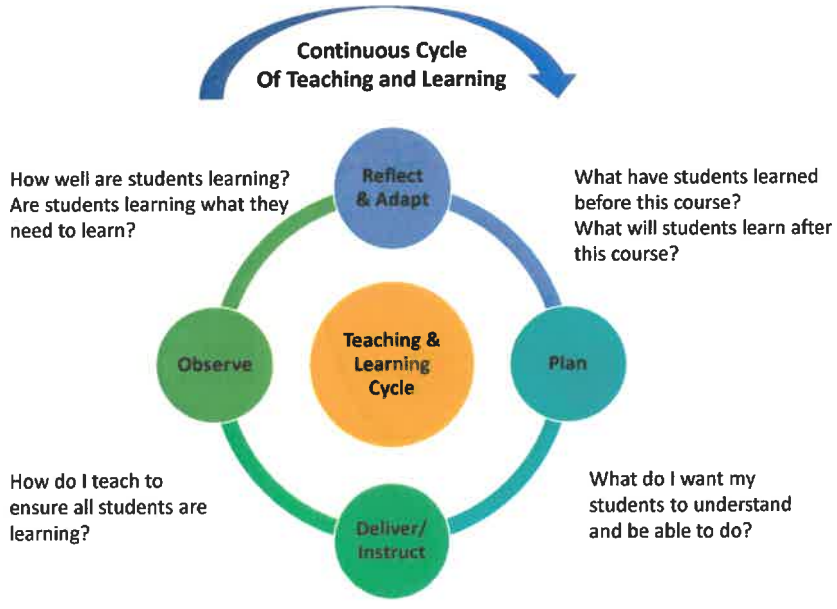
NAU's Philosophy of Curriculum & Assessment

- The words "Curriculum and Assessment" are our official terms for "Teaching and Learning."
- The Faculty Senate and College Curriculum & Assessment Committees' purpose is to ensure we offer the highest quality teaching and learning that we can within our resource constraints.
- Specifically, the College Curriculum Committees' purpose is to ensure high-quality planning, reflection and adaptation is incorporated into new curriculum and substantial curriculum changes.
- We ensure this by reviewing descriptions and explanations of faculty members' proposed teaching and learning experiences:
  - Justification of the proposed teaching and learning experience.
  - Purpose of the proposed teaching and learning experience.
  - Expected goals or "learning outcomes" of the proposed teaching and learning experience.
- These three areas of the curriculum proposal provide the explanation of crucial areas of the Teaching and Learning Cycle (see Figure 1).

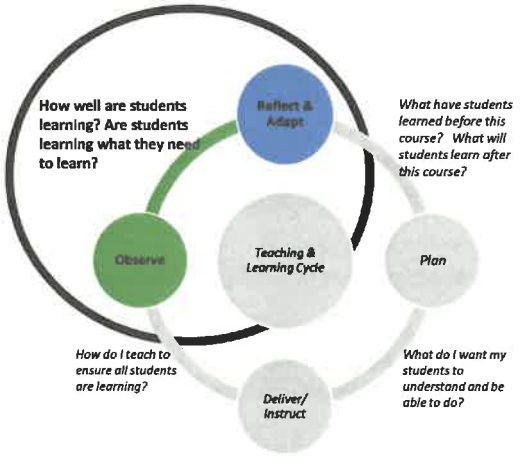
1

Figure 1: NAU's Philosophy of Curriculum & Assessment



2

Justification

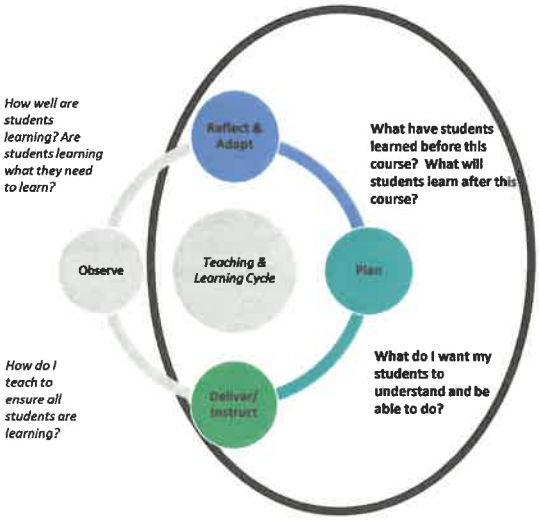


A good justification for changing a program or course will focus on:

- Aspects of student learning that the faculty want to improve in the course or program
- Reflections related to observations about the topic and its relationship to the field, to student learning in the course, and how the course fits into the program
- Descriptions of the adaptations made to the course or program to improve it.

3

Course Purpose

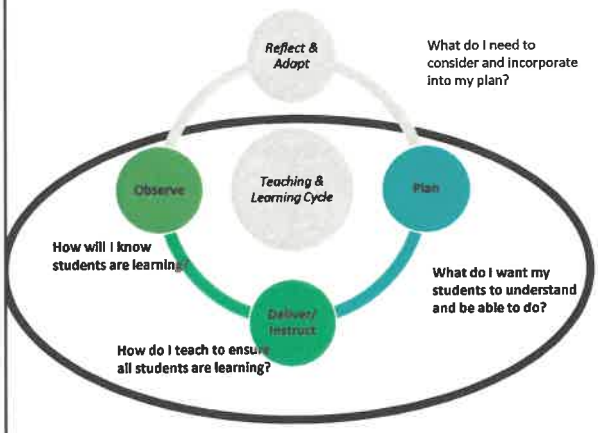


A good course purpose focuses on:

- Placing the course in context of what students have learned in the past and/or may learn in the future
- Summarizes what students will know and be able to do upon completion of the course (if they put their best effort in)

4

Course Learning Outcomes & *Assignments*



Good course learning outcomes:

- Clarify what students will know AND
- Explains what students will do with the knowledge they obtain.
- Align with or connect to the course's purpose
- Align with or connect to the positioning of the course in the program

Good assignments align with the learning outcomes, meaning they are selected to show the instructor

- Whether students are learning
- How well students are learning

5

Final: August 5, 2019

Curriculum Proposal Timelines for Academic Year 2019-20

All New Plan Proposals (Degree Programs, Minors and Certificates) will be accepted for the Fall 2020 Catalog during all three Review Periods. New Plan Curriculum Proposals submitted after 1/13/2020 will not be incorporated into printed Marketing and Recruitment materials that reflect NAU's portfolio of programs for AY20-21. Please contact marketing@nau.edu for additional information.

Exceptions for the Fall 2020 Catalog. **Exceptions may be submitted by October 4, 2019** and will be reviewed and approved by College Curriculum & Assessment Committees during the Fall 2019 semester. Exceptions for the Fall 2020 Catalog include the following:

- Any course additions to New Plans that were approved for the Fall 2019 Catalog.
- Changes required by accrediting bodies during AY2019-20 (evidence from the accreditor must be provided).
- Changes to the catalog that DO NOT IMPACT the AY20-21 schedule of classes (such as catalog verbiage for Admissions criteria, submission of Purpose Statements and Learning Outcomes). The catalog staff will work closely with schedule of classes staff to ensure changes do not impact the AY20-21 schedule of classes. Contact Melinda.Treml@nau.edu for such requests.

Proposal Due Dates and College Approval Periods

		Review Period 1	Liberal Studies Diversity	Review Period 2	Review Period 3
		1. Exceptions for the Fall 2020 Catalog; 2. Proposals for the Fall 2021 Catalog	***Deadline for Liberal Studies &/or Diversity Designation Proposals for the Fall 2021 Catalog***	***Proposals for the Fall 2021 Catalog; New Plans for the Fall 2020 Catalog***	***Proposals for the Fall 2021 Catalog; New Plans for the Fall 2020 Catalog[1]***
Prior to Due Date	**Approval of Proposals by Academic Unit-** Academic Unit approval must occur before the proposal due date	***Prior to 10/4/2019***	***11/1/2019***	***Prior to 12/13/2019***	***Prior to 2/21/2020***
Friday	**Proposals Due** w/ Academic Unit Leader e-mail confirmation, submitted to Curriculum Process Assoc.	**10/4/2019**	**11/1/2019**	**12/13/2019**	**2/21/2020**
2 weeks	**REVIEW OF PROPOSALS** *College Committees; Associate Deans; Advisors; Catalog Staff; Marketing; Institutional Research; Registrar's Office; Admissions*	10/14/2019 - 10/25/2019	*Reviewed by Diversity Curriculum Committee (if applicable), then by Liberal Studies Committee for February 21 deadline for review by College Committees during Review Period 3*	1/13/2020 – 1/24/2020	3/10/2019 – 3/27/2019
1 week	**COLLEGE MEETINGS FOR REVIEW OF PROPOSALS**	10/28/2019 - 11/1/2019		1/27/2020 – 1/31/2020	3/30/2020 – 4/3/2020
1 or 2 weeks	**PROPOSAL REVISIONS** *Academic Unit Faculty*	11/6/2018 – 11/20/2019		2/5/2020 – 2/12/2020	4/8/2020 – 4/22/2020
1 week	**VOTE ON PROPOSALS** *College Committees*	12/2/2019 – 12/6/2019		2/17/2020 - 2/21/2020	4/27/2020 – 5/1/2020
1 week	Finalize Approvals	12/9/2019 – 12/12/2019		2/24/2020 – 2/28/2020	5/4/2020 – 5/8/2020

[1] New Plans submitted after 1/13/2020 will not be incorporated into printed Marketing and Recruitment materials that reflect NAU's portfolio of programs for AY20-21.

