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1.0 Academic Program/Pathway Review

Name of Pathway: Physical Sciences

Division chairperson: L. J. McKenzie  Phone number: 310-233-4501

Names and types of program/pathway: Astronomy, Chemistry and Physics

This pathway includes associate of science degrees in Chemistry and Physics

The Program/Pathway Review Self-Study Committee consists of:

Division Chairperson: L. J. McKenzie

Program/Pathway Review Chairperson: L. J. McKenzie

<table>
<thead>
<tr>
<th>Program Tenured Faculty</th>
<th>Program Adjunct Faculty</th>
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<tbody>
<tr>
<td>J. Arias</td>
<td>R. Conn</td>
</tr>
<tr>
<td>B. Ibe</td>
<td>J. Fu</td>
</tr>
<tr>
<td>S. Morris</td>
<td>A. Gahrahmanpour</td>
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<tr>
<td></td>
<td>B. Gamble</td>
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<td></td>
<td>M. Kantz</td>
</tr>
<tr>
<td></td>
<td>L. Masoudipour</td>
</tr>
<tr>
<td></td>
<td>V. Schadev</td>
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<tr>
<td></td>
<td>S. Toeque</td>
</tr>
<tr>
<td></td>
<td>R. Whiting</td>
</tr>
</tbody>
</table>

Program/Pathway Staff:  A. Mendez – Chemistry Laboratory Technician
                        A. Vega – Division Secretary

Academic Dean: D. Humphreys

Vice-President of the Cluster: L. Rosas

One outside professional or alumni:

Two students currently enrolled in the program/pathway under review:

Thomas Abbatielo
Yeun Chang
2.0 Construction Plans

INSERT SCIENCE COMPLEX PICTURE
3.0 Pathway Mission

The Physical Sciences Pathway mission is to provide students with a foundation of science skills and competencies needed to satisfy a variety of degree and careers goals. Recognizing the diverse background of students, this foundation includes AA degree and transfer level courses that aim to contribute to workforce development and improvement. In all aspects of its mission, the pathway’s goal is to provide a supportive learning environment that imparts student success in analyzing, quantifying and developing critical thinking skills. The curriculum focuses on recognizing the interdependence between theory and application, enhancing it with the appropriate use of classroom technology.

4.0 Pathway Description and Overview

The Physical Sciences Pathway is designed to meet the needs of the diverse community college population interested in science and engineering as a career or to satisfy other academic program requirements such as AA degree, occupational and transfer programs requisites in allied health, engineering and pre-med. Courses offered in this pathway vary from introductory to college sophomore level, and are taught with a strong emphasis on laboratory hands-on experience. The pathway supports special students' populations by closely working with college support services such as Counseling, Financial Aid and Special Services programs.

The Physical Sciences Pathway meets the academic goals and strategies of the College by offering a flexible schedule of courses that accommodates morning and evening student populations. Scheduling of courses is based on student demand and course rotations that allow students to complete their transfer requirements in a timely manner.
5.0 Pathway Student Learning Outcomes and Assessment Results

Student will demonstrate increasing levels of mastery of the following outcomes throughout the physical sciences curriculum. Upon successful completion of the requirements for the Associate of Arts Degree, students will

- Interpret laboratory data and communicate quantitative and relational information
- Apply science formulas to solve problems that arise in the laboratory setting with and without the use of technology
- Communicate content information formally, using appropriate science notation and terminology
- Engage in logical and critical thinking

A. Pathway Curriculum – Appendix A page

B. Student Learning Outcomes

Upon successful completion of physical sciences courses, students will have a foundation in science needed to satisfy a variety of degree and careers goals.

Upon successful completion, with a grade of “C” or better, of Astronomy 001 and 005, or Chemistry 065, or Physical Sciences 001 and 014, or Physics 011, students will be able to meet the physical sciences requirement for the AA degree.

Upon successful completion of Chemistry 065 or Chemistry 066 with a grade of “C” or better, allied health majors will be able to meet the chemistry requirement for Microbiology and Physiology.

Upon successful completion, with a grade of “C” or better, of Astronomy 001 and 005, or Chemistry 065, 66,101, 102, 111 or 112, or Physical Sciences 001 and 014, or Physics 011, 006, 007, 037, 038 or 039 with a grade of “C” or better, students will be able to meet physical sciences transfer requirements.

D. Student Learning Outcomes Assessment

Faculty in the Physical Sciences Pathway have always been involved in the assessment of their students, however recent ACCJC accreditation standards demand that student learning outcomes be assessed on an ongoing and systematic basis.
The pathway conducted its first formal assessment project in spring 2009 by defining and refining student learning outcomes and formulating a rubric to measure success. Course outlines of record for all courses went through extensive revision to ensure alignment of measurable learning outcomes.

The “findings and recommendations” derived from this project has produced important data for the pathway faculty to analyze success as well as failure.

During 2009-10 faculty in the Physical Sciences pathway wrote student learning outcomes for the following courses: Astronomy 001 and 005, Chemistry 040, 065, 066, 101, 102, 211, 212, Physics 006, 007, 011, 037, 038 and 039.

During 2009-10 faculty in the Physical Sciences pathway measured and analyzed student learning outcomes in the following courses: Astronomy 001 and 005, Chemistry 040, 065, 066, 101, 102, 211, 212, Physics 006, 007, 011, 037, 038 and 039.

Supporting Documentation – appendix C

E. Program Modifications

Chemistry Department faculty introduced Chemistry 066; a unified allied health major's chemistry course to replace the equivalent two course sequence Chemistry 055 and 070.

The Stars4Kids program was introduced to fulfill the pathway commitment to the college mission by providing an opportunity to 3rd and 5th grade teachers and students in the community to participate in a planetarium lecture and chemistry laboratory demonstration that relates to astronomical phenomena, such as why is the sky blue or red. The Stars 4 Kids program is designed to enhance the 3rd and 5th grade science curriculum standards on constellations, planets and seasons.

Chemistry faculty are currently exploring the feasibility of offering a biochemistry course for allied health majors.

Faculty are currently involved in the design phase of the future Science Complex which will house the life and physical science disciplines. The complex, being built as a signature campus landmark, will break ground in March 2010 with an expected completion date in 2012.

F. Based on the assessment of student learning outcomes at the course and program/pathway levels, areas that require modifications to improve performance and areas that are working well and should be expanded.

1. Areas for improvement:
   a. Laboratory sections with enrollment in excess of 36 students is a major challenge for faculty in the
Physical Sciences Pathway. This situation is expected to improve once the new Science Complex comes online, however faculty in this pathway realize that they cannot continue to increase the number of students per section to meet college efficiency goals without compromising academic integrity and safety.

b. Astronomy is down to zero (0) tenured faculty, Chemistry is down to two (2), Physics is down to one (1) and there is no physics laboratory technician to support the physics discipline. The staffing level is well below the full-time faculty necessary to support course and program assessment efforts.

c. Faculty in this pathway should embrace instructional software provided by textbook publishers to increase student practice time and exposure to the subjects.

d. Faculty in this pathway should seek training in the use of web-based support services to develop websites and online/hybrid courses to remain competitive with other colleges offering similar courses.

e. Faculty in this pathway should complete the long overdue Los Angeles Harbor College Chemistry 101 and 102 Laboratory Experiments in order to reduce student laboratory manual costs.

2. Areas for reinforcement:

Following is a list of—short-term and long-term time goals:

a. Continue discussion on essential skills
   i. reinstate supplemental instruction
b. Increase focus on professional development
   i. observe each other’s classrooms
   ii. participate in the peer evaluation process
c. Increase and improve participation from discipline members
   i. vary dates and times of department meetings; set calendar for semester
   ii. establish course review committees
d. Continue focus on assessment and commitment to implement findings and recommendations
   i. build in time between projects for faculty to implement findings and recommendations
   ii. tie this to professional development workshops where findings and practical classroom strategies for improvement are discussed
e. Improve communication with part-time faculty
   i. more workshops, orientations
   ii. create department website
   iii. create a mentoring program
   iv. call for adjunct faculty to participate in course review committees
f. Improve communication with feeder high school science teachers and transfer institution faculty
   i. organize workshops and or orientations with feeder high school science teachers
Data collected for the Math-Physical Sciences and Technology Division was generated from the college FactBook. Data that relates exclusively to the Physical Sciences Pathway is highlighted.

6.1. External SCAN—General

a. Demographics—Service Area will grow at a slower rate than State average.

b. Demographics—Aging Population in the College’s Service Area
   i. The number of High School Seniors in our Service Area will peak in 2010 and then decline
   ii. The number of 15-19 year olds will decline over the next 10 years

c. Demographics—Percentage of Latinos and Asians in service area will increase, while percentage of Whites and African-Americans will decrease over the next 10 years.

d. Economic Downturn—For LAHC, Rising Unemployment is associated with Rising Enrollment.

e. Technology—Incoming students will be much more comfortable in the “virtual world” than previous generations.

(Source: 2008 LAHC Factbook)
6.2. External SCAN—Occupations in Physical Sciences Pathway.

Recognizing the diverse background of students, this pathway offers programs that aim to support the workforce development mission of the college.

Region Information

Demographics for engineering general and related fields indicate a steady 10% increase in job demand through the year 2017.

