Chabot College
Statement of Rationale

TO: Curriculum Committee

FROM: Science and Mathematics Division

DATE: September 15, 2006

SUBJECT: **Biotechnology 20 - Chemistry For Biotechnology**

A. PROPOSAL CONTENT (Please check all that apply)

- ☐ Degree/Certificate***: New
- ☒ Proposed New Course
- ☐ Revision of Existing Course
  - ☐ Title Change
  - ☐ Rubric Change*
  - ☐ Number Change*
  - ☐ Hours/Units Change
  - ☐ Minor Format Change
  - ☐ Prerequisite/Co-requisite/Advisory Addition, Deletion, Change
  - ☐ Catalog Description Change
  - ☐ Below-the-Catalog-Description Change
- ☒ Articulation Request
- ☐ Request to Remove from Catalog
- ☐ Other: Please specify

B. PROPOSAL RATIONALE

Program – Provide justification for core units over 18. Please include learning goals in the justification.

Course - In a brief paragraph, please describe the need for the course,

- based on the service area of the college, and/or
- as part of the continuing program or as a new course, and/or
- for students' academic benefit, and/or
- as a baccalaureate level course, which has been designed for lower-division community college students. (If the course is offered primarily in the upper division at CSU or UC, please state below how it has been adapted to meet the needs of lower-division community college students.)

This course is being introduced as one of the first 2 courses for a biotechnology program. Chabot has signed an agreement with Ohlone College to develop the first 2 courses in the Ohlone Biotechnology program to offer at Chabot and at a local high school. This course outline dovetails the same course at Ohlone. Students who take these courses at Chabot or at an affiliated high school will be able to enter the Ohlone program in the second semester of their Biotechnology program. Chabot hopes to use the two courses being approved here as a springboard to start a full Biotechnology program at Chabot.

C. GRADING OPTION: Letter Grade Only

D. **CONSULTATIONS:** Consultations are *strongly recommended;* consultation on courses shared with LPC is required.*

☒ Consulted with colleagues in my discipline. Date: 8/24/2006

☒ Consulted with colleagues in other disciplines/divisions.
List: Biology Date: 9/11/06

☒ Consulted with LPC discipline colleagues.
Who? Mike Ansell
Result? He agreed that it is a good idea Date: 8/29/06

E. **DIVISION DEAN INPUT (Please respond as applicable)**

Has this new or revised course/program been through the division's curriculum approval process and formally approved by the division? Yes

When do you expect the new or revised course/program to be implemented? Fall 2007

Are there expected costs for new facilities, faculty, equipment, etc.? Not for just these 2 courses. There will be an expense when the program is fully implemented though. What are the costs? We will work on area Biotechnology programs in the area for donations of most of the equipment when we are reacdy to implement a full program. Has the college indicated an ability to meet new costs? Yes

Can this course/program be accommodated within the discipline plan? Yes

Are there other areas that need to be involved in the implementation, such as ITS, etc.?

If so, who? Nursing and Dental Hygiene

If this proposal requires state approval before the course/program can be implemented, will the submission to the state be ready to mail in one week after Curriculum Committee approval? Yes

Please include any additional relevant information below:

Haydt Sawhney
H. Sawhney/M Schumacher, Instructor

Sally Jahnke 10/25/06
Sally Jahnke, Dean

ABBREVIATED COURSE DESCRIPTION FOR THE CLASS SCHEDULE

Biotechnology 20 - Chemistry For Biotechnology

This course covers the basic concepts of inorganic and organic chemistry, and biochemistry as they apply to the human body. This course satisfies the requirements of biotechnology program. Strongly recommended: Mathematics 65 or 65B or 65L (completed with a grade of "C" or higher).

Chabot College Fall 2007

Course Outline for Biotechnology 20
CHEMISTRY FOR BIOTECHNOLOGY

Catalog Description:

20 – Chemistry for Biotechnology 4 units

This course covers the basic concepts of inorganic and organic chemistry, and biochemistry as they apply to the human body. Included are concepts such as properties of aqueous systems, equilibrium, acid-base reactions, proteins, nucleic acids and catabolic processes. There is an emphasis on safety and proper technique. This course satisfies the requirements of the biotechnology program. Strongly recommended: Math 65 or 65B or 65L (completed with a grade of "C" or higher) and eligibility for English 1A. 3 hours lecture, 3 hours laboratory.

Prerequisite Skills:

None

Expected Outcome for Students:

Upon completion of the course, the student should be able to:

1. measure and calculate mass, volume, density, pressure, and temperature;
2. use the periodic table to predict physical and chemical properties of the elements, including bond formation, ionic charge, and reactivity;
3. name, write chemical formulas for, and summarize the chemical properties of commonly occurring ionic compounds containing either monatomic or polyatomic ions;
4. balance a chemical equation if the products and reactants are known and interrelate quantities of products and reactants;
5. clearly explain the difference between heat and work, kinetic and potential energy;
6. calculate and measure energies of physical and chemical transformations and determine amounts of heat required to effect relevant changes in a substance;
7. correlate changes in pressure, volume, and temperature using the gas laws and relate these laws to the behavior of gases on a molecular level;
8. prepare solutions with desired molar or percent concentrations and carry out dilutions of these solutions;
9. rationalize on a qualitative level the phenomena of diffusion, osmosis, and dialysis, and predict the direction of net particle flow across a membrane;
10. differentiate among solutions, suspensions, and colloids based on their physical properties;
11. recognize typical acids and bases by their chemical formulas, and write balanced equations for acid-base neutralizations;
12. identify the components of a buffer and explain how buffers function to maintain a relatively constant pH;
13. use the ion product of water to calculate hydrogen ion and hydroxide ion concentrations in aqueous solution and relate pH to these quantities;
14. name and draw the structures of typical organic molecules, differentiating between isomers and identical molecules;
15. identify the following functional groups in an organic structure: alkene, alkyne, alcohol, ether, aldehyde, ketone, carboxylic acid, ester, amine, amide, and aromatic ring, and know their physical properties;
16. name monofunctional compounds containing one of the above functional groups;
17. describe the various roles of carbohydrates, lipids, proteins, and nucleic acids in living cells and identify and draw key structural features in these classes of biomolecules;
18. predict the products of typical reactions of biomolecules, including hydrogenation of fats, hydrolysis of fats and proteins, and acid-base reactions of proteins;

Expected Outcomes for Students – continued:

19 describe the various roles of carbohydrates, lipids, proteins, and nucleic acids in living cells, and identify and draw key structural features in these classes of biomolecules;
20 differentiate among primary, secondary, tertiary, and quaternary structures of proteins, and evaluate the factors that would give rise to each type of structure;
21 describe typical enzyme types, and compare and contrast the general models of enzyme action;
22. describe the processes of DNA replication and transcription and RNA translation, including an evaluation of the effects of the various types of mutations, and relate these processes to the structures of the nucleic acids;
23. describe the role of ATP in the energetics of a cell, and summarize the role of the reactions by which glucose is degraded in the production of energy;
24. describe the major catabolic pathways in the production of ATP including calculations of ATP yield;
25. be able to integrate effects of chemical and electrical concentrations and gradients of ion movement and change flow;
26. perform laboratory experiments in a safe, efficient, and purposeful manner.

Course Content (Lecture):

1. Atoms and elements: the building blocks of matter
2. Isotopes
3. Energy levels and electron movement
4. Ionic and covalentcompounds
5. Measurements
   a. Metric and SI units
   b. Manipulation and recording of units: unit conversion, significant figures
   c. Applications: dose calculations
6. Chemical Compounds
   a. Dot structures, the octet rule, and covalent bonding
   b. Ion formation and ionic compounds
   c. Polyatomic ions and their compounds
   d. Polarity and electronegativity
7. Chemical Reactions
   a. Balancing equations
   b. The mole concept: mole to mole conversions, mass to mass conversions
   c. Physical and chemical change
8. Energy and states of matter
   a. Measuring heat
   b. States of matter and energy changes
   c. Calorimetry
9. Gas Laws
   a. Pressure and absolute temperature
   b. Ideal gas behavior: qualitative description
   c. Kinetic molecular theory concepts
   d. Applications: blood gases and lung function

Course Content (Lecture) – continued:

10. Aqueous systems
    a. Nature of aqueous solutions
    b. Solubility behavior of gases, liquids, and solids
    c. Concentration: percent concentration, molarity
    d. Dilution
    e. Concentration effects: osmosis, dialysis
    f. Suspensions and colloids
    g. Applications: kidney functions, isotonic solutions
    h. Electrical gradients
11. Equilibrium
    a. Definition
    b. LeChatlier's Principle
12. Acids, bases, and salts
    a. Acid-base theories
    b. Strong and weak electrolytes
    c. Neutralization reactions
    d. Ionization of water and pH
    e. Buffers
    f. Applications: blood buffers, acidosis, alkalosis
13. Organic Chemistry
    a. Hydrocarbons: nomenclature, physical properties, combustion, cis-trans isomers of alkenes, addition reactions of alkenes
    b. Functional groups
    c. Solubility
    d. Acids and bases
    e. Hydrolysis and saponification
    f. Oxidation-reduction
14. Biochemistry: Selected topics
    a. Carbohydrates: Structure
    b. Cyclic versus linear forms: mutarotation
    c. Formation of polysaccharides
    d. Introductory stereochemistry: Functions of mono- and polysaccharides
    e. Proteins:
        1) Amino acids: Structural features, zwitterions, side chain properties
        2) Polypeptide Structures: primary, secondary, tertiary, and quaternary structure
        3) Overview of protein function
        4) Enzymes
            a) Definition of apoenzymes, haloenzymes, cofactors, and allosteric enzymes
            b) How reaction rates are affected by pH, temperature, and substrate concentration
            c) Role of enzymes in the metabolic process
            d) Negative feedback mechanisms
        5) Lipids, Waxes
        6) Triglycerides: Structure and reactivity, functions
        7) Steroids, Phospholipids: Structure, function