Final: August 5, 2019

Proposal Due Dates and College Approval Periods

Action	~Timeframe	***Dates for AY2019-20***
Review Period 1		
Approval of Proposals by Academic Unit- Internal Academic Unit-specific processes;		*Prior to 10/4/2019*
Deadline for Review Period 1: Exceptions and New Plans for the Fall 2020 Catalog and *Proposals for the Fall 2021 Catalog* **Proposals Due** w/ Academic Unit Leader e-mail confirmation, submitted to Curriculum Process Associate.	Friday	**10/4/2019**
REVIEW OF PROPOSALS *College Committees; Associate Deans; Advisors; Catalog Staff; Marketing; Institutional Research; Registrar's Office; Admissions*	2 weeks	10/14/2019 - 10/25/2019
COLLEGE Mtgs FOR REVIEW OF PROPOSALS *Feedback given to Academic Unit Faculty*	1 week	10/28/2019 - 11/1/2019
PROPOSAL REVISIONS *Academic Unit Faculty*	2 weeks	11/6/2018 – 11/20/2019
VOTE ON PROPOSALS *College Committees*	1 week	12/2/2019 – 12/6/2019
Liberal Studies and Diversity Final Deadline		
Deadline for Liberal Studies &/or Diversity Designation Proposals for the Fall 2021 Catalog **Proposals Due** w/ Academic Unit Leader e-mail confirmation, submitted to Curriculum Process Associate.		**11/1/2019**
Review Period 2		
Approval of Proposals by Academic Unit- Internal Academic Unit-specific processes		*Prior to 12/13/2019*
Deadline for Review Period 2: Proposals for the Fall 2021 Catalog and New Plans for Fall 2020 **Proposals Due** w/ Academic Unit Leader e-mail confirmation, submitted to Curriculum Process Associate.	Friday	**12/13/2019**
REVIEW OF PROPOSALS *College Committees; Associate Deans; Advisors; Catalog Staff; Marketing; Institutional Research; Registrar's Office; Admissions*	2 weeks	1/13/2020 – 1/24/2020
COLLEGE Mtgs FOR REVIEW OF PROPOSALS *Feedback given to Academic Unit Faculty*	1 week	1/27/2020 – 1/31/2020
PROPOSAL REVISIONS *Academic Unit Faculty*	1 week	2/5/2020 – 2/12/2020
VOTE ON PROPOSALS *College Committees*	1 week	2/17/2020 - 2/21/2020
Review Period 3[1]		
Approval of Proposals by Academic Unit- Internal Academic Unit-specific processes		*Prior to 2/21/2020*
Deadline for Review Period 3:Proposals for the Fall 2021 Catalog and New Plans for Fall 2020[1] ***(Review of Liberal Studies & Diversity Proposals is Complete)*** **Proposals Due** w/ Academic Unit Leader e-mail confirmation, submitted to Curriculum Process Associate.	Friday	**2/21/2020**
REVIEW OF PROPOSALS *College Committees; Associate Deans; Advisors; Catalog Staff; Marketing; Institutional Research; Registrar's Office; Admissions*	2 weeks	3/10/2019 – 3/27/2019
COLLEGE MTGS FOR REVIEW OF PROPOSALS *Feedback given to Academic Unit Faculty*	1 week	3/30/2020 – 4/3/2020
PROPOSAL REVISIONS *Academic Unit Faculty*	2 weeks	4/8/2020 – 4/22/2020
VOTE ON PROPOSALS *College Committees*	1 week	4/27/2020 – 5/1/2020

[1] New Plans submitted after 1/13/2020 will not be incorporated into printed Marketing and Recruitment materials that reflect NAU's portfolio of programs for AY20-21.

Nicole A Morrow

To: Nicole A Morrow
Subject: Curriculum Proposals for Review Period 1- Fdbk due October 26
Attachments: Review_Form_Course.docx; Course_Review_Guide.docx; Review_Form_Plan.docx; Plan_Review_Guide.docx; CCAC_NAU_Agenda_APR19.pdf; APR19_Course Changes by College.rtf; CCAC-CEFNS_Agenda_APR19.pdf; CCAC-CEIAS_Agenda_APR19.pdf; CCAC-COE_Agenda_APR19.pdf; CCAC-FCB_Agenda_APR19.pdf; CCAC-HHS_Agenda_APR19.pdf; CCAC-OBC_Agenda_APR19.pdf; CCAC-SBS_Agenda_APR19.pdf; CCAC-UUC_Agenda_APR19.pdf; CCAC-CAL_Agenda_APR19.pdf

Dear Curriculum Reviewers,

The first review period for curriculum has arrived! Attached you will find your college's agenda and a set of review materials (review forms and guides).

Below is a list of the attachments and their purpose(s) to guide you in your review of curriculum.

The first four attachments are to support faculty in their review of courses and programs:

1. Review_Form_Course: This is the review form for courses. Please use this to review courses that have been proposed in your college in order to provide feedback on course submissions.

2. Course_Review_Guide: This is a Guide containing examples of excellent responses. It is meant to assist faculty reviewers as they review courses.

3. Review_Form_Plan: This is the review form for plans. Please use this to review plans that have been proposed in your college in order to provide feedback on plan submissions.

4. Plan_Review Guide: This is a Guide containing examples of excellent responses. It is meant to assist faculty reviewers as they review plans.

The next two attachments are provided for faculty members, Academic Unit Chairs/Directors, college curriculum committees, the University Undergraduate Committee, and the University Graduate Committee to review proposals for potential duplications. **Comments for changes regarding your college's agenda are due at your college "review and feedback" meetings occurring the last week of October.** If you find something that you are concerned about regarding **another college**, PROVIDE YOUR FEEDBACK TO YOUR COLLEGE'S ASSOCIATE DEAN by **OCTOBER 26**.

5. CCAC_NAU_Agenda: CCAC_NAU_Agenda_DEC19

    a. This agenda contains the curriculum from all colleges for the first review period.

    b. This agenda is for colleges who wanted to review proposals for duplications across colleges and provide feedback concerning curriculum proposals to their college's Associate Deans.

    c. Remember, ALL FEEDBACK GOES TO YOUR ASSOCIATE DEAN.

6. DEC19_Course Changes by College

    a. This item is for Associate Deans and faculty to skim through curriculum summaries of courses and identify potential duplications.

7. Individual college agendas. To review your college's proposals, select your college's agenda (for example CCAC_CEFNS_Agenda_DEC19):

    a. This agenda contains your college's curriculum for the first review period.

    b. To open an agenda item "mouse over" the link on the agenda and click on it to open the curriculum form.

    c. When you are reviewing courses, you will find the syllabus at the end of the curriculum form.

Comments for changes are due at your college "review and feedback" meetings occurring at the last week of October.

Please contact me if you have any questions or concerns or need assistance accessing materials during our third curriculum review process.

Nicole

Nicole Morrow

Associate Director
Curriculum, Commencement, and AZTransfer & Articulation

Office of Curriculum, Learning Design, and Academic Assessment
nicole.morrow@nau.edu | 928-523-9561
PO Box 4091, Flagstaff, AZ 86011

NAU NORTHERN ARIZONA UNIVERSITY

Course Proposals by College

Please note: Proposed course changes appear below the line for each course where applicable.

College of Arts and Letters

ENG 174 Effective: Effective: Fall 2020	**ENG 174**	INTRODUCTION TO CREATIVE WRITING This course will introduce students to fiction, nonfiction, and poetry writing. Students will learn the basic craft tools of creative writing, creative writing terminology, and workshopping skills.	3	Summary of Changes: *Add LibStud, New Course*
ENG 405 Effective: Fall 2020	**ENG 405**	WRITING COMMONS: WRITING, RESEARCH, DESIGN PRESENTATION One-to-one, individualized teaching to improve your writing. Pass-fail only. May be repeated for up to 4 units of credit.	1	Summary of Changes: *New Course*
FRE 407 Effective: Effective: Fall 2020	**FRE 407**	FRANCOPHONE CULTURES This course introduces students to different cultures of the Francophone world and helps them explore notions of cultural identity through authentic readings and films from the French-speaking world. It focuses on issues that characterize the French-speaking world, such as colonialism, independence, diversity, immigration, women's issues, environmental	3	Summary of Changes: *New Course*
HIS 229 Effective: Fall 2020	**HIS 229**	PRE-ISLAMIC IRAN & CENTRAL ASIA: FROM ALEXANDER TO ALI Examines historical developments in Iran and Central Asia in the thousand years from the fall of the Achaemenid Empire to the incorporation of the region into the Islamic world, including the Seleucid, Arsacid, Kushan, and Sasanid empires and the Silk	3	Summary of Changes: *New Course*