Region Information

Harbor - MSA

Description: LB, Sta Ana Metropolitan Area

Counties: Los Angeles, CA (6037), Orange, CA (6059)

Executive Summary

<table>
<thead>
<tr>
<th>Selected Occupations</th>
<th>Education Level</th>
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<tbody>
<tr>
<td>Aerospace engineering and operations technicians (SOC 17-3021)</td>
<td>Associate's degree</td>
</tr>
<tr>
<td>Civil engineering technicians (SOC 17-3022)</td>
<td>Associate's degree</td>
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<tr>
<td>Electro-mechanical technicians (SOC 17-3024)</td>
<td>Associate's degree</td>
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<tr>
<td>Mechanical engineering technicians (SOC 17-3027)</td>
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<tr>
<td>Engineering technicians, except drafters, all other (SOC 17-3029)</td>
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</table>

<table>
<thead>
<tr>
<th>Basic Information</th>
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<td>2017 Occupational Jobs</td>
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<td>Total Change</td>
</tr>
<tr>
<td>Total % Change</td>
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<tr>
<td>2007 Median Hourly Earnings</td>
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</tbody>
</table>
Executive Summary

Although the number of positions available in the areas of astronomy, chemistry, and physics are not overwhelming, demographics indicate a steady 16% to 19% increase in job demand through the year 2017. As part of the program review, the Physical Sciences Pathway will address present and future trends in mathematics, science and technology education as described in professional articles such as *Strengthening the Science and Math Pipeline*, an AASCU policy paper found at [http://www.aascu.org/policy_matters/pdf/v2n11.pdf](http://www.aascu.org/policy_matters/pdf/v2n11.pdf), and *Science and Mathematics*, found at [http://www.ohiostem.org/_data/user_docs/SAMEPAC_REPORT_FINAL_1-22.pdf](http://www.ohiostem.org/_data/user_docs/SAMEPAC_REPORT_FINAL_1-22.pdf)
6.3. Internal SCAN—Performance (Source: 2008 LAHC Factbook)

a. Recent personnel changes in the Physical Sciences Pathway include retirements of Physics Professor J. Fu and Physics Laboratory Technician R. Whiting in 2009, and the replacement of Chemistry Laboratory Technician R. Bumamglag who transferred to LA City College. The accompanying table summarizes the numerical relationship between adjunct and tenured faculty as budget and FTES targets fluctuate.

<table>
<thead>
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<th>Year</th>
<th>Equipment $</th>
<th>Hourly</th>
<th>Full-time</th>
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b. Within class retention

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<th>2005</th>
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<td>88.1%</td>
<td>93.7%</td>
<td>80.3%</td>
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<td>Chemistry</td>
<td>84.8%</td>
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<td>87.2%</td>
<td>86.5%</td>
<td>89.2%</td>
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<tr>
<td>Co Science</td>
<td>75.7%</td>
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<tr>
<td>Physics</td>
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<td>89.5%</td>
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<td>79.9%</td>
<td>83%</td>
<td>85%</td>
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| Division Rates  | 78.1%    | 78.9%    | 75.4%    | 76.7%    | 77.7%    |

During 2003-2007 pathway class retention average through census equals or exceeds the division retention
c. Within class successful completion rates

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<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
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<td>61%</td>
<td>67%</td>
<td>63%</td>
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Division Rates: 55.2% 55.3% 52.3% 55.2% 50.2%

During 2003-2007 the pathway class completion average exceeds the division completion rate

6.4. Internal SCAN—Efficiency


<table>
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<th>2005</th>
<th>2006</th>
<th>2007</th>
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<tbody>
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<td>32</td>
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Division Total: 36.7 34.2 34.1 35.2 32.5
During 2003-2007 the pathway class size average was less, equal or exceeded the division class size average.

b. Fall 2007 Detail (Source: BW i22report):

<table>
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<tr>
<th>Discipline</th>
<th>Reg FTEF</th>
<th>Hrly FTEF</th>
<th>Total FTEF</th>
<th>Total FTES</th>
<th>Total WSCH</th>
<th>FTES / FTEF</th>
<th>WSCH / FTEF</th>
<th>Average Class Size</th>
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<td>545.85</td>
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<td>16.5</td>
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</table>

This data supports the pathway’s alignment with college, contract and state efficiency goals.

c. Number of sections offered

<table>
<thead>
<tr>
<th>Fall</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
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<th>2007</th>
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<tr>
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<tr>
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<td>6</td>
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<td>6</td>
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<tr>
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<td>4</td>
<td>4</td>
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<td>Pathway Total</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>22</td>
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</tbody>
</table>
6.5. Change in support personnel, classifications, and budget since last review or the previous three years.

Recent personnel changes in the Physical Sciences Pathway include retirements of professors J. Fu and C. Huff in 2009, and the transfer of the chemistry laboratory assistant to LACC.

Budget for equipment is 100% dependent on state block grant allocations. Relative to the present college budget conditions, classroom equipment and supply allocations are adequate.

6.6. What areas of the program need strengthening?

**Instructional Assistance:** replacement of the physics laboratory technician is necessary to support the pathway's day to day operation. Laboratory equipment needs to be assembled for each session and the equipment must be maintained in operational condition.

**Schedule Coordination:** compatible life sciences, mathematics and physical sciences class schedules need to be created to allow students to move quickly through the curriculum.

**Facilities and resources:**
The long term goal for the Physical Sciences Pathway to find a building to call their own is about to be realized. The pathway has been programmed to be part of the Science Complex slated for completion in 2012. The Planetarium is scheduled to undergo renovation to be completed in 2011.

6.7. What are the strengths of the program?

**Curriculum:** Courses are fully articulated and have been designed to meet CSU/UC transfer requirements.

**Partnerships:** the relationship between the Physical Sciences Pathway and the Harbor teacher Preparatory Academy attracts the largest number of students to the entry level physics course.

6.8. Summarize program and unit plan modifications necessary for program improvement.

Pathway faculty continues to review textbooks and technology to assist students meet their instructional needs.
6.9. What sources of data outside the college data set (if any) were taken into consideration in this part of the program review?


6.10. From what was determined from the review, what trends are indicated by the data?

a. The average class retention in mathematics courses through census week, from 2003 to 2007, was 74.4%, on a par with the California state average of 75%

b. The average mathematics course completion rate from 2003 to 2007, was 48.4% lower than the California state average of 53%

c. The average class size in mathematics courses from 2003 to 2007, was 41 exceeding both division and college average of 34.6 for the same time period.

6.11. Describe any unique institutional goals the program satisfies

The Physical Sciences pathway aligns with the institutional missions and strategic LACCD goals by offering an array of courses and resources to meet the needs of all college students such as:

1. Sophomore-level courses provide transfer requirements that parallel four year colleges and university curricula.
2. Classes are provided at a range of times to allow students course schedule flexibility
3. The pathway strives to improve student retention and success by providing an effective learning environment for students, focusing on teaching excellence.
4. The pathway is actively engaged in implementing and assessing, SLOs for each of its courses. to ensure that course offerings are both effective and responsive to student needs, and ultimately ensuring improved student success and retention rates.
5. The pathway is actively engaged in mapping course SLO’s, PLO’s and ILO’s for the upcoming ACCJC accreditation report and visit.
6.12. For each degree and certificate offered by the program, complete the following

Presently the number of declared physical science majors is unknown

One AS degree in Chemistry was awarded in 2004

The pathway review did not focus on the gender breakdown of students. Faculty did not consider this to be a relevant issue at this time.

The pathway review did not focus on the ethnic breakdown of students. Faculty did not consider this to be a relevant issue at this time.
ASSOCIATE IN SCIENCE DEGREE IN
CHEMISTRY

Major Code: 190500

The Associate in Science degree in Chemistry is designed for students who either intend to transfer to the UC or CSU as Chemistry majors, or who want to prepare for work as a Physical Sciences Laboratory Assistant. The AS degree consists of a core general education component, 30 units in the major, and additional elective units as needed to reach a minimum of 60 units overall.

All students are strongly advised to meet with a counselor for academic planning. Students who plan to transfer will need to consult a counselor and the Transfer Center for specific information regarding preparation for the intended major at the colleges/universities of choice, in order to facilitate a seamless transition.

Choose either option 1 or 2 or 3 for the General Education Core:

1. LAHC G.E. Plan A (30 units)
2. CSU G.E. Breadth -- including Health or Nutrition, P.E. and U.S. history or U.S. government (39-41 units)
3. IGETC -- including Health or Nutrition, P.E. and U.S. history or U.S. government (34-41 units)

Courses required for the major (30 units):
Chemistry 101, General Chemistry I 5 units
Chemistry 102, General Chemistry II 5 units
Chemistry 211, Organic Chemistry I 5 units
Chemistry 212, Organic Chemistry II 5 units
Mathematics 267, Calculus with analytic Geometry III 5 units
Physics 039, Physics for Engineers III 5 units

ASSOCIATE IN SCIENCE DEGREE IN PHYSICS

Major Code: 190200

The Associate in Science degree in Physics is designed for students who either intend to transfer to the UC or CSU as Physics majors, or who want to prepare for work as a Physical Sciences Laboratory Assistant. The AS degree consists of a core general education component, 30 units in the major, and additional elective units as needed to reach a minimum of 60 units overall.

Physical Sciences 2008-09
All students are strongly advised to meet with a counselor for academic planning. Students who plan to transfer will need to consult a counselor and the Transfer Center for specific information regarding preparation for the intended major at the colleges/universities of choice, in order to facilitate a seamless transition.

Choose either option 1 or 2 or 3 for the General Education Core:
1. LAHC G.E. Plan A (30 units)
2. CSU G.E. Breadth -- including Health or Nutrition, P.E. and U.S. history or U.S. government (39-41 units)
3. IGETC -- including Health or Nutrition, P.E. and U.S. history or U.S. government (34-41 units)

Courses required for the major (30 units):
Chemistry 101, General Chemistry I 5 units
Chemistry 102, General Chemistry II 5 units
Mathematics 267, Calculus with analytic Geometry III 5 units
Physics 037, Physics for Engineers I 5 units
Physics 038, Physics for Engineers II 5 units
Physics 039, Physics for Engineers III 5 units
COURSES OFFERED

ASTRONOMY

1 - ELEMENTARY ASTRONOMY (3) UC:CSU
Lecture 3 hours and 20 minutes per week.
Introduction to astronomical methods used to determine the nature of
our universe. Course work included use of astronomical instruments in
a laboratory setting. A planetarium is used to study star patterns and
constellations.

5 - FUNDAMENTALS OF ASTRONOMY
LABORATORY (1) UC:CSU
Prerequisite: Completion of Astronomy 1 with a grade of “C” or better
or concurrent enrollment.
Lecture 3 hours and 20 minutes per week.
Introduction to astronomical methods used to determine the nature of
our universe. Course work included use of astronomical instruments in
a laboratory setting. A planetarium is used to study star patterns and
constellations.

