacogenomics and drug design

INTERNAL PREREQUISITES: None

TEXTS:

- Libeskind-Hadas, R. and E. Bush. 2014. *Computing for Biologists; Python Programming and Principles*, Cambridge Univ. Pr., Cambridge, U.K. (ISBN-10: 1107642183)
- Allesina, S., and M. Wilmes. 2019. *Computing Skills for Biologists*. Princeton Univ. Pr., Princeton, NJ, USA. (ISBN-10: 0691182752)

COURSE GRADING:

List of assessments, exercises, and assignments (*830 points possible*)

Online topical discussions (*10 x 5*)	50 pts

Online Programming Quizzes (*13 x 10*)	130 pts
Coding Exercise Sets (*11 x 10*)	110 pts
Larger Coding Problems (3 x 40)	120 pts
Critical Commentaries (3 x 40)	120 pts
Take-home Midterm	100 pts
Take-home Final	200 pts

- All assessments, exercises, and assignments will be posted to the course webpage, in CANVAS, and will be accompanied by due dates and times.
- Assignments will be completed either individually or in small groups (this will be clarified when each in class assignment is posted to the course webpage).
- Completed assessments, exercises, and assignments will be turned in to the appropriate drop-boxes on CANVAS.
- It is expected that work will be completed prior to the posted deadlines.
- A late penalty will be assessed for work completed after the due date (*initially 20%, but increasing by 20% per day from the due date and time*).
- Make-up assignments will be given only with proper written justification and prior consent of the instructor.
- Careful review of all assigned videos is required.
- Thoughtful completion of all assigned reading is required.

GRADE SCALE:

Letter grades will be based on the following scale:

A:	93-100	**B-:**	80-82.9	**D+:**	66-69.9
A-:	90-92.9	**C+:**	76-79.9	**D:**	63-65.9
B+:	86-89.9	**C:**	73-75.9	**D-:**	60-62.9
B:	83-85.9	**C-:**	70-72.9	**F:**	<60

FINAL EXAM: Yes– A comprehensive final learning evaluation will be completed online.

CREDIT STANDARD: The credit standard for this course is met by an expectation of a total of 135 hours of student engagement with the course learning activities (*at least 45 hours per credit*), which include:

- Careful review of assigned (1) video lectures, (2) chapters in course texts, (3) review articles, and (4) research articles;
- Completion of assigned (5) writing, (6) problem sets, and (7) software practicals;
- Reflective participation in (8) online discussions; and
- Additional work as described in the syllabus.

COURSE OUTLINE:

Week	*Conceptual Topics in Bioinformatics*	*Applied Programming Topics*
Wk_1	**Course Introduction &**	**Meet Python**

(*x/xx* – *x/xx*)	**The Diversity of Macromolecular Data** **The UNIX OS – CSB Ch. 1**	**Quiz over CFB Ch. 0** **HW for Ch. 0 due (*x/xx*)**
Wk_2 (*x/xx* – *x/xx*)	**Principles of Whole Genome Sequencing** **Green (2003)**	**Quiz over CFB Ch. 1** **Computing GC Content** **HW for Ch. 1 due (*x/xx*)**
Wk_3 (*x/xx* – *x/xx*)	**Next-Generation Sequencing** **Version Control, Git, & GitHub – CSB Ch. 2**	**Quiz over CFB Ch. 2** **Pathogenicity Islands** **HW for Ch. 2 due (*x/xx*)**
Wk_4 (*x/xx* – *x/xx*)	**Finding Genes in Sequenced Genomes I** **Harrow (2009)**	**Quiz over CFB Ch. 3** **ORFs & Genes** **HW for Ch. 3 due (*x/xx*)**
Wk_5 (*x/xx* – *x/xx*)	**Finding Genes in Sequenced Genomes II** **Basic Programming – CSB Ch. 3**	**Quiz over CFB Ch. 4** **Finding Genes**
Wk_6 (*x/xx* – *x/xx*)	**Landscape of the Human Genome I** **Lander (2011)**	**CFB Ch. 4** **Finding Genes** **Prog. for Ch. 4 due (*x/xx*)**
Wk_7 (*x/xx* – *x/xx*)	**Landscape of the Human Genome II** **Writing Good Code – CSB Ch. 4**	**Quiz over CFB Ch. 5** **Recursion** **HW for Ch. 5 due (*x/xx*)**
Wk_8 (*x/xx* – *x/xx*)	**Take Home Exam I due (x/xx)** **ENCODE I** **ENCODE Overview (2014)**	**Quiz over CFB Ch. 6** **Use-It-Or-Lose-It Principle** **HW for Ch. 6 due (*x/xx*)**
Wk_9 (*x/xx* – *x/xx*)	**ENCODE II** **Regular Expressions – CSB Ch. 5**	**Quiz over CFB Ch. 7** **Dictionaries, Memoization & Algorithmic Speed** **HW for Ch. 7 due (*x/xx*)**
Wk_10 (*x/xx* – *x/xx*)	**Medical Genomics I** **Rehm (2017)**	**Quiz over Bauldauf (2003)** **Phylogenetic Inference** **Whale Phylogeny due (*x/xx*)**
Wk_11 (*x/xx* – *x/xx*)	**Medical Genomics II** **Scientific Computing – CSB Ch. 6**	**Quiz over CFB Ch. 8** **Sequence Alignment**
Wk_12 (*x/xx* – *x/xx*)	**Public Health Genomics I** **Khoury et al. (2017)**	**Ch. 8 - Continued** **Sequence Alignment** **Prog. for Ch. 8 due (*x/xx*)**
Wk_13 (*x/xx* – *x/xx*)	**Public Health Genomics II** **Green et al. (2018)**	**Quiz over CFB Ch. 9** **Working with Trees** **HW for Ch. 9 due (*x/xx*)**
Wk_14	**Pharmacogenomics I**	**Quiz over CFB Ch. 10**