HIS 320
Effective:
Effective:
Fall 2020

HIS 320 REFORM AND REVOLUTION IN ISLAM 3

This course explores the importance of social and religious reform within the Islamic tradition. While beginning with the inception of the faith in the 7th century the majority of the course will focus on the evolution of reformist discourses within Islam in the so-called "modern" era. The class examines individual reformist movements as well the various ideologies that have informed Muslim reformist thought since the time of the Prophet. The course also devotes a considerable amount of time towards problematizing the idea of "reform" itself, what the term means

Summary of Changes:
New Course

HIS 346
Effective:
Effective:
Fall 2020

HIS 346 GLOBAL INDIGENOUS HISTORY 3

This course explores the history of indigenous peoples from around the world, including indigenous communities in Latin America, Pacific island nations, Canada, and Australia. By examining these diverse people's experiences with outside colonization from the 15th century to the present, this course will offer new perspectives on ongoing histories of colonialism,

Summary of Changes:
Add Diversity, Add LibStud, New Course

LAN 340
Effective:
Effective:
Fall 2020

LAN 340 GLOBAL ENGAGEMENT ABROAD 3

This asynchronous online course facilitates an exploration of students' learning-immersion experience while abroad, particularly with respect to cultural and social expectations in academic, professional, and personal spheres of the host culture. The course provides a guided structure for researching, reflecting on, journaling/blogging, and communicating about immersive academic experiences abroad by promoting dialogue across disciplines and cultures via online communication. Additionally, students will engage in direct research through engagement in the society in which they are living and studying in order to help prepare them for their field work experiences during the second semester abroad. Participation is limited to, and required of, students in the Interdisciplinary Global

Summary of Changes:
Add Diversity, Add LibStud, New Course

PHI 310W
Effective:
Effective:
Fall 2020

PHI 310W PHILOSOPHY WRITING SEMINAR 3

This course rotates topics within philosophy. It introduces techniques used in advanced philosophical writing. Also, this course provides an opportunity for career preparation and professional development. This course fulfills NAU's junior-level writing requirement. It may be repeated for up to 6 units of

Summary of Changes:
Add LibStud, New Course

College of Environment, Forestry and Natural Sciences
Curriculum and Assessment Committee Agenda
April 30, 2019

I. Minutes from previous meeting – February 26, 2019 Minutes

II. Action Items

These items represent new curriculum or substantial curriculum changes proposed for the Academic Catalog. Please review the Action Items using the review forms found here (https://in.nau.edu/curriculum-and-assessment/processes-and-review-forms/) prior to your college's committee meeting. Bring the forms or your notes to the meeting to discuss the proposals and vote on whether the college approves of the curriculum for inclusion in the Academic Catalog.

				Effective Date	Summary of Changes
SES					
ENV 115L, GLG 115L-Pending Liberal Studies approval					
1. ENV 115L	ENV	115L	1 CLIMATE CHANGE LAB	Fall 2020	Add LibStud, Cross-list, New Course
2. GLG 115L	GLG	115L	1 CLIMATE CHANGE LAB	Fall 2020	Add LibStud, Cross-list, New Course
3. Earth Sciences and Environmental Sustainability; Ph.D. Earth Sciences and Environmental Sustainability; Ph.D. Earth Sciences and Environmental Sustainability; Ph.D. Curriculum Map				Fall 2020	Major Reqmts-Course(s) Added, Major Reqmts-Course(s) Deleted
BIOLOGICAL SCIENCES					
4. BIO 450	BIO	450	3 BIOINFORMATICS	Fall 2020	Catalog Descr, Co-convene, Course Title
5. BIO 590	BIO	590	3 FUNDATMENTALS OF BIOINFORMATICS	Fall 2020	Co-convene New Course
BIO 432-Pending Liberal Studies approval					
6. BIO 432	BIO	432	3 EVOLUTIONARY MEDICINE	Fall 2020	Add LibStud, Number
7. Biomedical Science; B.S. Biomedical Science; B.S. Biomedical Science; B.S. Curriculum Map				Fall 2020	Major Reqmts-Course(s) Added
FORESTRY					
8. FOR 468	FOR	468	3 CONSERVATION GENETICS	Fall 2020	Co-convene, New Course

9.	FOR 568 FOR	568	3	CONSERVATION GENETICS	Fall 2020	Co-convene, New Course
10.	FOR 569 FOR	569	3	FOREST GENETICS	Fall 2020	New Course
11.	Forest Science; Ph.D. Forest Science; Ph.D. Ecology, Evolution and Conservation Biology Emphasis Forest Science; Ph.D. Curriculum Map - Attached				Fall 2020	Purpose and/or Outcome Change, Subplan Reqmts-Course(s) Added
12.	Forestry; M.F. Forestry; M.F. Ecology, Evolution and Conservation Biology Emphasis Forestry; M.F. Curriculum Map - Attached				Fall 2020	Purpose and/or Outcome Change, Subplan Reqmts-Course(s) Deleted
13.	Forestry; M.S.F. Forestry; M.S.F. Ecology, Evolution and Conservation Biology Emphasis Forestry; M.S.F. Curriculum Map - Attached				Fall 2020	Purpose and/or Outcome Change, Subplan Reqmts-Course(s) Added

CENTER FOR SCIENCE TEACHING & LEARNING

14.	Science Teaching; M.A. Science Teaching; M.A. Science Teaching; M.A. Curriculum Map				Fall 2020	Admission Requirements, Campus Change, Major Reqmts-Course(s) Added, Major Reqmts-Course(s) Deleted, Purpose and/or Outcome Change
15.	Teaching Science with Certification; M.A.T. Teaching Science with Certification; M.A.T. Teaching Science with Certification; M.A.T. Curriculum Map				Fall 2020	Admission Requirements, Campus Change, Major Reqmts-Course(s) Deleted, Major Reqmts-Unit Change

III. Consent Items

Please review these items to ensure you are in agreement with them. If you are NOT in agreement with an item(s), contact Nicole Morrow (Nicole.Morrow@nau.edu) by the end of this review period (3/29/2019) to have it moved to the Action agenda for discussion and she will request a representative to be present to discuss the item at the meeting. You do not need to complete review forms for items on this agenda.

		Effective Date	Summary of Changes
1.	2019 Test Score Changes	Fall 2019	Test Score Changes

IV. Fast Track Agenda

Please review these items to ensure you are in agreement with them. If you are NOT in agreement with an item(s), contact Nicole Morrow (Nicole.Morrow@nau.edu) by the end of this review period (3/29/2019) to have it moved to the Action agenda for discussion and she will request a representative to be present to discuss the item at the meeting. You do not need to complete review forms for items on this agenda.

					Effective Date	Summary of Changes
1.	BIO 444C BIO	444C	4	HUMAN PHYSIOLOGY	Fall 2019	Prereqs

NAU NORTHERN ARIZONA UNIVERSITY

Course Proposal: Review Form

Before beginning, go to http://nau.edu/Provost/Curriculum-and-Assessment/College-Curriculum-and-Assessment-Committees/Timelines-and-Agendas/, and click on your college's next meeting date to obtain the materials to review for this course.

Read 1, 2, 3, 4 of Course Form.
Course Prefix, Number & Title (from form):
Click or tap here to enter text.

Justification: Question 5 of Course Forms

5a. Identify each of the following reasons provided in the proposer's justification for the course:

☐ Improvements to the course or program (aligning curriculum to new or current curriculum standards or expectations, improving degree program progression, integration of learning from one course to another),
☐ Requirements or recommendations set forth by the program's Academic Program Review or Specialized
☐ Accreditation (addressing improvements based on input from external reviewers, industry trends, new or changing governmental regulations or external accreditation requirements),
☐ Academic unit goals identified in a unit's Annual Curriculum & Assessment Reports,
☐ Evidence and assessment findings (assessments of student learning, needs assessments, student or employer surveys, comparisons to other programs in the field), and/or
☐ Other important aspects of the academic unit and student learning not identified above.

5b. Does the justification adequately explain the reasons for developing a new course or changing an existing course?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

Syllabus of Record: Review the Syllabus

Course Purpose

CP1. Does the course purpose adequately summarize the content studied, the skills developed, and/or the learning experiences provided.

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

CP2. Does the course purpose adequately describe the role the course plays in the academic programs it serves?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

Comments:
Click or tap here to enter text.

Course Learning Outcomes

LO1. Are the course learning outcomes explicit enough to be assessed, measured, or observed?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

LO2. Are the course learning outcomes learning-centered?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

LO3. Are the course's learning outcomes aligned with the course purpose?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

LO4. Are the course learning outcomes appropriate for the position of the course within the curriculum, and/or the level of the course, such as 100-level, 500-level?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

Comments:
Click or tap here to enter text.

Assignments/ Assessments

A1. Are all of the outcomes addressed by the assignments/ assessments?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

A2. As a whole, do the assignments/ assessments align with the outcomes? For example, is there an adequate explanation of the purpose of the assignments/assessments and their connection to learning?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

Comments:
Click or tap here to enter text.

Complete the following ONLY for Co-convened Courses

CC1. Are the intended course learning outcomes differentiated between undergraduate and graduate study?