Course Content (Lecture) – continued:

f. Nucleic acids
Structures of DNA and RNA, DNA replicaton
1) DNA transcription, RNA translation, and protein formation
2) The genetic code, mutations

g. Catabolic processes and biochemical energetics
1) The role of ATP
2) NAD, FAD, and biochemical oxidation-reduction reactions
3) Glycolysis and anaerobic degradation of glucose
4) The citric acid cycle and the electron-transport chain
5) Degradion of fatty acids
6) Degradataion of amino acids: trasamination and the fate of organic nitrogen

Course Content (Laboratory):

1. Measurements
   a. Accuracy
   b. Precision
   c. Basic significant figures
   d. Common units of measurements
      1) Metric units
      2) English units
2. Safety in the laboratory and proper disposal of waste materials
3. Techniques of collecting and analyzing data to reach conclusions
4. Qualitative and quantitative experiments in the laboratory, including
   a. Conductivity of solutions
   b. Measurement of density
   c. Direct observations of reactions
   d. Experimentation with gas laws
   e. Experimentation with acids/bases including pH measurement, titration and buffers.
5. Molecular modeling
6. Syntheses of various compounds, including aspirin, soap, etc.
7. Chromatography
8. Qualitative analysis of functional groups
9. Direct observation of physical and chemical properties of functional groups
10. Tests for presence of carbohydrates and proteins
11. Proper techniques for the use of scientific instrumentation

Methods of Presentation:

1. Lecture, informal with student questions encouraged
2. Models, periodic tables, videos, and overhead transparencies
3. Demonstrations, computer simulations
4. Safety and proper respect for chemicals and scientific apparatus are constantly stressed

Assignments and Methods of Evaluating Student Progress:

1. Typical Assignments
   a. Homework: 10 – 12 homework problems per chapter taken from the text.
      Example: Name simple hydrocarbons.
      Predict the products of substitution reactions of alkanes.

Assignments and Methods of Evaluating Student Progress – continued:

b. Laboratory assignment: Investigate the reactivities of known functional groups. Apply this knowledge to the qualitative analysis of an unknown compound. How will the presence of sunlight or heat affect the rate of the reaction? Explain.

2. Methods of Evaluating Student Progress
   a. Homework
   b. Quizzes
   c. Written lab reports based on departmentally approved experiments
   d. Accuracy and precision of experimental laboratory results
   e. Midterm examinations
   f. Final examination
   g. Written assignments will encourage critical thinking and writing skills by including essays which involve analytical reasoning

Textbook(s) (Typical):

Chemistry: An Introduction to General, Organic and Biological Chemistry, Karen Timberlake, 9th edition, Pearson Education, Inc / Benjamin Cummings, 2006
Chemistry: Basic Chemistry, Timberlake, Benjamin Cummings, 2005
Chemistry Laboratory Manual: An Introduction to General, Organic and Biological Chemistry, Karen Timberlake, 9th edition, Pearson Education, Inc / Benjamin Cummings, 2006
General, Organic, and Biological Chemistry, 4th edition, H. Stephen Stoker, Houghton Mifflin, 2007

Special Student Materials:

1. Safety goggles approved for chemistry laboratory
2. Scientific calculator
3. Laboratory coat/apron (optional)

9/25/06
Maggie Schumaher
Harjot Sawhney

Chabot College
LIBRARY CONSULTATION FORM

NEW COURSE PROPOSED: BIOTECHNOLOGY 20

With regard to your new course proposal, please consult the library representative on the Curriculum Committee about the following services:

Library orientation sessions/courses;

Putting items on reserve;

Recommending book, periodical, or audio-visual material to support your course;

Other (e.g., special computer lab requirements).

Date of Consultation: 9/29/06

Proposer: Hayat Sahney

Curriculum Committee
Library representative:

kk 9/13/05
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CONTENT REVIEW FORM B
CHABOT COLLEGE ENGLISH SKILLS LEVEL ADVISORY

TARGET COURSE: Biotechnology 20

SKILLS LEVEL ADVISORY: **Eligibility for English 1A**

Instructions:

1. The specific skills which have been identified for the advisory skills level "Eligibility for English 1A" are listed below. These skills are determined from the "Advisory Skills" charts developed by the English faculty.

2. Indicate which of the advisory skills listed below are necessary "entering skills" probably needed for success in the target course. Mark with an "X" each needed skill.

3. Indicate the degree of importance of each needed entering skill for course success using the following rating scale: 1 = Critical 2 = Very Helpful 3 = Desirable

SKILLS ANALYSIS

English Level Advisory Skills: Eligibility for English 1A:	**Entering Skills Needed for Success Target Course**	**Degree of Importance**
Reading Skills:		
1. read actively, annotating and paraphrasing the text		
2. summarize accurately	X	2
3. evaluate evidence for relevance to one's purpose	X	2
4. distinguish between facts, opinions, assumptions, and inferences		
Writing Skills:		
1. generate ideas for writing based on the readings and lectures		
2. organize information around a central idea	X	1
3. select and present relevant evidence to support a thesis or proposition	X	1
4. create a focused thesis statement		
5. write a variety of sentences generally free of gross mechanical and grammatical errors	X	2
6. revise written work	X	2
7. identify errors in basic sentence structure, when proofreading	X	2

CONTENT REVIEW FORM A
ADVISORY REQUISITE COURSE

TARGET COURSE: Biotechnology 20

ADVISORY REQUISITE COURSE: Math 65

Instructions:

1. List exit competencies (skills) from Advisory Requisite course. These skills are listed in the "Expected Outcomes for Student" section of the course outline of record ("upon completion of the course, the student should be able to....")

2. Indicate which of the listed exit competencies (skills) are necessary "entering skills" probably needed for success in the target. Mark with an "X" each needed skill.

3. Indicate the degree of importance of each needed entering skill for course success using the following rating scale: 1 = Critical 2 = Very Helpful 3 = Desireable

SKILLS ANALYSIS

Math Level Advisory Skills	Entering Skills Needed for Success in the Target course	Degree of Importance
1. Write using set theory notation.		
2. Apply order of operations to simplify algebraic expressions.		
3. Solve linear equations in one variable.	X	1
4. Solve and graph linear equations in one variable.		
5. Solve and graph linear inequalities in one variable.		
6. Graph linear equations in two variables by various methods.		
7. Add, subtract, multiply, and divide polynomials.		
8. Apply the formula for squaring a binomial.		
9. Factor special products, general trinomials, and polynomials with four terms.		
10. Add, subtract, multiply, divide, and simplify rational expression.	X	1
11. Apply algebraic methods to solve word problems.	X	1
12. Solve quadratic equations by factoring, using the principle of square roots, and using the quadratic formula.		
13. Solve systems of equations by graphing, substitution, and elimination.		
14. Apply the properties of integral exponents.		
15. Solve formulas for any given variable.	X	2

16. Solve rational equations.	X	2
17. Find the slope of a line from the graph, from the definition and from the slope-intercept equation of the line.		
18. Find the equation of a line using the point-slope equation.		
19. Convert between scientific notation and standard notation.	X	2

For #1 – AS Graduation Requirements – Associate in Science Propose changes for Effective 07-08 Fall, Sp & Su

Before marking an "X" or a "✓" on the list below, please review Appendix C, Attachment A in Curriculum Handbook. The course(s) must meet the criteria.

