FORM A
College of Arts and Sciences
Revised 2/23/05

PROPOSAL SUMMARY AND ROUTING FORM

Proposal Title: Biol 280 Applied Fermentation: wine and cheese production

Initiating Unit or Individual: Michael D. Ryan

Contact Person's Name: Michael D. Ryan **e-mail:** ryanm@ferris.edu **phone:** 591-5892

Date or Semester of Proposal Implementation: Summer 2007

- ☐ Group I - A – New degree/major or major, or redirection of a current offering
- ☐ Group I - B – New minors or concentrations
- ☐ Group II - A – Minor curriculum clean-up and course changes
- X Group II - B – New Course
- ☐ Group III - Certificates
- ☐ Group IV – Off-Campus Programs

Group/Individual	Signature	Date	Vote/Action *
Program or Academic Unit Faculty			___Support ___Support with Concerns ___Not Support
Department Faculty	Joseph Ryan	2/21/07	18 Support 0 Support with Concerns 0 Not Support
Department Head		2/21/07	X Support ___Support with Concerns ___Not Support
College Curriculum Committee	Sandy Aspach	3/13/07	5 Support ___Support with Concerns 0 Not Support
Dean	Matthew G Klein	3/14/07	✓ Support ___Support with Concerns ___Not Support
University Curriculum Committee		3/22/07	✓ Support 9-0 ___Support with Concerns ___Not Support
Senate		3/22/07	✓ Support ___Support with Concerns ___Not Support
Academic Affairs			___Support ___Support with Concerns ___Not Support

*Support with Concerns or Not Support must include a list of concerns.
**Vote counts are to be shown for faculty group actions. "X" for administrative actions.

To be completed by Academic Affairs

President (Date Approved) Board of Trustees (Date Approved) President's Council (Date Approved)

REC'D MAR 22 2007

1. Proposal Summary

Biol 280: Applied Fermentation: wine and cheese production
Prerequisites: none

This introductory level three credit course will examine the application of basic scientific concepts of microbiology to the production of wine and cheese. It is important to note that this course is not an exercise in wine and cheese tasting but rather a scientific analysis of some the production of common fermented food products. Students will learn to apply basic science concepts to real world situations. (Note: this course was taught as Biol 290 in S05 for 16 students and in S06 for 17 students.)

The students will be introduced to the biology and chemistry of wine production (vinification). Students will learn about the evolution of various species of the genus *Vitis* involved in viticulture (the cultivation of grapes) as well as the effect of specific growth conditions such as soil factors, Phylloxera sp. (aphid) infestation and microclimate on grape cultivation. Students will learn the succession of yeast species involved in the initial fermentation process and the variety of fermentation end products, in addition to ethanol, (such as glycerol, organic acids and esters), all of which have an impact on the wine's taste, aroma and color. The students will learn the significance of the secondary malolactic fermentation by bacteria, which results in decreased acidity, a depletion of bacterial nutrients rendering the wine incapable of supporting growth of potential bacterial contaminants as well as significantly improving the aroma, taste and appearance of the wine. Students will also learn about the effects of contaminating microbes that result in unique tastes of some wine while making other wines "sick." Finally students will become acquainted with the descriptive nomenclature and legal classification of wine.

In the section of this course devoted to cheese, students will learn the varieties of milk employed in cheese making. Students will learn the significance of the various metabolisms associated with both mesophilic and thermophilic types of lactic acid bacteria employed in the initial fermentations as well as the importance of a wide range of bacterial and fungal microbes involved as secondary flora in the process of cheese ripening. Finally students will become acquainted with the descriptive nomenclature and legal classification of cheese.

The students' understanding of vinification and cheese production will be enhanced by the "real world" application of basic scientific concepts as observed during instructional visitations of industrial wine/cheese manufacturing facilities and vineyards.

2. Summary of All Course Action Required*

a. **Newly Created Courses to FSU:**

Prefix	Number	Title
Biol	280	Applied Fermentation: wine and cheese production

b. **Courses to be Deleted From FSU Catalog: NONE**

Prefix	Number	Title

c. **Existing Course(s) to be Modified: NONE**

Prefix	Number	Title

d. **Addition of existing FSU courses to program: NONE**

Prefix	Number	Title

e. **Removal of existing FSU courses from program: NONE**

Prefix	Number	Title

*Contact Senate Secretary or UCC Chair if spaces for additional courses are needed.

FORM C
Rev. 1/16/03

LIBRARY & INSTRUCTIONAL SERVICES CONSULTATION FORM

To be completed by the liaison librarian and approved by the Dean of LIS. All returned forms should be included in the proposal. **Library & Instructional Services must respond within 20 calendar days of receipt of this form to insure that the form is included in the final proposal.**

FAILURE TO RESPOND IS CONSIDERED AS SUPPORT OF THE CHANGE.