- Graduate outcomes contain language that indicates a higher degree of rigor for the graduate experience and specifics that indicate a greater intellectual engagement (provide greater depth, breadth, higher levels of learning and impact, etc.) as compared to undergraduate outcomes.
- Undergraduate outcomes clearly identify discipline-specific approaches to analysis, evaluation, synthesis and application; new understanding and comprehension tends to be gained through active learning and experiences of content knowledge in the field.

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

CC2. Are the assignments/ assessment within the course differentiated between undergraduate and graduate study?

- Graduate assignments provide higher levels of learning and impact, with more complex, nuanced, and advanced application of concepts as compared to undergraduate assignments. Assessments indicate an assumption of an advanced application of skills to achieve outcomes (i.e. graduate-level writing, oral skills, analysis, etc.).
- Grading systems for graduate assignments/ assessments reflect higher levels of rigor as compared to undergraduate assignments/ assessments.

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

CC3. Are the readings/ materials within the course differentiated between undergraduate and graduate study, such that the types and quantity of graduate reading materials provide greater depth, breadth, higher levels of learning and impact, etc. as compared to undergraduate readings/ materials?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

Comments:
Click or tap here to enter text.

Comments concerning other sections of the Course Proposal or Syllabus

If you have comments or corrections that you would like to recommend for other sections of the Course Proposal Form, please (a) identify the section you are addressing—otherwise we can't identify what you want to change, and (b) state the changes you are recommending.

For example:
*Section 2: There is a typo in the second paragraph, third line. "**This thesis-oriented plan allows...**" rather than "This thesis oriented plan allows..."*

NAU NORTHERN ARIZONA UNIVERSITY

Plan Proposal: Review Form

Before beginning, go to http://nau.edu/Provost/Curriculum-and-Assessment/College-Curriculum-and-Assessment-Committees/Timelines-and-Agendas/, and click on your college's next meeting date to obtain the materials to review for this course.

Read 1, 2, 3 of Plan Form.
Plan Title (from form):
Click or tap here to enter text.

Justification: : Question 4 of Plan Form

4a. Identify each of the following reasons provided in the proposer's justification for adding or changing the academic program:

☐ Improvements to the course or program (aligning curriculum to new or current curriculum standards or expectations, improving degree program progression, integration of learning from one course to another),
☐ Requirements or recommendations set forth by the program's Academic Program Review or Specialized
☐ Accreditation (addressing improvements based on input from external reviewers, industry trends, new or changing governmental regulations or external accreditation requirements),
☐ Academic unit goals identified in a unit's Annual Curriculum & Assessment Reports,
☐ Evidence and assessment findings (assessments of student learning, needs assessments, student or employer surveys, comparisons to other programs in the field), and/or
☐ Other important aspects of the academic unit and student learning not identified above.

4b. Does the justification adequately explain the reasons for a new plan or for making a plan change?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if it needs improvement, explain why:
Click or tap here to enter text.

Comments:
Click or tap here to enter text.

Academic Program Purpose Statement: Question 5 of Plan Form

Review only if the Program Purpose Statement has changed.

5a: Does the academic program's purpose statement adequately summarize the scope of the program.

Yes ☐ Needs Improvement ☐ No ☐
If not, or if the description needs improvement, explain why:
Click or tap here to enter text.

5b: Does the academic program's purpose statement adequately summarize the content studied, the skills developed, and/or the learning experiences provided.

Yes ☐ Needs Improvement ☐ No ☐
If not, or if the description needs improvement, explain why:
Click or tap here to enter text.

5c. Does the academic program's purpose statement adequately summarize the future opportunities for which it prepares students.

Yes ☐ Needs Improvement ☐ No ☐
If not, or if the description needs improvement, explain why:
Click or tap here to enter text.

5d: Only for programs with emphases: Programs with emphases also summarize the content and skills unique to each emphasis area.

Yes ☐ Needs Improvement ☐ No ☐ Not Applicable BOX
If not, or if the description needs improvement, explain why:
Click or tap here to enter text.

5e: Only for graduate degrees: The degree program's purpose statement identifies student populations who would benefit most from the degree.

Yes ☐ Needs Improvement ☐ No ☐ Not Applicable BOX
If not, or if the description needs improvement, explain why:
Click or tap here to enter text.

Comments:
Click or tap here to enter text.

Academic Program Learning Outcomes: Question 6 of Plan Form

Review only if the Program Student Learning Outcomes have changed.

6a. Are the degree program's student learning outcomes explicit?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if the description needs improvement, explain why:
Click or tap here to enter text.

6b. Are the degree program's student learning outcomes learning-centered?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if the description needs improvement, explain why:
Click or tap here to enter text.

6c. Are the degree program's student learning outcomes aligned with the degree program purpose?

Yes ☐ Needs Improvement ☐ No ☐
If not, or if the description needs improvement, explain why:
Click or tap here to enter text.

6d. Are the student learning outcomes appropriate for the level of the program (Bachelor's, Master's, etc.)? For example, graduate student learning outcomes describe complex learning that assumes acquisition of lower-level knowledge and skills from a Bachelor's degree.

Yes ☐ Needs Improvement ☐ No ☐
If not, or if the description needs improvement, explain why:
Click or tap here to enter text.

6e: If a degree program has emphases, the outcomes capture the learning associated with both the common and unique curricular requirements of the degree.

Yes ☐ Needs Improvement ☐ No ☐ Not Applicable BOX

If not, or if the description needs improvement, explain why:

Click or tap here to enter text.

Curriculum Map/ Matrix: Question 7 of Plan Form

7. Does the curriculum map/ matrix reflect the proposed changes to the program?

Yes ☐ No ☐

If no, what should be included?

Click or tap here to enter text.

Comments:

Click or tap here to enter text.

Comments concerning other sections of the Plan Proposal

If you have comments or corrections that you would like to recommend for other sections of the Plan Proposal, please (a) identify the section you are addressing—otherwise we can't identify what you want to change, and (b) state the changes you are recommending.

For example:
*Section 8a: There is a typo in the second paragraph, third line. "**This thesis-oriented plan allows...**" rather than "This thesis oriented plan allows..."*

NAU NORTHERN ARIZONA UNIVERSITY

Course Change
Fall 2020

1. College and Academic Unit: **CEFNS / Biological Sciences**

2. Course subject and number: **BIO 432**
See upper and lower division undergraduate course definitions.

3. Current catalog display in this column. Cut and paste the course's title, description, requisites and units from the current on-line academic catalog* *http://catalog.nau.edu/Catalog/*.	Show the proposed changes in this column **Bold** the proposed changes in this column to differentiate from what is not changing, and ~~**Bold with strikethrough**~~ ~~what is being deleted.~~
BIO 432 EVOLUTIONARY MEDICINE (3) Description: This course integrates medicine and the biological sciences, in particular the study of adaptation as it applies to the study of the human body. By combining these topics, the course provides students with intellectual tools that allow them to develop a new perspective on the study of medicine, and the role of evolution in shaping how and why the human body contains both exquisite adaptations as well as otherwise inexplicable shortcomings. Students learn these intellectual tools by cooperating to present papers from the primary literature to their peers. Students will be capable of developing and evaluating hypotheses concerning the evolution of human disease, and will understand why humans are susceptible to our species' common maladies: such as cancer, diabetes, mental illness, and infectious and non-infectious disease. Letter grade only. Units: 3 Prerequisite: (BIO 201 and BIO 202 with grades of C or better in each), Junior status or higher	BIO 432**C** EVOLUTIONARY MEDICINE (3) Description: This course integrates medicine and the biological sciences, in particular the study of adaptation as it applies to the study of the human body. By combining these topics, the course provides students with intellectual tools that allow them to develop a new perspective on the study of medicine, and the role of evolution in shaping how and why the human body contains both exquisite adaptations as well as otherwise inexplicable shortcomings. Students learn these intellectual tools by cooperating to present papers from the primary literature to their peers. Students will be capable of developing and evaluating hypotheses concerning the evolution of human disease, and will understand why humans are susceptible to our species' common maladies: such as cancer, diabetes, mental illness, and infectious and non-infectious disease. Letter grade only. Units: 3 **Requirement Designation: Senior Capstone** **Liberal Studies Essential Skills: Effective Writing, Scientific Inquiry** Prerequisite: (BIO 201 and BIO 202 with grades of C or better in each), Junior status or higher

To all faculty submitters and committee members: please be sure to proofread and edit all response submissions.
Form Effective Fall 2018

*if there has been a previously approved curriculum change since the last catalog year, please copy the approved text from the proposal form into this field.

Section I

4. Attach the proposed Syllabus of Record. Use the Syllabus Requirements and Template to ensure you have addressed syllabus aspects that will be reviewed by the College Curriculum and Assessment Committees. For topics courses, include a Syllabus of Record and a "sample topic" syllabus.

5. Justification for course changes:
Describe how the changes to this course are related to short- and long-term plans of the academic unit. Ensure your description addresses at least one of the following:

- Improvements to the program (aligning curriculum to new or current curriculum standards or expectations, improving degree program progression, integration of learning from one course to another),
- Requirements or recommendations set forth by the program's periodic review, or in preparation for its next review (addressing improvements based on input from external reviewers, industry trends, new or changing governmental regulations or external accreditation requirements),
- Academic unit goals identified in a unit's Annual Report on Curriculum & Assessment,
- Evidence and assessment findings (assessments of student learning, needs assessments, student or employer surveys, comparisons to other programs in the field),
- Other important aspects of the academic unit and student learning not identified above.