☒ New Course (not listed below) Rubric **BIOT** Course # **20** Title **Chemistry for Biotechnology** Units 4

☐ Old Course (listed below) Rubric_____ Course #_____ Title_____ Units_____

☐ Revised Course Rubric_____ Course #_____ Title_____ Units_____

☐ A. **Language & Rationality (3)**
ENGL 1A, 52A or 70

☐ A.2 **Communication and Analytical Thinking (3)**
BUS 14, 16, 31
CAS 8, 91
CSCI 8, 10, 14, 15, 19A, 91,92
ELEC 65
Foreign Language 1A*, 1B*
GEOG 20*
HIST 5*, 12
INDT 74
LIBS 3
MCOM 8, 32
MATH 1, 2, 12, 20, 31, 32, 33, 35, 36,37, 40, 43, 54,54L, 55,55A,55B, 57, 65,65B
65L
PHIL 12
PSYC 5
SPCH 1, 2B, 10, 11*, 30, 46
THTR 25*

☒ B. **Natural Science (3)**
ANAT 1
ANTH 1*, 1L
ASTR 1, 10, 20, 30
BIOL 2AB, 5, 10, 20, 31, 50
CHEM 1A, 8, 10, 30A, 30B, 31
BIOT 20

☐ B. **Natural Science** ---cont'd.
ECOL 8, 10, 11, 12
GEOG 1*, 1L, 8, 20*
GEOL 1A, 10, 10L
MICR 1
PHED 17
PSCI 15
PHYS 2A, 4A, 4B, 4C, 5, 11
PHSI 1

☐ C. **Humanities (3)**
ARCH 2AB, 4AB,8AB, 12, 14, 16, 20
ART 1, 2A, 3A, 4, 5, 6, 10, 16A, 17, 54, 67
ENGL 12, 13, 20, 21, 22, 32, 33 34,38, 45, 47, 48
Foreign Language 2A
FREN 1A*, 1B*, 2A
GNST 30*, 31
HIST 1*, 2*
HUMN 28, 50,65*, 72, 75
ITAL 1A* , 1B*
JAPN 1A*, 1B*
MUSL 1, 2ABCD, 3, 4
MUSP 12, 14, 43, 44, 45, 50
PHIL 1, 2, 4, 7, 25
PHOT 50, 53A, 67
RELS 1, 7, 11, 12, 30
SL 64, 65
SPAN 1A*, 1B*, 5, 2A
SPCH 2A, 5
Humanities – cont'd.
THTR 1,10, 12, 25*, 47, 48, 50

☐ D. **Social & Behavioral Sciences (3)**

ADMJ 50, 60
ANTH 1*, 2, 3, 5, 8, 12
BUS 17, 36, 40
ECD 40, 87
ECON 1, 2, 5, 10, 12
GEOG 1,* 2, 3, 5, 12
GNST 30*, 39
HLTH 8
HIST 1*, 2*, 5*, 7*, 8*, 12*, 19*, 20*, 21*, 22*, 25*, 27*, 44
MCOM 31
POLI 1*, 2*, 12*, 20*, 25*, 30*, 40*
PSYC 1, 2, 3, 6, 8, 12, 18, 33, 45
PSCN 1, 4, 13
SOCI 1*, 2, 3, 4,8,10,11, 30, 31, 32
SPCH 11*

*May be used to fulfill one area only unless stated otherwise.

☐ E. **Health or American Institutions & PHED (3)**

☐ E. 1. **Health Education or American Institutions:**
HLTH 1, 4, PHED 18 or
HIST 7*, 8*, 12*, 20*,21*, 22*, 25*, 27* or POLI 1*,2*

☐ E.2. **Physical Education (1)**

PHED 1, 2, 3, 4, 5, 6, 7, 12, 13, 13R, 14, 30-48, 50

American Cultures

ANTH 5
ENGL 32, 33
HIS 5, 7, 8, 12, 27
PSCN 1, 13
SOCI 1*, 3, 30

☐ Math Proficiency

BUS 16
ELEC 65
INDT 74
MATH 1, 2, 20, 31, 32, 33, 35, 36, 37, 40, 43, 54,54L, 55, 55A 55B,57, 65, 65B, 65L
PSYC 5

Form #1 – AA Graduation Requirements –Associate of Arts – Propose changes for effective 07-08 F ll, Sp. Su

Before urking an "X" or a "✓" on the list below, please review Appendix C, Attachment A in Curriculum Handbook. The course(s) must meet the criteria.

☒ New Course (not listed below) Rubric **BIOT** Course # **20** Title **Chemistry for Biotechnology** Units **4**

☐ Old Course (listed below) Rubric____ Course #____ Title____ Units____

☐ Revised Course Rubric____ Course #____ Title____ Units____

☐ A.1 **English Composition (3)**

ENGL 1A, or 52A or 70

☐ A.2 **Writing and Critical Thinking (3)**
BUS 10
ENGL 4, 7, 52B
FREN 2A*, 2B

☐ A.3 **Communication and Analytical Thinking (3)**

BUS 14, 16, 31
CAS 8, 91
CSCI 8, 10, 14, 15, 19A, 91,92
ELEC 65
Foreign Language 1A, 1B
GEOG 20
HIST 5*, 12
INDT 74
LIBS 3
MCOM 8, 32
MATH 1, 2, 12, 20, 31, 32, 33, 35, 36,37, 40, 43, 54, 54L, 55, 55A, 55B, 57, 65, 65B, 65L
PHIL 12
PSYC 5
SPCH 1, 2B, 10, 11*, 30, 40, 46
THTR 25*

☒ B. **Natural Science (3)**

ANAT 1
ANTH 1*, 1L
ASTR 1, 10, 20, 30
BIOL 2AB, 5, 10, 20, 31, 50
BIOT 20
CHEM 1A, 8, 10, 30A,30B, 31

☐ B. **Natural Science** ---cont'd.

ECOL 8, 10, 11, 12
GEOG 1*, 1L, 8, 20
GEOL 1A, 10, 10L
MICR 1
PHED 17
PSCI 15
PHYS 2A, 4A, 4B, 4C, 5, 11
PHSI 1

☐ C. **Humanities (3)**

ARCH 2AB, 4AB,8AB, 12, 14,16
ART 1, 2A, 3A, 4, 5, 6,10, 16A, 17, 54, 67
ENGL 12, 13, 20, 21, 22, 32, 33, 34, 38, 45, 47, 48
Foreign Language 2A
FREN 1A* 1B*, 2A
GNST 30*, 31
HIST 1*, 2*
HUMN 28, 50, 65, 72,75
ITAL 1A*, 1B*
JAPN 1A*, 1B*
MUSL 1, 2ABCD, 3, 4
MUSP 12, 14, 43, 44, 45, 50
PHIL 1, 2, 4, 7, 25
PHOT 50, 53A, 67
RELS 1, 7, 11, 12, 30
SL 64, 65
SPAN 1A*, 1B*, 5, 2A
SPCH 2A, 5
THTR 1, 10, 12, 25*, 47, 48, 50

☐ D. **Social & Behavioral Sciences (3)**

ADMJ 50, 60
ANTH 1*, 2, 3, 5, 8, 12
BUS 17, 36, 40
ECD 40, 87
ECON 1, 2, 5, 10, 12
GEOG 1*, 2, 3, 5, 12
GNST 30*, 39
HLTH 8
HIS 1*, 2*, 5*, 7*, 8*, 12*, 19*, 20* 21*, 22*, 25*, 27*, 44
MCOM 31
POLI 1*, 2*,12*, 20*, 25*, 30*, 40*
PSYC 1, 2, 3, 6, 8, 12, 18, 33, 45
PSCN 1, 4, 13
SOCI 1, 2, 3, 4, 8, 10, 11, 30, 31, 32
SPCH 11*

☐ E. **Wellness (3)**

E. 1. **Areas of Health Education**
Option 1
HLTH 1, 4 or PHED 18
Option 2: AA Nursing or DH

☐ E. 2 **Physical Education (1)**
PHED 1, 2, 3, 4, 5, 6, 7, 12, 13, 13R ,14, 30-48, 50

☐ **American Cultures**

ANTH 5
ENGL 32, 33
HIST 5, 7, 8, 12, 27
PSCN 1, 13
SOCI 1, 3, 30

☐ **Math (Proficiency)**

BUS 16
ELEC 65
INDT 74
MATH 1, 2, 20, 31, 32, 33, 35, 36, 37, 40, 43, 54,54L, 55, 55A, 55B, 57, 65, 65B, 65L
PSYC 5

American Institutions
A minimum of 3 units

HIS 7*, 8*, 12, 20*, 21*, 22*, 25*, 27* OR POLI 1*, 2*

2

Form #2 – CSU A-Z Baccalaureate – Transfer Elective Courses Propose changes for effective 07-08, Fall, Sp & Su.

Before marking an "X" or a "✓" on the list below, please review Appendix C, Attachment B-III in Curriculum Handbook. The course(s) must meet the criteria.