CHEMISTRY

40 - BASIC CHEMISTRY (3) UC*:CSU
Lecture 3 hours and 20 minutes per week.
Introductory chemistry course for non-science majors. Important
chemical principles are illustrated using topics of current interest as
illustrated in the media. Lectures are descriptive and conceptual using
demonstration to emphasize chemical principles. Course meets physical
science requirement without a laboratory.
* UC credit may be granted by petition after transfer.

65 - INTRODUCTORY GENERAL CHEMISTRY (4)
UC:CSU
Prerequisite: Completion of Mathematics 123C with a grade of “C” or
better or equivalent, or concurrent enrollment in Mathematics 123C.
Lecture 3 hours and 20 minutes and laboratory 3 hours and 20
minutes per week.
Introductory course in the principles of inorganic chemistry utilizing
elementary mathematics. It serves as a prerequisite for Chemistry 101.
Not open for credit to students who have credit for Chemistry 55.

66 - ORGANIC AND BIOCHEMISTRY FOR ALLIED
HEALTH MAJORS (5) UC:CSU
Prerequisite: Completion of Chemistry 065 and Mathematics 123C with grades of “C” or better.

Lecture 3 hours and 20 minutes and laboratory 6 hours and 40 minutes per week.

This course covers the organic and biochemical principles found in physiology and metabolic processes.

101 - GENERAL CHEMISTRY I (5) UC:CSU
Prerequisites: Completion of Chemistry 065 and Mathematics 123C or equivalent with grades of “C” or better.
Preparation: eligibility for English 101, or concurrent enrollment in English 028.

Lecture 3 hours and 20 minutes and laboratory/discussion 6 hours and 40 minutes per week.
First of two courses that introduces theory and laboratory topics dealing with general principles of chemistry. Chemical calculations are emphasized as well as laboratory precision and accuracy utilizing quantitative techniques.

102 - GENERAL CHEMISTRY II (5) UC:CSU
Prerequisite: Completion of Chemistry 101 with a grade of “C” or better.

Lecture 3 hours and 20 minutes and laboratory/discussion 6 hours and 40 minutes per week.
Second of two courses that introduces theory and laboratory topics dealing with general principles of chemistry. Chemical calculations are emphasized as well as laboratory precision and accuracy utilizing quantitative techniques.

201 - QUANTITATIVE ANALYSIS I (4) UC:CSU
Prerequisite: Chemistry 102.

Lecture 2 hours and 10 minutes and laboratory 6 hours and 40 minutes per week.
Principles of quantitative analysis and laboratory practice in typical methods of gravimetric and volumetric analyses are included in this course.

202 - QUANTITATIVE ANALYSIS II (4) UC:CSU
Prerequisite: Completion of Chemistry 201 with a grade of “C” or better

Lecture 2 hours and 10 minutes and laboratory 5 hours and 30
minutes per week.
This course is a continuation of Chemistry 201 and introduces the student to chemical reactions of molecules instrumental methods of analysis.

211 - ORGANIC CHEMISTRY FOR SCIENCE
MAJORS I (5) UC:CSU
Prerequisite: Completion of Chemistry 102 with a grade of “C” or better.
Lecture 3 hours and 20 minutes and laboratory 6 hours and 40 minutes per week.
Introductory organic chemistry course with emphasis on the structure, stereochemistry and reactions of carbon compounds. Laboratory work covers preparation and isolation of organic compounds with determination of their physical and chemical properties.

212 - ORGANIC CHEMISTRY FOR SCIENCE
MAJORS II (5) UC:CSU
Prerequisite: Completion of Chemistry 211 with a grade of “C” or better.
Lecture 3 hours and 20 minutes and laboratory 6 hours and 40 minutes per week.
Chemistry 212 is a continuation of Chemistry 211 with additional emphasis on mechanisms and stereo-chemistry. Special emphasis is given to reactions and organic compounds of biological importance. Significant laboratory time is devoted to the synthesis of complex organic molecules.

PHYSICAL SCIENCE

1 - PHYSICAL SCIENCE I (3) UC:CSU
This course is not available for credit to students who have completed a college-level physics course.
Lecture 3 hours and 20 minutes per week.
The fields of astronomy, chemistry, geology and physics are presented with an interdisciplinary approach. The fundamental concepts and principles of each discipline are developed to allow the student the opportunity to gain an understanding of both science and the scientist’s viewpoint.

14 - PHYSICAL SCIENCE LABORATORY (1) UC:
CSU

Laboratory 2 hours and 10 minutes per week.

Experiments in the fields of astronomy, chemistry, geology and physics are presented with an interdisciplinary approach. The fundamental concepts and principles of each discipline are developed to allow the student the opportunity to gain an understanding of both science and the scientist's viewpoint.
PHYSICS

6 - GENERAL PHYSICS I (4) UC:CSU
Prerequisite: Completion of Mathematics 240 with a grade of “C” or better or concurrent enrollment.
Lecture 3 hours and 20 minutes and laboratory 3 hours and 20 minutes per week.
This is a basic course in mechanics, electricity, magnetism and an introduction to modern physics.

7 - GENERAL PHYSICS II (4) UC:CSU
Prerequisite: Completion of Physics 006 with a grade of “C” or better.
Lecture 3 hours and 20 minutes and laboratory 3 hours and 20 minutes per week.
This is a basic course in light, electricity, magnetism and an introduction to modern physics.

11 - INTRODUCTORY PHYSICS (4) UC:CSU
Prerequisite: Completion of Mathematics 123C with a grade of “C” or better. This course is not open for credit to students who have credit in Physics 006.
Lecture 3 hours and 20 minutes and laboratory 3 hours and 20 minutes per week.
Survey course in general physics for students who did not complete high school level physics. Topics include mechanics, heat, sound, light, electricity, magnetism and modern physics.

37 - PHYSICS FOR ENGINEERS AND SCIENTISTS I (5) UC:CSU
Prerequisites: Completion of Physics 011 and Mathematics 265 or equivalents with grades of “C” or better.
Lecture 4 hours and 25 minutes and laboratory 3 hours and 20 minutes per week.
First course in a series of physics with calculus for majors in chemistry, engineering, mathematics and physics. Topics include Newton's three laws of motion, energy, momentum, rotational motion, gravitation and thermodynamics.

38 - PHYSICS FOR ENGINEERS AND SCIENTISTS II (5) UC:CSU
Prerequisite: Completion of Physics 037 and Mathematics 265 or equivalents with grades of “C” or better.
Lecture 4 hours and 25 minutes and laboratory 3 hours and 20 minutes per week.

Second course in a series of physics with calculus for majors in chemistry, engineering, mathematics and physics. Topics include electric charge and current, Maxwell's four equations of electromagnetism, resistors, capacitors and inductors, the laws of reflection and refraction and optics.

39 - PHYSICS FOR ENGINEERS AND SCIENTISTS III (5) UC:CSU

Prerequisite: Completion of Physics 037 and Mathematics 265 with grades of “C” or better.

Lecture 4 hours and 25 minutes and laboratory 3 hours and 20 minutes per week.

Third course in a series of physics with calculus for majors in chemistry, engineering, mathematics and physics. Topics include wave phenomena, electromagnetic radiation, relativity, quantum mechanics and nuclear physics.
COURSE OUTLINE
(Replaces PNCR and Course Outline)

Section I: BASIC COURSE INFORMATION

OUTLINE STATUS: Course Update

1. COLLEGE: Harbor

2. SUBJECT (DISCIPLINE) NAME: Chemistry

3. COURSE NUMBER: 102

4. COURSE TITLE: General Chemistry II

5. UNITS: 5

6. CATALOG COURSE DESCRIPTION -- Provide a description of the course, including an overview of the topics covered:

   Second of two courses that introduces theory and laboratory topics dealing with general principles of chemistry. Chemical calculations are emphasized as well as laboratory precision and accuracy utilizing quantitative techniques.

7. CLASS SCHEDULE COURSE DESCRIPTION -- Provide a brief description of the course, including an overview of the topics covered:

   Second of two courses that introduces theory and laboratory topics dealing with general principles of chemistry. Chemical calculations are emphasized as well as laboratory precision and accuracy utilizing quantitative techniques.

8. INITIAL COLLEGE APPROVAL DATE:

9. UPDATES (check all applicable boxes):

   - [ ] Content
   - [ ] Objectives
   - [ ] College Specific Course Attributes/Data Elements
   - [ ] Districtwide Course Attributes/Data Elements
   - [ ] Other (describe)

---

1 Underlined course attributes are the same for the course throughout the LACCD; all other course attributes are college specific.

Physical Sciences 2008-09
10. CLASS HOURS:

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<tr>
<th>Lecture:</th>
<th>3</th>
<th>54</th>
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<tr>
<td>Lab/activity (w/ homework):</td>
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<td>2</td>
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<td>Lab/activity (w/o homework):</td>
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<td>162</td>
<td>5</td>
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</table>

**Note:** The Carnegie Rule and Title 5, section 55002 sets forth the following minimum standards: 1 unit = 1 hour lecture per week, 2 hours homework per week; **OR** 2 hours per week of lab with homework; **OR** 3 hours of lab per week without homework. The hours per week are based on a standard 18-week calendar. Lecture also includes discussion and/or demonstration hours, laboratory includes activity and/or studio hours.

11. PREREQUISITES, COREQUISITES, ADVISORIES ON RECOMMENDED PREPARATION, and LIMITATION ON ENROLLMENT

**Note:** The LACCD’s Policy on Prerequisites, Corequisites and Advisories requires that the curriculum committee take a separate action verifying that a course’s prerequisite, corequisite or advisory is an “appropriate and rational measure of a student’s readiness to enter the course or program” and that the prerequisite, corequisite or advisory meets the level of scrutiny delineated in the policy.