The goal of BIO 432C is to provide a culminating experience for biomedical students who are preparing themselves for graduate or medical school in the biomedical sciences. This course integrates medicine and the biological sciences, in particular the study of adaptation as it applies to the study of the human body. Students will synthesize their knowledge of the fundamental principle of adaptation, and examine theoretical and primary literature to clarify how human biology (e.g., physiology, behavior, disease, pathogen interactions) is shaped by the evolutionary process of selection. By combining these topics, the course provides students with intellectual tools that allow them to develop a new perspective on the study of medicine, and the role of evolution in shaping how and why the human body contains both exquisite adaptations as well as otherwise inexplicable shortcomings. Based on the evolutionary topics selected, students will explore the interdisciplinary role of science as it is applied to human health challenges, such as the presence of health disparities among differing racial communities.

Students develop their graduate-level intellectual tools by:
• accessing and interrogating the primary scientific literature from specialized resources available within the biomedical sciences,
• analyzing, interpreting, and synthesizing scientific data,
• cooperating to present papers from the primary literature to their peers,
• leading seminar discussions among their peers concerning the interpretation and synthesis of research findings, and
• authoring a literature review and subsequent poster that demonstrates their mastery of evolutionary concepts and how they apply to medicine, showing their mastery of an area of evolutionary medicine.

These are all tasks students will encounter when they proceed to graduate or medical schools in the biomedical sciences.

6. Is this course in any plan (major, minor, or certificate) or sub plan (emphasis)? Yes ☒ No ☐
If yes, list.
Biomedical Sciences; B.S.

7. Is this course in any CAEP Accredited plan? Yes ☐ No ☒
If yes, list.

8. Is there a related plan change proposal being submitted? Yes ☒ No ☐
If no, explain.

Section II

Resource Implications
9a. Will the course change result in:

- an increase in library holdings and electronic or research resources for this course? Yes ☐ No ☒
  If yes, list:
- the need for equipment or technology, particularly in the classroom? Yes ☐ No ☒
  If yes, list:
- changes in the classroom space needed for the course? Yes ☐ No ☒
  If yes, list:

9b. Will the course change affect the frequency of offering the course? Yes ☐ No ☒
If yes, complete the following table identifying the number of sections and expected enrollment for this course over the next two academic years.

AY 2020-2021			AY 2021-2022		
	Sections	Enrollment Capacity		Sections	Enrollment Capacity
Fall			Fall		
Winter			Winter		
Spring	1	20	Spring	1	20
Summer			Summer		

- How many of your current faculty can teach this course? 2
- Based on enrollment and course offering projection, will additional resources be needed to offer the course? Yes ☐ No ☒
  If so, what resources are requested to offer this course?

To all faculty submitters and committee members: please be sure to proofread and edit all response submissions.
Form Effective Fall 2018

Impacts to Other Academic Units or Programs:
10a. Projected impacts to enrollments and courses in other academic units or programs: Based on the frequency of offering this course, what is the expected impact on enrollments and offerings within other academic units or programs?

10b. If other academic units or programs are impacted by this proposal, what discussions and actions have been taken for notification and/or resolution? Please attach correspondence.
NONE

11. Duplication or Perceived Duplication of Course; does there appear to be greater than 20% duplication with any other courses offered at Northern Arizona University? Yes ☐ No ☒
If so, which courses?
N/A

Section III

IN THE FOLLOWING SECTION, COMPLETE ONLY WHAT IS CHANGING

CURRENT	PROPOSED
Repeat for additional units in same term: Yes ☐ No ☐	Repeat for additional units same term: Yes ☐ No ☐
Repeat max number of units in same term:	Repeat max number of units in same term:
Instruction Mode: In person* ☐ Online ☐ Blended* ☐ *Where offered? FLGMTN ☐ Other ☐	Instruction Mode: In person* ☐ Online ☐ Blended* ☐ *Where offered? FLGMTN ☐ Other ☐
Incomplete option: incomplete (I) ☐ in progress (IP) ☐	Incomplete option: incomplete (I) ☐ in progress (IP) ☐
Experiential Learning Component: Yes ☐ No ☐	Experiential Learning Component: Yes ☐ No ☐
Terms Offered: Fall ☐ Winter ☐ Spring ☐ Summer ☐ Other ☐	Terms Offered: Fall ☐ Winter ☐ Spring ☐ Summer ☐ Other ☐

12. Will you be requesting a new or changing the current course fee? Yes ☐ No ☒
If yes, please refer to: *http://nau.edu/Registrar/Faculty-Resources/Course-Fees/*

Questions 13-15 for Undergraduate Courses only:

13a. Current Liberal Studies Designation
Distribution Block: None
Essential Skill: N/A
Write "None" if seeking LS designation for first time.

Proposed Liberal Studies Designation
Distribution Block: (list 1) **Senior Capstone**
Essential Skill: (list 1*) **Effective Writing**
Scientific Inquiry
List **two skills for capstone designation.*

13b. Justification for proposed Liberal Studies Designation change:

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Describe how the change addresses the purpose of the Liberal Studies Distribution Block, the Junior Level Writing Requirement, or the Senior Capstone course. Explain why this course belongs in the proposed area. **Explicitly reference** the specific ways in which the concepts, discourses, theories, methodological issues, and/or analytical tools of the Liberal Studies Requirement are addressed in this course. This may be copied and pasted from the Syllabus of Record's Course Purpose. At minimum, a summary of this information **must be provided** in the Syllabus of Record's Course Purpose.

14a. Current Diversity Designation
☐ Global ☐ Ethnic ☒ None

Proposed Diversity Designation
☐ Global ☐ Ethnic ☒ None

14b. Justification for proposed Diversity Designation change:
Describe how the change addresses the purpose of the Global or U.S. Ethnic Diversity Requirement. Explain why this course belongs in the proposed area. **Explicitly reference** the specific ways in which the concepts, discourses, theories, methodological issues, and/or analytical tools of the Diversity Requirement are addressed in this course. This may be copied and pasted from the Syllabus of Record's Course Purpose. At minimum, a summary of this information **must be provided** in the Syllabus of Record's Course Purpose

14c. Does at least 60% of the course's content address a Global or U.S. Ethnic population?
Yes ☐ No ☐

14d. Which Global or U.S. Ethnic population(s) is/are addressed in this course?

15. Is this course listed in the *Course Equivalency Guide*?
Yes ☐ No ☒

Scott Galland	**4/22/2019**
Reviewed by Curriculum Process Associate	Date
Approvals:	
Jason A. Wilder	**1/8/2019**
Department Chair/Unit Head (if appropriate)	Date
Dean of College	Date

From: Jason A Wilder <Jason.Wilder@nau.edu>
Sent: Tuesday, January 8, 2019 12:38 PM
To: Stuart S Galland <Stuart.Galland@nau.edu>
Subject: RE: Approval Request: BIO 432, Biomedical Science BS

Hi Scott,

To all faculty submitters and committee members: please be sure to proofread and edit all response submissions.
Form Effective Fall 2018

I did not see an entry for BIO432 in the BioMed curriculum map. I have changed this and updated the map in the attached file.
I approve!
Jason

PROPOSED SYLLABUS

College: CEFNS
Department/ Academic Unit: BIOLOGY
Course prefix, Section number and Title: BIO 432C EVOLUTIONARY MEDICINE
Term/ Year 2017
Total Units of Course Credit: 3
Course Pre-requisite(s): BIO 201, BIO 202 with grades of C or better.
Mode of Instruction: FACE-T0-FACE

Instructor's Name DAVID ABLE
Instructor's Contact Information: david.able@nau.edu
Instructor's Availability: In Biology room 429, MWF 2:00 - 4:00, always reachable by email.

Course Purpose:
Course Purpose:
The goal of BIO 432C is to provide a culminating experience for biomedical students who are preparing themselves for graduate or medical school in the biomedical sciences. This course integrates medicine and the biological sciences, in particular the study of adaptation as it applies to the study of the human body. Students will synthesize their knowledge of the fundamental principle of adaptation, and examine theoretical and primary literature to clarify how human biology (e.g., physiology, behavior, disease, pathogen interactions) is shaped by the evolutionary process of adaptation. By combining these topics, the course provides students with intellectual tools that allow them to develop a new perspective on the study of medicine, and the role of evolution in shaping how and why the human body contains both exquisite adaptations as well as otherwise inexplicable shortcomings. Based on the evolutionary topics selected, students will explore the interdisciplinary role of science as it is applied to human health challenges, such as the presence of health disparities among differing racial communities.

Students develop their graduate-level intellectual tools by:

- accessing and interrogating the primary scientific literature from specialized resources available within the biomedical sciences ,
- analyzing, interpreting, and synthesizing scientific data,
- cooperating to present papers from the primary literature to their peers,
- leading seminar discussions among their peers concerning the interpretation and synthesis of research findings, and
- authoring a literature review and subsequent poster that demonstrates their mastery of evolutionary concepts and how they apply to medicine, showing their mastery of an area of evolutionary medicine.