☒ New Course (not listed below) Rubric **BIOT** Course # **20** Title **Chemistry for Biotechnology** Units **4**

☐ Old Course (listed below) Rubric _____ Course #_____ Title_____ Units_____

☐ Revised Course Rubric _____ Course #_____ Title_____ Units_____

Administrative Justice (ADMJ) 50, 54,55,59,60 61,62,63,69,70,72,74,79,89	**Ecology (ECOL)** 8, 10, 11, 12, 29	**Dance (DANC)** 1, 5, 6
American Sign Language (ASL) See "Sign Language"	**Microbiology (MICR)** 1	**Dental Hygiene (DHYG)** 51, 52AB, 54,55AB, 56AB 57,58 ,60,61, 69AB, 71AB,73 74A,75 80AB, 81AB, 82AB, 83
Anthropology (ANTH) 1, 1L, 2, 3, 5, 8, 12, 29	**Physiology (PHYS)** 1, 2, 2L	**Design Technology (DSGN)** 50, 52, 55, 61, 62AB, 65, 66AB
Architecture (ARCH) 2AB, 4AB, 8AB, 12, 14, 16, 20, 31AB, 32AB, 33, 68	**Zoology (ZOOL)** 1	**Digital Media (DGM)** 34AB, 35AB, 36AB
Art (ART) 1, 2AB, 3ABCD, 4, 5, 6, 7ABCD, 10, 11, 12ABCD,13ABCD, 16ABCD, 17, 18, 19, 20, 29, 31AB, 32AB, 33, 40, 43, 45, 48, 50, 54, 55, 60, 61, 65, 67 (Limited to 6 sem units)	**Business (BUS)** 1AB, 2, 3, 4, 7, 8,10, 12, 14, 15, 16, 17, 21, 22, 24, 26, 28, 31, 32, 34, 36, 40, 41, 81, 82, 95, 96	**Early Childhood Development (ECD)** 40, 50, 51, 52, 55, 60, 61, 62, 63,64, 65, 67, 68, 69, 77 78, 79, 83, 85, 87,88, 90, 95, 96
Astronomy (ASTR) 1, 10, 20, 29, 30, 50	**Chemistry (CHEM)** 1AB, 5, 8, 10, 12AB, 29, 30AB, 31	**Economics (ECON)** 1, 2, 5, 10, 12, 29
Automotive Technology (ATEC) 50, 61AB, 63AB 64AB, 65, 66	**Computer Application Systems (CAS)** 8, 50, 54AB, 55, 58, 60, 61,72ABCDEFGHIJKLMN, 82, 88AB,91	**Electronic & Computer Technology (ELEC)** 60, 61, 62ABC, 63,64ABC, 65, 67,68, 69, 70, 74AB, 75, 76, 77
Anatomy (ANAT) 1	**Computer Science (CSCI)** 7,8, 10, 11, 12, 13, 14, 15, 19AB, 20, 20J, 21,29, 41,42, 44AB, 91, 92, 94	**Engineering (ENGR)** 10, 25, 32, 36, 43, 45
Biology (BIOL) 2AB, 5, 10, 12, 20, 25, 29, 31, 40, 50	**Contemporary Studies** 49	**Engineering Technology (ENGT)** 60, 66,
Biotechnology (BIOT) **20**	**Creative Arts (CRAR)** 10	**English (ENGL)** 1A, 4, 7, 10, 11, 12, 13, 15, 20, 29, 70 **Literature** 20, 21, 22, 30, 32, 33, 34, 38, 45, 47,48,52AB
		Fire Technology (FT) 50, 51, 54, 55, 56, 64AB, 70AB, 71AB, 72, 73ABC, 74, 75AB, 86, 90ABC, 91ABC, 95

3

Fr h (FREN) 1L French 1AB, 29	**Interior Design (INTD)** 31AB, 32AB, 33, 50, 54, 62,68	**Physics (PHYS)** 2AB, 4ABC, 5, 11, 18, 25,29
German (GRM) 1AB, 2AB	**International Studies** 7	**Political Science (POLI)** 1, 2,12, 20, 25, 29, 30, 40
Italian (ITAL) 1AB, 29	**Library Studies (LIBR)** 1, 3	**Psychology (PSYC)** 1, 2, 3, 5, 6, 7, 8, 12, 18, 25, 29, 33,45
Japanese (JAPN) 1AB	**Machine Tool Technology (MTT)** 60AB, 65, 66, 70, 71AB	**Psychology-Counseling (PSCN)** 1, 2, 4, 7, 10, 10AB, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 25, 26, 28, 36, 37A, 37B, 39,80
Spanish (SPAN) 1AB, 2AB, 5, 29, 52	**Mass Communication (MCOM)** 1, 3, 5, 8, 15*, 31, 32, 33AB*, 34, 35, 38** 39**	**Real Estate (REST)** 80, 81AB, 82AB, 83, 84, 85, 86, 87
General Studies (GNST) 10, 11, 30, 31, 39	**Mathematics (MATH)** 1, 2, 3, 4, 6, 8, 12*, 15, 20, 25,31, 32, 33, 35, 37, 40, 43	**Recreation & Rehabilitation Therapies (RECR)** 67AB
Geography (GEOG) 1, 1L, 2, 3, 5, 8, 12, 20	**Medical Assisting (MEDA)** 70AB, 71AB, 73AB, 74, 75	**Religious Studies (RELS)** 7,50,64,72
Geology (GEOL) 1AB, 10, 10L, 21	**Music (MUSL)** **Literature, Theory & Musicianship** 1, 2ABCD, 3, 4, 5, 6, 7, 11AB **Performance (MUSP)** 12, 12A, 12B, 13B, 13C, 14A, 14B, 15A, 15B, 16AB, 17 18, 19, 29,.43, 44*, 45*, 46*, 47, 50 **Applied (MUSA)** 20*, 21AB*, 22*, 22AB, 23AB*, 30*, 31*, 32*, 33, 34*, 35* 36*, 37*, 38*, 42	**Sociology (SOCI)** 1, 2, 3, 4, 8, 10, 29, 30, 31, 32, 63
Health (HLTH) 1, 4, 8, 50, 51AB, 53, 54, 60 70AB, 81, 83	**Nursing (NURS)** 50,51,52,53,54,55, 56, 57, 58, 59, 60ABC, 61, 64, 66, 69, 70, 72, 73,74	**Sign Language (ASL)** 64, 65
Health Information Technology (HIT) 50, 51, 52, 55, 56AB, 57AB, 65AB, 66AB,69	**Nutrition (NUTR)** 1, 57,58	**Special Studies** Courses may be offered under any course title contained in the catalogue using the #99.
History (HIS) 1, 2, 5, 7, 8, 12, 19, 20, 21, 22, 25, 27, 29 44	**Philosophy (PHIL)** 2,4,12,25,50	**Speech (SPCH)** 1, 2AB, 3, 5, 10, 11, 29, 30, 40, 46, 48
Humanities (HUMN) 28,50,65,72,75	**Photography (PHOT)** 31AB, 32AB, 33, 50, 51, 52, 53AB,55, 60, 61, 62 64AB, 65, 66, 67, 68, 71	**Theater Arts (THTR)** 1, 2, 5, 10, 11,12, 16, 25, 29, 30, 40 42, 43, 44, 47, 48, 50
Independent Study 29	**Physical Education (PHED)** 1, 2, 3, 4, 5, 6, 7, 8, 13, 13R, 14, 15, 16, 17, 18, 20, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 41, 42, 43, 44, 45, 46, 47, 48, 50,57,58,60,61	**Tutoring (TUTR)** 15, 29, 51
Industrial Technology (INDT) 61, 74	**Physical Science (PSCI))** 15	**Welding Technology (WELD)** 63, 64A, 64B, 65A, 65B, 66, 70, 71
Interdisciplinary Studies in Letters & Science (ISLS) 1ABC		**Work Experience (WESP)** 95, 96

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Form #3 CSU-GE – General Education Breadth Propose changes for effective 07-08, Fall, Spring & Summer

Be ... marking an "X" or a "✓" on the list below, please review Appendix C, Attachment C in Curriculum Handbook. The course(s) must meet the criteria.

☒ New Course (not listed below) Rubric **BIOT** Course # **20** Title **Chemistry for Biotechnology** Units **4**

☐ Old Course (listed below) Rubric _____ Course #_____ Title_____ Units_____

☐ Revised Course Rubric _____ Course #_____ Title_____ Units_____

A. Communication in the English Language and Critical Thinking
- ☐ A1 SPCH 1, 30, 46
- ☐ A2 ENGL 1A
- ☐ A3 ENGL 4, 7, HIS 5, MATH 12/PHIL 12, SPCH 46

B. The Physical & Life Science & Math

☒ B1 Physical Sciences
ASTR 1, 10, 20, 30
CHEM 1A, 1B, 8, 10, 12AB 30AB, 31
BIOT 20
GEOG 1, 1L, 8
GEOL 1A, 1B, 10, 10L, 21
PHYS 2A, 2B, 4A, 4B, 5, 11
PSCI 15
PSYC 2*

☐ B2 Life Science
ANAT 1
ANTH 1*, 1L
BIOL 2A, 2B, 5, 10, 20, 25 31, 40, 50
ECOL 8, 10, 11
MICR 1
PHYS 1

☐ B3 Lab Science Requirement
Any underline number satisfies this requirement.