- **Prerequisites:** Yes (If Yes, complete information below)

<table>
<thead>
<tr>
<th>Subject</th>
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<th>Units</th>
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<td>General Chemistry I</td>
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- **Corequisite:** None (If Yes, complete information below)

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- **Advisories:** None (If Yes, complete information below)

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<th>Number</th>
<th>Course Title</th>
<th>Units</th>
<th>Validation Approval Date (official use only)</th>
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</thead>
</table>
12. REPETITIONS -- Number of times course may be repeated for credit (three maximum): 0 (see: Section V, #9)

13. OTHER LIMITATIONS ON ENROLLMENT (see Title 5, Section 58106 and Board Rule 6803 for policy on allowable limitations. Other appropriate statutory or regulatory requirements may also apply):

| N/A |

### Section II: COURSE CONTENT AND OBJECTIVES

1. COURSE CONTENT AND OBJECTIVES:

<table>
<thead>
<tr>
<th>COURSE CONTENT AND SCOPE -Lecture: If applicable, outline the topics included in the lecture portion of the course (outline reflects course description, all topics covered in class).</th>
<th>Hours per topic</th>
<th>COURSE OBJECTIVES - Lecture (If applicable): Upon successful completion of this course, the student will be able to… (Use action verbs – see Bloom’s Taxonomy below for “action verbs requiring cognitive outcomes.”)</th>
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</thead>
<tbody>
<tr>
<td>Chemical kinetics</td>
<td>9</td>
<td>Determine the rate law of a chemical reaction.</td>
</tr>
<tr>
<td>Equilibrium</td>
<td>9</td>
<td>Solve problems involving zero, first, and second order reactions.</td>
</tr>
<tr>
<td>Weak acid/base, slightly soluble salts</td>
<td>9</td>
<td>Determine equilibrium concentrations of products and reactants in a reversible chemical reaction.</td>
</tr>
<tr>
<td>Ionic equilibrium</td>
<td>3</td>
<td>Solve for the pH of a weak acid or weak base solution.</td>
</tr>
<tr>
<td>Thermodynamics and equilibrium</td>
<td>3</td>
<td>Calculate the voltage and energy in an electrochemical reaction.</td>
</tr>
<tr>
<td>Electrochemistry</td>
<td>6</td>
<td>Determine the crystal field splitting energy in a transition metal complex.</td>
</tr>
<tr>
<td>Transition Metal/Coordination Complexes</td>
<td>6</td>
<td>Predict the effects of a ligand upon coordination to a transition metal.</td>
</tr>
<tr>
<td>Nuclear chemistry</td>
<td>3</td>
<td>Complete nuclear decay reactions.</td>
</tr>
<tr>
<td>Main-Group elements</td>
<td>3</td>
<td>Solve problems in nuclear decay kinetics.</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>3</td>
<td></td>
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</tbody>
</table>

**Physical Sciences 2008-09**
Illustrate the bonding properties of main-group elements.

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<tr>
<th>Total Lecture hours*</th>
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</table>

COURSE CONTENT AND SCOPE -- **Laboratory:**

If applicable, outline the topics included in the laboratory portion of the course (outline reflects course description, all topics covered in class).

<table>
<thead>
<tr>
<th>Hours per Topic</th>
<th>COURSE OBJECTIVES - <strong>Laboratory</strong> (If applicable):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualitative Analyses</td>
<td>Upon successful completion of this course, the student will be able to</td>
</tr>
<tr>
<td>15</td>
<td>Separation and determination of unknowns metal ions in a mixture.</td>
</tr>
<tr>
<td>Quantitative Analyses</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Determine the amount of a substance in a sample.</td>
</tr>
<tr>
<td>Chemical kinetics</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Monitor the rate of a chemical reaction and determine the order and rate law for the reaction.</td>
</tr>
<tr>
<td>Chemical equilibrium</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Determine the equilibrium constant for a chemical process.</td>
</tr>
<tr>
<td>Weak acid/base equilibrium</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Measure the solubility of a solid and solve for the enthalpy and entropy values of the solubility process for a given compound.</td>
</tr>
<tr>
<td>Solubility</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Construct both galvanic and electrolytic cells and measure the emf for the cells.</td>
</tr>
<tr>
<td>Electrochemistry</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Synthesis and analysis of coordination complexes of transition metals and determination of crystal field splitting energies.</td>
</tr>
<tr>
<td>Coordination complexes</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Read and interpret a laboratory procedure and construct a flow-chart of the procedure.</td>
</tr>
</tbody>
</table>

Total Lab hours* 108

*Total lecture and laboratory hours (which include the final examination) must equal totals on page 1.

**Physical Sciences 2008-09**
2. **REQUIRED TEXTS:**

   Provide a representative list of textbooks and other required reading; include author, title and date of publication:


3. **SUPPLEMENTARY READINGS:**

   Reading assignments may include, but are not limited to the following:

   **None**

4. **WRITING ASSIGNMENTS:**

   Title 5, section 55002 requires grades to be “based on demonstrated proficiency in subject matter and the ability to demonstrate that proficiency, at least in part, by means of essays or, in courses where the curriculum committee deems them to be appropriate, by problem solving exercises or skills demonstrations by students.” Writing assignments in this course may include, but are not limited to the following:

   **Short scientific article critiques such as The Other Half of the Brain. Scientific**

5. **REPRESENTATIVE OUTSIDE ASSIGNMENTS:**

   Out of class assignments may include, but are not limited to the following:

   **Write a short paper on the origins electrochemical cells**

6. **REPRESENTATIVE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING:**

   Title 5, section 55002(a) requires that a degree-applicable course have a level of rigor that includes “critical thinking and the understanding and application of concepts determined by the curriculum committee to be at college level”. Critical thinking may include, but is not limited to analysis, synthesis, and evaluation. Provide examples of assignments that demonstrate critical thinking.

   **Compare and contrast the materials used in the production of the origins electrochemical cells**

7. **METHODS OF EVALUATION:**

   Title 5, section 55002 requires grades to be “based on demonstrated proficiency in subject matter and the ability to demonstrate that proficiency, at least in part, by means of essays, or, in courses where the curriculum committee deems them to be appropriate, by problem solving exercises or skills demonstrations by students.” Methods of evaluation may include, but are not limited to the following (please note that evaluation should measure the outcomes detailed “Course Objectives” at the beginning of Section II):

   **Exams, quizzes, written homework and laboratory assignments**

8. **METHODS OF INSTRUCTION:**

   Physical Sciences 2008-09
Methods of instruction may include, but are not limited to the following:

- Lecture
- Discussion
- Laboratory
- Activity
- Field Experience
- Independent Study
- Other (explain)

9. SUPPLIES:

List the supplies the student must provide.

*Notebook, writing utensil, textbook, scientific calculator.*

10. COMPUTER COMPETENCY:

If applicable, explain how computer competency is included in the course.

*Students will be asked to research a topic of interest using the Internet.*

11. INFORMATION COMPETENCY:

Information competency is the ability to find, evaluate use, and communicate information in all its various formats. It combines aspects of library literacy, research methods and technological literacy. Information competency includes consideration of the ethical and legal implications and requires the application of both critical thinking and communications skills. If applicable, explain how information competency is included in the course.

*Students will be asked to compare and contrast topics presented in class with information found on the Internet.*

12. DIVERSITY:

If applicable, explain how diversity (e.g., cultural, gender, etc.) is included in the course.

*N/A*

13. SCANS COMPETENCIES (required for all courses with vocational TOP Codes; recommended for all courses):

SCANS (Secretary’s Commission on Necessary Skills) are skills the Department of Labor identified, in consultation with business and industry leaders, which reflect the skills necessary for success in the workplace. Check the appropriate boxes to indicate the areas where students will develop the following skills (please note that all SCANS competencies do not apply to all courses):

RESOURCES

*Physical Sciences 2008-09*
Managing Time: Selecting relevant goal-related activities, ranking them in order of importance, allocating time to activities, and understanding, preparing and following schedules.

Managing Money: Using or preparing budgets, including making cost and revenue forecasts; keeping detailed records to track budget performance, and making appropriate adjustments.

Managing Material and Facility Resources: Acquiring, storing, allocating, and distributing materials, supplies, parts, equipment, space or final products in order to make the best use of them.

INTERPERSONAL

Participating as Member of a Team: Working cooperatively with others and contributing to group’s efforts with ideas, suggestions and effort.

Teaching Others New Skills: Helping others learn needed knowledge and skills.

Exercising Leadership: Communicating thoughts, feelings, and ideas to justify a position, encouraging, persuading, convincing or otherwise motivating an individual or group, including responsibly challenging existing procedures, policies or authority.

Negotiating: Working toward agreement that may involve exchanging specific resources or resolving divergent interests.

Working with Cultural Diversity: Working well with men and women and with people from a variety of ethnic, social, or educational backgrounds.

INFORMATION

Acquiring and Evaluating Information: Identifying a need for data, obtaining the data from existing sources or creating them, and evaluating their relevance and accuracy.

Organizing and Maintaining Information: Organizing, processing and maintaining written or computerized records and other forms of information in a systematic fashion.

Interpreting and Communicating Information: Selecting and analyzing information and communicating the results of others, using oral, written, graphic, pictorial, or multimedia methods.

Using Computers to Process Information: Employing computers to acquire, organize, analyze and communicate information.

SYSTEMS

Understanding Systems: Knowing how social, organizational and technological systems work and operating effectively with them.
Monitor and Correcting Performance: Distinguishing trends, predicting impacts of actions on system operations, diagnosing deviations in the functioning of a system/organization, and taking necessary steps to correct performance.

Improving or Designing Systems: Making suggestions to modify existing systems in order to improve the quality of products or services and developing new or alternative systems.

TECHNOLOGY

Selecting Technology: Judging which sets of procedures, tools or machines, including computers and their programs, will produce the desired results.

Applying Technology to Tasks: Understanding overall intent and proper procedures for setting up and operating machines, including computers and their reprogramming systems.

Maintaining and Troubleshooting Equipment: Preventing, identifying, or solving problems with equipment, including computers and other technologies.
Section III: RELATIONSHIP TO COLLEGE PROGRAMS

1. THIS COURSE WILL BE AN APPROVED REQUIREMENT FOR AN APPROVED ASSOCIATE DEGREE OR CERTIFICATE PROGRAM: **Yes**

   a. If yes, the course will be a **program requirement** portion of the “approved program” listed on the State Chancellor’s Inventory of Approved Programs (approved programs can be found on the State Chancellor’s Office website at http://misweb.cccco.edu/esed/webproginv/prod/invmenu.htm

   | Associate of Science Degree in Chemistry |

   **NOTE:** In order for a course to be approved as a requirement for an associate degree or certificate program, the program must be listed on the State Chancellor’s Office Inventory of Approved Programs AND the course must be listed in the college catalog as either a requirement or an elective for the program. If course is not part of an approved program at the college adopting the course, it will be considered to be a “stand-alone” course, and is subject to the State Chancellor’s approval criteria. The college must complete and submit the Chancellor’s Office “APPLICATION FOR APPROVAL OF CREDIT” form. Certain courses are granted “blanket approval” by the State Chancellor’s Office and do not require separate approval. See the Chancellor’s Office Program and Course Approval Handbook for details. LACCD Skills Certificates are **not State approved programs** and are not listed on the Chancellor’s Office Inventory of Approved Programs.