RE: Proposal Title: Applied Fermentation: wine and cheese production
BIOL 280

Projected number of students per year affected by proposed change: 20

Initiator(s): Michael D. Ryan

Proposal Contact: Michael D. Ryan Date Sent: 7 February 2007

Department: Biological Sciences Campus Address: 2115 ASC
(Please print)

Liaison Librarian signature: Maureen L Watson **Date:** 2-6-07

Dean of LIS Signature: [signature] **Date Returned:** 2-6-07

Based upon our review on 2-6-07 (date), Library & Instructional Services concludes that:

☒ Library resources to support the proposed curriculum change are currently available.

☐ Additional Library resources are needed but can be obtained from current funds.

☐ Support, but significant additional Library funds/resources are required in the amount of $_____.

☐ Does not support the proposal for reasons listed below.

Comment regarding the impact this proposal will have on library resources, collection development, programs, etc. Use additional pages if necessary:

FORM E

NEW COURSE INFORMATION FORM

See Sample: Limit to One Page.

Course Identification:

Prefix:	Number	Title
Biol	280	**Applied fermentation: wine and cheese production**

Course Description:

This introductory level course will examine the application of basic concepts of microbiology in the production of food by fermentation. The student's classroom understanding of vinification (wine making) and cheese production will be enhanced by extensive field learning experiences via instructional visitations of vineyards as well as industrial wine and cheese manufacturing facilities.

Preresquistes: None Semester Offered: Summer only

Course Outcomes:

Students will learn the basic science of fermentation and the associated applied concepts related to the production of wine and cheese.

1. Demonstrate increased understanding of carbohydrate biosynthesis.
2. Demonstrate increased understanding of evolution/cultivation of several varieties of the grapes.
3. Demonstrate increased understanding of vinification and cheese production with special interest in the process of both bacterial and fungal fermentation processes.
4. Demonstrate the role of fermentation end products as well as specific environmental factors in defining the "province" and classification of wine and cheese products.

Course Outline including Time Allocation:

(lecture: 30 hours and Field Experience: 30 contact hours @ rate of 0.5 lecture hour)

I. INTRODUCTION TO FERMENTATION (4.0 Hours)
- history of microbial food processing
- microbiology of current food production

II. FERMENTATION OVERVIEW (4.0 Hours)
- photosynthesis and carbohydrates production
- glycolysis and fermentation pathways
- mechanisms of fermentation control

III. BOTANY AND BIOCHEMISTRY OF GRAPES (6.0 hours)
- species and varieties of Vitis and their associated wines
- role of growth conditions/microclimate on geographical distribution of grapes

IV. VINIFICATION AND WINE FERMENTATIONS (8.0 Hours)
- initial wine fermenations
- malolactic fermentation
- still vs sparkling wine production
- value and the threat of microbial contamination
- technical considerations in vinification and the biotechnology of winemaking
- wine classification /terminology and the art / science of wine"province"

V. CHEESE PRODUCTION (5.0) Hours)
- biochemistry of milks and the basics of cheese making
- advanced cheese preparation
- technical considerations in cheese production
- cheese classification / terminology and Art / science of cheese "province"

VI. PRE/POST TESTING, QUIZZES, DISCUSSION OF ASSIGNED PAPERS (3.0 Hours)

VII. FIELD EXPERIENCE (15 lecture equivalent hours/30 contact hours @ rate of 0.5 lecture hour)
- surveys to determine availability of specific wine and cheese products
- on-site reviews of wine and cheese production facilities
- on-site reviews of vineyards

CREATE A NEW COURSE

Course Date Entry Form

FORM F
Create Course
rev. 2/14/05

I. ACTION TO BE TAKEN: CREATE A NEW COURSE

Notes
1. Complete each item in section I and section II.
2. : If this course is to be used as a prerequisite for other university courses, Form Fs that reflect the prerequisite change must be submitted for those courses as well.

Term Effective: **a.** Semester [Summer] **b.** Year [2007] See instructions.