☐ B4 Mathematics
MATH 1, 2, 3, 4, 6, 8, 20, 31, 32 33, 35, 36, 37, 40, 43

C. Arts, Literature, Philosophy & Foreign Languages

☐ C1 Arts (Art Dance, Music, Theatre)
ARCH 14, 20
ART 1, 2A, 3A, 4, 5, 6, 10, 11 16A, 17, 20, 67
MUSL 1, 3, 4, 6, 12A, 44, 45
PHOT 67
THTR 1A, 5, 10, 11, 12, 16, 25, 40

☐ C2 Humanities (Literature, Philosophy)
Foreign Languages)
ENGL 12, 13, 20, 21*, 22*, 30, 32, 34, 38, 45, 47, 48,
FREN 1A, 1B, 2A, 2B
GNST 31
GERM 2A, 2B
HIST 1*, 2*
HUMN 28, 65,72,75
ITAL 1B
PHIL 2, 4, 25, 50
RELS 7,50,64,65,72
SL 64, 65
SPAN 1A, 1B, 5, 2A,2B,5
SPCH 2A, 5

☐ D. Human Social, Political and And Economic Institutions and Behavior
- ☐ D1 Anthropology & Archaeology
  ANTH 1*, 2, 3, 5*, 8*, 12*
- ☐ D2 Economics
  ECON 1, 2, 5, 10, 12
- ☐ D3 Ethnic Studies
  ANTH 5*, 8*, 12*
  ENGL 21*, 22*
  PSCN 4
  HIST 19*, 20*, 21*, 22*, 25*, 26*
  SOCI 3*, 10
- ☐ D4 Gender Studies
  ENGL 33
  GNST 31
  HIST 27*
  SOCI 11*
- ☐ D5 Geography
  GEOG 2, 3, 5, 12, 20
- ☐ D6 History
  HIS 1*, 2*, 7, 8, 12, 19*, 20*, 21 22*, 25*, 27*, 44
- ☐ D7 Interdisciplinary Social or Behavioral Science
  BUS 17, 36
  CAS 50
  ECD 67
  MCOM 5
  PSCN 1, 13
  SOCI 33*
  SPCH 11
- ☐ D8 Political Science, Govt. & Legal
  Legislature
  ADMJ 60
  POLI 1, 2, 12, 20, 25, 30, 40
- ☐ D9 Psychology
  PSYC 1, 2*, 3, 6, 33
- ☐ D10 Sociology and Criminology
  ADMJ 50
  SOCI 1, 2, 3*, 4, 11*, 30*, 31* 32

☐ E. Understanding and Self Development
ECOL 12
GNST 20
HLTH 1, 2, 4, 8
NUTR 1,57,58
PHED 15, 18,57,58
PSYC 8, 12, 45
PSCN 10, 11, 20
SOCI 8, 30*, 31*, 33*
SPCH 10
PHED Activity:
1, 2, 3, 5, 7, 12, 13, 13R, 14, 17, 20, 25, 26, 27, 30, 31-39, 41-48, 50 (limit 2 units).

American Institutions
One of the following combinations will satisfy this requirement.

HIST 7* + Select ONE from the following:

HIST 8*, 12, 21, 22, 25*, 27*, Poli 1,2*

OR

Poli 1* + Select ONE from the following:

HIST 7*, 8*, 20*, 21*, 22*, 25, 27
.....for a total of 6 units.

* (Courses in American Institutions may be counted in Area D).

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Form #5 IGETC – Propose changes for effective 07-08, Fall, Spring & Summer

Before m .ing an "X" or a "✓" on the list below, please review Appendix C, Attachment D in faculty handbook. The course(s) must meet the criteria.

☒ New Course (not listed below) Rubric **BIOT** Course# **20** Title **Chemistry for Biotechnology** Units 4

☐ Old Course (listed below) Rubric _____ Course# _____ Title _____ Units _____

☐ Revised Course Rubric _____ Course# _____ Title _____ Units _____

Area 1 - ENGLISH COMMUNICATION ☐ **Group A: English Composition** English 1A ☐ **Group B: Critical Thinking** English 4 or 7 ☐ **Group C: Oral Communication** Speech 1 or 46	**Area 3 – ARTS & HUMANITIES** ☐ **ARTS:** Art 1, 4, 5, 67 Music 1 Photography 67 Theater Arts 10, 11, 12 ☐ **HUMANITIES:** English 20, 21, 22, 30, 32, 33 45, 46, 47 Foreign Language 2A,2B General Studies 31 History 1, 2 Humanities 28,75 Philosophy 2, 4, 25, 50 Religious Studies 50,64,65,72	**Area 5A – PHYSICAL AND BIOLOGICAL SCIENCES** ☒ Astronomy 1, 10, 20, 30 Chemistry 1A, 1B, 5, 8, 10, 12A 12B, 30A, 30B, 31 **BIOT 20** Geography 1, 1L, 8 Geology 1A, 1B, 10, 10L, 21 Physics 2A, 2B, 4A, 4B, 4C, 11 **Area 5B – Biological Sciences** ☐ Anatomy 1 Anthropology 1, 1L Biology 2A, 2B, 5, 10, 20, 25, 31, 50 Botany 10 Ecology 10, 11 Microbiology 1 Physiology 1
Area 2 - MATHEMATICAL CONCEPTS AND QUANTITATIVE REASONING ☐ Math 1, 2, 3, 4, 6, 8, 20, 31, 32, 33 35, 40, 43	**Area 4 – SOCIAL AND BEHAVIORAL SCIENCES** Anthropology 1, 2, 3, 5, 8, 12 ☐ Economics 1, 2, 5, 10 Geography 2, 3, 5, 12 History 1, 2, 7, 8, 12, 19, 20, 21 22, 25, 27, 44, 45 Political Science 1, 2, 20, 25, 30, 40 Psychology 1, 2, 3, 6, 18, 33, 43 Psychology-Counseling 4, 13 Sociology 1, 2, 3, 4, 10, 11, 30	****CSU Graduation Requirement** **American Institutions** **One of the following combinations will satisfy this requirement.** HIST 7* + Select ONE from the following: HIST 8*, 12, 21*22,,25*, 27*, Poli 1,2* OR Poli 1* + Select ONE from the following: HIST 8*, 20*, 21*, 22*, 25*, 27* .....for a total of 6 units.

Chabot College
Statement of Rationale

TO: Curriculum Committee

FROM: Science and Mathematics Division

DATE: September 15, 2006

SUBJECT: **Biotechnology 30 - Basic Biotechnology: Introduction to Cell and Molecular Biology**

A. **PROPOSAL CONTENT (Please check all that apply)**

- ☐ Degree/Certificate***: New
- ☒ Proposed New Course
- ☐ Revision of Existing Course
  - ☐ Title Change
  - ☐ Rubric Change*
  - ☐ Number Change*
  - ☐ Hours/Units Change
  - ☐ Minor Format Change
  - ☐ Prerequisite/Co-requisite/Advisory Addition, Deletion, Change
  - ☐ Catalog Description Change
  - ☐ Below-the-Catalog-Description Change
- ☒ Articulation Request
- ☐ Request to Remove from Catalog
- ☐ Other: Please specify

B. **PROPOSAL RATIONALE**

Program – Provide justification for core units over 18. Please include learning goals in the justification.

Course - In a brief paragraph, please describe the need for the course,

- based on the service area of the college, and/or
- as part of the continuing program or as a new course, and/or
- for students' academic benefit, and/or
- as a baccalaureate level course, which has been designed for lower-division community college students. (If the course is offered primarily in the upper division at CSU or UC, please state below how it has been adapted to meet the needs of lower-division community college students.)

This course is being introduced as one of the first 2 courses for a biotechnology program. Chabot has signed an agreement with Ohlone College to develop the first 2 courses in the Ohlone Biotechnology program to offer at Chabot and at a local high school. This course outline dovetails the same course at Ohlone. Students who take these courses at Chabot or at an affiliated high school will be able to enter the Ohlone program in the second semester of their Biotechnology program. Chabot hopes to use the two courses being approved here as a springboard to start a full Biotechnology program at Chabot.

C. **GRADING OPTION: Letter Grade Only**

D. **CONSULTATIONS:** Consultations are *strongly recommended;* consultation on courses shared with LPC is required.*

☒ Consulted with colleagues in my discipline. Date: 8/18/2006

☒ Consulted with colleagues in other disciplines/divisions.
List: Chemistry department; all of them, and whole division on 8/18/06 Date: 9/11/06

☐ Consulted with LPC discipline colleagues.
Who? _____ Date: _____
Result? _____

E. **DIVISION DEAN INPUT (Please respond as applicable)**

Has this new or revised course/program been through the division's curriculum approval process and formally approved by the division? Yes

When do you expect the new or revised course/program to be implemented? Fall 2007

Are there expected costs for new facilities, faculty, equipment, etc.? Not for just these 2 courses. There will be an expense when the program is fully implemented though. What are the costs? We will work on area Biotechnology programs in the area for donations of most of the equipment when we are reacdy to implement a full program. Has the college indicated an ability to meet new costs? Yes

Can this course/program be accommodated within the discipline plan? Yes

Are there other areas that need to be involved in the implementation, such as ITS, etc.?
_____

If so, who? Nursing and Dental Hygiene

If this proposal requires state approval before the course/program can be implemented, will the submission to the state be ready to mail in one week after Curriculum Committee approval? Yes

Please include any additional relevant information below:

Rebecca Otto/ Patricia Wu, Instructor

Sally Jahnke, Dean 10/25/06

ABBREVIATED COURSE DESCRIPTION FOR THE CLASS SCHEDULE

Biotechnology 30 - Basic Biotechnology: Introduction to Cell and Molecular Biology

Basic Biological concepts and research methods. Includes such concepts as cell structure and function, genetics, measurement, preparing solutions, aseptic technique, use of equipment, etc. Strongly recommended: Mathematics 65 or 65L or 65B or appropriate skill level as demonstrated by the Mathematics placement test, CAS 8 or CSCI 8 or equivalent, and eligibility for English 1A.