2. GENERAL EDUCATION REQUIREMENTS FOR THE ASSOCIATE DEGREE STATUS:

   a. Area requested: **None** Approval date:

      If applicable, provide an explanation of how the course meets the General Education parameters for one of the five general education areas – **Natural Sciences, Social and Behavioral Sciences, Humanities, Language and Rationality, Health and Physical Education** -- contained in Board Rule 6201.14 -General Education Requirements. 

      http://marlin.laccd.edu/district/BoardRules_AdmRegs/boardrules.htm

   a. 2nd Area requested: **None** Approval date:

      If applicable, provide an explanation of how the course meets General Education parameters for an additional general education area -- **Natural Sciences, Social and Behavioral Sciences, Humanities, Language and Rationality, Health and Physical Education** -- contained in Board Rule 6201.14 - General Education Requirements. http://marlin.laccd.edu/district/BoardRules_AdmRegs/boardrules.htm
Section IV: ARTICULATION INFORMATION

(Complete in consultation with College Articulation Officer)

1. TRANSFER STATUS:
   a. Transferable to the University of California: Yes
   b. UC approval date: 2008
   c. Transferable to the California State University: Yes
   d. College approval date: 2008

2. GENERAL EDUCATION FOR TRANSFER:

   IGETC Certification:
   a. Area requested: 5-A: Physical Sciences
   b. Date requested:
   c. IGETC approval date: 2008

   If applicable, provide an explanation of how the course meets the appropriate General Education parameters, as defined in IGETC Certification Guidelines.

   CSU Certification:
   a. Area requested: B-1: Physical Science
   b. Date requested:
   c. CSU approval date: 2008

   If applicable, provide an explanation of how the course meets the appropriate General Education parameters, as defined in CSU Certification Guidelines.

   a. 2nd Area requested: None
   b. Date requested:
   c. IGETC approval date:

   If applicable, provide an explanation of how the course meets the appropriate General Education parameters, as defined in IGETC Certification Guidelines.

   a. 2nd Area requested: None
   b. Date requested:
   c. CSU approval date:

   If applicable, provide an explanation of how the course meets the appropriate General Education parameters, as defined in CSU Certification Guidelines.

3. MAJOR REQUIREMENT FOR TRANSFER – Will this course be articulated to meet lower division major requirements? NO

   List college/university and the majors:

<table>
<thead>
<tr>
<th>College/University</th>
<th>Major(s)</th>
</tr>
</thead>
</table>

Physical Sciences 2008-09
Section V: SUPPLEMENTAL COURSE INFORMATION

1. DEPARTMENT/DIVISION NAME: Chemistry

2. DEPARTMENT/DIVISION CODE: 45

3. SUBJECT CODE -- 3 characters, assigned by District Office: 123 (existing subject codes are available on the LACCD website at http://www.laccd.edu/curriculum/directory-programs-courses/index.htm

4. SUBJECT ABBREVIATION -- 7 characters, assigned by District Office: Chem

5. SPC CODE -- 3 characters, assigned by District Office: 766

6. ABBREVIATION FOR TRANSCRIPTS -- 20 characters, assigned by District Office: Chem

7. DEGREE CREDIT: Indicate whether the course meet the "standards for approval" for degree credit course set forth in Title 5, section 55002(a)(2), which requires the course to have a degree of intensity, difficulty, and vocabulary that the curriculum committee has determined to be at the college level:
   This course is **Degree Applicable**

8. CREDIT/NO CREDIT GRADING: No

9. REPETITIONS -- Number of times course may be repeated for credit (three maximum): 0

   How does the repetition of this course meet Title 5, section 58161 requirements? A course may be repeatable when, "course content differs each time it is offered, and that the student who repeats it is gaining an expanded educational experience for one of the following reasons: (A) Skills or proficiencies are enhanced by supervised repetition and practice within class periods; or (B) Active participatory experience in individual study or group assignments is the basic means by which learning objectives are obtained."

10. PRIOR TO TRANSFERABLE LEVEL – This course attribute applies to English, writing, ESL, reading and mathematics courses ONLY. If applicable, indicate how many levels below the transferable level this course should be placed: **Not applicable**

11. CREDIT BASIC SKILLS -- Title 5, section 5502(d) defines basic skills as “courses in reading, writing, computation, and English as a Second Language, which are designated as non-degree credit courses pursuant to Title 5, section 55002(b).” **No** If Yes, course must be non-degree applicable.

12. CROSS REFERENCE -- Is this course listed as equivalent in content to existing College/District courses in another discipline? **No**

   If Yes, list courses (documentation of cross-discipline agreement must be provided):
13. **COURSE SPECIFICALLY DESIGNED FOR STUDENTS WITH DISABILITIES** -- Title 5, section 56029 allows a course to be repeatable when continuing success of the students with disabilities is dependent on additional repetitions of a specific class. Is this course designated as an “approved special class” for students with disabilities? **No**

If yes, provide an explanation of how this course meets the requirements of Title 5, section 56029.

14. **COOPERATIVE EDUCATION STATUS** -- Title 5, section 55252 allows for two types of Cooperative Education: 1) General Work Experience Education -- i.e., supervised employment, which is intended to assist students in acquiring desirable work habits, attitudes and career awareness, which need not be related to the students’ educational goals; or 2) Occupational Work Experience Education -- i.e., supervised employment, extending classroom based occupational learning at an on-the-job learning station, which is related to the students’ educational or occupational goal. Is this course part of the college’s approved cooperative work experience education program? **No**

15. **COURSE CLASSIFICATION**: **Liberal Arts Sciences**

    Note: A course’s Classification, TOP Code and SAM code must be aligned – e.g., Courses with an “Occupational” Course Classification must have an “Occupational” TOP Code and a SAM Code of A, B, C, or D; courses that do not have an “Occupational” Course Classification cannot have an Occupational TOP Code and must have an “E” SAM Code. Courses coded as “basic skills” in #11 should be coded “Adult and Secondary Basic Skills.”

16. **TOP CODE** – (6 digits xxxxx.xx) **1905.00**
    
    Course content should match discipline description in Taxonomy of Programs found at www.cccco.edu/cccco/esed/curric/curriculum.htm.

17. **SAM CODE (Student Accountability Model)**: **E – Non-Occupational**

    SAM Codes (see CCC Chancellor’s Office Student Accountability Model Operations Manual, 1984) should be assigned as follows:

    **Priority “A” – Apprenticeship**: Courses designed for an indentured apprentice must have the approval of the State of California, Department of Industrial Relations Department, Division of Apprenticeship Standards.

    **Priority “B” – Advanced Occupational**: Courses taken by students in the advanced stages of their occupational programs. Courses should be offered in one specific occupational area only. Priority letter “B” should be assigned sparingly; in most cases, no more than two courses in any one program should be labeled “B.” “B”-level courses must have Priority “C” prerequisites in the same program area.

    **Priority “C” – Clearly Occupational**: Courses generally taken by students in the middle stages of their programs should have a difficulty level sufficient to detract “drop-ins.” Courses may be offered in several occupational programs within a broad area. The “C” priority, however, should also be used for courses within a specific program area when the criteria for “B” classification are not met. A “C”-level course should provide the student with entry-level job skills.

    **Priority “D” – Possibly Occupational**: “D” courses are those taken by students in the beginning stages of their occupational programs. The “D” priority can also be used for service (or survey) courses for other occupational programs.

    **Priority “E” – Non-occupational.**
SECTION VI: APPROVAL STATUS

1. APPROVAL STATUS:

a. ☐ New Course . Board Approval Date: . Effective Semester:

b. ☐ Addition of Existing District Course . College Approval Date: . Effective Semester:

c. ☐ Course Change* . College Approval Date: . Effective Semester:

d. ☒ Outline Update . College Approval Date:

* Changes to a course require the completion of a “Course Change Request” form and approval by the college’s Curriculum Committee. In some cases districtwide approval is also required; see, Administrative Regulation E-65, section 3(c) for details.

SECTION VII: APPROVAL INFORMATION FOR NEW OR ADDED COURSES

(complete in consultation with Department Chair and the appropriate Academic Administrator)

1. ORIGINATOR: Lauren McKenzie

2. DEPARTMENT: Chemistry

3. IF THIS IS A NEW COURSE, INDICATE HOW THE COLLEGE PLANS TO MEET THE EXPENSE OF THIS COURSE:

☐ By additional funds. Describe:

☐ By deleting courses from the college catalog and course database. List specific courses to be deleted:

☐ By deleting sections of existing courses. List courses and number of sections to be deleted:

First year: Second year: Third year:

☐ By rotating sections of existing courses. List courses and number of sections to be rotated, as well as the semesters in which they will be offered:

4. IMPACT -- Will this course directly impact other course offerings and/or associate degree or certificate programs on campus?

Physical Sciences 2008-09
No  (If yes, briefly explain how)

5. METHOD OF SUPPORT -- Indicate how the college plans to support the proposed course:

Additional staff -- List additional staff needed:

Classroom -- List classroom type needed:

Regular classroom and chemistry laboratory

Equipment -- List new equipment needed and indicate funding source for any new equipment:

Equipment needed for demonstrations and laboratories is adequate

Supplies- List supplies and indicate dollar value:

Supplies needed for laboratories is adequate

Library/Learning Resources- The course initiator shall consult with the College Librarian and review the college library, book, periodical, and electronic resource collections relevant to this course. List additional titles and resources to be considered for purchase as funding permits:

Titles needed for the course are adequate
CERTIFICATION AND RECOMMENDATION

☒ This course meets Title 5 requirements for Associate Degree applicable college credit towards an Associate of Arts Degree.