II. PROPOSED FOR NEW COURSE: Complete all sections of this part through Prerequisites. See instructions in manual for further clarification.

a. Course Prefix [Biol] **b.** Number [280] **c.** Enter Contact Hours or check Indepemndent Study (X).
LECture [2] hr/week LAB [2] hr/week INDependent Study ☐
Practicum: [ ] hr/semester Seminar: [ ] hr/week

d. Full Course Title: [**Applied Fermentation: wine and cheese production**]

e. Abbreviated Course Title: [Applied Fermentation]. (Abbreviate only if necessary. Use Arabic numerals. Limit to 26 characters and spaces.)

f. Semester(s) Offered: [Summer] (See instructions for listing.) **g.** Max. Section Enrollment : [20]

Credit Hours: Check (x) type and enter maximum and minimum hours in boxes.

h. Type: ☐ Variable ☒ Fixed **i.** Maximum Credit Hours [3] **j.** Minimum Credit Hours [3]

k. Grade Method: Check (x) ☒ Normal Grading ☐ Credit/No Credit only (Pass/Fail)

m. May Be Repeated for Added Credit: Check (x) ☐ Yes ☒ No

n. Levels: Check (x) ☒ Undergraduate ☐ Graduate ☐ Professional

o. Does proposed new course replace an equivalent course? Check (x) ☐ Yes ☒ No
p. Equivalent course: Prefix [ ] Number [ ] See instructions on Replacement courses.

q. CATALOG DESCRIPTION – Limit to 75 words – PLEASE BE CONCISE.
[**This introductory level course will examine the application of basic concepts of microbiology involved in the production of food by fermentation. The student's classroom understanding of vinification (wine making) and cheese production will be enhanced by extensive field learning experiences via instructional visitations of vineyards as well as industrial wine and cheese manufacturing facilities.**]

r. Prerequisites: (if no prerequisites, write "None") Limited to 60 spaces. [none].

UCC Chair Signature/Date: _____ 3/22/07

Academic Affairs Approval Signature/Date: _____ / /

To be completed by Academic Affairs Office: - Standard & Measures Coding and General Education Code

☐ Basic Skill (BS) ☐ General Education (GE) ☐ Occupational Education (OC) [Z] G.E. Codes

Office of the Registrar use ONLY

Date Received: _____ **Date Completed:** _____ **Entered: SIS [125 ___ 1D4 ___ 12R___, 131___]**

FORM G
rev. 10/17/01

GENERAL EDUCATION APPROVAL FORM

Form G plus justification of the general education designation being sought should be sent to the General Education Coordinator (preferably electronically). The criteria for each designation can be found on the FSU web page: Home/Academics/General Education Requirements/Criteria.

Upon review the form below will be completed by the **University General Education Committee** for the courses that will meet General Education requirements. The form must be included in the proposal packet.

THE UNIVERSITY GENERAL EDUCATION COMMITTEE MUST ACT BEFORE PROPOSAL CAN BE FORWARDED TO THE UCC.

Course Prefix: Biol **Course Number:** 280

Course Title : Applied Fermentation G. E. Codes Requested: Z

G.E. Codes: G=**Global Consciousness**; R=**Race/Ethnicity/Gender Issues**; S=**Social Awareness**; **C=Cultural Enrichment**; W=**Writing Intensive**; Z=**Scientific Awareness**

Initiator: Mike Ryan **Date Sent:** 7 february 2007

Proposal Contact: Michael Ryan **Email:** ryanm@ferris.edu

Department: Biological Sciences Campus Address:2115 ASC
Please Print

University General Education Committee: _____

Chair: _____ Date Returned: _____

Based upon University General Education Committee review on _____(date), we

☐ Support the request to designate the course listed above as a _____(insert Gen. Ed. Designation(s).)

☐ Do not support the request to designate the course listed above as a _____(insert Gen. Ed. Designation(s) for reasons listed below.

Comments:

Scientific Understanding Justification Statement
Biol 280 Applied Fermentation: wine and cheese production

1. Biol 280 is open to students of all programs.

2. The series of lectures found in this course will include discussion of the evolution of understanding of the process of fermentation from pre-historic times to the present. This lecture will also discuss the development of the "Germ Theory of Disease" (yes, wines can get microbial infections!)

3. The development of the Henle Koch postulates as a practical use of the scientific method within the context of microbiology will be discussed as well as use of scientific inquiry as a tool to solve common problems associated with fermentations.

4. The course content of lecture and field experiences will represent the current "state of the art" in the production of wine and cheese for the discussion of specific role of individual microbes to the application of biotechnological techniques.

5. During both the lecture and the field experience components of this course, the demonstration of basic microbiological concepts within the applied context of the production of wine and cheese will employ the student's abilities to conduct scientific inquiry and observations.

6. Through the use of numerous "deep thought" discussion sessions throughout the course, as well as through the inclusion of papers at the end of the course, students are encouraged to integrate information into coherent applications of real world situations.

7. My background as a Ph.D in microbiology was reinforced by attendance in a workshop on applied fermentation sponsored by the Michigan Branch of the American Society for Microbiology. This workshop was conducted by a faculty member from the Department of Viticulture and Enology, UC Davis.

8. Courses in viticulture (the cultivation of grapes), enology (science of wine production) and the production of cheese are found throughout the country in community colleges as well as graduate programs. Biol 280 is taught with an emphasis on the discovery and application of basic concepts in biology. For more details of the course content please review the attached course outline. By way of example of how basic concepts are derived from classroom observation and re-applied to other seemingly unrelated setting, I will relate a classroom example. Phylloxera is a small aphid that attacked and destroyed most of the European vines in the mid 1800's. When it was discovered that native North American grapevines were resistant to phylloxeria, native European grapevines were transplanted onto North American root stocks, thereby saving European vine industry. The students are then questioned to determine what came first to North America: the aphid or the resistant grape vines? After some discussion, the class realizes that the aphid selected for resistant grapevines by destroying susceptible plants, therefore the resistant plants were present before the aphid's attack. Then the student are asked to apply that concept to other areas of science and soon realized that process of selection results in the development of antibiotic resistant microbes and treatment resistant human cancers! Throughout this course, basic concepts are discovered by the students and reapplied to different settings as should be expected in a course that satisfies the Scientific Understanding component of a general education requirement in the natural sciences.

TEMPLATE FOR NEW COURSE PROPOSALS

COURSE PREFIX, NUMBER AND TITLE: BIOL 280 Applied Fermentation: wine and cheese production

CURRENT DATE: 7 February 2007

STUDENT LEARNING OUTCOMES FOR PROPOSED COURSE

1. Demonstrate increased understanding carbohydrate biosynthesis.
2. Demonstrate increased understanding of evolution and cultivation of varieties of grapes.
3. Demonstrate increased understanding of vinification and cheese production with special interest in the process of both bacterial and fungal fermentation processes.
4. Demonstrate the role of fermentation end products as well as specific environmental factors in defining the "province" and classification of wine and cheese products.

EVALUATION OF STUDENT ACHIEVEMENT

1. Quizzes will demonstrate student understanding of basic science concepts, specific microbiological concepts

2. Group discussions and specific field experiences will demonstrate the application of scientific concepts to the real world experience of vinification and cheese production.

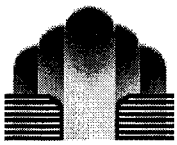
3. Research papers will demonstrate the basic and applied scientific concepts involved in the classification and production of specific wine and cheese products.

COURSE EVALUATION STRATEGIES (How will course successes be measured?)

1. In addition to the written student comments on the SAI, I will administer pre/post test surveys to measure student understanding of the important concepts of fermentation and wine/cheese production

According to current College of Arts and Sciences policy, the department head may be required to identify a course that will not be offered in the semester the new course is first offered.

Notes:



Paula L Hadley-Kennedy/FSU
03/26/2007 01:35 PM

To Maureen Milzarski/FSU@Ferris
cc
bcc
Subject Fw: General Education Approvals.

FYI

I wasn't sure if got this or not.

P
----- Forwarded by Paula L Hadley-Kennedy/FSU on 03/26/2007 01:35 PM -----

Leonard Johnson/FSU
03/26/2007 01:30 PM

To Paula L Hadley-Kennedy/FSU@Ferris
cc
Subject Fw: General Education Approvals.

Paula
Copy the Form G for BIOL 280 and add it to the proposal (if it hasn't already been sent up).
Thanks.
Leonard

Leonard R. Johnson, Ph.D
Professor
Ferris State University
1349 Cramer Circle
Big Rapids, Michigan 49307
(231) 591-2134
http://www.ferris.edu/education/education

----- Forwarded by Leonard Johnson/FSU on 03/26/2007 01:29 PM -----

H R Vonderosten/FSU
03/26/2007 11:39 AM

To Melinda J Britton/FSU@Ferris
cc Leonard Johnson/FSU@Ferris
Subject General Education Approvals.

Attached are the following approvals.

HUMH 290 Popular Culture and Race has been approved for Cultural Enrichment and REG status.
PHIL 290 Philosophy of Sex and Love has been approved for Cultural Enrichment and REG status.
PSYC 390 Death and Dying has been approved for Social Awareness status.
BIOL 280 Applied Fermentation has been approved for Scientific Understanding status.
PHIH 390 Philosophy of Mind has been approved for cultural enrichment credit.
LITH 290 Victorian Literatue Honors has been approved for Cultural Enrichment status.

At the end of the semester, I will send my Action Record with a detailed account of each action to make certain we didn't miss anything.

Robert von der Osten
Chair of the University General Education Committee