These are all tasks students will encounter when they proceed to graduate or medical schools in the biomedical sciences.

By the end, students will be capable of developing and evaluating hypotheses concerning the evolution of human disease, and will understand why humans are susceptible to our species' common maladies: such as cancer, diabetes, mental illness, and infectious and non-infectious disease. They will be able to synthesize material from throughout the biomedical discipline and apply this information at a graduate level.

This course addresses the Science and Applied Science Distribution Block. Medicine is the last of the biological sub-disciplines to realize the importance of a thorough understanding of evolution by natural selection. By understanding the role of natural selection in the design of the human body, both in its successes and its failures, our students will solidify their understanding of evolution, as well as gain an important new perspective on the study of medicine.

Students will also engage in the skill of Scientific Inquiry, in that students will gain experience in critically evaluating peer-reviewed published scientific studies in medical and biological science, as well as published theoretical papers concerned with the growing recognition of the importance of knowledge of evolution to the study and practice of medicine. By studying, presenting, writing, and taking part in guided discussion of published scientific papers, students refine their ability to formulate and evaluate hypotheses in medicine and biology. The discussions of published hypotheses inevitably results in students' developing and refining their own hypotheses.

Students will engage in the skill of Effective Writing: By writing a literature review students will learn the intellectual history of their subject of choice, and lay the foundation for their year-end poster presentation. Students will use the information discovered in their literature review to construct a poster written in the form of a scientific paper. This exercise will refine their ability to interrogate and synthesize the primary literature. All these skills will serve them in graduate or medical school.

Course Student Learning Outcomes

Students will be able to:

- Communicate scientific information effectively orally and in writing, with specialized knowledge of issues in health-related fields within the biosciences.
- Analyze, interpret, and synthesize scientific data with application to problems involving evolution and human disease.
- Apply the scientific method as a demonstration that they understand the basic paradigm of scientific inquiry as it relates to health-related questions in the field of biology.
- Describe fundamental principles of adaptation and its effects involving human disease.
- Explore how evolution is the central principle uniting the field of biology, by examining how the human body, health and disease, (e.g., physiology, behavior, disease, pathogen interactions) are shaped by the evolutionary process of selection.
- Access and interrogate the primary scientific literature with knowledge of specialized resources available within the biomedical sciences (e.g., the National Library of Medicine)
- Synthesize material from throughout the biomedical discipline (e.g., evolution, genetics, molecular biology, anatomy, physiology, behavior, microbiology) and apply to seminar discussions and a year-end poster presentation.
- Examine the interdisciplinary role of science as applied to human health challenges, including health issues affecting the global community and health disparities among differing communities.

Assignments/ Assessments of Course Student Learning Outcomes:

Students will read, present, and discuss primary literature in the field of Evolutionary Medicine in weekly meetings. Students will be graded in each discussion meeting based on their ability to summarize and explain scientific concepts and experiments from the assigned readings (Learnings Outcomes 1 & 2), to discuss the application of the assigned readings to human health-related problems (Learning Outcomes 3, 4 & 5), and to formulate questions related to the assigned readings that help to identify aspects of evolutionary medicine warrant further study (Learning Outcomes 2 & 3).

Students will prepare a literature review and present a poster in one of six different themes in evolutionary medicine. This assignment directly addresses Learning Outcomes 6 & 7, while also cementing Learning outcomes 1-5.

Grading System:

Students are evaluated based on their mastery of their chosen papers (10% of grade), clarity of presentation and engagement in leading the seminar discussion (20% of grade), their contributions to all discussions (20% of grade), their literature review (20%); their poster (30% of grade).

Grading Scale: A: 90-100; B: 80-89; C: 70-79; D: 60-69; F: 0-59.

Readings and Materials

All readings are from the primary literature are chosen for their merit as foundational papers, and for their contributions to the study of evolutionary medicine.

Class Outline or Tentative Schedule

The first three class meetings are 'toolbox' presentations by the Instructor. In these sessions, the Instructor presents the theoretical approach of the course in a didactic/discussion format. These sessions are meant to introduce students to the underpinnings of the study of biological adaptation, to reinforce their knowledge of basic concepts in evolutionary biology, and to give students their first opportunities to apply an evolution-centered approach to the study of medicine. In all subsequent meetings, there is a paper presentation each week by a three-person presenting group. During and following the presentation, the topics in the paper(s) are evaluated in open discussion.

Class outline: DATES AND TOPICS ARE SUBJECT TO CHANGE

Week	Topic	Reading(s)
1	Introduction to Evolutionary Medicine	Williams et al Chapters 1,2, Sherman 1988
2	Evolution, natural selection, and adaptation	Williams et al Chapters 1,2, Sherman 1988
3	Evolution, natural selection, and adaptation	Gould 1987, Puts et al 2012
4	Critiques of the adaptationist program	Spandrels of San Marcos
5	Counter critique of adaptationist program	Ernst Mayr, David Dennis

6	Symptoms	Ewald 1994; Purssell 2005
7	Evolution of virulence	Ewald 1994 Ch 3,5,6; Zimmer 2003
8	Vaccines and the evolution of virulence	Gandon et al 2001; Soubeyrand and Plotkin 2002; Read et al 2015
9	Allergy	Sherman et al 2008
10	Preeclampsia and eclampsia	Haig 1993; Von Dadelszen et al 2005
11	Pregnancy sickness	Flaxman & Sherman 2000; Forbes 2002, Flaxman & Sherman reply 2002
12	Evolution of cancer	Aktipis and Nesse 2013
13	Old friends hypothesis for evolution of autoimmune disease	Zaccone et al 2006; Fleming et al 2011
14	Evolution of menopause	Peccei 2001
15	Senescence & death	Williams 1957

Class Policies:
Students who miss class on their day of presentation must make up that contribution at another date, to be arranged with the Instructor. Students are expected to notify the instructor if they will miss any class. Students must abide by the rules of academic integrity found here:

NORTHERN ARIZONA UNIVERSITY
POLICY STATEMENTS FOR COURSE SYLLABI
https://policy.nau.edu/policy/Documents/Syllabus_Policy_Statement_091118.pdf

NAU NORTHERN ARIZONA UNIVERSITY

☒ Plan Change
☐ Plan Deletion
Fall 2020

All Plans with CAEP designation, or plans seeking CAEP designation, must include a CAEP Accreditation Memo of Approval from the NAU CAEP administrator prior to submission.

1. College and Academic Unit: **CEFNS / Biological Sciences**
2. Academic Plan Name: **Biomedical Sciences; B.S. (BIOMDBSX)**
3. Emphasis:

Section I

4. Justification for plan changes (*click for examples*):
Describe how the proposed changes are related to short and long-term goals of the Academic Unit. Ensure your description addresses at least one of the following:

- Improvements to the academic program (aligning curriculum to new or current learning outcomes, improving degree program progression, aligning learning experiences in pre-requisites),
- Requirements or recommendations set forth by the program's Academic Program Review or Specialized Accreditation (addressing improvements based on input from external reviewers, industry trends, new or changing governmental regulations or external accreditation requirements),
- Academic unit goals identified in a unit's Annual Curriculum & Assessment Reports,
- Evidence and assessment findings (assessments of student learning, needs assessments, student or employer surveys, comparisons to other programs in the field), and/or
- Other important aspects of the academic unit and student learning not identified above.

The goal of BIO 432C is to provide a culminating experience for biomedical students who are preparing themselves for graduate or medical school in the biomedical sciences. This course integrates medicine and the biological sciences, in particular the study of adaptation as it applies to the study of the human body. Students will synthesize their knowledge of the fundamental principle of adaptation (5), and examine theoretical and primary literature to clarify how human biology (e.g., physiology, behavior, disease, pathogen interactions) is shaped by the evolutionary process of adaptation (6). By combining these topics, the course provides students with intellectual tools that allow them to develop a new perspective on the study of medicine, and the role of evolution in shaping how and why the human body contains both exquisite adaptations as well as otherwise inexplicable shortcomings. Based on the evolutionary topics selected, students will explore the interdisciplinary role of science as it is applied to human health challenges, such as the presence of health disparities among differing racial communities (9).

Students develop their graduate-level intellectual tools by:

- accessing and interrogating the primary scientific literature from specialized resources available within the biomedical sciences (7),
- analyzing, interpreting, and synthesizing scientific data (2);
- cooperating to present papers from the primary literature to their peers (1),
- leading seminar discussions among their peers concerning the interpretation and synthesis of research findings(1), and
- authoring literature review papers that demonstrate their mastery of evolutionary concepts (1) and how they apply to medicine, showing their mastery of an area of biomedical science (10).

These are all tasks students will encounter when they proceed to graduate or medical schools in the biomedical sciences.

This proposal adds the new (approved December 2018) BIO 434-Human Microbiome Ecology as an elective course. The focus of the course is on ecological and human health related concepts in the context of the emerging field of human microbiome research. This interdisciplinary field combines concepts of host immunology, microbiology, biochemistry, and clinical research. The course will enhance our undergraduate degree in Biology, Biomedical Sciences, and Microbiology.

This proposal also adds BIO 451- Developmental Biology as an elective course. This course is particularly important for students on a pre-med track and many research-directed careers. Developmental Biology serves the Biology and Biomedical Science majors by reinforcing fundamental principles of biology including inheritance, evolution of form, cell communication, gene regulation, and cell physiology which contribute to a student's mastery of Anatomy, Physiology, Genetics, and Molecular Biology.

Per Policy 100201, a student may not use major requirements to also fulfil more than 50% of the requirements for a minor.

5. Current purpose statement. Cut and paste from the current on-line academic catalog: (*http://catalog.nau.edu/Catalog/*)	Show the proposed changes in this column (if applicable). **Bold** the changes, to differentiate from what is not changing, and change font to **~~Bold Red with strikethrough~~** for what is being deleted. *(Resources, Examples & Tools for Developing Program Purpose Statements).*
Purpose Statement The Bachelor of Science degree in Biomedical Sciences consists of a Life Sciences Core combined with a broad range of flexible elective options. From anatomy and physiology to human microbiology, students will develop an understanding of biological and chemical systems of the human body — and develop a foundation for a career in a range of health professions. The Life Sciences Core is designed to provide the student with a strong grounding in biology, chemistry and mathematics. The student, in consultation with an academic advisor and using a basic course schedule as a guideline, may select from elective courses relevant to a range of disciplinary areas and career fields, such as Human Genomics, Immunobiology, Medical Microbiology, Bioinformatics, Bioengineering or design his or her own set of electives approved by one of the program academic advisors. Numerous undergraduate research opportunities involve you in the process and application of science in research areas at NAU's research centers and institutes, such as the Center for Bioengineering Innovation (CBI),the Center for Microbial Genetics & Genomics (MGGen), the Center for Applied Research and Environmental Endocrinology (CAREE), and at the Imaging and Histology Core Facility. Due to the rigorous nature of our program, our graduates have exceptional placement rates in medical schools, government agencies, and graduate programs.	

6. Current student learning outcomes of the plan. If structured as plan/emphasis, include for both core and emphasis. Cut and paste from the current on-line academic catalog: (*http://catalog.nau.edu/Catalog/*)	Show the proposed changes in this column (if applicable). **Bold** the changes, to differentiate from what is not changing, and change font to **~~Bold Red with strikethrough~~** for what is being deleted. *(Resources, Examples & Tools for Developing Effective Program Student Learning Outcomes).*
Student Learning Outcomes • Students will be able to communicate scientific information effectively, with specialized knowledge of issues in health-related fields within the biosciences. • As preparation for careers in research and the health sciences, students will be able to collect, analyze and interpret scientific data with application to problems involving human disease, molecular biology, genetics, cell biology and/or microbiology. • Students will develop proficiency in the quantitative skills necessary to analyze biological problems (e.g., arithmetic, algebra, dimensional analysis, and statistical analysis), with an emphasis of quantitative techniques applicable to biomedical fields.	

To all faculty submitters and committee members: please be sure to proofread and edit all response submissions.
Form Effective Fall 2018

• Students will be able to apply the scientific method as a demonstration that they understand the basic paradigm of scientific inquiry as it relates health-related questions in the field of biology. • Students will be able to describe fundamental principles of biology e.g., central dogma, diversity of life, inheritance. • Students will understand that evolution is the central principle uniting the field of biology, and that human biology (e.g., physiology, behavior, disease, pathogen interactions) is shaped by the evolutionary process. • Students will be able to access and interrogate the primary scientific literature with knowledge of specialized resources available within the biomedical sciences (e.g., the National Library of Medicine) • Students will be able to synthesize material from throughout the biomedical discipline (e.g., evolution, genetics, molecular biology, anatomy, physiology, behavior, microbiology) and apply this to advanced-level course material (i.e., a Capstone experience). • Students will develop an appreciation for the interdisciplinary role of science as applied to human health challenges, including health issues affecting the global community and health disparities among differing communities. • Students will develop a mastery of one of the following areas, as applied to the biomedical sciences: a) Anatomy and Physiology, b) Genetics and Molecular Biology c) Microbiology and Immunology.	

Question 7 for Degree Programs only; not minors or certificates.

7. For degree programs: Attach the proposed curriculum map (example formats). (Current Curriculum Map can be found here: http://nau.edu/ocldaa/assessment-process/report-archives/) Use the Curriculum Map Guidelines to ensure you have addressed curriculum mapping aspects that will be reviewed by the College Curriculum and Assessment Committees (Reviewer's Forms).

8. Current catalog display in this column. Cut and paste from the current on-line academic catalog: (http://catalog.nau.edu/Catalog/)

Biomedical Sciences; B.S.
In addition to University Requirements:
At least 67 units of major requirements

- Up to 9 units of major prefix courses may be used to satisfy Liberal Studies requirements; these same courses may also be used to satisfy major requirements
- Elective courses, if needed, to reach an overall total of at least 120 units

Please note that you may be able to use some courses to meet more than one requirement. Contact your advisor for details.

Minimum Units for Completion	120
Major GPA	C
Highest Mathematics Required	MAT 125
Research	Optional
University Honors Program	Optional
AZ Transfer Students complete AGEC-A	Recommended
Progression Plan Link	View Progression Plan

Major Requirements
Take the following 67 units including 40 units of Biology and Biology-related coursework with a Grade of "C" or better:

- BIO 181, BIO 181L, BIO 182, BIO 182L (8 units)

Select one of the following junior-level writing requirement options (3-5 units)

- BIO 205, BIO 205L, BIO 305W (5 units)
- BIO 365W (3 unit)

(Note: The Department of Biological Sciences is phasing out the BIO 305W course and transitioning to the BIO 365W course for its majors).

Select one of the following courses (3-4 units):

- BIO 482C (Recommended), BIO 401C, BIO 420C, BIO 444C, BIO 465C, BIO 488C

Select additional courses from (23-24 units):

Show the proposed changes in this column. **Bold** the changes, to differentiate from what is not changing, and change font to ~~**Bold Red with strikethrough**~~ for what is being deleted

Biomedical Sciences; B.S.
In addition to University Requirements:
At least 67 units of major requirements

- Up to 9 units of major prefix courses may be used to satisfy Liberal Studies requirements; these same courses may also be used to satisfy major requirements
- Elective courses, if needed, to reach an overall total of at least 120 units

Please note that you may be able to use some courses to meet more than one requirement. Contact your advisor for details.

Minimum Units for Completion	120
Major GPA	C
Highest Mathematics Required	MAT 125
Research	Optional
University Honors Program	Optional
AZ Transfer Students complete AGEC-A	Recommended
Progression Plan Link	View Progression Plan

Major Requirements
Take the following 67 units including 40 units of Biology and Biology-related coursework with a Grade of "C" or better:

- BIO 181, BIO 181L, BIO 182, BIO 182L (8 units)

Select one of the following junior-level writing requirement options (3-5 units)

- BIO 205, BIO 205L, BIO 305W (5 units)
- BIO 365W (3 unit)

(Note: The Department of Biological Sciences is phasing out the BIO 305W course and transitioning to the BIO 365W course for its majors).

Select one of the following courses (3-4 units):

- BIO 482C (Recommended), BIO 401C, BIO 420C, **BIO 432C,** BIO 444C, BIO 465C, BIO 488C

Select additional courses from (23-24 units):

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• BIO 201, BIO 201L, BIO 202, BIO 202L, BIO 344, BIO 416, BIO 450 (These 20 units are recommended.) • BIO 300 (up to 3 units) • BIO 240, BIO 320, BIO 334, BIO 338, BIO 338L, BIO 343, BIO 346, BIO 350, BIO 375, BIO 376, BIO 424, BIO 460, BIO 460L, BIO 475, BIO 484, BIO 488L, BIO 545 • BIO 485, BIO 497, or BIO 498 (up to 6 units) • Non-BIO prefix courses from: CHM 238L, CHM 461, CHM 462C; NTS 356, NTS 425; PHI 332 (up to 6 units) Basic chemistry sequence: CHM 151, CHM 151L, CHM 152, CHM 152L (9 units) Biochemistry sequence: CHM 360 or CHM 461 (3 units) Select one of the following organic chemistry sequences: • CHM 230, CHM 230L (4 units) • CHM 235, CHM 235L (5 units) • CHM 235, CHM 235L, CHM 238 (8 units) Select one of the following math combinations: • MAT 125, (STA 270 or PSY 230) (7-8 units) • MAT 136 (4 units) Select one of the following physics sequences: • PHY 111, PHY 112 (8 units) • PHY 161, PHY 262, PHY 262L (8 units) All prerequisite coursework must be completed with grades of C or better. The Department of Biological Sciences does not allow dual majors within the department. If you are considering a minor, 18 qualifying units of chemistry satisfy the requirements for the Chemistry Minor. *General Electives* Additional coursework is required, if, after you have met the previously described requirements, you have not yet completed a total of 120 units of credit.	• BIO 201, BIO 201L, BIO 202, BIO 202L, BIO 344, BIO 416, BIO 450 (These 20 units are recommended.) • BIO 300 (up to 3 units) • BIO 240, BIO 320, BIO 334, BIO 338, BIO 338L, BIO 343, BIO 346, BIO 350, BIO 375, BIO 376, BIO 424, **BIO 434, BIO 451,** BIO 460, BIO 460L, BIO 475, BIO 484, BIO 488L, BIO 545 • BIO 485, BIO 497, or BIO 498 (up to 6 units) • Non-BIO prefix courses from: CHM 238L, CHM 461, CHM 462C; NTS 356, NTS 425; PHI 332 (up to 6 units) Basic chemistry sequence: CHM 151, CHM 151L, CHM 152, CHM 152L (9 units) Biochemistry sequence: CHM 360 or CHM 461 (3 units) Select one of the following organic chemistry sequences: • CHM 230, CHM 230L (4 units) • CHM 235, CHM 235L (5 units) • CHM 235, CHM 235L, CHM 238 (8 units) Select one of the following math combinations: • MAT 125, (STA 270 or PSY 230) (7-8 units) • MAT 136 (4 units) Select one of the following physics sequences: • PHY 111, PHY 112 (8 units) • PHY 161, PHY 262, PHY 262L (8 units) All prerequisite coursework must be completed with grades of C or better. The Department of Biological Sciences does not allow dual majors within the department. ~~**If you are considering a minor, 18 qualifying units of chemistry satisfy the requirements for the Chemistry Minor.**~~ *General Electives* Additional coursework is required, if, after you have met the previously described requirements, you have not yet completed a total of 120 units of credit.