☐ This course meets Title 5 requirements but does not satisfy the requirements for an Associate Degree applicable course.

We certify that the information and answers above properly represent this course.

__________________________________________________________________________

                      Originator                                      Date

__________________________________________________________________________

                      Department/Cluster Chairperson                      Date

__________________________________________________________________________

                      Articulation Officer                              Date

__________________________________________________________________________

                      Librarian                                           Date

__________________________________________________________________________

                      Dean (if applicable)                                Date

__________________________________________________________________________

                      Curriculum Committee Chairperson                    Date

__________________________________________________________________________

                      Academic Senate President                          Date

__________________________________________________________________________

                      Vice President, Academic Affairs                     Date

__________________________________________________________________________

                      College President                                    Date
**DATA INPUT PAGES**  
*(Fills Automatically from Other Pages)*

**COLLEGE:** Harbor

**APPROVAL STATUS:**

<table>
<thead>
<tr>
<th>New Course</th>
<th>Board Approval Date:</th>
<th>Effective Semester:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition of Existing District Course</td>
<td>College Approval Date:</td>
<td>Effective Semester:</td>
</tr>
</tbody>
</table>

**DEPARTMENT/DIVISION NAME:** Chemistry/Math-Phy-Sci and Technology

**DEPARTMENT/DIVISION CODE:** Chemistry

**SUBJECT (DISCIPLINE) NAME:** Chemistry

**SUBJECT CODE** -- 3 characters, assigned by District Office: 123

**SUBJECT ABBREVIATION** -- 7 characters, assigned by District Office: Chem

**COURSE TITLE:** General Chemistry II

**COURSE NUMBER:** 102

**UNITS:** 5

**CLASS HOURS:**

<table>
<thead>
<tr>
<th></th>
<th>Hours per week (based on 18 weeks)</th>
<th>Total Hours per term (hrs per week x 18)</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>3</td>
<td>54</td>
<td>3</td>
</tr>
<tr>
<td>Lab/activity (w/ homework)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lab/activity (w/o homework)</td>
<td>6</td>
<td>108</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>3</td>
<td>162</td>
<td>5</td>
</tr>
</tbody>
</table>

**DEGREE CREDIT:** Indicate whether the course meet the “standards for approval” for degree credit course set forth in Title 5, section 55002(a)(2), which requires the course to have a degree of intensity, difficulty, and vocabulary that the curriculum committee has determined to be at the college level:

This course is **Degree Applicable**

**THIS COURSE WILL BE AN APPROVED REQUIREMENT FOR AN APPROVED ASSOCIATE DEGREE OR CERTIFICATE PROGRAM:** Associate in Science in Chemistry

If yes, the course will be a program requirement portion of the “approved program” listed on the State Chancellor’s
Inventory of Approved Programs (approved programs can be found on the State Chancellor’s Office website at

**GENERAL EDUCATION FOR TRANSFER:** No

**Area requested:** None **Approval date:**

**GENERAL EDUCATION REQUIREMENTS FOR THE ASSOCIATE DEGREE STATUS:**

**Area requested:** None **Approval date:**

**2nd Area requested:** None **Approval date:**

**TRANSFER STATUS:**

Transferable to the University of California: UC approval date:

Transferable to the California State University: College approval date:

**GENERAL EDUCATION FOR TRANSFER:** No

**IGETC**

**Area requested:** None

**Date requested:**

**IGETC approval date:**

**CSU CERTIFICATION** Yes

**Date requested:**

**CSU approval date:** 2008

**ABBREVIATION FOR TRANSCRIPTS** -- 20 characters, assigned by District Office: Chem

**COURSE CLASSIFICATION:** Liberal Arts Sciences

**TOP CODE** -- (6 digits XXXX.xx) 1905.00

**SAM CODE** (Student Accountability Model): E - Non-Occupational

**PREREQUISITES, COREQUISITES, ADVISORIES ON RECOMMENDED PREPARATION, and LIMITATION ON ENROLLMENT**

**Prerequisites:** Yes (If Yes, complete information below)

**Corequisite:** None (If Yes, complete information below)

**CREDIT/NO CREDIT GRADING:**

**REPETITIONS** -- Number of times course may be repeated for credit (three maximum): 0

**CROSS REFERENCE** -- Is this course listed as equivalent in content to existing College/District courses in another discipline? No

**CREDIT BASIC SKILLS** -- Title 5, section 55502(d) defines basic skills as “courses in reading, writing, computation, and English as a Second Language, which are designated as non-degree credit courses pursuant to Title 5, section 55002(b).” No

**If Yes, course must be non-degree applicable**

**COURSE SPECIFICALLY DESIGNED FOR STUDENTS WITH DISABILITIES** -- Title 5, section 56029 allows a course to be repeatable when continuing success of the students with disabilities is dependent on additional repetitions of a specific
class. Is this course designated as an “approved special class” for students with disabilities? No

APPROVAL STATUS:

New Course

Board Approval Date:
Effective Semester:

Addition of Existing District Course

College Approval Date:

COOPERATIVE EDUCATION STATUS -- Title 5, section 55252 allows for two types of Cooperative Education: 1) General Work Experience Education -- i.e., supervised employment, which is intended to assist students in acquiring desirable work habits, attitudes and career awareness, which need not be related to the students’ educational goals; or 2) Occupational Work Experience Education -- i.e., supervised employment, extending classroom based occupational learning at an on-the-job learning station, which is related to the students’ educational or occupational goal. Is this course part of the college’s approved cooperative work experience education program? No

CATALOG COURSE DESCRIPTION -- Provide a description of the course, including an overview of the topics covered:

Second of two courses that introduces theory and laboratory topics dealing with general principles of chemistry. Chemical calculations are emphasized as well as laboratory precision and accuracy utilizing quantitative techniques.

CLASS SCHEDULE COURSE DESCRIPTION -- Provide a brief description of the course, including an overview of the topics covered:

Second of two courses that introduces theory and laboratory topics dealing with general principles of chemistry. Chemical calculations are emphasized as well as laboratory precision and accuracy utilizing quantitative techniques.

SPC CODE -- 3 characters, assigned by District Office: 766
La Habor College
Student Learning Outcomes (SLOs) Assessment Report

Course Assessment

Division: Math Physical Science
Discipline/Program: Chemistry

Course Number and Name: CHEM 102 General Chemistry II

Program Contact Person: ____________________________ Phone: __________________

Reviewed by: ____________________________, Academic Dean

Date:

Attache additional pages as necessary.

<table>
<thead>
<tr>
<th>Institutional Mission and Goals</th>
<th>Course Intended Outcomes</th>
<th>Means of Assessment and Criteria for Success</th>
<th>Summary of Data Collected</th>
<th>Use of Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1) Solve problems in chemical kinetics.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) Solve problems in chemical equilibrium.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3) Solve acid-base equilibrium problems.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>4) Display knowledge of thermodynamics and equilibrium.</td>
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<tr>
<td></td>
<td>5) Solve problems in electrochemistry.</td>
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<tr>
<td></td>
<td>6) Demonstrate knowledge of transition metal chemistry.</td>
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<tr>
<td></td>
<td>7) Solve problems in nuclear chemistry.</td>
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<tr>
<td></td>
<td>8) Show a basic understanding of organic chemistry.</td>
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<td></td>
<td></td>
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<tr>
<td>2</td>
<td>9) Interpret a chemical</td>
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</tr>
</tbody>
</table>

Means: On a comprehensive multiple choice exam, the students will solve problems from the lecture topics 1 through 8 as listed in the course outline.

Criteria: 70% of the students will score 50% or greater on the assessment exam.

Means: Summarize an
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10) Compose a scientific report.</td>
<td>Means: On a word processor type a scientific report from collected laboratory data.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Criteria: 70% of the students will score 70% or higher on a department analytic rubric.</td>
</tr>
<tr>
<td>2</td>
<td>11) Collect, organize and analyze laboratory data.</td>
<td>Means: The organization of data/observations into data tables which include proper labels and units.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Criteria: 90% of the students will score 80% or higher on a department analytic rubric.</td>
</tr>
<tr>
<td>2</td>
<td>12) Demonstrate proper laboratory skills.</td>
<td>Means: Solve for an unknown sample by qualitative or quantitative techniques.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Criteria: 70% of the students will score 70% or higher on a department analytic rubric.</td>
</tr>
</tbody>
</table>
Instructor: Joachim Arias, Ph.D.
Phone: 310-233-4512 leave message with Angie Vega in Division office, Email: ariasj@lahc.edu
Office location: Tech 2-Office Hours: TTh, 9:00AM – 9:25 AM and other times by appointment.
Lecture: 7:50 AM - 9:05 MW, TR 101
Discussion: 9:05 AM-11:00 MW PH 102
Laboratory: 12:20 PM - 1:45 MW PH 102
5 unit course UC-CSU Transferable

Prerequisites: Completion of Chemistry 101 with grade of “C” or better.

Course Goal and Objectives: The goal for this course is to understand and communicate the principles of general college chemistry. Students will build upon concepts and skills that were developed in Chemistry 101. Instructional and learning activities will be reinforced during the laboratory period. Experiments will be performed that will emphasize critical observation and thinking, chemical calculations, precision and accuracy in performing measurements, and qualitative methods of chemical analysis.

Required Course Materials:
b) The LAHC Laboratory Manual and supplementary readings booklet will be provided.
c) Hardcover permanently bound notebook for laboratory calculations and reports.
d) Calculator with exponential and logarithmic capability. Calculators with significant memory are prohibited during exams. This prohibition applies to mobile phone, organizer, PDA and programmable calculators. Check with the instructor if you are not sure about the acceptability of your calculator.
e) Purchase an American combination padlock at the Seahawk Center bookstore (other padlocks are not acceptable) by the second lab meeting. One shared lock is needed per lab group.
f) Safety goggles.