(*x/xx – x/xx*)	**Dugger et al. (2017)**	**Drawing Trees** **HW for Ch. 10 due (*x/xx*)**
Wk_15 (*x/xx – x/xx*)	**Pharmacogenomics II** **Ekins et al. (2019)**	**Quiz over CFB Ch. 11** **The UPGMA Algorithm**

Take Home FINAL (*including Ch. 11 program*) due (x/xx)

ABT 780: Bioinformatic Inquiry

PROFESSOR(s): Ryan J. Haasl

PHONE(s): (608) 342-7330

E-MAIL(s): haaslr@uwplatt.edu

COURSE DELIVERY MODE: Online

COURSE DESCRIPTION: Advances the development of competencies promoting efficient analysis of biological data. Emphasizes matching a research problem with the most effective tools for its completion, balancing use of existing software and de novo software development. Advanced aspects of Python and R, algorithmics, machine learning, simulations, and effective communication of results are emphasized.

COURSE CREDITS: 3

COURSE ALIGNMENT WITH PROGRAM OUTCOMES: This course addresses the following competencies and program outcomes of the Masters of Applied Biotechnology:

- Competency A: Demonstrate professional and scientific communication appropriate for biotechnology settings
    - Program Outcome 1: Select the most appropriate modalities, methodologies, tools, and practices to communicate complex ideas effectively across diverse audiences
    - Program Outcome 3: Construct and deliver effective, professional presentations
- Competency C: Distinguish among diverse methods and technologies and their applications in biotechnology
    - Program Outcome 8: Compare and contrast emerging with existing technologies
    - Program Outcome 11: Demonstrate competency in data analysis and statistics

COURSE OBJECTIVES: At the end of this course, students will be able to:

- Implement successful solutions to tasks in bioinformatics using existing software and newly developed code.
- Write R scripts and packages, including formulation of new R classes

- Create helpful, user-defined classes in Python.
- Implement knowledge of algorithmics to write elegant solutions to bioinormatics tasks.
- Interface with a MySQL database in Python.
- Simulate biological data to use as a null distribution for novel test statistics.
- Decide when machine learning methods are appropriate to a task in bioinformatics.
- Use GitHub to effectively share new software and manage version control.
- Communicate complicated methodology and results to a variety of stakeholders.

INTERNAL PREREQUISITES: ABT 720 and ABT 730

TEXTS/LEARNING RESOURCES (software, web-based resources, other required resources/materials)

- Open-source software
    - Python interpreter
    - RStudio
    - MrBayes
    - OrthoFinder
    - Atom or other IDE
    - Cygwin (if not using a Linux operating system)
- Personal computer
    - 4GB RAM or greater
    - If Windows machine, dual boot Linux operating system (preferred) or installed Cygwin software
- Web-based resources
    - Free account at UW-Madison Center for High Throughput Computing for access to cluster computing (arranged by instructor).
- Textual resources
    - Journal articles provided by instructor
    - Readings from:
        - *Bioinformatics Algorithms: An Active Learning Approach, 3rd Edition*
          Phillip Compeau and Pavel Pevzner
          2018, Active Learning Publishers
        - *Machine Learning with R, the tidyverse, and mlr*.
          Hefin I. Rhys
          2020, Manning Publications

COURSE GRADING:

Component	**Description**	**Points**
Homework assignments	Coding exercises; content questions	*100 (10 @ 10 each)*
Final project proposal	Details research problem and proposes	*25*

	solutions.	
Coding examinations	Open book exams that require you to submit code as your answers.	*200 (2 @ 100 each)*
Primary literature presentation	Half-hour presentation delivered live or recorded for the class. Focus on three-four papers from the primary literature on a specific topic not related directly to the topic of your final project.	*50*
Final Project	A scientific paper in the format of a Discovery Note to *Bioinformatics* as well as underlying software component published on GitHub.	*200*

GRADE SCALE:

Grade*	**Threshold percentage (points of 575)**
A	90 (518)
B	80 (460)
C	70 (403)
D	60 (345)

* “Minus” and “Plus” grades will follow the standard grading scheme of, for example, [80, 83) = B-, [83, 87) = B, [87, 90) = B+.

FINAL EXAM: No

The final project is the culmination of the course and replaces the need for a final exam. Because this course emphasizes experiential learning, the final project provides each student with his or her main opportunity to showcase skills learned during the class. The main deliverable related to the final project is a scientific paper. Students will also share their project with fellow students in a 15-minute presentation.

COURSE OUTLINE (Create as Modules not as Weeks)

I. Planning data analysis (1 week)
   a. The diversity of research problems in bioinformatics
   b. Computational efficiency; intractable problems and heuristic methods
   c. Case studies: Different problems require different degrees of unique solutions

II. Writing R packages and classes (2 weeks)
   a. Review of standard R objects (Week 2)
   b. Motivations for writing an R package (Week 2)

c. How to write a class in R and create a package (Weeks 2,3)

III. Object-oriented Python (2 weeks)

a. Writing efficient classes in Python (Week 4)

b. Using standard and user-defined classes in a Python program (Weeks 4,5)

c. Data integration and interfacing with a MySQL database in Python (Week 5)

IV. Bioinformatics algorithms (Weeks 6-10)

a. Algorithmic thinking and pseudocode (Weeks 6, 7)

b. A general problem: Pattern recognition (Weeks 7, 8, 9, 10)

IV. Machine learning methods (Weeks 11-15)

a. Supervised machine learning methods (Weeks 11,12)

b. Unsupervised machine learning (Week 13)

c. Representation machine learning (Weeks 14,15)

ABT 785: Applications of Bioinformatics

PROFESSOR(s):
Francis M. Mann, Ph.D. (UW-Parkside)
Maryam Sayadi, Ph.D. (Iowa State University)
Andrew Severin, Ph.D. (Iowa State University)

PHONE(s): 262-595-3459

E-MAIL(s): mannf@uwp.edu

COURSE DELIVERY MODE: Online

COURSE DESCRIPTION: Exploration and application of existing bioinformatic tools. Implementation of pre-coded solutions to data acquisition, wrangling, analysis, visualization, and structural modeling problems. Students will complete a project that generates a multi-system workflow to solve bioinformatic problems.

COURSE CREDITS: 3

COURSE ALIGNMENT WITH PROGRAM OUTCOMES: This course addresses the following competencies and program outcomes of the Masters of Applied Biotechnology:
(Note: if you feel there are new competencies outside the ABT competencies that should also be included, please include them here.)

- Competency B – Demonstrate comprehensive understanding of organizational processes and product development pipelines
    1. Evaluate and describe systems of product research, development, and production
- Competency C - Distinguish among diverse methods and technologies and their applications in biotechnology

1. Compare and contrast emerging with existing technologies
2. Exhibit strong technical knowledge to evaluate and choose appropriate technologies
3. Demonstrate competency in data analyses and statistics

COURSE OBJECTIVES: At the end of this course, students will be able to:

- Identify existing databases for genomic, transcriptomic, proteomic, and metabolomics analysis
- Describe construction and limitations for existing databases
- Identify existing tools for sequence analysis
- Identify and critique methods and tools for annotation of genomes
- Identify and critique methods and tools for phylogenetic analysis
- Identify and critique methods for assigning protein structure and function
- Identify and critique methods for identifying and assembling metabolite profiles
- Describe best practices in adapting and editing existing tools
- Identify methods for developing multi-tool workflows
- Build, analyze, and critique functional workflows