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You may take these remaining courses from any academic areas, using these courses to pursue your specific interests and goals. We encourage you to consult with your advisor to select the courses that will be most advantageous to you. (Please note that you may also use prerequisites or transfer credits as electives if they weren't used to meet major, minor, or liberal studies requirements.) *Additional Information* Be aware that some courses may have prerequisites that you must also take. For prerequisite information click on the course or see your advisor.	You may take these remaining courses from any academic areas, using these courses to pursue your specific interests and goals. We encourage you to consult with your advisor to select the courses that will be most advantageous to you. (Please note that you may also use prerequisites or transfer credits as electives if they weren't used to meet major, minor, or liberal studies requirements.) *Additional Information* Be aware that some courses may have prerequisites that you must also take. For prerequisite information click on the course or see your advisor.

9. Will there be a change to the campus(es) where the plan is offered? Yes ☐ No ☒
If yes, check all campuses where the plan will be offered:

Flagstaff ☐ Fully Online ☐ (Fully Online- all courses are offered online.) Partially Online ☐ (Partially Online- some courses are offered online.) Statewide ☐

List the Statewide Campuses where the plan will be offered:

☐ Yuma	☐ Central Arizona College	☐ Chandler-Gilbert C.C.	☐ Eastern Arizona College
☐ Estrella Mountain C.C.	☐ Glendale C.C.	☐ Marine Corps Air Sta- Yuma.	☐ Mesa C.C.
☐ Mohave C.C.	☐ NAU-East Valley	☐ NAU-North Valley	☐ NAU-Yavapai
☐ Northland Pioneer College	☐ Paradise Valley C.C.	☐ Personalized Learning	☐ Phoenix Biomedical
☐ Phoenix College	☐ Pima C.C Community	☐ Pima C.C. Desert Vista	☐ Pima C.C. Downtown
☐ Pima C.C. West	☐ Scottsdale C.C	☐ South Mountain C.C.	☐ Yavapai College

Section II

Impacts to Other Academic Units or Programs

10a. Projected impacts to enrollments and courses in other academic units or programs: What is the expected impact on enrollments and offerings within other academic units or programs?

NONE

10b. If other academic units or programs are impacted by this proposal, what discussions and actions have been taken for notification and/or resolution?

N/A

Section III

Questions 11-14 for Undergraduate Plans only:

11. A major is differentiated from another major by required course commonality: 18* units of the required coursework to complete the major must be unique, (i.e. not common or not dual use as a required element in another major), to that major. Does this plan have 18* units of unique required credit? Yes ☐ No ☒

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* If there are not 18 units unique, the program will need to justify why the major is not conforming to this requirement in one of two ways:

1. The distinctiveness of the degree program must be evident through a well-articulated (1) Degree Program Purpose, (2) Degree Program Learning Outcomes, and (3) explanation for why the specified curriculum requirements are necessary for students to achieve the Degree Program Student Learning Outcomes as illustrated in the program's Curriculum Map/ Matrix and narrative describing the design of the degree program curriculum.
2. Degree programs can prohibit students from earning dual majors/dual degrees if the dual majors/dual degrees do not conform to this requirement. A prohibiting policy must be documented in the academic catalog for both majors/degrees.

The Biological Sciences department restricts dual majors

12. An emphasis is differentiated from another emphasis by required course commonality: 15 units of the required coursework to complete the emphasis must be unique, (i.e. not common or not dual use as a required element in another emphasis), to that emphasis. Do the emphases each have 15 units of unique required credit? Yes ☐ No ☐

13. An undergraduate certificate is differentiated from another certificate by required course commonality: 12 units of the required coursework to complete the certificate must be unique (i.e. not common or not dual use as a required element in another certificate), to that certificate. Does this certificate have 12 units of unique required credit? Yes ☐ No ☐

14 A minor is differentiated from another minor by required course commonality: 12 units of the required coursework to complete the minor must be unique, (i.e. not common or not dual use as a required element in another minor), to that minor. Does this minor have 12 units of unique required credit? Yes ☐ No ☐

Questions 15-18 for Graduate Plans only:

15. Graduate degrees are differentiated from one another by required curriculum and course commonality: at least 12 units of required coursework to complete the degree must be unique (i.e. not common or for dual use as a required element in another degree).
Does this degree contain at least 12 unique units of required credit? Yes ☐ No ☐

16. Emphases within a Graduate degree are differentiated by required curriculum and course commonality: at least 9 units of required coursework to complete the emphasis must be unique (i.e. not common or not dual use as a required element in another emphasis).
Do emphases contain at least 9 unique units of required credit? Yes ☐ No ☐

17. If this is a non-thesis plan, does it require a minimum of 24 units of formal graded coursework? Yes ☐ No ☐

If no, explain why this proposal should be approved.

18. If this is a thesis plan, does it require a minimum of 18 units of formal graded coursework? Yes ☐ No ☐

If no, explain why this proposal should be approved.

Scott Galland **5/2/2019**

Reviewed by Curriculum Process Associate Date

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Approvals:

Jason A. Wilder	**2/14/2019**
Department Chair/Unit Head (if appropriate)	Date
Dean of College	Date

From: Jason A Wilder <Jason.Wilder@nau.edu>
Sent: Thursday, February 14, 2019 12:36 PM
To: Stuart S Galland <Stuart.Galland@nau.edu>
Cc: Richard George Holloway <Richard.Holloway@nau.edu>; Teresa Ann Del Vecchio <Teresa.DelVecchio@nau.edu>; Alice Coulter Gibb <Alice.Gibb@nau.edu>
Subject: Re: Approval Request Microbiology BS, Biomedical Science BS

Hi Scott,
Your justifications for the changes to the BioMed and Microbiology degree plans looked great. I made no changes to the BioMed plan (and so am not returning it), and only added my signature to the Micro plan. An updated curriculum map integrating BIO434 and 451 in the Micro and BioMed degrees is attached.

Thanks!
Jason Wilder
Chair, Department of Biological Sciences

From: Jason A Wilder <Jason.Wilder@nau.edu>
Sent: Tuesday, January 8, 2019 12:38 PM
To: Stuart S Galland <Stuart.Galland@nau.edu>
Subject: RE: Approval Request: BIO 432, Biomedical Science BS

Hi Scott,
I did not see an entry for BIO432 in the BioMed curriculum map. I have changed this and updated the map in the attached file.
I approve!
Jason

From: Jason A Wilder <Jason.Wilder@nau.edu>
Sent: Thursday, May 2, 2019 4:44 PM
To: Stuart S Galland <Stuart.Galland@nau.edu>
Cc: Alice Coulter Gibb <Alice.Gibb@nau.edu>; Richard George Holloway <Richard.Holloway@nau.edu>; Amy Vaughn Whipple <Amy.Whipple@nau.edu>
Subject: RE: Catalog clean up: Minor 50% rule

Received. Though I haven't read through them yet.

From: Stuart S Galland <Stuart.Galland@nau.edu>
Sent: Thursday, May 2, 2019 4:21 PM
To: Jason A Wilder <Jason.Wilder@nau.edu>
Cc: Stuart S Galland <Stuart.Galland@nau.edu>
Subject: FW: Catalog clean up: Minor 50% rule

Hi Jason,

Attached are revised/new plan changes for the Biology degrees (effective for the Fall 2020 catalog).

This statement now violates Policy 100201, and needs to be removed.
If you are considering a minor, 18 qualifying units of chemistry satisfy the requirements for the Chemistry Minor.

Please let me know that you received these.

Thanks
Scott Galland
Curriculum Process Associate
Office of Curriculum, Learning Design and Academic Assessment
928-523-1753
928-699-9147 (cell)
Scott.galland@nau.edu