Grading (evaluation)

<table>
<thead>
<tr>
<th></th>
<th>Points Earned</th>
<th>Percent</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four exams (100 points each)</td>
<td>400 points</td>
<td>720-800</td>
<td>90-100</td>
</tr>
<tr>
<td>Final Exam (150 points)</td>
<td>150 points</td>
<td>640-719</td>
<td>80-89</td>
</tr>
<tr>
<td>Quizzes &amp; Assignments</td>
<td>100 points</td>
<td>536-639</td>
<td>67-79</td>
</tr>
<tr>
<td>Lab Experiments &amp; Reports</td>
<td>150 points</td>
<td>400-535</td>
<td>50-66</td>
</tr>
<tr>
<td>Total points (possible)</td>
<td>800 points</td>
<td>&lt;400</td>
<td>&lt;50</td>
</tr>
</tbody>
</table>

If you miss an exam due to an illness or emergency, you must provide a medical excuse or written verification. Your score for the (one) missed exam will be 90% of the next exam score. No makeup exams will be given. For each exam, you will have a periodic table-data sheet. You will have 90 minutes to complete each exam. You must take the final exam on the date given in the Schedule. Quizzes will be given both unannounced and announced. No makeup quizzes will be given.

Course Structure
Lecture: Three hours per week TTh for 1-1/2 hours each day. Lecture may be extended during the Discussion. The attached weekly schedule gives the lecture topic with chapters, sections and homework from the text. The schedule also gives the dates for the four exams and comprehensive final exam, as well as other reminder dates.
Independent Study: The questions and problems on the attached schedule are assignments. They are expected to be done in a timely fashion. These assignments may be collected. While they will not be graded, students may be asked to discuss their methods and solutions to selected questions and problems. Questions on quizzes and exams will often be based upon or similar to those assigned.

Laboratory and Discussion: Three hours per day TTh, following the lecture. Students usually will work within a small group and the instructor may change the group composition periodically. The attached schedule gives the assignment number and name. Students are expected to prepare for each lab before coming to the lab. All laboratory work must be completed on the day the lab is assigned, unless told otherwise. The lab notebook must be initialed by the instructor before you leave the lab. Check your calculations carefully before leaving the lab. Hand in the answer to the lab problem of the day, if one is assigned, before leaving the lab. Follow the same format that was used in Chemistry 101 for writing up lab reports (see the hand out). Complete your lab report before the next lab meeting. Additional instructions and safety precautions will be given in the lab for the experiments to be performed. Lab techniques will be demonstrated when appropriate. Attendance is required for each lab session. There will be no make ups for missed labs. Lab reports will be graded. Total possible score for all lab reports is 150 points. A passing score (100 points) must be earned in the laboratory to pass Chem. 102.

The points earned on your labs are based on the following criteria:

- a) How prepared you were to do the lab work and how well you followed the experimental procedure;
- b) Your presence, participation and contribution to the success of the experiment (If you are late or not present during the discussion and/or lab, points proportional to the time or work missed may be deducted);
- c) how well you handled the data from the experimental results you obtained (not necessarily your experimental results);
- d) how well the lab report was written (format, clarity, legibility and neatness of your lab report);
- e) your written lab work must be original: If a student’s or a group’s experimental data, interpretation and conclusions are identical to those of another student or lab group I will suspect academic dishonesty. Those individuals or groups will receive scores of zero for that particular lab;
- f) the questions and/or problems accompanying the lab experiment. The instructor will score your notebooks periodically so lab notebooks must be up to date when notebooks are due for evaluation and grading.

**PROCEDURES AND GUIDELINES FOR SUCCESS IN CHEMISTRY 102**

**Attendance –** Class attendance is expected. Be prompt. Being on time is a matter of personal responsibility and courtesy to others. Excessive absences and/or tardiness may result in a lower grade, or to being dropped from the class. Let me know by phone or email message before class if you must be absent or late for a legitimate reason. If you arrive to lab after my presentation of detailed instructions and safety precautions you may be excluded from the lab that day.

**Classroom and Laboratory Disruptions -** All personal electronic devices such as mobile phones, radio phones, radios and pagers must be turned off during lecture and laboratory. Exceptions, with instructor approval, will be made for on-call emergency personnel and for students who require college-approved accommodations. Sound from a phone or pager is a personal distraction as well as a classroom disruption. If you are not willing to accept this policy, please do not take this class. Students may be excluded from this course for disruptions and other violations of student conduct as described on pp 6-8 of the 2002-2004 LAHC Los Angeles Community College General Catalog.
**Exams and Quizzes** - Quiz and exam questions will involve material covered both in lecture and lab. It is your responsibility to be present and on time for all exams and quizzes. No extra time will be given owing to unapproved late arrival. Repeat: There will be no make-up exams or quizzes.

**Grades** are earned, not negotiated, appointed or gifted. It is up to you to learn the material fluently enough to earn passing grades on quizzes, exams, labs, and on the final. Plan to spend no fewer than 10 hours per week on this course—in addition to time spent in class. Study effectively: read the text chapter before lecture. Take good lecture notes because some information given by the instructor may not be found in the text. Rewrite your lecture notes to look for holes or areas that are not yet clear. Regularly review difficult ideas in the text, your notes, and your lab notebook. Do all the assigned problems, and then some more. Independently answer the assigned questions and solve the assigned problems. If you do not, do not expect to do well in Chemistry 102. This is a guarantee! Use flashcards to help memorize terms and formulas. Working with study partners or groups is especially recommended!

**Success is a matter of preparation and repetition.** Make use of all possible learning resources - your texts, the instructor (in class and during office hours), internet chemistry tutorials, human tutors if necessary, and especially your fellow students who earn high grades. Always remember that everything in Chemistry builds on itself, and the final exam is cumulative and comprehensive, so don’t let any gaps develop!

<table>
<thead>
<tr>
<th>Time Allocated (in hours)</th>
<th>Topic or Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 hrs – lec 6 hrs - lab</td>
<td>Chemical Bonding: Bond polarity, covalent and ionic bonding Lewis structures, molecular geometry, net molecular dipoles. Laboratory: Use of molecular models</td>
</tr>
<tr>
<td>12 hrs - lec 24 hrs - lab</td>
<td>Stoichiometry: moles, simplest &amp; molecular formulas balancing equations, reaction qualities, limiting reactants, analysis of mixtures, percent yield. Laboratory: Limiting reactants. Estimation of Avogadro’s #: Stoichiometry paper lab</td>
</tr>
<tr>
<td>3 hrs - lec 6 hrs - lab</td>
<td>Gases: ideal gas law, partial pressures, gas stoichiometry, kinetic molecular theory, non-ideal behavior. Laboratory: Molar mass by vapor density. Analysis of a nitrite solution</td>
</tr>
<tr>
<td>7.5 hrs - lec 15 hrs - lab</td>
<td>Changes of State: solid state, crystal structure, liquid state, heating &amp; cooling curves, phase diagrams, heat exchange. Laboratory: Study of crystalline solids. Calorimetry</td>
</tr>
<tr>
<td>Time</td>
<td>Lectures</td>
</tr>
<tr>
<td>-------</td>
<td>-----------</td>
</tr>
<tr>
<td>3 hrs</td>
<td>lec</td>
</tr>
<tr>
<td>6 hrs</td>
<td>lab</td>
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<tr>
<td>4.5 hrs</td>
<td>lec</td>
</tr>
<tr>
<td>9 hrs</td>
<td>lab</td>
</tr>
<tr>
<td>4.5 hrs</td>
<td>lec</td>
</tr>
<tr>
<td>9 hrs</td>
<td>lab</td>
</tr>
<tr>
<td>3 hrs</td>
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</tr>
<tr>
<td>6 hrs</td>
<td>lab</td>
</tr>
<tr>
<td>6 hrs</td>
<td>lec</td>
</tr>
<tr>
<td>12 hrs</td>
<td>lab</td>
</tr>
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</table>
9.0 Stars 4Kids Press Release

Los Angeles Harbor College launched its Stars 4 Kids program on Friday, October 5, 2007. Two 5th grade classes (about 50 students) walked with their teachers, B. Louie and P. Correa, to the college from Hawaiian Avenue School to take part in an introductory Astronomy program led by Harbor College instructor, Ali Ghahremanpour and Joachim Arias. It is held in the Planetarium – a distinctive building that was constructed in the 1960’s. Activities also include a chemistry demonstration that relates to astronomical phenomena, such as why is the sky blue or red and a short visit to the campus TV studio. Grade school teachers and students are escorted around campus by docents from the Harbor Teacher Preparatory Academy which is housed on the campus.

In addition to Hawaiian Avenue, 3rd and 5th grade students from Fries, Lomita Magnet, Crestwood, Caroldale, Denker, LaSalle, Leland, Lomita Magnet and Point Fermin elementary schools travelled to L.A. Harbor College to participate in this program. Stars 4 Kids program is designed to enhance the 3rd and 5th grade science curriculum on constellations, planets and seasons. Groups are limited to 60 students due to the capacity of the planetarium.

It is hoped that students will not only become interested in the sciences, but also have a pleasant college campus experience, hopefully returning someday as a Harbor college student.