INTERNAL PREREQUISITES: ABT720, ABT730

TEXTS/LEARNING RESOURCES (software, web-based resources, other required resources/materials)

- Github
- Slack
- zenhub
- Twitter
- http://www.bio-itworld.com/
- https://www.nature.com/subjects/computational-biology-and-bioinformatics
- https://journals.plos.org/ploscompbiol/
- https://rna-seqblog.com/
- https://bioinformaticsworkbook.org

COURSE GRADING: Grades will be assessed using a variety of methods including:
10% Quizzes
20% Tutorials and Exploratory Assignments
20% Discussions
20% Small projects
30% Final projects

GRADE SCALE:
A 92-100
A- 89-91

B+ 84-88
B 80-83
B- 76-79
C+ 72-75
C 68-71
C- 64-67
F <64

FINAL EXAM: No

If NO, what will take the place of a final exam? Project

COURSE OUTLINE (Create as Modules not as Weeks…Courses need to fit into 15 or 11 week formats):

I. Project management
a. slack
b. github
c. zenhub

II. Existing databases for analysis
a. Examples for genome analysis (UCSC genome browser, EMBL, NCBI, SRA, GEO, etc)
b. Examples for transcriptome analysis (ENSEMBL, Biosmart, etc)
c. Examples for protein analysis (NCBI, Uniprot, ExPASy, etc)
d. Examples for metabolic analysis (KEGG, BiGG, Metacyc, etc)
e. Construction and limitations of existing databases

III. Current and available tools for genome and transcriptome analysis
a. QC
b. alignment
c. assembly
d. annotation
e. DGE
f. variant calling
g. limitations

IV. Tools for phylogenetic analysis and mapping
a. origins
b. construction and limitations

V. Tools for protein structure and function prediction

a. origins
b. construction and limitations

VI. Editing and adapting existing tools
a. bioinformatics workbook
b. github
c. version control

VII. Workflow management tools
a. Examples of tools
b. Multi-omic integration

Memorial Resolution for Dennis Bryan, Professor Emeritus

On August 21, 2020, Dennis Bryan's family lost their beloved husband, father, grandfather and uncle. The University lost another retired faculty member who was deeply committed to his career and to the colleagues and students with whom he worked. He was one of the original faculty members in the Professional Program in Education.

Dennis was born in Cincinnati, Ohio on June 4, 1937 to Roy and Bessie Bryan. The family moved to Kalamazoo, MI when he was one month old, and he attended Western Michigan University's Campus School from kindergarten through grade 12. This is where in the seventh grade, he met a new student at the school, Ann Malotte, the love of his life. They became high school sweethearts and were married in 1958.

Dennis worked for the City Forestry Department in Kalamazoo during the summers while in high school. Throughout college he owned and operated his own landscaping and tree trimming business. He entered college planning to become a forester, but changed to education after being a counselor at a YMCA summer camp and enjoying his work with young people. His freshman and sophomore years were spent at Carthage College in Kenosha, and then he transferred to Western Michigan University where he earned a bachelor's degree, master's degree and his teaching license.

After teaching sixth grade for three years in Portage, Michigan, the family moved to Lansing where Dennis attended Michigan State University, earning a Ph.D. in Education. In 1969, Dennis and Ann moved the family to Green Bay. Dennis was one of the first faculty members in the Education Department at UWGB. During his 27 years as a professor, he helped build the four-year program and was instrumental in developing a master's degree offering. He greatly missed his contact with students after his retirement in 1996. Dennis owned an educational consulting business that provided long-term strategic planning studies for public schools in Wisconsin and Michigan.

Dennis and Ann built the house of their dreams in the country (in New Franken) in 1971. They felt blessed to have such a wonderful, natural sanctuary. Dennis was an avid gardener, a talented birder, and a true naturalist. He enjoyed experimenting with various types of heirloom tomatoes in his greenhouse to get a jump start on the growing season.

His love of hunting and fishing started during his childhood and became a lifelong passion. He hunted throughout the Midwest, but his favorite hunting trips were to Saskatchewan with his friend, Lyle Martens, and their labradors, Charlie and Teal. He fished throughout Michigan, Wisconsin, the Florida Everglades and fly-in trips to Canada.

Dennis is survived by his wife, their four children, eight grandchildren, and three great-grandchildren, along with nieces and nephews in Michigan, Indiana, Pennsylvania and Washington.

RESOLUTION TO DELAY IMPLEMENTATION OF BIWEEKLY PAY FOR FACULTY AND ACADEMIC STAFF IN THE UW SYSTEM

WHEREAS many monthly employees have constructed budgets that revolve around receiving their paychecks at the beginning of every month,

WHEREAS there was no formal consultation by the UW-System administration with any shared governance entities regarding a timeline for possible changes to the payroll system prior to the announcement on October 30, 2020,

WHEREAS the rapid change in the payroll system will most disproportionally impact the budgets of our lowest paid monthly employees,

WHEREAS the current proposal will result in all monthly deductions for February being deducted from a February 1 paycheck even though the February 1 paycheck will only include 50% of their monthly salaries, thus further increasing hardships on the lowest paid employees,

BE IT RESOLVED the Faculty Senate strenuously objects to the proposed timeline forcing monthly employees to move to a biweekly pay system and requests the implementation date be moved to July 1, 2021. Moving the implementation date to July 1 will allow monthly employees the time to adjust their budgets and will reduce the immediate impact on nine-month employees.

BE IT FURTHER RESOLVED that we call on the University of Wisconsin System administration to formally consult with all shared governance entities regarding the timeline for implementation and to do everything possible to mitigate the impact of the payroll changes on our most vulnerable employees.

Upon approval, this resolution shall be transmitted to Chancellor Michael Alexander, Interim UW System President Tommy Thompson, and Regent President Andrew Petersen.

Faculty Senate New Business 5d 11/11/2020

Graduate Academic Affairs Council
Faculty Senate Report
November 11, 2020

The GAAC met on Tuesday, November 3, 2020, with the following agenda and actions:

General Business

1. Welcomed graduate student representative, Janne Roovers from MS-SEPP, as a non-voting member of the GAAC for 2021-21.

Courseleaf Activity

1. SMGT 786: Climate Change. **New course approved**

Next Meeting

December 8, 2020, 3:00-4:00

ASC Report for Faculty Senate Meeting
November 11, 2020

- The Academic Staff Professional Development Program Committee, working jointly with the University Staff sister committee, had initiated and distributed an interest survey to its members. The results were tallied and the first professional development offering for the academic year will take place virtually in November, "It Makes Me Happy" with Nurse Jesse. The University Staff Professional Development Committee and the Academic Staff Professional Development Program Committee are excited to announce a virtual 2-hour workshop with Nurse Jesse facilitated via Blackboard Collaborate Ultra.
    - "It Makes Me Happy" with Nurse Jesse. This 2-hour workshop is designed to allow attendees to reconnect with their authentic selves and a simple formula to find joy in everyday living. The workshop is a mix of storytelling, self-assessments, and interactive "play" to get started on the "It Makes Me Happy!"™ journey.
    - Learning Objectives
        - Explore 12 key areas for happiness and a simple process to discover the joy in everyday living
        - Cultivate self-awareness and appreciation
        - Deepen relationships amongst participants
    - Learn more about Nurse Jesse at their website itmakesmehappy.com
- Planning for the virtual Winter Academic Staff Assembly is underway which will be held Monday, December 7th
- Committees will be reviewing charges to prepare for assistance for the Total Title and Compensation project.
- The ASC will continue to support the members of our staff community as we navigate through the pandemic, many as front-line workers and various campus support services essential positions. Continuous meaningful communication with administration, other shared governance groups, human resources, and direct supervisors over workload options and flexibilities has been at the forefront of our committee work and is appreciated.
- Next meeting scheduled for November 18th, 2020 at 1:30pm via TEAMS

Respectfully submitted,

Sherri Arendt, Chair
Academic Staff Committee

USC Report for Faculty Senate Meeting
November 11, 2020

The University Staff Committee Elections are complete and the new officers are as follows:

- Chair – Sue Machuca
- Vice Chair- Kim Mezger
- Treasurer – Teri Ternes
- Secretary – Theresa Mullen

The rest of the committee is made up of the following:

- Jayne Kluge
- Lisa Francl
- Kaitlyn O'Claire
- Dolly Jackson
- Monika Pynaker

We congratulate all of our new members and officers and look forward to working closely with the Faculty and Academic Staff this year.

Respectfully submitted,

Sue Machuca, Chair
University Staff Committee