Chabot College

Fall 2007

Course Outline for Biotechnology 30
BASIC BIOTECHNOLOGY: Introduction to Cell and Molecular Biology

Catalog Description:

30 – Basic Biotechnology: Introduction to Cell and Molecular Biology 4 units

Basic biological concepts, for example, measuring volume and mass, preparing solutions, performing aseptic technique, using micropipetters, operating a spectrophotometer, microscope, pH meter, and electrophoresis apparatus. Also included are culture techniques and concepts of recombinant DNA. Strongly recommended: Mathematics 65 or 65B or 65L (completed with a grade of "C" or higher) or appropriate skill level as demonstrated by the mathematics placement test, CAS 8 or CSCI 8 or equivalent and eligibility for English 1A. 3 hours lecture, 3 hours laboratory.

Prerequisite Skills:

None

Expected Outcomes for Students:

Upon completion of this course, the student should be able to:

1. demonstrate appropriate behaviors, teamwork, and proper safety procedures to work in a laboratory environment, including maintaining a professional quality laboratory notebook;
2. demonstrate an understanding of the scientific method, experimental design, data collection, basic statistics, basic laboratory skills, and procedures including the preparation of reagents and other materials;
3. demonstrate basic concepts and applications of chemistry and biochemistry appropriate for a biotechnology laboratory, with the goal of preparing students to work with basic and sophisticated instrumentation in a biotechnology laboratory, e.g., spectrophotometers, electrophoresis apparatus, pH meters, and chromatographic systems;
4. demonstrate the proper procedures for the aseptic culturing of microorganisms, their preparation for microscopy (e.g., Gram staining), and their use as vectors in recombinant DNA work;
5. describe the general features of cell structure and function, how cells reproduce, and basic concepts of Mendelian and chromosomal inheritance;
6. describe the fundamentals of molecular inheritance, including DNA structure and replication, transcription, translation, introduction to mobile elements, and genomics.

Course Content:

1. Lecture topics
   a. Process of science and experimental design
   b. Atomic structure and bonding; chemistry of water and pH
   c. Organic macromolecules
   d. Enzymes; enzyme kinetics
   e. Metabolism
   f. Cell structure and function
   g. Microorganisms

Course Content – continued:

h. Cell division
i. Mendelian inheritance
j. Chromosomal inheritance
k. Molecular inheritance
l. Genomics
m. Introduction to recombinant DNA technology

2. Lab topics and skills
   a. Laboratory safety
   b. Maintaining a laboratory notebook
   c. International system of measurement; unit conversions; scientific notation
   d. Laboratory glassware; measuring temperature, mass, volume, and length
   e. Constructing tables and graphs
   f. Preparing solutions
   g. Using micropipetters
   h. pH measurement
   i. Spectrophotometry
   j. Chromatography
   k. Microscopy
   l. Aseptic technique
   m. Bacterial streaking and staining techniques
   n. Introduction to statistical analysis (Chi-square)
   o. Agarose gel electrophoresis

Methods of Presentation:

1. Cooperative laboratory activities
2. Instructor demonstrations
3. Media presentations
4. Lectures and discussions

Assignments and Methods of Evaluating Student Progress:

1. Typical Assignments
   a. Reading
      1) Textbook
         Read chapter 1 to get an introductory idea to the science, methods, and applications of biotechnology. In this chapter, students should be able to understand some applications of biotechnology used in medical/veterinary and agricultural/food related applications. Also, students should be able to gain basic insights into the organization of a biotechnology company, such as the research and development, production, quality/control/quality assurance departments.
      2) Articles
         In this article, students should be able to understand the genesis of the human genome project to the discovery of DNA, and how this revelation enabled researchers to understand that human genes are responsible for specific traits.

Assignments and Methods of Evaluating Student Progress – continued:

b. Writing
   1) Maintaining laboratory notebook
   2) Worksheets, e.g., solving problems and completing study guide reviews
   3) Laboratory reports

C. Activities
   1) Preparing graphs, tables, and calculations in analysis of laboratory results
   2) Measuring mass and volumes to prepare stock solutions and serial dilutions
   3) Properly utilizing and maintaining laboratory equipment, e.g., microscopes, spectrophotometer, micropipetters, pH meters
   4) Aseptic culturing and staining of microorganisms
   5) Accurate laboratory observations

2. Methods of Evaluating Student Progress
   a. Exams, including a final exam, combination of short answer, fill-ins, multiple choice, matching, and essay
   b. Professional quality lab notebook
   c. Quizzes, homework, class participation

Textbooks (typical):

Molecular Cell Biology, 5th edition, Lodish, H., et al W. H. Freeman and Company, 2004
Basic Laboratory Methods for Biotechnology, Seidman, Lisa A. and Cynthia J. Moore, Prentice Hall, 2000

Special Student Materials:

1. White lab coat
2. Safety goggles
3. Disposable latex gloves
4. Bound lab notebook
5. Sharpies for marking glassware and Petri dishes
6. Black ink pens for notebook

Chabot College
LIBRARY CONSULTATION FORM

NEW COURSE PROPOSED: Biotechnology 30

With regard to your new course proposal, please consult the library representative on the Curriculum Committee about the following services:

Library orientation sessions/courses:

Putting items on reserve;

Recommending book, periodical, or audio-visual material to support your course;

Other (e.g., special computer lab requirements).

Date of Consultation: 9/18/06

Proposer: [signature]

Curriculum Committee
Library representative: [signature]

CONTENT REVIEW FORM B
CHABOT COLLEGE ENGLISH SKILLS LEVEL ADVISORY

TARGET COURSE: Biotechnology 30

SKILLS LEVEL ADVISORY: **Eligibility for English 1A**

Instructions:

1. The specific skills which have been identified for the advisory skills level "Eligibility for English 1A" are listed below. These skills are determined from the "Advisory Skills" charts developed by the English faculty.

2. Indicate which of the advisory skills listed below are necessary "entering skills" probably needed for success in the target course. Mark with an "X" each needed skill.

3. Indicate the degree of importance of each needed entering skill for course success using the following rating scale: 1 = Critical 2 = Very Helpful 3 = Desirable

SKILLS ANALYSIS

English Level Advisory Skills: Eligibility for English 1A:	Entering Skills Needed for Success Target Course	Degree of Importance
Reading Skills:		
1. read actively, annotating and paraphrasing the text	X	1
2. summarize accurately	X	1
3. evaluate evidence for relevance to one's purpose	X	1
4. distinguish between facts, opinions, assumptions, and inferences	X	1
Writing Skills:		
1. generate ideas for writing based on the readings and lectures	X	1
2. organize information around a central idea	X	1
3. select and present relevant evidence to support a thesis or proposition	X	2
4. create a focused thesis statement	X	1
5. write a variety of sentences generally free of gross mechanical and grammatical errors	X	1
6. revise written work	X	1
7. identify errors in basic sentence structure, when proofreading	X	1

CONTENT REVIEW FORM A
ADVISORY REQUISITE COURSE

TARGET COURSE: Biotechnology 30

ADVISORY REQUISITE COURSE: Math 65

Instructions:

1. List exit competencies (skills) from Advisory Requisite course. These skills are listed in the "Expected Outcomes for Student" section of the course outline of record ("upon completion of the course, the student should be able to....")

2. Indicate which of the listed exit competencies (skills) are necessary "entering skills" probably needed for success in the target. Mark with an "X" each needed skill.

3. Indicate the degree of importance of each needed entering skill for course success using the following rating scale: 1 = Critical 2 = Very Helpful 3 = Desireable

SKILLS ANALYSIS

Exit Skills for Prerequisite Course	Entering Skills Needed for Success in the Target course	Degree of Importance
1. Write using set theory notation.		
2. Apply order of operations to simplify algebraic expressions.	X	1
3. Solve linear equations in one variable.	X	1
4. Solve and graph linear equations in one variable.	X	3
5. Solve and graph linear inequalities in one variable.	X	3
6. Graph linear equations in two variables by various methods.		
7. Add, subtract, multiply, and divide polynomials.		
8. Apply the formula for squaring a binomial.		
9. Factor special products, general trinomials, and polynomials with four terms.		
10. Add, subtract, multiply, divide, and simplify rational expression.	X	1
11. Apply algebraic methods to solve word problems.	X	1+
12. Solve quadratic equations by factoring, using the principle of square roots, and using the quadratic formula.	X	3
13. Solve systems of equations by graphing, substitution, and elimination.		
14. Apply the properties of integral exponents.		
15. Solve formulas for any given variable.	X	1

16. Solve rational equations.	X	1
17. Find the slope of a line from the graph, from the definition and from the slope-intercept equation of the line.		
18. Find the equation of a line using the point-slope equation.		
19. Convert between scientific notation and standard notation.	X	1+
20. Assess the reading task in advance according to the purpose for reading and the difficulty of the materials to be read.	X	1
21. Establish outcomes for the reading material prior to reading it by forming appropriate questions.	X	3
22. Pause at intervals to recite, reflect, and develop additional questions or outcomes for the reading.		
23. Develop methods and strategies which will enable a more critical evaluation of the text.	X	1
24. Respond critically to reading by means of class discussions and through writing.	X	3
25. Support written and spoken responses to a reading by citing appropriate and adequate textual evidence (and other rationale when appropriate).		
26. Organize coherent essays around a central idea.	X	3
27. Apply structural elements in writing that are appropriate to the audience and purpose.		
28. Proofread her/his own prose.	X	1

Form #1 – AS Graduation Requirements – Associ e in Science Propose changes for Effective 07-08 Fall, Sp & Su

Before marking an "X" or a "✓" on the list below, please review Appendix C, Attachment A in Curriculum Handbook. The course(s) must meet the criteria.

☒ New Course (not listed below) Rubric **BIOT** Course # **30** Title **Basic Biotechnology: Introduction to Cell & Molecular Biology** Units **4**

☐ Old Course (listed below) Rubric_____ Course #_____ Title_____ Units_____

☐ Revised Course Rubric_____ Course #_____ Title_____ Units_____

☐ A. **Language & Rationality (3)**
ENGL 1A, 52A or 70

☐ A.2 **Communication and Analytical Thinking (3)**
BUS 14, 16, 31
CAS 8, 91
CSCI 8, 10, 14, 15, 19A, 91,92
ELEC 65
Foreign Language 1A*, 1B*
GEOG 20*
HIST 5*, 12
INDT 74
LIBS 3
MCOM 8, 32
MATH 1, 2, 12, 20, 31, 32, 33, 35, 36,37, 40, 43, 54,54L, 55,55A,55B, 57, 65,65B
65L
PHIL 12
PSYC 5
SPCH 1, 2B, 10, 11*, 30, 46
THTR 25*

☒ B. **Natural Science (3)**
ANAT 1
ANTH 1*, 1L
ASTR 1, 10, 20, 30
BIOL 2AB, 5, 10, 20, 31, 50
BIOT 30
CHEM 1A, 8, 10, 30A, 30B, 31

☐ B. **Natural Science** ---cont'd.
ECOL 8, 10, 11, 12
GEOG 1*, 1L, 8, 20*
GEOL 1A, 10, 10L
MICR 1
PHED 17
PSCI 15
PHYS 2A, 4A, 4B, 4C, 5, 11
PHSI 1

☐ C. **Humanities (3)**
ARCH 2AB, 4AB,8AB, 12, 14, 16, 20
ART 1, 2A, 3A, 4, 5, 6, 10, 16A, 17, 54, 67
ENGL 12, 13, 20, 21, 22, 32, 33 34,38, 45, 47, 48
Foreign Language 2A
FREN 1A*, 1B*, 2A
GNST 30*, 31
HIST 1*, 2*
HUMN 28, 50,65*, 72, 75
ITAL 1A* , 1B*
JAPN 1A*, 1B*
MUSL 1, 2ABCD, 3, 4
MUSP 12, 14, 43, 44, 45, 50
PHIL 1, 2, 4, 7, 25
PHOT 50, 53A, 67
RELS 1, 7, 11, 12, 30
SL 64, 65
SPAN 1A*, 1B*, 5, 2A
SPCH 2A, 5
Humanities – cont'd.
THTR 1,10, 12, 25*, 47, 48, 50

☐ D. **Social & Behavioral Sciences (3)**

ADMJ 50, 60
ANTH 1*, 2, 3, 5, 8, 12
BUS 17, 36, 40
ECD 40, 87
ECON 1, 2, 5, 10, 12
GEOG 1,* 2, 3, 5, 12
GNST 30*, 39
HLTH 8
HIST 1*, 2*, 5*, 7*, 8*, 12*, 19*, 20*, 21*, 22*, 25*, 27*, 44
MCOM 31
POLI 1*, 2*, 12*, 20*, 25*, 30*, 40*
PSYC 1, 2, 3, 6, 8, 12, 18, 33, 45
PSCN 1, 4, 13
SOCI 1*, 2, 3, 4,8,10,11, 30, 31, 32
SPCH 11*

*May be used to fulfill one area only unless stated otherwise.

☐ E. **Health or American Institutions & PHED (3)**

☐ E. 1. **Health Education or American Institutions:**
HLTH 1, 4, PHED 18 or
HIST 7*, 8*, 12*, 20*,21*, 22*, 25*, 27* or POLI 1*,2*

☐ E.2. **Physical Education (1)**

PHED 1, 2, 3, 4, 5, 6, 7, 12, 13, 13R, 14, 30-48, 50

American Cultures

ANTH 5
ENGL 32, 33
HIS 5, 7, 8, 12, 27
PSCN 1, 13
SOCI 1*, 3, 30

☐ Math Proficiency

BUS 16
ELEC 65
INDT 74
MATH 1, 2, 20, 31, 32, 33, 35, 36, 37, 40, 43, 54,54L, 55, 55A 55B,57, 65, 65B, 65L
PSYC 5

Form #1 – AA Graduation Requirements –Associate of Arts – Propose changes for effective 07-08 Fall, Sp. Su

Before marking an "X" or a "✓" on the list below, please review Appendix C, Attachment A in Curriculum Handbook. The course(s) must meet the criteria.

☒ New Course (not listed below) Rubric **BIOT** Course # **30** Title **Basic Biotechnology: Introduction to Cell & Molecular Biology** Units **4**

☐ Old Course (listed below) Rubric_____ Course #_____ Title_____ Units_____

☐ Revised Course Rubric_____ Course #_____ Title_____ Units_____

☐ A.1 **English Composition (3)**

ENGL 1A, or 52A or 70

☐ A.2 **Writing and Critical Thinking (3)**
BUS 10
ENGL 4, 7, 52B
FREN 2A*, 2B

☐ A.3 **Communication and Analytical Thinking (3)**

BUS 14, 16, 31
CAS 8, 91
CSCI 8, 10, 14, 15, 19A, 91,92
ELEC 65
Foreign Language 1A, 1B
GEOG 20
HIST 5*, 12
INDT 74
LIBS 3
MCOM 8, 32
MATH 1, 2, 12, 20, 31, 32, 33, 35, 36,37, 40, 43, 54, 54L, 55, 55A, 55B, 57, 65, 65B, 65L
PHIL 12
PSYC 5
SPCH 1, 2B, 10, 11*, 30, 40, 46
THTR 25*

☒ B. **Natural Science (3)**

ANAT 1
ANTH 1*, 1L
ASTR 1, 10, 20, 30
BIOL 2AB, 5, 10, 20, 31, 50
BIOT 30
CHEM 1A, 8, 10, 30A,30B, 31

☐ B. **Natural Science** –cont'd.

ECOL 8, 10, 11, 12
GEOG 1*, 1L, 8, 20
GEOL 1A, 10, 10L
MICR 1
PHED 17
PSCI 15
PHYS 2A, 4A, 4B, 4C, 5, 11
PHSI 1

☐ C. **Humanities (3)**

ARCH 2AB, 4AB,8AB, 12, 14,16
ART 1, 2A, 3A, 4, 5, 6,10, 16A, 17, 54, 67
ENGL 12, 13, 20, 21, 22, 32, 33, 34, 38, 45, 47, 48
Foreign Language 2A
FREN 1A* 1B*, 2A
GNST 30*, 31
HIST 1*, 2*
HUMN 28, 50, 65, 72,75
ITAL 1A*, 1B*
JAPN 1A*, 1B*
MUSL 1, 2ABCD, 3, 4
MUSP 12, 14, 43, 44, 45, 50
PHIL 1, 2, 4, 7, 25
PHOT 50, 53A, 67
RELS 1, 7, 11, 12, 30
SL 64, 65
SPAN 1A*, 1B*, 5, 2A
SPCH 2A, 5
THTR 1, 10, 12, 25*, 47, 48, 50

☐ D. **Social & Behavioral Sciences (3)**

ADMJ 50, 60
ANTH 1*, 2, 3, 5, 8, 12
BUS 17, 36, 40
ECD 40, 87
ECON 1, 2, 5, 10, 12
GEOG 1*, 2, 3, 5, 12
GNST 30*, 39
HLTH 8
HIS 1*, 2*, 5*, 7*, 8*, 12*, 19*, 20* 21*, 22*, 25*, 27*, 44
MCOM 31
POLI 1*, 2*,12*, 20*, 25*, 30*, 40*
PSYC 1, 2, 3, 6, 8, 12, 18, 33, 45
PSCN 1, 4, 13
SOCI 1, 2, 3, 4, 8, 10, 11, 30, 31, 32
SPCH 11*

☐ E. **Wellness (3)**

E. 1. **Areas of Health Education**
Option 1
HLTH 1, 4 or PHED 18
Option 2: AA Nursing or DH

☐ E. 2 **Physical Education (1)**
PHED 1, 2, 3, 4, 5, 6, 7, 12, 13, 13R ,14, 30-48, 50

☐ **American Cultures**

ANTH 5
ENGL 32, 33
HIST 5, 7, 8, 12, 27
PSCN 1, 13
SOCI 1, 3, 30

☐ **Math (Proficiency)**

BUS 16
ELEC 65
INDT 74
MATH 1, 2, 20, 31, 32, 33, 35, 36, 37, 40, 43, 54,54L, 55, 55A, 55B, 57, 65, 65B, 65L
PSYC 5

American Institutions
A minimum of 3 units

HIS 7*, 8*, 12, 20*, 21*, 22*, 25*, 27* OR POLI 1*, 2*

hr

Forr #2 – CSU A-Z Baccalaureate – Transfer Elec /e Courses Propose changes for effective 07-08, Fall, Sp & Su.

Before marking an "X" or a "✓" on the list below, please review Appendix C, Attachment B-III in Curriculum Handbook. The course(s) must meet the criteria.

☒ New Course (not listed below) Rubric **BIOT** Course # **30** Title **Basic Biotechnology: Introduction to Cell & Molecular Biology** Units **4**

☐ Old Course (listed below) Rubric _____ Course #_____ Title_____ Units_____

☐ Revised Course Rubric _____ Course #_____ Title_____ Units_____

Administrative Justice (ADMJ) 50, 54,55,59,60 61,62,63,69,70,72,74,79,89	**Ecology (ECOL)** 8, 10, 11, 12, 29	**Dance (DANC)** 1, 5, 6
American Sign Language (ASL) See "Sign Language"	**Microbiology (MICR)** 1	**Dental Hygiene (DHYG)** 51, 52AB, 54,55AB, 56AB 57,58 ,60,61, 69AB, 71AB,73 74A,75 80AB, 81AB, 82AB, 83
Anthropology (ANTH) 1, 1L, 2, 3, 5, 8, 12, 29	**Physiology (PHYS)** 1, 2, 2L	**Design Technology (DSGN)** 50, 52, 55, 61, 62AB, 65, 66AB
Architecture (ARCH) 2AB, 4AB, 8AB, 12, 14, 16, 20, 31AB, 32AB, 33, 68	**Zoology (ZOOL)** 1	**Digital Media (DGM)** 34AB, 35AB, 36AB
Art (ART) 1, 2AB, 3ABCD, 4, 5, 6, 7ABCD, 10, 11, 12ABCD,13ABCD, 16ABCD, 17, 18, 19, 20, 29, 31AB, 32AB, 33, 40, 43, 45, 48, 50, 54, 55, 60, 61, 65, 67 (Limited to 6 sem units)	**Business (BUS)** 1AB, 2, 3, 4, 7, 8,10, 12, 14, 15, 16, 17, 21, 22, 24, 26, 28, 31, 32, 34, 36, 40, 41, 81, 82, 95, 96	**Early Childhood Development (ECD)** 40, 50, 51, 52, 55, 60, 61, 62, 63,64, 65, 67, 68, 69, 77 78, 79, 83, 85, 87,88, 90, 95, 96
Astronomy (ASTR) 1, 10, 20, 29, 30, 50	**Chemistry (CHEM)** 1AB, 5, 8, 10, 12AB, 29, 30AB, 31	**Economics (ECON)** 1, 2, 5, 10, 12, 29
Automotive Technology (ATEC) 50, 61AB, 63AB 64AB, 65, 66	**Computer Application Systems (CAS)** 8, 50, 54AB, 55, 58, 60, 61,72ABCDEFGHIJKLMN, 82, 88AB,91	**Electronic & Computer Technology (ELEC)** 60, 61, 62ABC, 63,64ABC, 65, 67,68, 69, 70, 74AB, 75, 76, 77
Anatomy (ANAT) 1	**Computer Science (CSCI)** 7,8, 10, 11, 12, 13, 14, 15, 19AB, 20, 20J, 21,29, 41,42, 44AB, 91, 92, 94	**Engineering (ENGR)** 10, 25, 32, 36, 43, 45
Biology (BIOL) 2AB, 5, 10, 12, 20, 25, 29, 31, 40, 50	**Contemporary Studies** 49	**Engineering Technology (ENGT)** 60, 66,
Biotechnology (BIOT) **30**	**Creative Arts (CRAR)** 10	**English (ENGL)** 1A, 4, 7, 10, 11, 12, 13, 15, 20, 29, 70 **Literature** 20, 21, 22, 30, 32, 33, 34, 38, 45, 47,48,52AB
		Fire Technology (FT) 50, 51, 54, 55, 56, 64AB, 70AB, 71AB, 72, 73ABC, 74, 75AB, 86, 90ABC, 91ABC, 95

Form #3 C3U-GE – General Education Breadth **Propose changes for effective 07-08, Fall, Spring & Summer**

Be. : marking an "X" or a "✓" on the list below, please review Appendix C, Attachment C in Curriculum Handbook. The course(s) must meet the criteria.

☒ New Course (not listed below) Rubric **BIOT** Course # **30** Title **Basic Biotechnology: Introduction to Cell & Molecular Biology** Units **4**

☐ Old Course (listed below) Rubric _____ Course #_____ Title_____ Units_____

☐ Revised Course Rubric _____ Course #_____ Title_____ Units_____

A. Communication in the English Language and Critical Thinking
- ☐ A1 SPCH 1, 30, 46
- ☐ A2 ENGL 1A
- ☐ A3 ENGL 4, 7, HIS 5, MATH 12/PHIL 12, SPCH 46

B. The Physical & Life Science & Math

☐ B1 Physical Sciences
ASTR 1, 10, 20, 30
CHEM 1A, 1B, 8, 10, 12AB
30AB, 31
GEOG 1, 1L, 8
GEOL 1A, 1B, 10, 10L, 21
PHYS 2A, 2B, 4A, 4B, 5, 11
PSCI 15
PSYC 2*

☒ B2 Life Science
ANAT 1
ANTH 1*, 1L
BIOL 2A, 2B, 5, 10, 20, 25
31, 40, 50
BIOT 30
ECOL 8, 10, 11
MICR 1
PHYS 1

☐ B3 Lab Science Requirement
Any underline number satisfies this requirement.

☐ B4 Mathematics
MATH 1, 2, 3, 4, 6, 8, 20, 31, 32
33, 35, 36, 37, 40, 43

C. Arts, Literature, Philosophy & Foreign Languages

☐ C1 Arts (Art Dance, Music, Theatre)
ARCH 14, 20
ART 1, 2A, 3A, 4, 5, 6, 10, 11
16A, 17, 20, 67
MUSL 1, 3, 4, 6, 12A, 44, 45
PHOT 67
THTR 1A, 5, 10, 11, 12, 16, 25, 40

☐ C2 Humanities (Literature, Philosophy)
Foreign Languages)
ENGL 12, 13, 20, 21*, 22*, 30,
32, 34, 38, 45, 47, 48,
FREN 1A, 1B, 2A, 2B
GNST 31
GERM 2A, 2B
HIST 1*, 2*
HUMN 28, 65,72,75
ITAL 1B
PHIL 2, 4, 25, 50
RELS 7,50,64,65,72
SL 64, 65
SPAN 1A, 1B, 5, 2A,2B,5
SPCH 2A, 5

☐ D. Human Social, Political and And Economic Institutions and Behavior
- ☐ D1 Anthropology & Archaeology
  ANTH 1*, 2, 3, 5*, 8*, 12*
- ☐ D2 Economics
  ECON 1, 2, 5, 10, 12
- ☐ D3 Ethnic Studies
  ANTH 5*, 8*, 12*
  ENGL 21*, 22*
  PSCN 4
  HIST 19*, 20*, 21*, 22*, 25*, 26*
  SOCI 3*, 10
- ☐ D4 Gender Studies
  ENGL 33
  GNST 31
  HIST 27*
  SOCI 11*
- ☐ D5 Geography
  GEOG 2, 3, 5, 12, 20
- ☐ D6 History
  HIS 1*, 2*, 7, 8, 12, 19*, 20*, 21
  22*, 25*, 27*, 44
- ☐ D7 Interdisciplinary Social or Behavioral Science
  BUS 17, 36
  CAS 50
  ECD 67
  MCOM 5
  PSCN 1, 13
  SOCI 33*
  SPCH 11
- ☐ D8 Political Science, Govt. & Legal
  Legislature
  ADMJ 60
  POLI 1, 2, 12, 20, 25, 30, 40
- ☐ D9 Psychology
  PSYC 1, 2*, 3, 6, 33
- ☐ D10 Sociology and Criminology
  ADMJ 50
  SOCI 1, 2, 3*, 4, 11*, 30*, 31*
  32

☐ E. Understanding and Self Development
ECOL 12
GNST 20
HLTH 1, 2, 4, 8
NUTR 1,57,58
PHED 15, 18,57,58
PSYC 8, 12, 45
PSCN 10, 11, 20
SOCI 8, 30*, 31*, 33*
SPCH 10
PHED Activity:
1, 2, 3, 5, 7, 12, 13, 13R, 14, 17, 20, 25, 26, 27, 30, 31-39, 41-48, 50 (limit 2 units).

American Institutions
One of the following combinations will satisfy this requirement.

HIST 7* + Select **ONE** from the following:

HIST 8*, 12, 21, 22, 25*, 27*, Poli 1,2*

OR

Poli 1* + Select **ONE** from the following:

HIST 7*, 8*, 20*, 21*, 22*, 25, 27
.....for a total of 6 units.

* (Courses in American Institutions may be counted in Area D).

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