Our community partners contributing to the program (by providing busses) are:

For more information, contact Math/Physical Science and Technology Division Chairman, Lauren McKenzie, or Division Secretary, Angie Vega, at 310 233-4501.
### 10.0 Unit Plan

<table>
<thead>
<tr>
<th>DIVISION PRIORITY AND SLO’S</th>
<th>COLLEGE STRATEGY AND SLO’S</th>
<th>OBJECTIVES</th>
<th>ACTIVITIES/TASKS</th>
<th>RESOURCES</th>
<th>COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-16</td>
<td>DIVISION PRIORITIES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1, A</td>
<td>7.3, 7.4</td>
<td>To facilitate student learning via qualified faculty and staff</td>
<td>Monitor/enforce contractual and participatory governance agreements involving administration, faculty and staff. Make periodic request through FHPC, Senate, Academic Affairs and President’s Offices</td>
<td>Program 100</td>
<td>$1.23M per year</td>
</tr>
<tr>
<td>2</td>
<td>2.4, 2.5</td>
<td>To provide students with up to date classroom/laboratory equipment and supplies</td>
<td>Purchase necessary contemporary classroom/laboratory equipment and supplies</td>
<td>Program 100, Bloc Grant</td>
<td>$15K per year</td>
</tr>
<tr>
<td>3, A</td>
<td>1.1, 1.3, 5.2</td>
<td>To provide a stable and viable student tutorial service</td>
<td>Hire peer tutors for Math Lab, student worker to assist in Chemistry stockroom and technology labs</td>
<td>Program 100</td>
<td>$8K per year</td>
</tr>
<tr>
<td>4, A</td>
<td>1.1, 1.3, 5.2</td>
<td>To provide quality instruction to students and aim for 54% class retention in all courses</td>
<td>Assign trained readers to classes to increase graded homework output. Perform periodic evaluation of course placement cut scores.</td>
<td>A pool of qualified readers. Viable research data. Cooperative staff</td>
<td>$4K per year</td>
</tr>
<tr>
<td>5</td>
<td>1.1, 1.3, 5.2</td>
<td>To expose students to current technology in and out of the classroom</td>
<td>Update classrooms and laboratories on a regular basis</td>
<td>Bloc Grant and VATEA funds</td>
<td>$60K</td>
</tr>
<tr>
<td>6</td>
<td>1.1, 1.3, 5.2</td>
<td>To increase student’s science awareness in the community</td>
<td>Foster partnerships with LAUSD and PVUSD. Offer college courses in local HS for qualified students. Schedule college courses in such a way that qualified HS students can enroll. Schedule Chemistry 040</td>
<td>STARS for Kids Program, Drafting classes at Peninsula HS, PLTW program, Comp Sci courses at Narbonne HS, Comp Tech courses at Banning HS</td>
<td>$20K</td>
</tr>
<tr>
<td>7</td>
<td>1.1, 1.3, 5.2</td>
<td>To Support student success initiatives for basic skills and entry level courses</td>
<td>Lower class size limits for entry-level courses. Add skills/discussion lab TBA. Provide supplemental instruction. Assign peer tutors to work with faculty in the classroom. Enforce course pre-</td>
<td>Program 100. Admissions and records</td>
<td>Unk.</td>
</tr>
<tr>
<td>DIVISION PRIORITY AND SLO’S</td>
<td>COLLEGE STRATEGY AND SLO’S</td>
<td>OBJECTIVES</td>
<td>ACTIVITIES/TASKS</td>
<td>RESOURCES</td>
<td>COST</td>
</tr>
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<td>54</td>
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<td></td>
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<tr>
<td>8</td>
<td>1.1, 1.3, 5.2</td>
<td>To address the college mission on workforce development by preparing students for immediate employment in local oil refineries</td>
<td>Restart Process Plant Tech Program Foster partnerships with local industry and trade unions. Submit PNPR for Process Pant AS degree and Instrumentation AS degree. Seek funding for an instrumentation laboratory.</td>
<td>State/Conoco Phillips/Valero/Mobil Oil/SBCC/AWU Grant to fund classes</td>
<td>Unk.</td>
</tr>
<tr>
<td>9</td>
<td>1.1, 1.3, 5.2</td>
<td>To address the college mission on workforce development by training students in craft skills that could lead to immediate employment or apprenticeship</td>
<td>Add basic craft skills courses such as electrical. Continue to schedule drafting courses</td>
<td>Grants to fund classes and equipment. Program 100</td>
<td>$200K</td>
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<tr>
<td>10</td>
<td>1.1, 1.3, 5.2</td>
<td>To provide students with additional basic skills preparation</td>
<td>Add more sections of existing basic skills courses. Introduce new courses related to math test taking skills, employment, GED, etc. (Math 140).</td>
<td>Program100</td>
<td>$50K per year</td>
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<tr>
<td>11</td>
<td>1.1, 1.3, 5.2</td>
<td>To address the college mission on workforce development by training students in craft skills that could lead to immediate employment or apprenticeship</td>
<td>Promote fiber optics courses and certificate</td>
<td>SCE Grant to fund classes and equipment.</td>
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<tr>
<td>12</td>
<td>2. 3, 2.5, 6.1, 6.2</td>
<td>To provide students with easy to read and erase slate boards in classrooms and laboratories</td>
<td>Request through CPC. Monitor construction phase of new buildings</td>
<td>Prop A/AA funds.</td>
<td>$Unk.</td>
</tr>
<tr>
<td>13</td>
<td>2. 3, 2.5, 6.1, 6.2</td>
<td>To provide students with up to date planetarium</td>
<td>Request through CPC. Monitor renovation phase. Work with College Foundation to find sponsors for a new planetarium projector</td>
<td>Prop A/AA funds. SFP grants and donations</td>
<td>$500K</td>
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<tr>
<td>DIVISION PRIORITY AND SLO'S</td>
<td>COLLEGE STRATEGY AND SLO'S</td>
<td>OBJECTIVES</td>
<td>ACTIVITIES/TASKS</td>
<td>RESOURCES</td>
<td>COST</td>
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<tr>
<td>14</td>
<td>2.4, 2.5, 6.3</td>
<td>To ensure that students have continual access to modern and leading edge laboratory equipment</td>
<td>Install security systems in locations housing laboratory equipment to protect costly investments.</td>
<td>Prop A/AA or State Deferred Maintenance funds</td>
<td>Unk.</td>
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<tr>
<td>15</td>
<td>1.1, 1.3, 5.2</td>
<td>To provide learning experiences for students using current technology.</td>
<td>Install Smart Board, computer projector in classroom and laboratories</td>
<td>Prop A/AA funds</td>
<td>Unk.</td>
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<tr>
<td>16</td>
<td>1.1, 1.3, 5.2</td>
<td>To introduce new student oriented programs such as hazardous disposal certification and allied health assistant programs (pharmacology, dental, biotechnology, etc)</td>
<td>Package existing college courses into a viable certificates and programs. Coordinate with Life Sciences Dept.</td>
<td>Faculty</td>
<td>$0</td>
</tr>
</tbody>
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## 11.0 Budget Plan

### LOS ANGELES HARBOR COLLEGE

**FY 07-08 Operating Budget**

**MATH-PHY- SCI AND TECH DIVISION**

<table>
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<th>CATEGORY</th>
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<td>BOOKSTORE</td>
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<td>MISC SUPPL &amp; BKS 5,849</td>
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<td>MISC OTH EXP</td>
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<td><strong>TTL OPER EXP</strong></td>
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**Physical Sciences 2008-09**
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<td>CONTING/UNALLOC</td>
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<td>TTL OTHER</td>
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</table>

**TOTAL BUDGET** $1,353,426
12.0 Executive Summary

The Physical Sciences Pathway faculty thanks the external validation team for its thorough review of the documents submitted and addresses its recommendations as follows:

I. The pathway will continue to rely and build on the strengths noted by the validation team such as

a) encouraging more transfers students to pursue chemistry and physics degrees particularly with pending new State of California blended apportionment funding. See 2009-10 Unit Plan priority #4

b) Maintain the quality and rigor of science courses with current course outline content and SLO’s assessment. In priority #7 of the 2009-10 Unit Plan, faculty in the Math-Phy-Sci and Tech Division outline goals to improve teaching learning-skills strategies that would benefit all students

c) Continue to reach out to the community via the Stars4Kids as soon as renovation of the college planetarium is complete. In priority #6 of the 2009-10 Unit Plan, the divisions desire to promote science awareness is clearly identified

d) Maintain realistic academic, staffing and enrollment goals. In priority #1 of the 2009-10 Unit Plan, the division emphasizes its intention to participate in the FHPC process to sustain a viable staffing level, and again in priority #7 the division states its intent to address class size limits to improve student learning

e) Maintain professional relationships with the college community to help students succeed. In priority #1, 7, 6, 9 and 10 of the 2009-10 Unit Plan, the division recognizes the need to include the college community when planning for student success

II. The pathway will address the external validation team recommendations as follows:

a) Continue to work with the Science Complex team to ensure that program space is correctly addressed and make a smooth transition into the new building. During 2007-09 the division fought an uphill battle with the college administration to replace the existing Physics Building. Due to the generosity of LA County taxpayers, the division will share a new building complex with the Life Sciences Division

b) Reducing the number of students in the chemistry laboratories will be a careful balancing act involving student safety, efficiency and budget limitations. Overall 32 students in a chemistry laboratory setting is a very reasonable number

c) In priority #1 of the 2009-10 Unit Plan, the division intends to address on an annual basis requests to the Staffing Committee to replace the physics laboratory technician and to FHPC to fill the astronomy and physics positions vacated by Charles Huff and Joan Fu

d) The division intends to create a Physical Sciences Pathway Advisory Committee involving local industries, businesses and schools in the service area. The division recognizes that the advisory committee mechanism is a good away to draw knowledgeable members of the community to participate in college planning and decision making.
12.1. Validation Team Duties

A program review involves the visitation, observation and analysis of a program/discipline by a team with the purpose of providing suggestions for improvement.

Duties of the Team Member

Pre-Visit Responsibilities

- Study the self-study report prepared by the faculty.

Visit Responsibilities

- Meet with program/discipline faculty.
- Examine teaching materials, supplies, and equipment presently being used in the program.

Post-Visit Responsibilities

- Develop an executive summary of team findings and recommendations.

The Role of the Validation Team

The validation team has been selected to include professionals who can assist the program by reviewing the self-study and plan of action, then making comments and suggestions that will lead to program improvement. In addition to reviewing the materials included in the written packet, team members are asked to visit the facility which houses the program, talk with instructors and students in the program, and request any further informational materials which would be helpful in preparing the executive summary.

<table>
<thead>
<tr>
<th>Program Name: Process Plant Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
</tr>
<tr>
<td>David Humphreys</td>
</tr>
<tr>
<td>Thomas Abbatiello</td>
</tr>
<tr>
<td>Ana Escandon</td>
</tr>
<tr>
<td>Beatriz Ruiz-Silva</td>
</tr>
<tr>
<td>Humberto Ortiz</td>
</tr>
</tbody>
</table>
12.2. Validation Team Report

Executive Summary
Validation Team Report
Discipline: Mathematics
April 2010

Team Members:
David Humphreys, Dean Academic Affairs, LAHC

Major Findings: Strengths:
Major Findings: Concerns:
Recommendations: