**Merced College**

**Merced Community College District**

**3600 M Street**

**Merced, CA 95348**

**Substantive Change Proposal**

**April 2013**

**Addition of New Paramedic and Mechatronics Programs**

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**SUBSTANTIVE CHANGE PROPOSAL**

**PARAMEDIC and MECHATRONICS PROGRAM**

**MERCED COLLEGE**

**MERCED COMMUNITY COLLEGE DISTRICT**

**A. Proposed Change and Rationale**

A.1 Description of Change

Merced College would like to add two new programs, including a Paramedic Program and a Mechatronics Program.

*Paramedic Program:*

The creation of a Paramedic series of courses is designed to meet the requirements of hours and content as delineated in the California Code of Regulations; Title 22. Division 9; Pre-Hospital Emergency Medical Services, Chapter 4; Emergency Medical Technician-Paramedic.

All paramedic students who begin their education on or after January 1, 2013, and wish to obtain NREMT National EMS Certification at the paramedic level must successfully complete their paramedic education at an accredited program or one that is seeking accreditation sponsored by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). The courses, provided in a cohort format, would prepare the student for taking the Paramedic National Registry examination administered by the National Registry of Emergency Medical Technicians (NREMT).

*Mechatronics Program:*

The Mechatronics/Automated Systems Technology Program is the result of revising an existing antiquated electronics program that was known as Industrial Electronics Technology. The revisions, in part, were to upgrade and modernize the existing curriculum content and secondly to take steps toward instilling some of the eight guiding principles vital to the TAA/CCCT Grant requirements. The greatest efforts in the program and curriculum revisions encompassed the compression of instruction time to completion, and to integrate transformative technology into the advanced courses. The compression of instruction time to completion was accomplished by the removal of courses that would be integrated into additional stackable credentials, as well as the removal of courses that fell short of current industry needs. There were also two new courses written that concentrate on introductory and advanced Mechatronics systems.

A.2 Relationship to College Mission

The Merced College Mission Statement is:

“In a rapidly changing and increasingly global society faced with great challenges, Merced College faculty, staff, and leadership are committed to continuously improving methods of providing an accessible, affordable, and relevant education that improves the quality of life for all students and their communities.

Recognizing that education is never a mistake, Merced College serves as a gateway to the future by welcoming all students from our richly diverse region. We prepare our students for the next stage of their lives by providing the following:

A supportive environment

Committed and caring faculty, staff, and leadership

Mutually beneficial community partnerships

State-of-the-art facilities

The latest technology”

*Paramedic Program:*

The proposed Paramedic program is intended to provide a service to the community by training local area students to be hired and/or promoted in the area of community emergency response at a level that can make significant differences in reducing suffering and saving lives. This training service literally addresses the portion of the Mission Statement which describes providing an education which would “improve the quality of life for all students and their communities.”

*Mechatronics Program:*

One of the three primary goals of the California community college system is to provide students access to relevant Career Technical Education programs that will lead to employment upon program completion. The application of electronics in today’s employment marketplace is immense. Human Machine Interface (HMI) and Mechatronics technologies are as commonly used in manufacturing and processing as irrigation technology is in today’s production farming practices. Of the high wage, high demand jobs found in the central valley, the greatest percentage integrate skill sets in the electronics field in some capacity.

The Mechatronics Program strongly supports the Merced College Mission as it “Promotes a Sustainable, Supportive and Safe Learning Environment” through the continual assessment of curriculum and updating of technology to provide training that develops skill sets in students that are relevant to today’s industry standards. The Mechatronics Program continually works to “Partner with the Community” through the creation of industry and education partnerships with local employers to provide highly trained entry level workers with electronic skillsets needed in the industry, as well as offering short term incumbent worker training for employees of local industry in the area of HMI and PLC applied electronics. Thirdly, the Mechatronics Program supports the Merced College Strategic Plan through offering an industry relevant program that encourages student internships, and has been condensed so participants can complete the program in two semesters. These recent changes will help to meet our ability to “Assure Student Access and Success.”

A.3 Rationale for change

The need for these programs, including the “accessible, affordable, and relevant education” aspects was addressed during the application portion of being part of a consortium that applied for grant funding. The Trade Adjustment Assistance Community College and Career Training (TAA/CCCT) Grant Program was approved for Merced College in March 2011. The TAA/CCCT Grant is a large, multi-college grant funded by the Department of Labor that is administered by West Hills College. (Appendix A)

*Paramedic Program:*

Merced College has never had a Paramedic program, or courses, designed to prepare students for taking the National Registry test to become nationally licensed Paramedics. The local county EMS agency and local ambulance provider contacted the college Fire Technology coordinator prior to the grant, explaining the community need and asking that the college provide Paramedic training. Personnel wanting to become Paramedics must drive significant distances, at significant cost, to attend Paramedic courses. The time and intensity of the coursework makes completion problematic and a burden on the student. Because of this need, and the requests from the local emergency response agencies and certifying authority, a Paramedic program was part of the grant request. The grant was approved to include a Paramedic program and steps were taken to incorporate the program into the college system.

*Mechatronics Program:*

Advances in microchip and computer technology have bridged the gap between traditional electronic control and mechanical technology. The study of Mechatronics is a response to industry’s increasing demand for technicians who are able to work across the discipline boundaries of computer controlled electronic systems that integrate programmable logic controls, pneumatics, hydraulics, and a variety of human machine interfacing applications. Highly trained Mechatronics Technicians must have the training to diagnose and repair these integrated systems. Mechatronics covers a wide range of application areas, including consumer product design, instrumentation, manufacturing technology, motion control systems, computer integration, process and device control, and integration of functionality with embedded microprocessor control. Some also include the design of machines, devices and systems possessing a degree of computer-based intelligence. Robotic manipulators, aircraft simulators, electronic traction control systems, adaptive suspensions, and automated manufacturing systems are examples of technologies a mechatronics technology graduate may work with during their career in this field of study.

**B. Description of Programs to be Delivered**

B.1 New Educational Program Descriptions

*Paramedics Program:*

The components of the program are structured to enable the successful student to have the necessary education and skills to take, and pass, a certifying national examination which would allow the student to pursue employment as a Nationally Registered Emergency Medical Technician- Paramedic. The hours of instruction and course content is required by California Code of Regulations; Title 22. Division 9; Pre-Hospital Emergency Medical Services. Chapter 4; Emergency Medical Technician-Paramedic. The course content is modeled on the United States Department of Transportation National Highway Traffic Administration EMT-Paramedic: National Standard Curriculum. (Appendix B)

*Mechatronics Program:*

Students who graduate with a CT (Certificate of Completion) or an AA Degree in Mechatronics/Automated Systems Technology have many work opportunities in manufacturing industries (i.e. Food Process, Printing, Utilities, Chemical, Metal, Aerospace, Computer and Electronic Product, Electrical Equipment, Appliance and Component, etc.) working as PLC programmers, system analyst, electronics and electro-mechanical systems installer and repair. The courses within this program provide the fundamental knowledge of electronics and the application of electronic theories and designs. The more advance “Capstone” courses concentrate on the application of integrated automated systems that embrace Programmable Logic Controllers, Human Machine Interface, various sensors and monitors, as well as onboard diagnostic systems.(Appendix C)

B.2 Meets Eligibility Requirements

Both programs will be integrated into all the College’s planning, curricular, and service processes. This will include Program Review and Student Learning Outcome responsibilities. Appropriate resources will be identified as part of this process. The proposed programs will meet all of the Eligibility Requirements, Accreditation Standards and Commission policies related to student learning programs, services, and resources.

**C. Planning Process Description**

C.1 Relationship to planning, evaluation and mission

Both of the proposed programs are concrete examples of, and highly related to, Merced College’s mission statement. The college’s mission includes a commitment “to continuouslyimproving methods of providing an accessible, affordable, and relevant education in a rapidly changing and increasingly global society faced with great challenges.”

*Paramedic Program:*

The planning process was initiated when Merced College identified the need for a Paramedic program to meet the training and recruiting needs of local and regional emergency response employers. It was determined that the concept of Paramedic training met the program parameters mandated by the TAA/CCCT Grant application for the Health Care sector and was included as part of the grant funding request. The program’s design aligns with the broader campus goals for remediation, retention, and completion at Merced College. Careful consideration was given to identifying programs that would meet campus and Grant goals alike.

*Mechatronics Program:*

The planning process was initiated when Merced College Electronics Technology faculty identified the need to update existing curriculum to meet industry needs thereby creating the Mechatronics/Automated Systems Technology Program. The intent of this program is to meet the training and recruiting needs of local and regional agriculture product manufacturing/processing companies that utilize highly technical automated equipment, and have a need for trained technicians to maintain, diagnose, and repair automated equipment in a manner that reduces down time. It was determined that the concept of Mechatronics/Automated Systems Program was an appropriate fit for the parameters set forth by the TAA/CCCT Grant application becauseAgriculture Manufacturing/Processing was a target sector. The program’s design aligns with the broader campus goals for remediation, retention, and completion at Merced College. Careful consideration was given to identifying programs that would meet campus and grant goals alike. The Mechatronics/Automated Systems programhas been reviewed in light of its relationship to Merced College’s institutional planning, evaluation, and stated Mission.

C.2 Needs and Resources Assessment

*Paramedic Program:*

The need for the Paramedic Program was established through contact with local and regional emergency response agencies, service providers, and certifying authority, all of which have an invested interest in trained personnel that have taken the National Registry certifying examination. As part of the TAA/CCCT Grant funding, the Paramedic Program is provided with the funding necessary to purchase training equipment, instructional materials, and supplies, sufficient to sustain the program.

*Mechatronics Program:*

The need for the Mechatronics/Automated Systems Technology Program was confirmed through ongoing contacts established through the Electronics Department’s Advisory Committee. The Advisory Committee is comprised of employer representatives from area industrial and food processing manufacturers whose expertise guide and support the Mechatronics/Automated Systems Program and the Electronics Department. Members are invited on a rotating basis to ensure a broad range of perspectives and participation from key stakeholders, including business, industry, government, and education to ensure that the curriculum is employer driven. The Advisory Committee is charged with guiding and supporting the Mechatronics/Automated Systems Program and the Electronics Department to ensure that employer recruiting needs are met through internships and full-time employment of Merced College students that have completed this program of study. Support includes feedback, recommendations for course content that results in specific learning objectives and employee success on the job, development of internship opportunities for students enrolled in the Mechatronics/Automated Systems Program course of study, and technical assistance.

C.3 Anticipated Effect on College

*Paramedic Program:*

A Paramedic program is not currently offered at Merced College. During the initial development phase for the TAA/CCCT Grant Program application, it was identified as a high-demand field that met the requirements of the grant for a shortened time to completion for coursework that is employer-driven. The inclusion of a Paramedic certificate significantly enhances Merced College’s students’ ability to be marketable and competitive for available jobs.

*Mechatronics Program:*

Merced College has a well-established and equipped electronics facility to support the Mechatronics/Automated Systems Technology Program. Funding for the advanced training equipment is being provided through the TAA/CCCT Grant. There are already instructional support technicians in place and therefor**e** no negative fiscal effects are anticipated. The anticipated positive effects are that the Mechatronics/Automated Systems Technology Program will significantly enhance Merced College’s students’ ability to be marketable and competitive for available jobs.

C.4 Intended Benefits

*Paramedic Program:*

The clear benefit of including the Paramedic program as part of the TAA/CCCT Grant funded programs at Merced College is that student success drives it. The Paramedic program is designed in harmony with the strategic structure of the Grant: coursework is employer-driven; there is now a shortened time to completion; students are ready for employment when they complete the program; it helps students reach their potential; and the program will increase student completion rates.

*Mechatronics Program:*

The clear benefit of transforming the Industrial Electronics Technology program into a present-day Mechatronics/Automated Systems Technology program as part of the TAA/CCCT Grant funded programs at Merced College is that the program completers will be prepared to join a workforce in a well-trained high wage position with great potential for advancement. The Mechatronics/Automated Systems Technology program is designed in harmony with the strategic structure of the TAA/CCCT Grant: coursework is employer-driven; there is now a shortened time to completion; students are ready for employment when they complete the program; it helps students reach their potential; and the program will increase student completion rates.

C.5 Description of Preparation and Planning

*Paramedic Program:*

Two phases mark the preparation and planning for the Paramedic Program. In preparation to launch a new Paramedic Program, the first phase was initiated. The instructor investigated comparable local and regional offerings, consulted emergency medical services providers that would serve as potential recruiters of program graduates, and identified equipment needs to support instructional delivery. Once it was determined that a need exists for highly trained workers in this career field, that no program is offered in the surrounding area to meet this training need, and that training could appropriately be offered to support employer recruiting through Merced College facilities, the instructor initiated the next phase. This planning phase included consulting with the Allied Health academic dean, the vice president of instruction, curriculum committee, remediation faculty, facilities scheduling office, and student support services staff to identify components to incorporate into the design of an integrated program. Through these steps the design of the new Paramedic Program has taken shape that fulfills the intentions of the TAA/CCCT Grant program. The foundation has been established for implementing a credible program to meet employer recruiting needs and reward committed students with an opportunity for professional employment in the healthcare field.

*Mechatronics Program:*

Careful consideration was also necessitated in the preparation and planning of an integrated Mechatronics Program for the Ag/Manufacturing sector. Significant time was invested into researching comparable programs, both state-wide and across the nation, in order to identify and evaluate elements of electronics and mechanized systems most necessary for a comprehensive, yet compressed program of study. Advisory Committee meetings with employer representatives throughout the initial phase of preparation have served to ensure that this re-designed program would be employer-driven and focused on maximizing student success. Similar to the Paramedic Program, the planning phase included significant collaborations. Consultation with the Ag/Manufacturing academic dean, the vice president of instruction, curriculum committee, remediation faculty, facilities scheduling office, and student support services staff helped to identify components to incorporate into the Mechatronics Program design. Through these critical preparation and planning steps, the Mechatronics Program has emerged to take a credible place in the lineup of TAA/CCCT Grant-funded programming at Merced College. It, too, is poised to meet employer recruiting needs and reward committed students with an opportunity for professional employment in a high-wage, high-demand field.

**D. Evidence of Adequate Resources**

D.1 Adequate and Accessible Student Support Services

Students in the Paramedic program will receive all of the same services as other students, including assessment, orientation, counseling, tutorial services, access to the library and other learning resources. All credit students are issued password protected access to the student portal and other online resources.

D.2 Faculty, Management and Support Staffing

The TAA/CCCT grant manager, Dr. Christine Hollister, has extensive experience as a program administrator for almost thirteen years at California State University, Stanislaus. She served by appointment on campus committees throughout her tenure, including those focusing on accreditation, program reviews, and student success. Following her time at the university, Dr. Hollister worked with the Stanislaus County Alliance Worknet as a workforce consultant and counselor. The organizational chart programs may be found in Appendix J.

*Paramedic Program:*

Staff has the necessary qualifications to initiate and manage the program. The proposed program director, Bryan Donnelly, has the necessary state and local certifications as required by the California Emergency Medical Services Agency and the local Emergency Medical Services Agency. (Appendix D) An instructor pool of subject matter experts has been identified as potential adjunct instructors, pending program approval.

The program would reside under the existing Fire Technology program, which is an ongoing program under the Dean of Public Safety and Allied Health. The Dean currently manages the Registered Nursing, Licensed Vocational Nursing, Radiologic Technician, and Criminal Justice programs. These programs have credentialing, accreditation, and certification responsibilities and management and associated staff are well versed in the steps and responsibilities of programs with those requirements. Many of these ongoing programs have addressed the issues that will arise with a program of this nature and will provide a great resource for overcoming obstacles and hurdles.

The program has a counselor that has a dedicated amount of time and delineated responsibilities for ensuring the best opportunity for student success in the program. As part of the TAA/CCCT Grant, there is a required component for assessment and remediation for Basic Skills. These tools are already in place and mentors will be identified to assist individual students.

*Mechatronics Program:*

The Mechatronics/Automated Systems Technology Program would reside under the Industrial Technology department. This program has two full-time faculty members and is directly supervised by the Dean of Career Technical Education. (Appendix E) There are four instructional support staff members within the Industrial Technology Department. One support staff member is scheduled to provide instructional support during all electronics labs. The Counseling department will provide all needed academic advising for students in the program.

D.3 Faculty and Staff Professional Development

*Paramedic Program:*

In the vocational areas that provide medical care, especially emergency medical care, faculty must be current in trends and practices for the provision of that care. Professional development will be ongoing. Faculty will attend professional seminars and conferences that address these issues. Faculty will maintain close relationships with industry partners, governing agencies, and accrediting bodies to address any changes, advancements, or concerns relative to instructional content, instructional practices, practitioner skills and materials.

Support staff for the Paramedic Program has current experience in dealing with other programs that have similar matters involving accreditation, specific entrance requirements, and additional procedures for program admission and completion.

*Mechatronics Program:*

Professional development in the electronics programs is an ongoing process. Professional development for faculty members that are teaching Mechatronics/Automated Systems Technology include Rockwell automated system trainings, the older SLC 500 platform as well as the Compact Logix 5000 platform. In addition, faculty shadow technicians at local companies that utilize automated systems technology within their manufacturing and processing facilities. The hands-on shadowing of technicians working in the field is an essential component of the professional development as it provides the faculty with real-world applications so vital to our student success.

D.4 Equipment and Facilities

*Paramedic Program:*

The Paramedic Program will be housed in the Allied Health Center. The Allied Health Center houses a complete Radiology and Sonography Suite, Registered & Licensed Vocational Nursing Skills Lab, a large computer lab, a large conference room, study rooms, and multiple large and small classrooms. The Allied Health Center is a beautiful facility that is home to the programs of the Dr. Lakireddy School of Health Sciences and currently includes:

* Registered Nursing
* Licensed Vocational Nursing
* Certified Nurse Assistant
* Diagnostic Radiologic Technology
* Diagnostic Medical Sonography
* Emergency Medical Technician

The Allied Health Center has State-of-the Art equipment and software that assist students with learning current health practices and procedures. A listing of equipment, materials and supplies for the new Paramedic Program, including cost associated with each item listed may be found in Appendix F.

*The Mechatronics Program:*

The electronics facilities are comprised of two classrooms with integrated access to computers, and four different industrial electronics labs. These labs are equipped to provide training in:

* Computer Networking Technology
* Industrial Electronics, Pneumatics, and Hydraulics,
* Electronic circuit, construction, evaluation, and diagnostics
* Mechatronics/Automated Systems lab with various trainers and simulators relating to Automated Systems

Each lab is equipped with functional trainers appropriate to the subject matter being taught. The newest additions to the inventory of lab trainers are in the area of Mechatronics/Automated Systems Technology. This includes classroom sets of PLC trainers that employ three different platforms used in manufacturing plants today. Additionally, there are automated systems trainers that integrate Programmable Logic Controllers, Human Machine Interface, various sensors and monitors, as well as onboard diagnostic systems.

D.5 Long-term Fiscal Resources

The TAA/CCCT grant has served to provide the startup funding for the two programs. It has allowed for the purchase of equipment and materials, but just as importantly, has allowed the college the time to develop the curricula and develop plans for implementation.

Once established, the two programs will be part of the regular Merced College offerings. As such, apportionment will be collected from the State of California for the students who attend the programs. This will provide the necessary ongoing financial support. Both programs will have relatively small numbers of students and will not represent a significant burden to the educational budget. Therefore, sustainability will not be a problem. Other support will come from the WorkKeys assessments that would be conducted through Merced Worknet, which is described below.

D.6 Comparative Budget, Enrollment and Resources Analysis

***Financial Resources****:*

*Paramedic Program:*

Since the initial funding of the 3-year Grant to Merced College and the other partner colleges in the consortium, adequate funds have been allocated toward developing and implementing an innovative Paramedic Program, including staff planning time and purchasing instructional equipment and supplies. (Appendix F) Employment opportunities exist in the Health Care sector for workers who achieve industry-recognized training, such as the Paramedic Program offers. The funding of the Paramedic Program would not otherwise be available, and the campus would lose the opportunity to design and implement innovative education that will accelerate training of a target population to meet specific industry needs. Without the grant the college would have been unable to offer the level of training required by employers seeking qualified personnel in our area, since there is no other Paramedic program offered in the region. TAA/CCCT Grant funds also support curriculum development, research, and connecting with employers to solicit feedback about recruiting and training needs.

Included in the budget is the ability to assess students, using the common assessment tool of WorkKeys utilized by the Grant funded colleges. Students only have to re-assess at the end of the program if they do not initially assess at the basic skills level required for the Paramedic program. Remediation is embedded throughout the Paramedic program to support student success along the way. While the Grant covers the costs associated with WorkKeys for the three year funding period, as a sustainability measure once the Grant funding ends, students will be referred to the local Workforce Investment Agency for assessment and support services. The Workforce Investment Agency serves as an important partner to Merced College and its students, many of whom struggle financially.

*Mechatronics Program:*

Since the initial funding of the 3-year Grant to Merced College and the other partner colleges in the consortium, adequate funds have been allocated toward developing and implementing an The Mechatronics/Automated System Technology Program, including staff planning time and purchasing instructional equipment and supplies. (Appendix G) The TAA/CCCT Grant has provided a substantial level of funding which has made it possible to equip the Mechatronics/Automated System Technology Program with cutting edge trainers as well as funding to revise the curriculum and program to meet current industry needs.

Included in the budget is the ability to assess students, using the common assessment tool of WorkKeys utilized by the Grant funded colleges. Students only have to re-assess at the end of the program if they do not initially assess at the basic skills level required for the Mechatronics/Automated System Technology Program. Remediation is embedded throughout the Mechatronics/Automated System Technology Program to support student success along the way. While the Grant covers the costs associated with WorkKeys for the three year funding period, as a sustainability measure once the Grant funding ends, students will be referred to the local Workforce Investment Agency for assessment and support services. The Workforce Investment Agency serves as an important partner to Merced College and its students, many of whom struggle financially.

***Enrollment Analysis:***

*Paramedic Program:*

No credit Paramedic program currently is offered in California’s Central Valley. Bakersfield College (2011-12 FTES: 12,260.09) offers a non-credit, contract education Paramedic program. According to their Allied Health office, the program enrolls an average of twenty-six students twice a year and an average of twenty students completes the program on their first attempt. In 2011, the most recent information available, twenty-three Bakersfield College students took the National Registry of EMTs Paramedic written examination and 96% passed on their first attempt; the same percentage passed the previous year.

A comparable credit program would be Merced College’s Emergency Medical Technician (EMT), in terms of student profile and interest, and similarity of curriculum, both being an allied health discipline. Merced College’s 2011-12 FTES is 10,014.33.

In 2011-12, the course retention and success rates for the two core courses that make up the Emergency Medical Technician certificate program were 76.47% and 73.53%, respectively. For the past six academic years, those rates were 77.24 and 69.93%. The District’s six-year average rates are 82.55% and 66.61%, respectively.

The number of students who successfully completed both courses, and thus the program, is 219.

During the same time period, the program’s demographic majorities are 20-24 year olds, male and White, non-Hispanic. As a reference point, Merced College’s demographic majorities are 20-24 year olds, female, and Hispanic.

The Fire Technology would also be a comparable program. Although more overwhelmingly male than EMT, the Fire Technology program has 20-24 year old and White, non-Hispanic majorities.

Fire Technology courses have had higher than district averages for retention (95.18%) and success (91.26%) rates in the past six years. Using the same timeframe, thirty-two Associate of Arts and seventeen certificates have been awarded.

*Mechatronics Program:*

Sierra College (2011-12 FTES: 15,177.98) offers Mechatronics Technology program. Here, three Associate Degree concentrations (60 units), five certificate options (18-24 units) and two Skills Certificates (less than 18 units) are available to students.

It should be noted that Sierra College is not similar demographically to ethnic/racial student body of Merced College. Where 47.4% of Merced College’s students are Hispanic, , Sierra College had 63.2% White, Non-Hispanic students in fall 2011 (CCCCO DataMart). Both schools have similar figures for gender and age, with female and 20-24 years serving as the majority. Sierra College’s 2011-12 FTES (15,177.98) was higher than Merced College’s (10,014.33)

In fall 2011, the course retention and success rate for courses under the Industrial Technology discipline were 88.04% and 75.37%, respectively. These rates were much higher when looking at “Fundamental of Mechatronics” and “Mechatronic Processes and Material” courses (90.74%, 80.25%). For comparisons, Merced College’s six-year (2006-07 to 2011-12) average rates are 82.55% and 66.61%, respectively.

In 2011-12, forty program awards were given, according to Sierra College’s Gainful Employment Disclosure. For more information on Sierra College’s Mechatronics Technology program, visit http://www.realskillsrealjobs.com.

***Human Resources:***

Section D.2 (above) provides a summary of the faculty, management and staffing for the programs. All human resources processes, including recruitment and hiring, are handled by the colleges’ Human Resources Department. All employees will follow standard college personnel evaluation processes. Employees working in other departments, such as Information and Technology Services or the Learning Resources Center, will provide needed infrastructural support.

***Other Campus Resources:***

A variety of Student Support Services are already available on campus for the use of enrolled students. (Appendix H) It is anticipated that the Paramedic Program and Mechatronics Program cohorts will likewise avail themselves of these services and resources. The following list serves as a brief example:

Academic Counseling and Guidance

Admissions and Registration

Bookstore

Disabled Student Services

Financial Aid

Tutoring and Peer Mentoring

New Student Orientation

Computer Labs, including labs situated in the Allied Health Building

Student Health Services

Career/Transfer Counseling

Veteran’s services

D.7 Achievement Monitoring Plan

*Paramedic Program*

The Paramedic Program will be monitored through the standard college assessment tools- program review, student learning objective assessments, and student success for completion of certificates and degrees. In addition, the TAA/CCCT grant has requirements for tracking student success in gaining employment and opportunities for employment. This program will prepare students for becoming licensed as paramedics by taking and successfully passing a national registered test. The student scores and successful completion rate will also be monitored for student achievement. The program, as a condition of being approved by the local and state Emergency Medical Agencies, is to be accredited. The accreditation also has requirements for tracking student achievement.

*Mechatronics Program:*

The Mechatronics/Automated System Technology Program will also be monitored through the standard college assessment tools-program review, student learning objective assessments, and student success for completion of certificates and degrees. In addition, the TAA/CCCT grant has requirements for tracking student success in gaining employment and opportunities for employment. This program will prepare students for becoming Automated System technicians that are OSHA 10 certified. The student scores and successful completion rate will also be monitored for student achievement.

D.8 Student Success Evaluation and Assessment

Evaluation and assessment of student success, retention and completion for the new Paramedic and Mechatronics Technology programs will be accomplished via data collection and analyses.  Reports to program faculty, the Merced College Student Success Committee, the Merced College Matriculation Advisory Committee, and to other advisory and/or decision-making bodies as appropriate will be provided.  These individuals and committees will review, discuss and utilize research results to inform quality improvements in academic and student support services, pedagogy, offerings, and other aspects related to the Paramedic and Mechatronics Technology programs.  Similar to other Merced College Allied Health and Career Technical Education program evaluation and assessment, the Office of Grants & Institutional Research (OGIR) will provide the following research and staff support to the proposed programs:

* Analyze Merced College Institutional Effectiveness (IE) metrics which contain success, retention and completion information;
* Monitor and report term-to-term and program cohort persistence to various stakeholders, including Student Success committee, Matriculation Advisory committee and discipline-specific advisory committees;
* Conduct disproportionate impact studies (e.g., race/ethnicity, gender, age) on students entering and progressing through both programs as part of student equity initiatives;
* Monitor and report Paramedic and Mechatronics Technology programs’ student use of Academic Support Services Centers to various stakeholders, including Student Success committee,  Matriculation Advisory committee and discipline-specific advisory committees;

Beginning early fall 2013, the IE Metrics 2.0 will include students’ high school of origin.  This information can and will be used for marketing purposes to target certain geographic areas.  Additionally, faculty will complete and report on Course and Program Student Learning Outcomes (SLO) assessments to their respective deans and the vice president of instruction.  These SLO assessment results will also be reviewed by the Merced College Assessment Review Committee (ARC), which will incorporate its findings into its annual report to the Merced College Council.

**E. Evidence of Necessary Internal and External Approvals**

E.1 Evidence of Internal and External Approvals

The Paramedic Program has been approved by the Merced College Board of Trustees as part of the TAA/CCCT grant contract. (Appendix A) The program also will need approval by the Commission on Accreditation of Allied Health Education Programs (CAAHEP) and the Merced County Health Department, Emergency Services Agency.

The Mechatronics Program will require approval from the California Community Colleges Chancellor’s Office and the Central Region Consortium.

E.2 Legal Requirements Met

All contracts are reviewed by business and fiscal personnel to ensure that all legalities are met.

Development of curriculum occurs by department and is reviewed by the Curriculum Committee and Academic Senate. Once those approvals occur, all curricula are approved by the California Community Colleges Chancellor’s Office and the Merced College Board of Trustees.

E.3 Governing Board Action

Changes to the grant, as they occur, are brought to the Board of Trustees for action. The grant was renewed in March 2013 and approved by the Board of Trustees. (Appendix I)

**F. Accreditation Eligibility Requirements**

1. Authority: Merced College, a public California community college, will have the authority to operate the programs and award the degrees.
2. Mission: The College’s mission has been adopted by its Board of Trustees and published in official documents, including the College catalogue. The full text of the College’s mission statement may be found on page three of this report.
3. Governing Board: Merced College has a seven person elected Board of Trustees that is responsible for the oversight of the college. Each trustee verifies that there are no conflicts of interest on annual basis.
4. Chief Executive Officer: The Chief Executive Officer is chosen by the Board of Trustees. The CEO’s full time responsibility is to serve as the president of the College.
5. Administrative Capacity: The College’s existing administrative capacity is sufficient to provide the services needed to operate the programs. Descriptions of the personnel most immediately involved with the programs may be found on pages nine and ten.
6. Operational Status: Merced College has been open and operating since 1962.
7. Degrees: Aside from some non-credit courses, all of Merced College’s programs lead to degrees or certificates.
8. Educational Programs: Merced College’s programs are consistent with its mission, meet recognized fields of study (including articulation to other colleges and universities and licensure where appropriate), are rigorous and result in identified student outcomes. Almost all associate degree programs are two years in length.
9. Academic Credit: Academic credits are based on regulatory requirements established by federal and state governing agencies. Programs, including the credits awarded, are approved by the California Community Colleges Chancellor’s Office. The only programs not approved by the Chancellor’s Office are very brief certificate programs. Information about the amount of credit awarded may be found in the college catalogue, online, and in the class schedule.
10. Student Learning and Achievement: All programs have established expected learning and achievement outcomes. They may be found online in the College’s public website (Curricunet). Programs are to be assessed on a regular cycle, no matter how or where they are taught.
11. General Education: All Associate degree programs at Merced College include general education courses, which include competency in writing, computational skills, and introductory courses in “major areas of knowledge.” The courses are all reviewed and approved by the College’s Curriculum Committee, and evaluated by other colleges for articulation and transfer. The rigor and amount of credit awarded is consistent with state and national practice.
12. Academic Freedom: Merced College’s Board Policy 4030 confirms the importance of academic freedom. The Policy is posted online and in the College catalogue.
13. Faculty: The majority of courses at Merced College are taught by full time faculty, whose responsibilities are defined in their job descriptions. A key responsibility is the development and review of curriculum.
14. Student Services: Merced College provides all students services that facilitate student learning and are consistent with the College’s mission.
15. Admissions: Merced College’s policies are consistent with its mission, and also adhere to regulations established by the U.S. Department of Education and the California Community Colleges Chancellor’s Office.
16. Information and Learning Resources: All students have access to sufficient information and information learning resources, either at the libraries located at the Merced and Los Baños campuses, and access to a number of online resources. Online resources may be utilized from home, at the libraries, or from various computer labs.
17. Financial Resources: Merced College is a public community college. Its financial resources are stable and adequate to support and improve program effectiveness.
18. Financial Accountability: Merced College submits an annual Fiscal Report to the Commission. An independent accounting firm conducts annual audits of the college’s fiscal status, which includes financial aid programs.
19. Institutional Planning and Evaluation: Merced College has established processes for regular, cyclical, and systematic evaluation. These include assessment of student learning outcomes and service outcomes, and program evaluation. These integrated processes are part of overall college planning, resource allocation, implementation, and then reevaluation.
20. Integrity in Communication with the Public: Merced College’s print and electronic catalogue includes required general information, requirements, and major policies affecting students. Board of Trustee policies and procedures may be found on the College’s public website as well. Information about all of the above also is shared in student orientations (live and online), class schedules, and in course syllabi when appropriate.
21. Integrity in Relations with the Accrediting Commission: Board Policy 3200 confirms that Merced College will “adhere to the Eligibility Requirements and Accreditation Standards and policies of the Commission, describes itself in identical terms to all accrediting agencies, communicates any changes in its accredited status, and agrees to disclose information required by the Commission to carry out its accrediting responsibilities.” Merced College addresses all Commission requests and directives.

**G. Accreditation Standards and Relevant Commission Policies**

G. Evidence that each Accreditation Standard will still be fulfilled specifically related to the change and that all relevant Commission policies are addressed.

Standard I: Mission and Effectiveness

1. Mission: Creation of these two programs relates directly to Merced College’s mission, which includes a commitment to “continuously improving methods of providing an accessible, affordable, and relevant education that improves the quality of life for all students and their families.” Other relevant portions of the mission statement include the desire to provide “state of the art facilities,” the “latest technology,” and “mutually beneficial community partnerships.” TAA/CCCT grant funding allowed for these programs to have the needed planning and equipment funds to create quality programs. Please see pages 3 and 4 above.
2. Institutional Effectiveness: Although the programs were initiated due to special grant funding, their planning processes are folded into institutional planning as a whole. The need for these types of programs had been identified previously. Although they will be evaluated by the requirements of the grant, they also will become part of the College’s overall evaluation of effectiveness. Sections C, and part of D, above pay particular attention to these needs.

Standard II: Student Learning Programs and Services

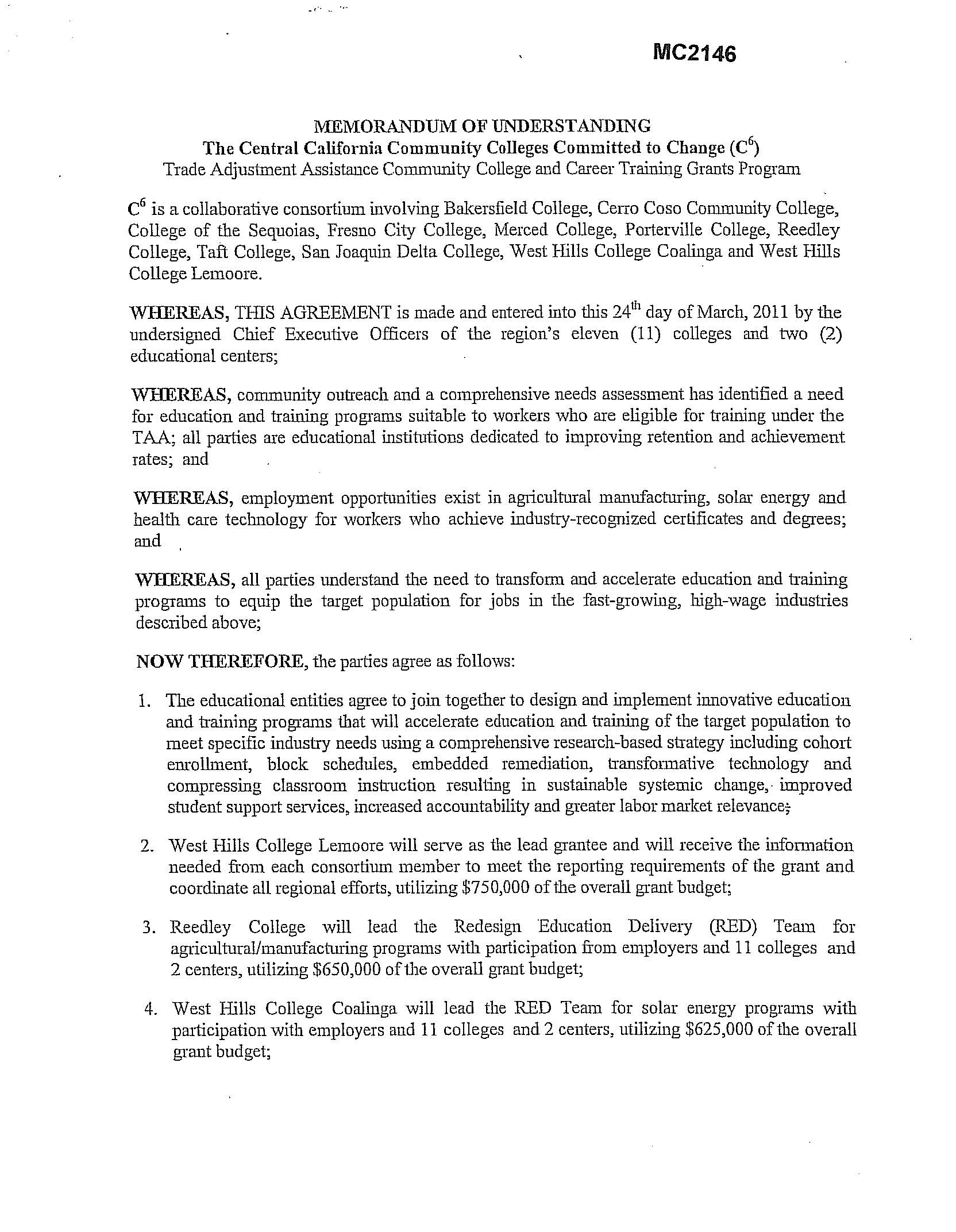
1. Instructional Programs: Sections C and D of this report provide a review of these processes, and the appendices provide additional data. The quality of instruction for the Paramedic and Mechatronics Programs will be held at the same level of quality as others taught at Merced College. All courses have been submitted for review by the Curriculum Committee and ultimately are approved by the Board of Trustees. All courses must incorporate Student Learning Outcomes and complete assessments at both the course and program level. The two programs will be part of the College’s ongoing program review process. Acceptable standards for awarding credit are utilized. Students completing associate level degrees will complete already existing general education and other degree requirements. When approved, these programs will be included in the College’s course catalogue. All polices related to instructional standards, conduct, and freedom of expression will be upheld.
2. Student Support Services: All students participating in the two programs will be eligible for student services related to registration, orientation, counseling, education planning, financial aid, and supportive services. All major policies that affect students will apply to them. Information about student support services may be found on pages 9, 14, 15.
3. Library and Learning Support Services: Students in these programs will have full access to all relevant services, including tutorial programs, computer learning laboratories, the library, and online resources. Information about library and learning support services may be found on pages 9, 14, and 15.

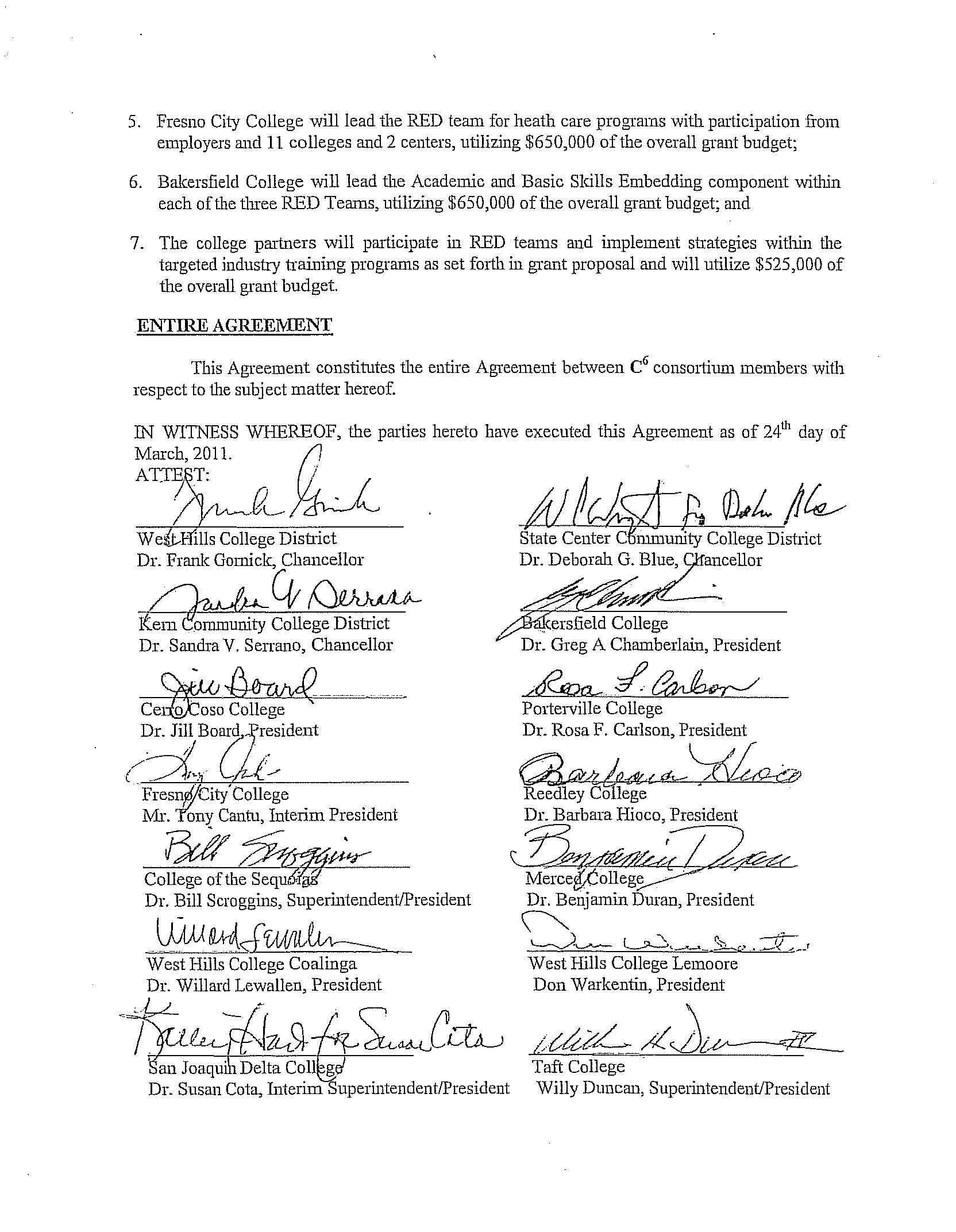
Standard III: Resources

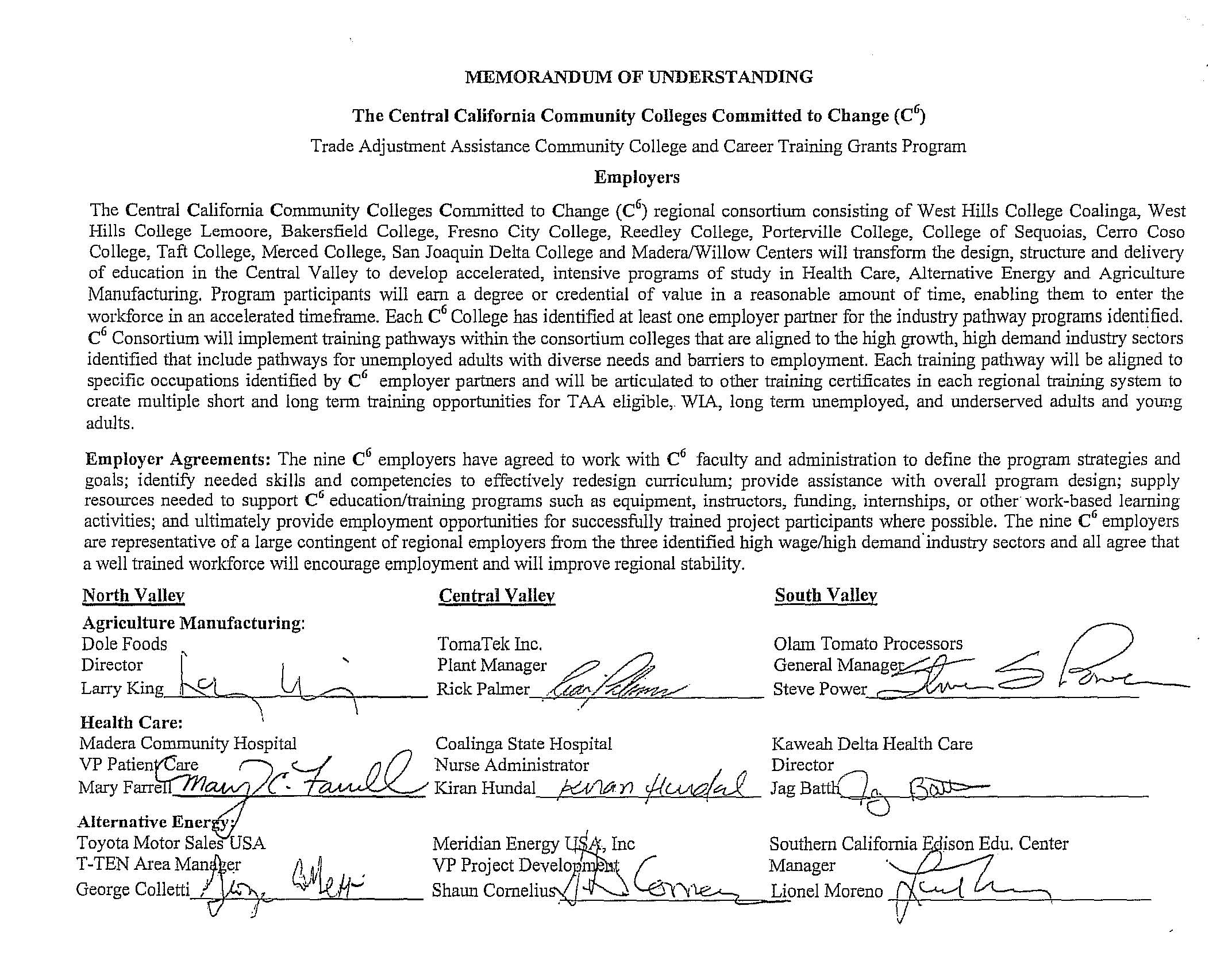
1. Human Resources: Earlier portions of this document have described the types of personnel and the requirements for hiring. These personnel will be subject to the same personnel policies and procedures as other Merced College employees. Pages 9, 10, and 14 provide this information.
2. Physical Resources: The learning facilities and equipment were described earlier. The provision of grant funding has allowed for purchase of current equipment. Classroom facilities already exist and are appropriate. Information about these resources may be found in Section D.4, beginning on page 11.
3. Technology Resources: The programs will utilize both new technology purchased by the grant, as well as existing campus technology. They will be utilizing the college’s technology infrastructure, and will be supported by existing information technology personnel. This information also will be found in section D.4.
4. Financial Resources: The College is fortunate in that it received generous funding for the program. Ongoing funding will be provided by state apportionment. It is possible that other resources may become available in the future as part of grants that are provided specifically for career and technical education. Financial information may be found on pages 12 and 13, under sections D.5 and D.6.

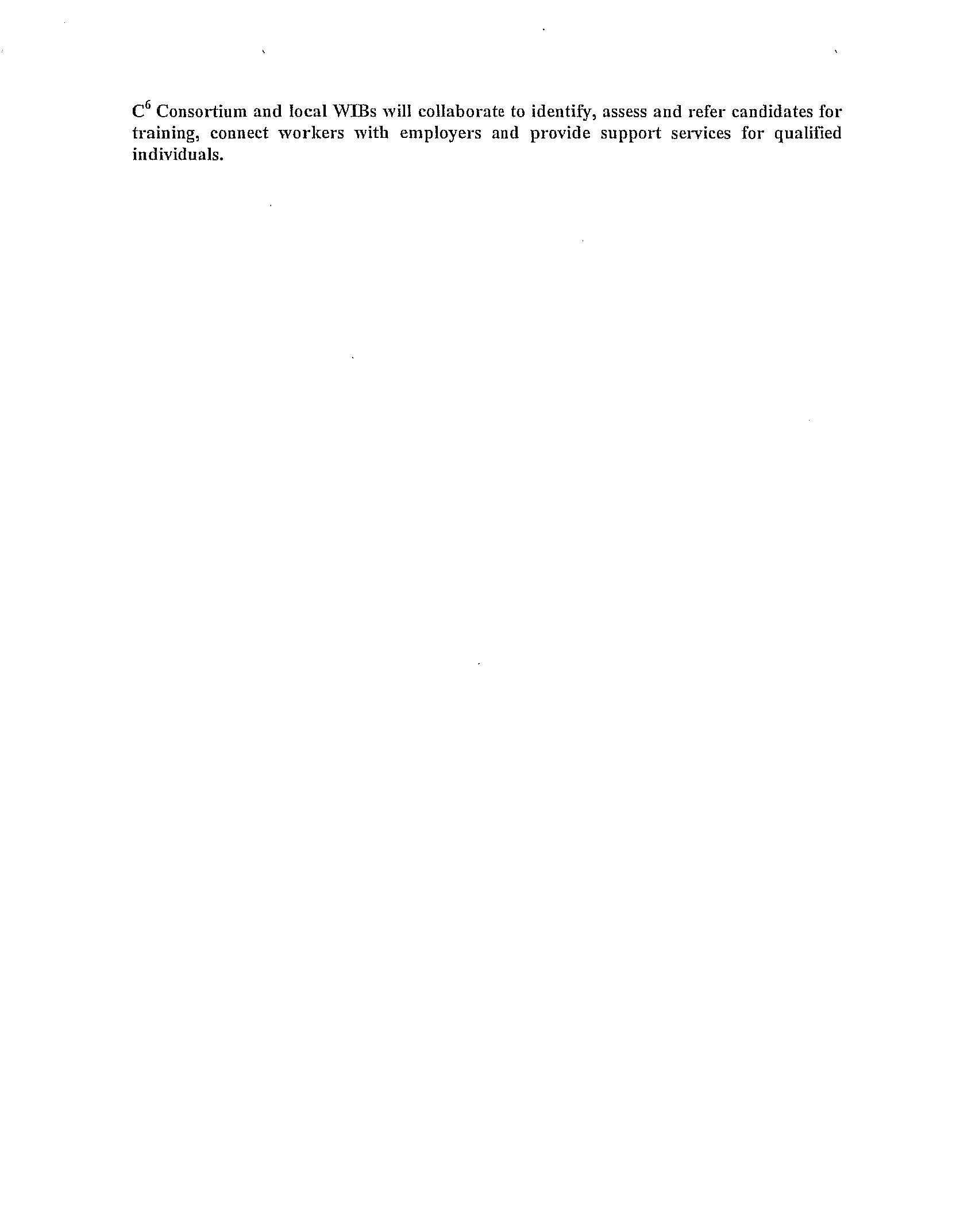
Standard IV: Leadership and Governance

1. Decision-Making Roles and Processes: As part of the instructional program at Merced College, these two programs are included in the decision making roles and processes that already exist. Members of departments are part of shared decision making, participate in planning committees, and have a voice in budget development. All program faculty members are represented by the Academic Senate for decisions related to instruction, counseling, and other student learning programs and services. Curricula for all programs are approved by the Curriculum Committee, a subcommittee of the Academic Senate.
2. Board and Administrative Leadership: The Merced College Board of Trustees ultimately is responsible for policies and practices for the College. The Board is responsible for the hiring of the Chief Executive Officer. Dr. Ron Taylor serves as the CEO and president of Merced College, and provides leadership for overall institutional progress and effectiveness.

**Appendix A**

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**Appendix B**

**Merced College**

**Course Outline**

1. Course Number: EMER 10 and Title: Paramedic I
2. Units 12.5 Hours: Lecture (Weekly): 12.25 (Per Term): 220.5 Lab (Weekly): 0.75 (Per Term): 13.5 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 234

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to: NONE

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to:

EMER 11   
Linked Student Learning Outcomes:

Calculate dosages properly in order to administer medications.

Demonstrate the ability to successfully perform venipuncture and phlebotomy.

Evaluate patients by conducting a proper history and comprehensive physical exam.

Perform a physical assessment in order to manage emergency patients.

Advisory Skills: Upon entering the course it is recommended that the student be able to:

MATH 81   
Linked Student Learning Outcomes:

Evaluate problems involving real numbers and algebraic expressions.

Perform operations (add, subtract, multiply, divide, compose) on polynomial functions and factor polynomials.

Set up equations (linear, quadratic, and systems of equations) to solve application problems.

Graph and solve problems involving linear equations, linear inequalities, and systems of equations.

Make appropriate use of available technology.

ENGL 01A   
Linked Student Learning Outcomes:

Integrate the ideas of others through paraphrasing, summarizing, and quoting in appropriate documentation format.

Demonstrate proofreading and editing techniques so that written work conforms to the conventions of standard, written, academic English.

Limitation on Enrollment: EMT course, within the last collegiate calendar year, passed with a grade of B or better, and successfully pass entrance examination. OR, If NREMT certification held for greater than one (1) year- proof of field experience and successful completion of entrance examination. NREMT 1 Certification (current), and maintained throughout coursework. Minimum 18 years of age. Live scan background clearance. Health screen clearance. BLS Healthcare Provider card (current) and maintained throughout the course. Based upon State and Federal Regulations, CA Title 22.

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This course introduces the student to the roles and responsibilities of the Paramedic within the EMS system, apply basic concepts of development, pathophysiology, pharmacology, patient assessment, medication administration, airway and ventilation concepts, the pulmonary, cardiac, neurological, and endocrine systems to be able to formulate a ?field impression? of patient status.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Caroline, Nancy, *Emergency Care in the Streets*, (7th/e). Jones and Bartlett Learning. (2013).  
Workbook

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Describe the roles and responsibilities of a Paramedic within an EMS system.
   2. Apply the basic concepts of development, pathophysiology and pharmacology.
   3. Assess in order to manage emergency patients.
   4. Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient.
   5. Integrate pathophysiological principles and assessment findings to formulate a field impression.

Student Learning Objectives:

Understand the roles and responsibilities of a Paramedic within an EMS system.

Apply the basic concepts of development, pathophysiology and pharmacology.

Assess and manage emergency patients.

1. Able to properly administer medications.

B. Communicate effectively with patients.

C. Establish and or maintain a patent airway, oxygenate, and ventilate a patient.

Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient.

1. Communicate clinical findings to other health care providers.

Integrate pathophysiological principles and assessment findings to formulate a field impression.

1. Implement the treatment plan for the medical patient.

Applies to all SLOs.

1. Attain Advanced Cardiac Life Support Certification
2. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * texts, handouts, supplementary materials.
   3. Required Writing Assignments:
      * field notes, patient care reports, assessment reports
   4. Learning Activities Required Outside of Class:
      * reading, studying, workbooks and work sheets, research
   5. Assignments or Activities that Demonstrate Critical Thinking:

Describe the roles and responsibilities of a Paramedic within an EMS system. Determine medical treatment and care for ill and injured patients.  
Assess emergency scenes in order to safely manage medical care.  
Apply the basic concepts of development, pathophysiology and pharmacology. Patient care reports and forms  
Determine medical treatment and care for ill and injured patients.  
Assess in order to manage emergency patients. Patient care reports and forms  
Determine medical treatment and care for ill and injured patients.  
Assess emergency scenes in order to safely manage medical care.  
Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient. Patient care reports and forms  
Determine medical treatment and care for ill and injured patients.  
Assess emergency scenes in order to safely manage medical care.  
Integrate pathophysiological principles and assessment findings to formulate a field impression. Patient care reports and forms  
Determine medical treatment and care for ill and injured patients.  
Assess emergency scenes in order to safely manage medical care.

* 1. Lab Content and scope:
     + A. Participation in effective resuscitation team dynamics

B. Participate in intubation

C. Participate in a respiratory arrest case

D. Identify ventricular fibrillation (VF) and intervene  with cardiopulmonary resuscitation (CPR) and automated external defibrillator (AED) case

E. Participate in VF/pulseless VT Case

F. Participate in pulseless electrical activity (PEA) case

G. Respond to an asystole case

H. Participate in an acute coronary syndromes case

I. Participate in a bradycardia case

J. Participate in an unstable tchycardia case

K. Participate in a stable tachycardia case

L. Participate in an acute stroke case

1. Methods of Instruction:

Describe the roles and responsibilities of a Paramedic within an EMS system. Lecture  
Multi-media  
Demonstration  
Directed Study  
Guest Speakers  
Small Group Discussion  
Apply the basic concepts of development, pathophysiology and pharmacology. Lecture  
Multi-media  
Demonstration  
Directed Study  
Guest Speakers  
Small Group Discussion  
Assess in order to manage emergency patients. Lecture  
Multi-media  
Demonstration  
Directed Study  
Guest Speakers  
Small Group Discussion  
Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient. Lecture  
Multi-media  
Demonstration  
Directed Study  
Guest Speakers  
Small Group Discussion  
Integrate pathophysiological principles and assessment findings to formulate a field impression. Lecture  
Multi-media  
Demonstration  
Directed Study  
Guest Speakers  
Small Group Discussion

1. Methods of Evaluation:

Describe the roles and responsibilities of a Paramedic within an EMS system. Class Performance  
Class Work  
Exams/Tests  
Apply the basic concepts of development, pathophysiology and pharmacology. Class Performance  
Class Work  
Exams/Tests  
Assess in order to manage emergency patients. Class Performance  
Class Work  
Exams/Tests  
Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient. Class Performance  
Class Work  
Exams/Tests  
Integrate pathophysiological principles and assessment findings to formulate a field impression. Class Performance  
Class Work  
Exams/Tests

1. COURSE CONTENT
   1. Preparatory
      * Paramedic Role
      * Injury and illness prevention
      * Well Being Paramedic
      * Roles & Responsibilities
      * Preventing disease transmission
      * Medical/legal/ethical
      * Pathophysiology
      * Pharmacology
      * Medication Administration
      * Therapeutic Communication
      * Life Span Development

Describe the roles and responsibilities of a Paramedic within an EMS system.  
  
Apply the basic concepts of development, pathophysiology and pharmacology.   
  
Assess in order to manage emergency patients.  
  
Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient.  
  
Integrate pathophysiological principles and assessment findings to formulate a field impression.

* 1. Airway Management & Ventilation

Describe the roles and responsibilities of a Paramedic within an EMS system.  
  
Apply the basic concepts of development, pathophysiology and pharmacology.   
  
Assess in order to manage emergency patients.  
  
Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient.  
  
Integrate pathophysiological principles and assessment findings to formulate a field impression.

* 1. Patient Assessment
     + History Taking
     + Technique of Physical exam
     + Clinical Decision Making
     + Communications
     + Documentation

Describe the roles and responsibilities of a Paramedic within an EMS system.  
  
Apply the basic concepts of development, pathophysiology and pharmacology.   
  
Assess in order to manage emergency patients.  
  
Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient.  
  
Integrate pathophysiological principles and assessment findings to formulate a field impression.

* 1. Medical Patients
     + Pulmonology
     + Cardiology
     + Neurology
     + Endocrinology
     + Allergies & Anaphylaxis

 Describe the roles and responsibilities of a Paramedic within an EMS system.  
  
Apply the basic concepts of development, pathophysiology and pharmacology.   
  
Assess in order to manage emergency patients.  
  
Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient.  
  
Integrate pathophysiological principles and assessment findings to formulate a field impression.

* 1. Basic cardiology
  2. Cardiac pharmacology
  3. EKG interpretation used in Advanced Cardiac
  4. The Systematic Approach: BLS Primary Survey and ACLS Secondary Survey
  5. Effective Resuscitation Team Dynamics
  6. Respiratory Arrest Case
  7. Ventricular Fibrillation (VF) Treated with cardiopulmonary resuscitation (CPR) and automated external defibrillator (AED) Case
  8. VF/Pulseless VT Case
  9. Pulseless Electrical Activity (PEA) Case
  10. Asystole Case
  11. Acute Coronary Syndromes Case
  12. Bradycardia Case
  13. Unstable Tachycardia Case
  14. Stable Tachycardia Case
  15. Acute Stroke

Describe the roles and responsibilities of a Paramedic within an EMS system.  
  
Apply the basic concepts of development, pathophysiology and pharmacology.   
  
Assess in order to manage emergency patients.  
  
Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient.  
  
Integrate pathophysiological principles and assessment findings to formulate a field impression.4168

**Appendix B (continued)**

**Merced College**

**Course Outline**

1. Course Number: EMER 11 and Title: Paramedic I Lab
2. Units 1.5 Hours: Lecture (Weekly): 0 (Per Term): 0 Lab (Weekly): 4.5 (Per Term): 81 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 81

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to: NONE

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to:

EMER 10   
Linked Student Learning Outcomes:

Describe the roles and responsibilities of a Paramedic within an EMS system.

Assess in order to manage emergency patients.

Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient.

Integrate pathophysiological principles and assessment findings to formulate a field impression.

Apply the basic concepts of development, pathophysiology and pharmacology.

Advisory Skills: Upon entering the course it is recommended that the student be able to:

MATH 81   
Linked Student Learning Outcomes:

Evaluate problems involving real numbers and algebraic expressions.

Set up equations (linear, quadratic, and systems of equations) to solve application problems.

ENGL 01A   
Linked Student Learning Outcomes:

Integrate the ideas of others through paraphrasing, summarizing, and quoting in appropriate documentation format.

Demonstrate proofreading and editing techniques so that written work conforms to the conventions of standard, written, academic English.

Limitation on Enrollment: Limitation on Enrollment EMT course, within the last collegiate calendar year, passed with a grade of B or better, and successfully pass entrance examination. If NREMT certification held for greater than one (1) year- proof of field experience and successful completion of entrance examination. NREMT 1 Certification (current), and maintained throughout coursework. Minimum 18 years of age. Live scan background clearance. Health screen clearance. BLS Healthcare Provider card (current) and maintained throughout the course. Based upon State and Federal Regulations, CA Title 22.

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This course is the corequisite for Paramedic I and occurs in the skills lab or simulation lab. The student will practice and master skills that will allow the student to meet clinical performance objectives. Competency testing is the focus of this course and will include physical assessment, medication administration, IV skills, and airway maintenance including intubation.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Caroline, Nancy, *Emergency Care in the Streets* , (7th/e). Jones and Bartlett. (2013).  
Workbooks, handouts

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Perform a physical assessment in order to manage emergency patients.
   2. Calculate dosages properly in order to administer medications.
   3. Demonstrate the ability to successfully perform venipuncture and phlebotomy.
   4. Evaluate patients by conducting a proper history and comprehensive physical exam.

Student Learning Objectives:

Applies to all SLOs.

A. Assess and manage emergency patients.

B. Implement blood borne and pathogen precautions.

C. Safely calculate and administer medications.

D. Initiate IV therapy successfully.

E. Successfully perform venipuncture and phlebotomy.

F. Establish and or maintain a patent airway, oxygenate, and ventilate a patient.

G. Take a proper history and perform a comprehensive physical exam on any patient.

H. Implement the treatment plan for the medical patient.

I. Identify signs of allergic reactions.

1. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * Text  
        Handouts
   3. Required Writing Assignments:
      * Patient care reports  
        Worksheets
   4. Learning Activities Required Outside of Class:
      * Reading text, handouts
   5. Assignments or Activities that Demonstrate Critical Thinking:

Perform a physical assessment in order to manage emergency patients. In given scenarios, determine airway adjunct needs and medical care solutions.  
In given scenarios, perform patient assessment in order to determine course of treatment.  
In given scenarios, determine the need and route for vascular access.  
Calculate dosages properly in order to administer medications. In given scenarios, perform medication administration calculations.  
Demonstrate the ability to successfully perform venipuncture and phlebotomy. In given scenarios, determine the need and route for vascular access.  
Evaluate patients by conducting a proper history and comprehensive physical exam. In given scenarios, determine airway adjunct needs and medical care solutions.  
In given scenarios, perform patient assessment in order to determine course of treatment.  
In given scenarios, determine the need and route for vascular access.

* 1. Lab Content and scope:
     + Lab is integrated with and contains the same content as lecture.

1. Methods of Instruction:

Perform a physical assessment in order to manage emergency patients. Activity  
Demonstration  
Demonstration with Return Demonstration  
Individualized Instruction  
Laboratory Practice of Skills  
Calculate dosages properly in order to administer medications. Activity  
Demonstration  
Demonstration with Return Demonstration  
Individualized Instruction  
Laboratory Practice of Skills  
Demonstrate the ability to successfully perform venipuncture and phlebotomy. Activity  
Demonstration  
Demonstration with Return Demonstration  
Individualized Instruction  
Laboratory Practice of Skills  
Evaluate patients by conducting a proper history and comprehensive physical exam. Activity  
Demonstration  
Demonstration with Return Demonstration  
Individualized Instruction  
Laboratory Practice of Skills

1. Methods of Evaluation:

Perform a physical assessment in order to manage emergency patients. Class Participation  
Evaluation of laboratory skill sets  
Simulation  
Exams/Tests  
Calculate dosages properly in order to administer medications. Class Participation  
Evaluation of laboratory skill sets  
Simulation  
Exams/Tests  
Demonstrate the ability to successfully perform venipuncture and phlebotomy. Class Participation  
Evaluation of laboratory skill sets  
Simulation  
Exams/Tests  
Evaluate patients by conducting a proper history and comprehensive physical exam. Class Participation  
Evaluation of laboratory skill sets  
Simulation  
Exams/Tests

1. COURSE CONTENT
   1. Preparatory
      * Injury and illness prevention
      * Prevention of disease transmission
      * Medication Administration
      * Airway Management & Ventilation
      * Airway and oxygenation

Perform a physical assessment in order to manage emergency patients.  
Calculate dosages properly in order to administer medications.   
Evaluate patients by conducting a proper history and comprehensive physical exam.

* 1. Patient Assessment
     + History Taking
     + Technique of Physical exam
     + Clinical Decision Making
     + Communications
     + Documentation

Perform a physical assessment in order to manage emergency patients.  
Evaluate patients by conducting a proper history and comprehensive physical exam.

* 1. Medical Patients
     + Pulmonology
     + Cardiology
     + Neurology
     + Endocrinology

Perform a physical assessment in order to manage emergency patients.  
Evaluate patients by conducting a proper history and comprehensive physical exam.  
  
1. Allergies & Anaphylaxis  
Perform a physical assessment in order to manage emergency patients.  
Evaluate patients by conducting a proper history and comprehensive physical exam.

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**Appendix B (continued)**

**Merced College**

**Course Outline**

1. Course Number: EMER 20 and Title: Advanced Paramedic
2. Units 11.5 Hours: Lecture (Weekly): 11.5 (Per Term): 207 Lab (Weekly): 0 (Per Term): 0 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 207

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to:

EMER 10   
Linked Student Learning Outcomes:

Describe the roles and responsibilities of a Paramedic within an EMS system.

Assess in order to manage emergency patients.

Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient.

Integrate pathophysiological principles and assessment findings to formulate a field impression.

Apply the basic concepts of development, pathophysiology and pharmacology.

EMER 11   
Linked Student Learning Outcomes:

Calculate dosages properly in order to administer medications.

Demonstrate the ability to successfully perform venipuncture and phlebotomy.

Evaluate patients by conducting a proper history and comprehensive physical exam.

Perform a physical assessment in order to manage emergency patients.

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to:

EMER 21   
Linked Student Learning Outcomes:

Describe the standards and guidelines that help ensure safe and effective ground and air medical transport.

Demonstrate the proper application of patient care skills relative to patient assessment findings.

Demonstrate the requisite skills necessary for patient care within the paramedic scope of practice.

Integrate pathophysiological principles and assessment findings to formulate a field impression in order to implement the treatment plan for the medical patient.

Advisory Skills: Upon entering the course it is recommended that the student be able to:

MATH 81   
Linked Student Learning Outcomes:

Evaluate problems involving real numbers and algebraic expressions.

Set up equations (linear, quadratic, and systems of equations) to solve application problems.

ENGL 01A   
Linked Student Learning Outcomes:

Integrate the ideas of others through paraphrasing, summarizing, and quoting in appropriate documentation format.

Demonstrate proofreading and editing techniques so that written work conforms to the conventions of standard, written, academic English.

Limitation on Enrollment: Health Screening Clearance Live Scan clearance. Maintenance of current NREMT. Maintenance of current BLS Healthcare Provider card. Based upon State and Federal Regulations, CA Title 22.

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This theory course is the application of theory and skills in a wide variety of sick and injured clients in the pre-hospital setting. This course covers care of medical patients, trauma patients, special populations including obstetrical, pediatric, geriatric and mental health patients .This course is part of a program of study to prepare paramedics as described in California Code of Regulations, Title 22, Division 9, Chapter 4 and lists the required hours and subjects to be covered as set forth by the Department of Transportation curriculum.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Caroline, Nancy, *Emergency Care in the Streets*, (7th/e). Jones and Bartlett. (2013).  
Workbook  
Handouts

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Differentiate pathophysiological principles and assessment findings in order to implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients.
   2. Relate pathophysiological principles and assessment findings in order to implement the treatment plan for the trauma patient with hemorrhage, shock, head injury, spinal cord injuries, and musculoskletal injuries.
   3. Define the components of safely managing the scene of an emergency.
   4. Compare the principles of general incident management and multiple casualty incident (MCI) management.

Student Learning Objectives:

Applies to all SLOs.

A. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the patient with a gastroenterologic problem.

B. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the patient with a gastroenterologic problem.

C. Integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the patient with a renal or urologic problem.

D. Integrate the pathophysiological principles of the hematopoietic system to formulate a field impression and implement a treatment plan

E. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the patient with an environmentally induced or exacerbated medical or traumatic condition.

F. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement a management plan for the patient with infectious and communicable diseases.

G. Describe and demonstrate safe, empathetic competence in caring for patients with behavioral emergencies.

H. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the trauma patient with hemorrhage, shock, head injury, spinal cord injuries, and musculoskletal injuries.

I. Understand the anatomy and physiology of the female reproductive system to the assessment and management of a patient experiencing normal or abnormal labor.

J. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients.

K. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for patients with common complaints.

L. Safely manage the scene of an emergency.

M. Understand standards and guidelines that help ensure safe and effective ground and air medical transport.

1. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * Text  
        Handouts  
        Medical Journals as assigned
   3. Required Writing Assignments:
      * Patient care reports  
        Assessment findings  
        Pharmacological indications, contraindications, and uses
   4. Learning Activities Required Outside of Class:
      * Assigned reading  
        Research of assigned topics
   5. Assignments or Activities that Demonstrate Critical Thinking: Differentiate pathophysiological principles and assessment findings in order to implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients. For given scenarios, integrate pathophysiological principles and the assessment findings in order to formulate a field impression and implement a treatment plan.  
      For given scenarios, determine alternative treatment regiments or allowances for patients with cultural restrictions.  
      Relate pathophysiological principles and assessment findings in order to implement the treatment plan for the trauma patient with hemorrhage, shock, head injury, spinal cord injuries, and musculoskletal injuries. For given scenarios, integrate pathophysiological principles and the assessment findings in order to formulate a field impression and implement a treatment plan.  
      For given scenarios, determine alternative treatment regiments or allowances for patients with cultural restrictions.  
      Define the components of safely managing the scene of an emergency. For given scenarios, determine alternative treatment regiments or allowances for patients with cultural restrictions.  
      Compare the principles of general incident management and multiple casualty incident (MCI) management. For given scenarios, determine alternative treatment regiments or allowances for patients with cultural restrictions.
   6. Lab Content and scope:
2. Methods of Instruction:

Differentiate pathophysiological principles and assessment findings in order to implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients. Class Discussion  
Demonstration  
Lecture  
Multi-media  
Guest Speakers  
Relate pathophysiological principles and assessment findings in order to implement the treatment plan for the trauma patient with hemorrhage, shock, head injury, spinal cord injuries, and musculoskletal injuries. Class Discussion  
Demonstration  
Lecture  
Multi-media  
Guest Speakers  
Define the components of safely managing the scene of an emergency. Class Discussion  
Demonstration  
Lecture  
Multi-media  
Guest Speakers  
Compare the principles of general incident management and multiple casualty incident (MCI) management. Class Discussion  
Demonstration  
Lecture  
Multi-media  
Guest Speakers

1. Methods of Evaluation:

Differentiate pathophysiological principles and assessment findings in order to implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients. Class Participation  
Class Performance  
Exams/Tests  
Simulation  
Relate pathophysiological principles and assessment findings in order to implement the treatment plan for the trauma patient with hemorrhage, shock, head injury, spinal cord injuries, and musculoskletal injuries. Class Participation  
Class Performance  
Exams/Tests  
Simulation  
Define the components of safely managing the scene of an emergency. Class Participation  
Class Performance  
Exams/Tests  
Simulation  
Compare the principles of general incident management and multiple casualty incident (MCI) management. Class Participation  
Class Performance  
Exams/Tests  
Simulation

1. COURSE CONTENT
   1. Gastroeneterology disorders
   2. Urology disorders
   3. Toxicology disorders
   4. Environmental Conditions
   5. Infectious & communicable diseases
   6. Behavioral/Psychiatric disorders
   7. Hematology  disorders
   8. Gynecology disorders
   9. Obstetrics, normal and abnormal deliveries

Differentiate pathophysiological principles and assessment findings in order to implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients.  
  
Define the components of safely managing the scene of an emergency.

* 1. Special Considerations
  2. Neonatology
  3. Pediatrics
  4. Geriatrics Abuse & Assault
  5. Pts with special challenges
  6. Acute intervention for the chronic care patient

Differentiate pathophysiological principles and assessment findings in order to implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients.  
  
Define the components of safely managing the scene of an emergency.   
  
1. Assessment based management for common complaints  
Differentiate pathophysiological principles and assessment findings in order to implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients.  
  
Relate pathophysiological principles and assessment findings in order to implement the treatment plan for the trauma patient with hemorrhage, shock, head injury, spinal cord injuries, and musculoskletal injuries.   
  
Define the components of safely managing the scene of an emergency.   
  
Compare the principles of general incident management and multiple casualty incident (MCI) management.

* 1. Operations
     + Medical Incident Command
     + Ground and air rescue
     + Hazardous  Materials  Incidents
     + Crime Scene Awareness

Define the components of safely managing the scene of an emergency.   
  
Compare the principles of general incident management and multiple casualty incident (MCI) management.

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**Appendix B (continued)**

**Merced College**

**Course Outline**

1. Course Number: EMER 21 and Title: Advanced Paramedic Lab
2. Units 1.5 Hours: Lecture (Weekly): 0 (Per Term): 0 Lab (Weekly): 4.5 (Per Term): 81 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 81

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to:

EMER 10   
Linked Student Learning Outcomes:

Describe the roles and responsibilities of a Paramedic within an EMS system.

Assess in order to manage emergency patients.

Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient.

Integrate pathophysiological principles and assessment findings to formulate a field impression.

Apply the basic concepts of development, pathophysiology and pharmacology.

EMER 11   
Linked Student Learning Outcomes:

Calculate dosages properly in order to administer medications.

Demonstrate the ability to successfully perform venipuncture and phlebotomy.

Evaluate patients by conducting a proper history and comprehensive physical exam.

Perform a physical assessment in order to manage emergency patients.

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to:

EMER 20   
Linked Student Learning Outcomes:

Relate pathophysiological principles and assessment findings in order to implement the treatment plan for the trauma patient with hemorrhage, shock, head injury, spinal cord injuries, and musculoskletal injuries.

Differentiate pathophysiological principles and assessment findings in order to implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients.

Compare the principles of general incident management and multiple casualty incident (MCI) management.

Define the components of safely managing the scene of an emergency.

Advisory Skills: Upon entering the course it is recommended that the student be able to:

MATH 81   
Linked Student Learning Outcomes:

Evaluate problems involving real numbers and algebraic expressions.

Set up equations (linear, quadratic, and systems of equations) to solve application problems.

ENGL 01A   
Linked Student Learning Outcomes:

Integrate the ideas of others through paraphrasing, summarizing, and quoting in appropriate documentation format.

Demonstrate proofreading and editing techniques so that written work conforms to the conventions of standard, written, academic English.

Limitation on Enrollment: Limitation on Enrollment Health Screening Clearance Live Scan clearance. Maintenance of current NREMT certification. Maintenance of current BLS Healthcare Provider card. Based upon State and Federal Regulations, CA Title 22.

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This course is the co requisite for Advanced Paramedic (Paramedic II) and occurs in the skills lab or simulation lab. The student will practice and master skills that will allow the student to meet the clinical performance objectives of the program. Practice and competency testing is the focus of this course and will include physical assessment, care of the medical patient, special populations? needs, trauma management , communication with EMS base station and medical director, implementing safety precautions for hazardous materials exposure and manage the scene of an emergency.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Caroline, Nancy, *Emergency Care in the Streets*, (7th/e). Jones and Bartlett. (2013).  
Workbook  
Student Handouts

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Integrate pathophysiological principles and assessment findings to formulate a field impression in order to implement the treatment plan for the medical patient.
   2. Describe the standards and guidelines that help ensure safe and effective ground and air medical transport.
   3. Demonstrate the proper application of patient care skills relative to patient assessment findings.
   4. Demonstrate the requisite skills necessary for patient care within the paramedic scope of practice.

Student Learning Objectives:

All SLO's apply

A. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the medical patient.

B. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients.

C. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for patients with common complaints.

D. Safely manage the scene of an emergency.

E. Safely manage a hazardous materials scene.

F. Understand standards and guidelines that help ensure safe and effective ground and air medical transport.

G. Integrate the principles of general incident management and multiple casualty incident (MCI) management.

1. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * Text  
        Student workbooks  
        Instructor handouts
   3. Required Writing Assignments:
      * Patient treatment reports  
        Pharmacological medical parameter reports
   4. Learning Activities Required Outside of Class:
      * Reading texts  
        Reading handouts
   5. Assignments or Activities that Demonstrate Critical Thinking:

Integrate pathophysiological principles and assessment findings to formulate a field impression in order to implement the treatment plan for the medical patient. In given scenarios. perform patient assessments.  
In given scenarios, determine care for medical and trauma patients.  
Perform manipulative and technical skills required for paramedic scope of practice.  
Describe the standards and guidelines that help ensure safe and effective ground and air medical transport. In given scenarios. perform patient assessments.  
In given scenarios, determine care for medical and trauma patients.  
Perform manipulative and technical skills required for paramedic scope of practice.  
Demonstrate the proper application of patient care skills relative to patient assessment findings. In given scenarios. perform patient assessments.  
In given scenarios, determine care for medical and trauma patients.  
Perform manipulative and technical skills required for paramedic scope of practice.  
Demonstrate the requisite skills necessary for patient care within the paramedic scope of practice. In given scenarios. perform patient assessments.  
In given scenarios, determine care for medical and trauma patients.  
Perform manipulative and technical skills required for paramedic scope of practice.

* 1. Lab Content and scope:
     + 1. Formulate a field impression and implement the treatment plan for the patient with a gastroenterologic problem.
       2. Formulate a field impression and implement a treatment plan for the patient with a renal or urologic problem.
       3. Formulate a field impression and implement a treatment plan for the patient with a toxic exposure.
       4. Formulate a field impression and implement a treatment plan for a patient with a hematopoietic  condition.
       5. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the patient with an environmentally induced or exacerbated medical or traumatic condition.
       6. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement a management plan for the patient with infectious and communicable diseases.
       7. Describe and demonstrate safe, empathetic competence in caring for patients with behavioral emergencies.
       8. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the trauma patient with hemorrhage, shock, head injury, spinal cord injuries, and musculoskletal injuries.
       9. Utilize gynecological principles and assessment findings to formulate a field impression and implement the management plan for the patient experiencing a gynecological emergency.
       10. Understand the anatomy and physiology of the female reproductive system to the assessment and management of a patient experiencing normal or abnormal labor.
       11. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients
       12. Integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for patients with common complaints.
       13. Safely manage the scene of an emergency.
       14. Understand standards and guidelines that help ensure safe and effective ground and air medical transport.
       15. Integrate the principles of general incident management and multiple casualty incident (MCI) management

1. Methods of Instruction:

Integrate pathophysiological principles and assessment findings to formulate a field impression in order to implement the treatment plan for the medical patient. Demonstration  
Lecture  
Multi-media  
Observation and Demonstration  
Laboratory Practice of Skills  
Describe the standards and guidelines that help ensure safe and effective ground and air medical transport. Demonstration  
Lecture  
Multi-media  
Observation and Demonstration  
Laboratory Practice of Skills  
Demonstrate the proper application of patient care skills relative to patient assessment findings. Demonstration  
Lecture  
Multi-media  
Observation and Demonstration  
Laboratory Practice of Skills  
Demonstrate the requisite skills necessary for patient care within the paramedic scope of practice. Demonstration  
Lecture  
Multi-media  
Observation and Demonstration  
Laboratory Practice of Skills

1. Methods of Evaluation:

Integrate pathophysiological principles and assessment findings to formulate a field impression in order to implement the treatment plan for the medical patient. Class Participation  
Class Performance  
Exams/Tests  
Lab Activities  
Simulation  
Describe the standards and guidelines that help ensure safe and effective ground and air medical transport. Class Participation  
Class Performance  
Exams/Tests  
Lab Activities  
Simulation  
Demonstrate the proper application of patient care skills relative to patient assessment findings. Class Participation  
Class Performance  
Exams/Tests  
Lab Activities  
Simulation  
Demonstrate the requisite skills necessary for patient care within the paramedic scope of practice. Class Participation  
Class Performance  
Exams/Tests  
Lab Activities  
Simulation

1. COURSE CONTENT

**Appendix B (continued)**

**Merced College**

**Course Outline**

1. Course Number: EMER 30 and Title: Paramedic, Acute Clinical Lab
2. Units 3 Hours: Lecture (Weekly): 0 (Per Term): 0 Lab (Weekly): 0 (Per Term): 0 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 0

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to:

EMER 10   
Linked Student Learning Outcomes:

Assess in order to manage emergency patients.

Describe the roles and responsibilities of a Paramedic within an EMS system.

Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient.

Integrate pathophysiological principles and assessment findings to formulate a field impression.

Apply the basic concepts of development, pathophysiology and pharmacology.

EMER 11   
Linked Student Learning Outcomes:

Calculate dosages properly in order to administer medications.

Demonstrate the ability to successfully perform venipuncture and phlebotomy.

Evaluate patients by conducting a proper history and comprehensive physical exam.

Perform a physical assessment in order to manage emergency patients.

EMER 20   
Linked Student Learning Outcomes:

Relate pathophysiological principles and assessment findings in order to implement the treatment plan for the trauma patient with hemorrhage, shock, head injury, spinal cord injuries, and musculoskletal injuries.

Differentiate pathophysiological principles and assessment findings in order to implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients.

Compare the principles of general incident management and multiple casualty incident (MCI) management.

Define the components of safely managing the scene of an emergency.

EMER 21   
Linked Student Learning Outcomes:

Describe the standards and guidelines that help ensure safe and effective ground and air medical transport.

Demonstrate the proper application of patient care skills relative to patient assessment findings.

Demonstrate the requisite skills necessary for patient care within the paramedic scope of practice.

Integrate pathophysiological principles and assessment findings to formulate a field impression in order to implement the treatment plan for the medical patient.

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

Advisory Skills: Upon entering the course it is recommended that the student be able to:

ENGL 01A   
Linked Student Learning Outcomes:

Integrate the ideas of others through paraphrasing, summarizing, and quoting in appropriate documentation format.

Demonstrate proofreading and editing techniques so that written work conforms to the conventions of standard, written, academic English.

MATH 81   
Linked Student Learning Outcomes:

Evaluate problems involving real numbers and algebraic expressions.

Set up equations (linear, quadratic, and systems of equations) to solve application problems.

Limitation on Enrollment: Health Screening Clearance. Current NREMT certification maintained throughout course. Current BLS Health Care Provider card maintained throughout course. Live Scan Clearance. Based upon State and Federal Regulations, CA Title 22.

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This course occurs in the acute care hospital setting in a precepted format. It is the hands-on application of theory and skills in a hospital setting to a wide variety of sick and injured clients. This course is part of a program of study to prepare paramedics as described in California Code of Regulations, Title 22, Division 9, Chapter 4 and lists the required hours and subjects to be covered as set forth by the Department of Transportation curriculum.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Caroline, Nancy, *Emergency Care in the Streets*, (7th/e). Jones and Bartlett. (2013).  
Clinical manuals  
Student Workbook

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Summarize the findings of a thorough client examination including health history, appropriate inquiry and inspection pertinent to the client's chief complaint.
   2. Develop, in order to implement, an appropriate medical care plan for individual patient treatment.
   3. Assess accurate client history, chief complaint, medications, and allergies in a systematic and timely manner.
   4. Demonstrate the knowledge and skill necessary for the use of pharmacological intervention of the sick and injured client.

Student Learning Objectives:

All SLO's Apply

A. Perform a thorough client examination including health history, appropriate inquiry and inspection pertinent to the client's chief complaint.

B. Develop and implement an appropriate plan of action for client care.

C. Demonstrate basic level psychomotor skills in IV insertion, medication administration, and wound care.

D. Use universal precautions and wear appropriate personal protective equipment specific for any client interaction.

E. Recognize the need for and request additional assistance or equipment needed from the hospital staff in a timely manner.

F. Obtain a relevant and accurate client history, chief complaint, medications, and allergies in systematic and timely manner.

G. Identify breath sounds and have adequate knowledge of chest auscultation.

H. Identify cardiac rhythms in an accurate and timely manner.

I. Develop and implement an appropriate plan of action.

J. Build rapport with client, family and staff and function as a member of the client care team.

K. Complete client care documentation in an accurate, thorough, and legible manner adhering to hospital requirements.

L. Use all equipment in a safe and correct manner.

M. Assure the adequate delivery of oxygen to client, including use of appropriate airway adjunct and achieving or maintaining patency of airway in a timely manner.

N. Exhibit the knowledge and skill necessary for the use of pharmacological intervention of the sick and injured client.

O. Establish an intravenous infusion with proper technique and in a timely manner.

P. Demonstrate the respect for, and the dignity of, each individual in the practice of professional duties.

1. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * Text  
        Instructor JHandouts
   3. Required Writing Assignments:
      * Patient care assessments  
        Pharmacological worksheets
   4. Learning Activities Required Outside of Class:
      * Reading of materials and texts
   5. Assignments or Activities that Demonstrate Critical Thinking:

Summarize the findings of a thorough client examination including health history, appropriate inquiry and inspection pertinent to the client's chief complaint. Patient/client history and physicals with determination of acceptable clinical care within scope of practice.  
Develop, in order to implement, an appropriate medical care plan for individual patient treatment. Patient/client history and physicals with determination of acceptable clinical care within scope of practice.  
Assess accurate client history, chief complaint, medications, and allergies in a systematic and timely manner. Patient/client history and physicals with determination of acceptable clinical care within scope of practice.  
Demonstrate the knowledge and skill necessary for the use of pharmacological intervention of the sick and injured client. Patient/client history and physicals with determination of acceptable clinical care within scope of practice.

* 1. Lab Content and scope:

1. Methods of Instruction:

Summarize the findings of a thorough client examination including health history, appropriate inquiry and inspection pertinent to the client's chief complaint. Laboratory Practice of Skills  
Observation and Demonstration  
Directed Study  
Develop, in order to implement, an appropriate medical care plan for individual patient treatment. Laboratory Practice of Skills  
Observation and Demonstration  
Directed Study  
Assess accurate client history, chief complaint, medications, and allergies in a systematic and timely manner. Laboratory Practice of Skills  
Observation and Demonstration  
Directed Study  
Demonstrate the knowledge and skill necessary for the use of pharmacological intervention of the sick and injured client. Laboratory Practice of Skills  
Observation and Demonstration  
Directed Study

1. Methods of Evaluation:

Summarize the findings of a thorough client examination including health history, appropriate inquiry and inspection pertinent to the client's chief complaint. Evaluation of laboratory skill sets  
Lab Activities  
Portfolios  
Develop, in order to implement, an appropriate medical care plan for individual patient treatment. Evaluation of laboratory skill sets  
Lab Activities  
Portfolios  
Assess accurate client history, chief complaint, medications, and allergies in a systematic and timely manner. Evaluation of laboratory skill sets  
Lab Activities  
Portfolios  
Demonstrate the knowledge and skill necessary for the use of pharmacological intervention of the sick and injured client. Evaluation of laboratory skill sets  
Lab Activities  
Portfolios

1. COURSE CONTENT

Lecture is integrated with and contans the same content as TBA.  
Summarize the findings of a thorough client examination including health history, appropriate inquiry and inspection pertinent to the client's chief complaint.  
  
Develop, in order to implement, an appropriate medical care plan for individual patient treatment.  
  
Assess accurate client history, chief complaint, medications, and allergies in a systematic and timely manner.  
  
Demonstrate the knowledge and skill necessary for the use of pharmacological intervention of the sick and injured client.

**Appendix B (continued)**

**Merced College**

**Course Outline**

1. Course Number: EMER 31 and Title: Paramedic Field Experience
2. Units 9 Hours: Lecture (Weekly): 0 (Per Term): 0 Lab (Weekly): 0 (Per Term): 0 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 0

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to:

EMER 10   
Linked Student Learning Outcomes:

Assess in order to manage emergency patients.

Describe the roles and responsibilities of a Paramedic within an EMS system.

Demonstrate taking a proper history in order to perform a comprehensive physical exam on any patient.

Integrate pathophysiological principles and assessment findings to formulate a field impression.

Apply the basic concepts of development, pathophysiology and pharmacology.

EMER 11   
Linked Student Learning Outcomes:

Calculate dosages properly in order to administer medications.

Demonstrate the ability to successfully perform venipuncture and phlebotomy.

Evaluate patients by conducting a proper history and comprehensive physical exam.

Perform a physical assessment in order to manage emergency patients.

EMER 20   
Linked Student Learning Outcomes:

Relate pathophysiological principles and assessment findings in order to implement the treatment plan for the trauma patient with hemorrhage, shock, head injury, spinal cord injuries, and musculoskletal injuries.

Differentiate pathophysiological principles and assessment findings in order to implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients.

Compare the principles of general incident management and multiple casualty incident (MCI) management.

Define the components of safely managing the scene of an emergency.

EMER 21   
Linked Student Learning Outcomes:

Describe the standards and guidelines that help ensure safe and effective ground and air medical transport.

Demonstrate the proper application of patient care skills relative to patient assessment findings.

Demonstrate the requisite skills necessary for patient care within the paramedic scope of practice.

Integrate pathophysiological principles and assessment findings to formulate a field impression in order to implement the treatment plan for the medical patient.

1-Way Co-requisite Skills: During the course the student should acquire the ability to:

EMER 31   
Linked Student Learning Outcomes:

Perform appropriate and timely medical care in the emergency scene environment.

Assess traumatic patients in order to determine pathophysiology, assessment findings, need for rapid intervention and transport, and management of traumatic emergencies.

Assess medical patients in order to determine the pathophysiology, assessment findings, need for rapid intervention and transport, and management of medical emergencies.

Organize evaluative and medical care efforts and actions at emergency scenes.

2-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

Advisory Skills: Upon entering the course it is recommended that the student be able to:

ENGL 01A   
Linked Student Learning Outcomes:

Integrate the ideas of others through paraphrasing, summarizing, and quoting in appropriate documentation format.

Demonstrate proofreading and editing techniques so that written work conforms to the conventions of standard, written, academic English.

MATH 81   
Linked Student Learning Outcomes:

Evaluate problems involving real numbers and algebraic expressions.

Set up equations (linear, quadratic, and systems of equations) to solve application problems.

Limitation on Enrollment: Health Screening Clearance. Current NREMT certification maintained throughout course. Current BLS Health Care Provider card maintained throughout course. Live Scan Clearance. Based upon State and Federal Regulations, CA Title 22.

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This course is the final course in the paramedic series and occurs completely in the field under the direct supervision of a certified pre-arranged paramedic preceptor. It assists the student in developing and refining skills. A wide variety of client activities are taught, including: medical histories, physical examination, client management, triage, trauma care and supportive care of the sick or injured in a field setting. This course is part of a program of study to prepare paramedics as described in California Code of Regulations, Title 22, Division 9, Chapter 4 and lists the required hours and subjects to be covered as set forth by the Department of Transportation curriculum.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Caroline, Nancy, *Emergency Care in the Streets*, (7th/e). Jones and Bartlett. (2013).  
Student Workbook  
Instructor handouts  
On line publisher resources

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Assess medical patients in order to determine the pathophysiology, assessment findings, need for rapid intervention and transport, and management of medical emergencies.
   2. Assess traumatic patients in order to determine pathophysiology, assessment findings, need for rapid intervention and transport, and management of traumatic emergencies.
   3. Organize evaluative and medical care efforts and actions at emergency scenes.
   4. Perform appropriate and timely medical care in the emergency scene environment.

Student Learning Objectives:

All SLO's Apply

A. Discuss the pathophysiology, assessment findings, need for rapid intervention and transport, and management of medical emergencies.

B. Discuss the causative agent, body systems affected and potential secondary complications, routes of transmission, susceptibility and resistance, signs and symptoms, client management and protective measures for medical emergencies.

C. List the psychosocial implications that medical emergencies can have on a client and discuss ways to assess and properly intervene to produce positive client outcomes.

D. Compare and contrast the pathophysiological, assessment, and management strategies of clients with gynecological emergencies.

E. Evaluate the epidemiology, preventive strategies, pathophysiology, assessment findings and management of emergent neurological problems.

F. Distinguish between the signs and symptoms of emergent and non-emergent gastroenterological problems.

G. Diagram the pathophysiological principles of an infectious process. Given several scenarios of clients with pulmonary problems, formulate a detailed assessment, systematic care, and appropriate transport.

H. Given several scenarios involving endocrine emergency clients, plan for the appropriate management and care of the client.

I. Given several scenarios of poisoning and overdose, evaluate the clients and provide appropriate assessments, treatment and transport.

J. Given several scenarios, evaluate the clients and provide appropriate assessments, treatment and transport of clients involved in environmental emergencies.

1. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * Text  
        Medical care reports.
   3. Required Writing Assignments:
      * Patient care reports  
        Evaluation documents  
        Emergency scene synopsi  
        Documentation of performance- skills and assessment findings
   4. Learning Activities Required Outside of Class:
      * Skills enhancement and performance while being evaluated.
   5. Assignments or Activities that Demonstrate Critical Thinking:

Assess medical patients in order to determine the pathophysiology, assessment findings, need for rapid intervention and transport, and management of medical emergencies. Using learned assessment skills -determine appropriate treatment, destination selection, and transport modality for ill or injured victims.  
Using learned manipulative skills- perform appropriate treatment procedures for ill and injured victims.  
Assess traumatic patients in order to determine pathophysiology, assessment findings, need for rapid intervention and transport, and management of traumatic emergencies. Using learned assessment skills -determine appropriate treatment, destination selection, and transport modality for ill or injured victims.  
Using learned manipulative skills- perform appropriate treatment procedures for ill and injured victims.  
Organize evaluative and medical care efforts and actions at emergency scenes. Using learned assessment skills -determine appropriate treatment, destination selection, and transport modality for ill or injured victims.  
Using learned manipulative skills- perform appropriate treatment procedures for ill and injured victims.  
Perform appropriate and timely medical care in the emergency scene environment. Using learned assessment skills -determine appropriate treatment, destination selection, and transport modality for ill or injured victims.  
Using learned manipulative skills- perform appropriate treatment procedures for ill and injured victims.

* 1. Lab Content and scope:

1. Methods of Instruction:

Assess medical patients in order to determine the pathophysiology, assessment findings, need for rapid intervention and transport, and management of medical emergencies. Field Experience  
Observation and Demonstration  
Assess traumatic patients in order to determine pathophysiology, assessment findings, need for rapid intervention and transport, and management of traumatic emergencies. Field Experience  
Observation and Demonstration  
Organize evaluative and medical care efforts and actions at emergency scenes. Field Experience  
Observation and Demonstration  
Perform appropriate and timely medical care in the emergency scene environment. Field Experience  
Observation and Demonstration

1. Methods of Evaluation:

Assess medical patients in order to determine the pathophysiology, assessment findings, need for rapid intervention and transport, and management of medical emergencies. Class Performance  
Evaluation of laboratory skill sets  
Portfolios  
Assess traumatic patients in order to determine pathophysiology, assessment findings, need for rapid intervention and transport, and management of traumatic emergencies. Class Performance  
Evaluation of laboratory skill sets  
Portfolios  
Organize evaluative and medical care efforts and actions at emergency scenes. Class Performance  
Evaluation of laboratory skill sets  
Portfolios  
Perform appropriate and timely medical care in the emergency scene environment. Class Performance  
Evaluation of laboratory skill sets  
Portfolios

1. COURSE CONTENT

Lecture content is integrated with and contains the same content as TBA.

**Appendix C**

**Merced College**

**Course Outline**

1. Course Number: ELCT 31 and Title: Direct Current and Alternating Current Circuits
2. Units 5 Hours: Lecture (Weekly): 3 (Per Term): 0 Lab (Weekly): 6 (Per Term): 0 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 0

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to: NONE

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

Advisory Skills: Upon entering the course it is recommended that the student be able to:

ENGL 85 **and** ENGL 41   
Linked Student Learning Outcomes:

Vocabulary development to decipher author's meaning: 1. Analyze denotation and connotation 2. Identify figurative language 3. Analyze tone and bias 4. Identify different levels of diction

Reading Comprehension appropriate to college-level texts: 1. Identify and paraphrase main ideas, supporting details, and inferences within reading selections 2. Outline and map reading selections 3. Determine the author's purpose and audience 4. Anaiyze rhetorical forms for development 5. Analyze patterns of organization 6. Analyze the extended meaning of texts through word choice 7. Infer tone 8. Analyze point of view

College-level critical reading and thinking skills: 1. Recognize argument structures 2. Evaluate authority and claims in arguments 3. Recognize deductive and inductive reasoning 4. Recognize and evaluate fallacies 5. Examine language elements to decipher author's meaning 6. Apply critical reading and thinking skills to reading on the World Wide Web

MATH 80 or MATH 83   
Linked Student Learning Outcomes:

Simplify expressions including -m), -(-n), -n, and --n

Set up and solve word problems described by linear equations in one variable

Determine order relationships among integers using

Collect like terms in linear algebraic expressions

Give real world examples of the use of integers

Graph integers on a number line

Solve linear equations in one variable

Interpret and construct charts, graphs, and tables

Identify definitions for the vocabulary used to communicate the above ideas

Solve a variety of word problems requiring the above mentioned skills

Perform the above calculations with the aid of a scientific calculator

Use ratios and proportions as mathematical models for solving applied problems

Evaluate numerical and algebraic expressions involving more than one set of grouping symbols and operations

Perform addition, subtraction, multiplication, and division of signed numbers including fractions, decimals, and percents

Limitation on Enrollment: NONE

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This is a course in basic electronics/electricity theory that investigates the resistance, capacitance, inductance, and transformer action in direct and alternating current circuits. Network analysis of series, parallel, and series-parallel circuits is accomplished through basic circuit formuias according to Ohm's and Kirchhoff's laws, nodai anaiysis, loop equations, and by using Thevinen's, Norton's, and superposition theorems. The Principles of Magnetism, Electromagnetic Field and the behavior of reactive components as Inductors, Capacitors, (and Resistors) in AC circuits are also studied.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Meade, R., *Foundations of electronics*, (4th/e). Albany, NY Dlimar Publishers. (2003).  
Meade, R., *Foundations of electronics: Laboratory manual*, Albany, NY Delmar Publishers. (2003).  
Scientific calculator (TI-36 or equivalent)

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Interpret DC circuits from schematics diagrams and written descriptions
   2. Calculate resistance, current, voltage drops, and power in series and parallel circuits with a direct current power source
   3. Analyze circuits to determine electrical parameters using Ohm's law, Kirchhoff's current and voltage laws, and network theorems analysis
   4. Analyze loaded voltage dividers and Wheatstone bridge circuits
   5. Recognize schematic symbols
   6. Construct a DC circuit from a schematic
   7. Measure basic AC quantities including sine wave voltage
   8. Construct RL and RC circuits and calculate the time constant
   9. Construct RL, RC and RLC circuits and evaluate the circuits frequency responses
   10. Safely use power sources and various types of electronics equipment to provide power to a circuit and to test the circuit for proper operation
   11. Be familiar with electronics bench techniques and the use of computer-aided software for simulated circuit construction and virtual instrumentation
   12. Write test reports, analyze electrical data, and obtain electronics data from current literature including catalogs and magazine articles
   13. Read technical literature, specification sheets, and catalogs to obtain component information and to be able to ascertain circuit trends and methods used to develop circuits in the electronics industry

Student Learning Objectives:

1. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * 1) Weekly assignments will be given from the textbook and from the lab manual.  
        2) Data manuals, specification sheets, and parts catalogs as needed throughout  
        the course will be studied.
   3. Required Writing Assignments:
      * 1) Laboratory reports or assignments from lab activity manuals containing  
        numerous problems and questions requiring written answers will be assigned.  
        A special subject report related to direct current circuit electronics from current  
        literature, data sheets, and catalogs may be assigned.
   4. Learning Activities Required Outside of Class:
      * 1) Weekly reading assignments from the text and lab manual.  
        2) Extensive weekly homework assignments.  
        3) Evaluation of data, writing lab reports and subject matter reports.  
        4) Computer-aided instruction is to be used on student-owned computers or in  
        the computer labs to increase exposure to DC circuit theory.
   5. Assignments or Activities that Demonstrate Critical Thinking:

  The solving of weekly homework assignments which includes advanced theorems and circuit analysis.  
  The interpretation of data from experiments in order to draw conclusions and write Reiated reports.  
  Constructing electronic circuits and completing required circuit testing.

* 1. Lab Content and scope:
     + A. Ohm's Law Projects  
       Relationship of I and V with R constant  
       Relationship of I and R with V constant  
       Relationship of Power to V with R constant  
       Relationship of Power to I with R constant
     + B. Series Circuits Projects  
       Total Resistance in Series Circuits  
       Current in Series Circuits  
       Voltage Distribution in Series Circuits  
       Power Distribution in series Circuits  
       Effects of an Open in Series Circuits  
       Effects of a Short in Series Circuits
     + C. Parallel Circuits Projects  
       Equivalent Resistance in Parallel Circuits  
       Current in Parallel Circuits  
       Voltage in Parallel Circuits  
       Power Distribution in Parallel Circuits  
       Effects of an Open in Parallel Circuits  
       Effects of a Short in Parallel Circuits
     + D. Series-Parallel Circuits Projects  
       Total Resistance in Series-Parallel Circuits  
       Current in Series-Parallel Circuits  
       Voltage distribution in Series-Parallel Circuits  
       Power Distribution in Series-Parallel Circuits  
       Effects of an Open in Series-Parallel Circuits  
       Effects of a Short in Series-Parallel Circuits
     + E. Basic Network Theorems Projects  
       Thevenin's Theorem  
       Northon's Theorem  
       Maximum Power Transfer Theorem
     + F. Network Analysis Techniques Projects  
       Loop/Mesh Analysis  
       Nodal Analysis  
       Wye-Delta and Delta-Wye Conversions.
     + G. The Oscilloscope Projects  
       Basic Foundation: Familiarization  
       Basic Operation: Control Manipulation  
       Basic Operation: Vertical Controls and DC V  
       Voltage Measurements  
       Phase Comparisons  
       Determining Frequency
     + H. Inductance Projects  
       Total Inductance in Series and Parallel
     + I. Inductance Reactance in AC Projects  
       I. Induced Voltage  
       2. Relation ofXL to L and Frequency
     + J, RL Circuits in AC Projects  
       V, I, R, Z, and 0 Relationship in Series RL Circuit  
       V, I, R, Z, and 0 Relationship in Parallel RL Circuit
     + K. Basic Transformer Characteristics  
       hlrns. Voltage and Current ratios  
       Turns Ratio Versus Impedance ratios
     + L. Capacitance (DC Characteristics)  
       Charge and Discharge Action and RC Time  
       Total capacitance in Series and Parallel
     + M. Capacitive Reactance in AC Projects  
       Capacitance Opposing a Change in Voltage  
       XC Related to Capacitance and Frequency  
       XC Formula
     + N. RC Circuits in AC Projects  
       v. I, R, Z, and 0 Relationship in Series RC Circuit  
       V, I, R, Z, and 0 Relationship in Parallel RC Circuit
     + O. Series Resonance Projects  
       XL and XC Relationship with Frequency  
       V, I, R, Z, and 0 Relationship when XL =XC  
       Q and Voltage in a Series Resonant Circuit  
       Bandwidth related to Q
     + P. Parallel Resonance Projects  
       V, I, R, Z, and 0 Relationship when XL = XC  
       Q and Impedance in a Parallel Resonant Circuit  
       Bandwidth related to Q

1. Methods of Instruction:

  Lecture  
  Demonstration  
  Other - Media presentation equipment inciuding smartboard technology, LCD projection, VCR tapes and computer-generated presentations  
  Other - "Show and Tell" demonstrations  
  Other - Textbook, homework and reading assignments  
  Other - Field trips/Industry visitations  
  Other - Guest presenters  
  Other - Laboratory presentations and assignments

1. Methods of Evaluation:

Other - Skill and knowledge tests and quizzes based upon textbook material including problems from preViously assigned homework and material presented during lectures and laboratory periods.  
Other - Homework assignments, iaboratory and project reports.  
Other - Demonstration of special projects as assigned  
Other - Participation in laboratory assignments in cooperation with other students.  
Other - Completion of computer-aided software assignments.

1. COURSE CONTENT

A. Basic concepts of electricity  
1. Composition of matter, structure of the atom, and energies that affect electrical balance  
2. Conductors, semiconductors and insuiators  
3. Electrical potential, electrons in motion and opposition to electron fiow (resistance)  
B. Electricai quantities and components  
1. Eiectricai units: amperes, volts and ohms  
2. Resistors as components  
3. Resistor color code  
4. Component symbois and electrical/electronic schematics, wiring and block diagrams  
5. Units of measurement  
6. Scientific notation, engineering notation and metric prefixes  
C. Ohm's law and power formulas  
1. Ohm's law and the reiationships between electrical quantities  
2. Direction of current fiow, polarity and voltage  
3. Work, energy and power  
4. Mathematical development of the PIRE wheel  
D. Series circuits  
1. Series circuit characteristics  
2. Resistance, current and voltage in series circuits  
3. Kirchhoff's voltage law in series circuits  
4. Power in series circuits  
5. Troubleshooting series circuits: opens and shorts  
6. Using power supplies and test equipment in series circuits  
E. Parallel circuits  
1. Parallel circuit characteristics  
2. Resistance, current and voltage in parallel circuits  
3. Methods for calculating total resistance in parallel circuits  
4. Kirchhoff's current law in parallel circuits  
5. Power in parallel circuits  
6. Troubleshooting parallel circuits: opens and shorts  
7. Using power supplies and test equipment in parallel circuits  
F. Series-Parallel circuits  
1. Series-Parallel circuit characteristics  
2. Resistance, current and voltage in series-parallel circuits  
3. Kirchhoff's voltage and current laws in series-parallel circuits  
4. Power in series-parallel circuits  
5. Troubleshooting series-parallel circuits: opens and shorts  
6. Using power supplies and test equipment in series-parallel circuits  
7. Loaded voitage dividers  
8. Wheatstone bridge circuits  
G. Network theorems and network analysis  
1. Maximum power transfer theorem  
2. Superposition Theorem  
3. Thevenin's Theorem  
4. Norton's Theorem  
5. Complex circuit analysis using loops or mesh current techniques  
H. Producing electricity and using transducers/sensors for measurement  
1. Cells and batteries  
2. Electromagnetic devices  
3. Photoelectric devices  
4. Thermal devices  
I. Electrical measurement instruments   
1. DC permanent magnet moving coil instruments  
2. Analog ammeters, voltmeters and ohmmeters  
3. Digital multimeter  
J. Magnetism and electromagnetism  
1. Laws, rules and terms concerning magnetism  
2. Elements of electromagnetism  
3. Magnetic units, terms, symbols and formulas  
4. Induction  
K. Basic AC quantities  
1. The sine wave and its generation  
2. Waveform period, frequency (rate of change) and amplitude  
3. Phase relationships of mUltiple sine waves  
4. AC in resistive circuits and relationships to Ohm's law  
5. Periodic waveforms  
6. Peak, peak-to-peak, RMS, and average values of sinusoidal waveforms  
L. Understanding and using the oscilloscope  
1. Types and usage of oscilloscopes  
2. Construction of the typical oscilloscope  
3. Measuring current and voltage on the oscilloscope  
4. Horizontal and vertical aspects of signals  
5. Phase comparisons on the oscilloscope  
6. Measuring frequency with the oscilloscope  
M. Vector algebra  
1. Graphical addition of instantaneous values of sine waves  
2. Vector representation and addition by graphical methods  
3. Polar coordinates of a vector  
4. Rectangular coordinates of a vector  
5. Addition, subtraction, multiplication, and division of vectors using rectangular and polar  
coordinates  
N. Inductance  
1. Electromagnetic induction and Lenz's Law  
2. Self-inductance and equations to determine inductance  
3. Rise and fall of DC current in inductive circuits  
4. L/R Time constants  
5. Energy stored in an inductor  
6. Inductors as components and circuit symbols  
7. Inductors in series and parallel circuits  
8. Inductive reactance  
O. RL relationships in DC and AC circuits  
1. RL relationships in DC circuits  
2. Resistance, reactance and impedance in RL circuits  
3. Basic AC circuit analysis techniques of RL circuits  
4. Analysis of series and parallel RL circuits  
P. Transformer characteristics  
1. Mutual inductance and transformer action  
2. Coefficient of coupling  
3. Coil and inductor mutual inductance  
4. Transformer ratios  
5. Matching, step-up, and step-down transformers  
6. Single phase, two-phase and three-phase transformers  
Q. Capacitance  
1. Electrostatic fields  
2. Dielectrics and dielectric strength and insulators  
3. Definition, description and factors affecting capacitance  
4. Charging and discharging capacitors  
5. RC time constants and the rise and fall of DC current in capacitive circuits  
6. Capacitor types, symbois and identification of capacitors  
7. Capacitors in series and parallel circuits  
8. Capacitive reactance  
R. RC relationships in DC and AC circuits  
1. RC reiationships in DC circuits  
2. Resistance, reactance and impedance in RC circuits  
3. Basic AC circuit anaiysis techniques of RC circuits  
4. Analysis of series and parallel RC circuits  
S. RLC circuits and vector analysis  
1. Basic RLC circuit analysis  
2. Resistance, reactance and impedance in RLC circuits  
3. RLC analysis in series and parallel circuits  
4. Power in RLC circuits  
T. Resonance  
1. Relationships between XL, Xc. and frequency  
2. Resonant characteristics of series and parallel RLC circuits  
3. Q of resonant circuits  
4. Coupled loads  
5. Selectivity. band-pass and bandwidth of a tuned circuit  
6. Applications of resonant and non-resonant circuits  
U. Circuit simulation and virtual instrumentation using computer software  
1. Construct simulated circuits using CAl software  
2. Test simulated circuits using virtual instrumentation  
3. Complete data sheets concerning circuit operation and characteristics  
v. Recording laboratory data and reporting electronics information  
1. Write reports on assigned projects  
2. Write technical reports on laboratory assignments  
3. Write a technicallinformational report on a current electronics subject related to course  
material  
4. Obtain informational data from trade literature. catalogs. data sheets and other forms of  
literature to further circuit knowledge and component actions in a circuit

**Appendix C (continued)**

**Merced College**

**Course Outline**

1. Course Number: ELCT 32 and Title: Semiconductors & Integrated Circuits
2. Units 5 Hours: Lecture (Weekly): 2 (Per Term): 0 Lab (Weekly): 9 (Per Term): 0 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 0

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to:

ELCT 31   
Linked Student Learning Outcomes:

Analyze circuits to determine electrical parameters using Ohm's law, Kirchhoff's current and voltage laws, and network theorems analysis

Calculate resistance, current, voltage drops, and power in series and parallel circuits with a direct current power source

Analyze loaded voltage dividers and Wheatstone bridge circuits

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

Advisory Skills: Upon entering the course it is recommended that the student be able to:

ENGL 85, MATH 80 or MATH 83   
Linked Student Learning Outcomes:

Simplify expressions including -m), -(-n), -n, and --n

Set up and solve word problems described by linear equations in one variable

Determine order relationships among integers using

Collect like terms in linear algebraic expressions

Give real world examples of the use of integers

Graph integers on a number line

Solve linear equations in one variable

Interpret and construct charts, graphs, and tables

Perform the above calculations with the aid of a scientific calculator

Use ratios and proportions as mathematical models for solving applied problems

Evaluate numerical and algebraic expressions involving more than one set of grouping symbols and operations

Solve practical problems requiring the solution ofa given algebraic formula for one unknown

Perform addition, subtraction, multiplication, and division of signed numbers including fractions, decimals, and percents

Limitation on Enrollment: NONE

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This course introduces students to fundamentals of semiconductor devices and analog integrated circuits. The course covers circuit analysis of diodes, BJTs, FETs, MOSFETs transistors, with emphasis in their practical applications as rectifiers, single and multiple stages amplifiers, osciilators and power amplifiers. Integrated circuits as operational amplifiers, timers, instrumentation amplifiers, active filters, digital-to-analog (ADC) and analog-to-digital (DAC) converters are also covered. Laboratory activities equip students with real job skiils in the utilization of various electronic test equipment during circuit construction and troubleshooting.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Cox, J., *Fundamentals of Linear Electronics: Integrated and Discrete*, Albany, NY Delmar Publishers. (2002).  
Scientific calculator (TI-36 or equivalent)

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Analyze the output voltage waveform in the construction of clampers. clipper and voltage multiplier circuits.
   2. Calculate the electrical parameters. voltage dropped and the current flow through a zener diode regulator using Ohm's and Kirchhoffs laws
   3. Examine the effect of capacitors and inductors used in analog power supply
   4. Construct and determine electrical parameters for voltage divider biased amplifier with bipolar transistor.
   5. Calculate Voltage/Current and Power Gain for Single or Multistage Amplifier circuits
   6. Measure the frequency response for RL. RC active filters
   7. Construct and test MOSFET transistors Switching Amplifier
   8. Set up a astable circuit with the 555 Timer
   9. Construct and Test Non-inverting and Inverting Operational Amplifiers
   10. Analyze electronic circuit with SCR (Silicon Control Rectifier)
   11. Differentiate between analog and switching power supplies
   12. Differentiate between the 555 integrated circuit used as a timer or as a multivibrator
   13. Write test reports. using supporting electronics data obtained from the Web. current literature including catalogs and magazine articles

Student Learning Objectives:

1. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * a. Weekly assignments will be given from the textbook and from the lab manual.  
        b. Glossary. Specific Terminology/Definitions of Laws and Theorems as needed throughout the  
        course will be used and studied.
   3. Required Writing Assignments:
      * a. Laboratory reports or assignments from lab activity manuals containing numerous problems  
        and questions requiring written answers will be assigned.  
        b. A special subject report related to advanced circuits or solid-state electronics from current  
        literature. data sheets. and catalogs may be assigned.
   4. Learning Activities Required Outside of Class:
      * a. Weekly reading assignments from the text and lab manual.  
        b. Evaluation of data. writing lab reports and subject matter reports.
   5. Assignments or Activities that Demonstrate Critical Thinking:

The interpretation of data from experiments in order to draw conclusions and write required reports.

* 1. Lab Content and scope:
     + 1. Diodes: Clippers, Clampers and Half-wave and Full Wave Rectifier Circuits
     + 2. Zener Diode Voltage Regulator and LED Circuits
     + 3. Transistor Switch and Transistor Amplifier
     + 4. Voltage Divider and Multistage Amplifier
     + 5. JFET Amplifiers
     + 6. MOSFET Amplifier and Switching Circuits
     + 7. Basic Op-Amp Circuits
     + 8. Op-Amp Limitations
     + g. The Inverting and Noninverting Op-Ampllfiers
     + 10. Sound Activated SWitching System
     + 11. Active RC Filters
     + 12. Sine Waves Oscillators
     + 13. Periodic Waveforms Oscillators
     + 14. Differential Amplifier and PLL (Phase-Locked Loop)
     + 15. Power Amplifiers
     + 16. TRIAC Phase Control
     + 17. Switching Regulators
     + 18. ADC and DAC Converters
     + 19. Optical Sensors and Optolsolators
     + 20. Fan Control System

1. Methods of Instruction:

  Lecture  
  Demonstration  
  Other - Presentation equipment including interactive white board technology  
  Other - LCD projector, power point software  
  Other - "Show and Tell" demonstrations  
  Other - Field trips/Industry visitations  
  Other - Guest presenters  
  Other - Laboratory experiments demo presentations

1. Methods of Evaluation:

Other - Skill and knowledge tests and quizzes based upon textbook material including problems from previously assigned homework and material presented during lectures and laboratory periods.  
Other - Homework assignments and laboratory.  
Other - Demonstration of special projects as assigned.  
Other - Participation in laboratory assignments in cooperation with other students.  
Other - Completion of computer-aided software assignments.  
Other - Class participation and collaboration

1. COURSE CONTENT

1. Semiconductor theory - the PN junction  
a. Review of atomic structure  
b. N/P-type of materials, the PN junction  
2. Diodes - high vacuum, selenium, germanium and silicon  
a. Characteristic curves of diodes  
b. Diode applications: clamper, clipper, multipliers, displays  
3. Special-application diodes  
a. Varactor diodes and applications  
b. Transient suppressors and constant-current diodes  
c. Special Diodes  
4. DC power suppiies  
a. Haif and full wave rectification  
b. Inductive and capacitive Filters  
5. Bipolar junction transistors  
a. Basic configurations: common-emitter, common-base and common-collector amplifiers  
b. Characteristics of Class A, Band C amplifiers  
c. Transistor frequency response and cutoff frequency(s)  
d. Signal to noise radio and Gain-Bandwidth product  
7. Field effect transistors  
a. JFET transistors  
b. JFET Amplifiers  
b. MOSFET transistors  
d. MOSFET Amplifiers and Switching Circuits  
8. Thyrislors and special devices  
a. Silicon control rectifiers (SCR's)  
b. Unijunction transistors (UJT's)  
c. Programmable unijunction transistors (PUT's)  
d. TRIAC's and DIAC's  
e. Three-terminal voltage regulators (IC's)  
f. Opto-electronic devices  
g. Integrated Circuits/Operational amplifiers  
a. Characteristics and specifications of operational amplifiers  
b. Op-Amp voltage-level detectors and comparators  
c. Inverting and non-inverting amplifiers  
d. Mathematical operations with operational amplifiers and linear integrated circuits  
e. Testing and measuring with operational amplifiers  
f. Instrumentation amplifiers  
g. Active filter circuits  
h. Pulse fundamentals (Types and characteristics of various waveforms)  
i. Operational amplifiers used in switching circuits  
j. Integrated circuit timer circuits  
k. Astable and monostable circuits with 555 IC (timer)  
I. Digital-to-analog (D/A) and analog-to-digital (AID) conversion

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**Appendix C (continued)**

**Merced College**

**Course Outline**

1. Course Number: ELCT 34 and Title: Digital Logic Circuits & Systems
2. Units 3 Hours: Lecture (Weekly): 2 (Per Term): 0 Lab (Weekly): 3 (Per Term): 0 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 0

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to: NONE

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

Advisory Skills: Upon entering the course it is recommended that the student be able to:

ENGL 85, MATH 80 or MATH 83   
Linked Student Learning Outcomes:

Simplify expressions including -m), -(-n), -n, and --n

Set up and solve word problems described by linear equations in one variable

Determine order relationships among integers using

Collect like terms in linear algebraic expressions

Give real world examples of the use of integers

Graph integers on a number line

Solve linear equations in one variable

Interpret and construct charts, graphs, and tables

Perform the above calculations with the aid of a scientific calculator

Use ratios and proportions as mathematical models for solving applied problems

Evaluate numerical and algebraic expressions involving more than one set of grouping symbols and operations

Solve practical problems requiring the solution ofa given algebraic formula for one unknown

Perform addition, subtraction, multiplication, and division of signed numbers including fractions, decimals, and percents

Limitation on Enrollment: NONE

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This course covers the theory of digital logic circuits and systems. Analog and digital conversion circuits, number systems and codes, Boolean algebra, Karnaugh maps, logic gates, counters, multlvibrators, registers, decoders, counters, memories, and clock and timing circuits, are also studied. Programmable logic devices, microprocessors will be introduced.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Roger Tokheim, *Digital Electronics. Principles and Applications*, (6th/e). Glencoe McGraw Hill. (2004).  
Roger Tokheim, *Experiments Manual*, (6th/e). Glencoe McGraw Hill. (2004).  
Scientific calculator able to work with binary. octal and hexadecimal numbers

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Evaluate binary-, octal-, and hexadecimal-based number systems,
   2. Construct digital logic circuits from schematic diagrams
   3. Analyze TTL and CMOS integrated circuit devices and their use in digital circuits
   4. Examine digital circuits on digital trainers
   5. Measure digital circuit inputs/outputs with digital test equipment, digital voltmeters and the oscilloscope
   6. Test output conditions of digital logic circuits with LED's and/or 7-segment display devices
   7. Analyze and construct D flip-flop , J-K flip-flop, ripple counter and shift register circuits on digital trainers
   8. Properly and safely use power sources and various types of electronics equipment to provide power to various circuits and test these circuits for proper operation
   9. Write test reports, analyze electrical data, and obtain electronics data from the Web and current literature, including catalogs and magazine articles

Student Learning Objectives:

1. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * 1. Weekly assignments will be given from the textbook and from the lab manual.  
        2. Data manuals, specification sheets, and parts catalogs as needed throughout the course will be  
        studied.
   3. Required Writing Assignments:
      * 1. Laboratory reports or assignments from lab activity manuals containing numerous problems and  
        questions requiring written answers will be assigned.  
        2. A special subject report related to advanced circuits or solid state electronics from current  
        literature, data sheets, and catalogs may be assigned.
   4. Learning Activities Required Outside of Class:
      * 1. Weekly reading assignments from the text and lab manual.  
        2. Extensive weekly homework assignments.  
        3. Evaluation of data from laboratory manual assignments, writing lab reports and 4. subject matter  
        reports.  
        4. Computer-aided instruction is to be used on student-owned computers or in the computer labs to  
        increase exposure to digital theory.
   5. Assignments or Activities that Demonstrate Critical Thinking:

  Develop and analyze truth tables.  
  Solve Boolean equations, and then simplify them through the use of De Morgan's Theorem, Boolean algebra and Karnaugh mapping.  
  Construct and analyze combinational and sequential logic circuits.  
  Demonstrate troubleshooting skills needed to debug digital circuits when they fail to operate

* 1. Lab Content and scope:
     + 1. Clock Circuit  
       One-Shot Multivibrator
     + 2. Using an Encoder/Decoder  
       Using a CMOS Binary Counter
     + 3. Logic Gates  
       - AND, OR and Inverter Gates  
       - NAND< NOR< XOR< and XNOR Gates  
       - Converting gates to Other Logic Functions
     + 4. Combining Logic Gates  
       - Developing a Logic Circuit  
       - Simplifying Logic Circuits  
       - Data Selector
     + 5. IC Specifications and Simple Interfacing  
       - Interfacing Switches with TTL  
       - Interfacing TTL and CMOS ICs  
       - Interfacing CMOS with Buzzers, Relays, and Motors  
       - Using an Optoisolator In Interfacing
     + 6. Encoding, Decoding and Seven-Segment Displays  
       - Encoding, Decoding and Seven-Segment Displays  
       - Seven-Segment LED Display  
       - Driving the LCD Display  
       - Troubleshooting Decoder/Display Circuit
     + 7. Flip-Flops  
       - R-S Flip-Flops  
       - 0 Flip-Flops  
       - J-K Flip-Flops  
       - The Schmit! Trigger  
       - Latched Encoder-Decoder Using CMOS/LCD
     + 8. Counters  
       - Ripple Counters  
       - TTL IC Synchronous Up/Down Counters  
       - Cascading Counters  
       - Using Counters for Frequency Division  
       - CMOS IC Counters  
       - An Optical Encoder Driving Counter
     + 9. Shift Registers  
       - Serial-Load Shift Register  
       - Parallel-Load Shift Register  
       - The Universal Shift Register  
       - ACMOS 8-Bit Shift Register
     + 10. Arithmetic Circuits  
       - Half and Full Adders  
       - 3-Bit Parallel Adder  
       - Using the 7483 TTL IC Adder  
       - 2s Complement Adder/Substractor  
       - Troubleshooting Full-Adder/Substractor Circuits
     + 11. Memories  
       - Random-Access Memory  
       - Read-Only Memory
     + 12. Digital Systems  
       - Microcomputer Memory Address Decoding  
       - Data Transmission System  
       - Adder/Substractor System  
       - Multiplexed Displays
     + 13. Connecting with Analog Devices  
       - Voltage Gain of an Operational Amplifier  
       - D/A Convertor  
       - Using the CMOS ADC0804 AID Converter IC

1. Methods of Instruction:

  Lecture  
  Demonstration  
  Other - Media presentation equipment including VCR tapes and computer-generated visuals  
  Other - "Show and Tell" demonstrations  
  Other - Textbook, homework and reading assignments  
  Other - Field trlpslindustry visitations  
  Other - Guest presenters  
  Other - Laboratory presentations and assignments

1. Methods of Evaluation:

Other - Skill and knowledge tests and quizzes based upon textbook material including problems from previously assigned homework and material presented during lectures and laboratory periods.  
Other - Homework assignments, laboratory and project reports.  
Other - Demonstration of special projects as assigned.  
Other - Participation in laboratory assignments in cooperation with other students.

1. COURSE CONTENT

A. Test equipment familiarizatiDn  
1. The use Df puise and functiDn generatDrs fDr c1Dcking and gating signals  
2. The use Df dual trace, X-V functiDn and delayed sweep Df wide band width DsciliDscDpes  
3. Use Df IDgic probes, pulsers and current tracers in digital troubleshDDting  
B. Number systems  
1. Binary-, Dctal-, and hexadecimal-based number systems  
2. Types and uses Df binary cDdes  
3. Binary arithmetic Dperations  
4. One's and twD's cDmplement arithmetic  
C. Characteristics Df TIL and CMOS IDgic devices  
1. Use Df data sheets tD Dbtain specificatiDns and pin diagrams  
2. Verify truth tabies fDr NAND, NOR, AND, OR, XNOR, XOR and NOT (inverter) gates  
3. Determine propagatiDn delay and rise/fall times  
D. CombinatiDnallDgic  
1. BDDlean theDrems, interpretatiDn and usage  
2. Circuit equivaiency  
E. ProtDtyping  
1. LDgical iayDut and cDnstructiDn Df digitai circuits  
2. Debugging digital systems  
3. Use Df the 555 timer as a pulse SDurce  
4. Use Df analDg and digital multiplexers  
F. Displays  
1. Lamps and lamp driver circuits  
2. Display multiplexing  
3. ReadDuts  
G. Latches and flip-flDps  
1. RS latch  
2. D latch and nip-flDps  
3. J-K flip-fiDp  
4. T flip-fiDp  
H. CDunters  
1. Ripple and synchronDus types  
2. CIDck and timing circuits  
3. Multi-vibratDrs (fIip-fIDps)  
4. Schmitt triggers  
I. Pulse SDurces and shapers  
1. The 555 timer  
2. The 74121 mDnDstable multivibratDr  
3. The 74122 mDnDstable multivibratDr  
J. Shift registers and CDunters  
1. Shift register  
2. Ring cDunter  
3. JDhnsDn cDunter  
M. LabDratDry and project repDrts  
1. Write repDrts Dn assigned projects  
2. Write technical repDrts Dn labDratDry assignments  
3. Write a technical/infDrmatiDnal repDrt Dn a current electronics subject related tD CDurse material  
4. RecDrd circuit and cDmpDnent infDrmatiDn in labDratDry nDtebDDks  
5. Obtain infDrmatiDnal data from trade literature, catalDgs, data sheets and Dther fDrms Df literature tD further  
circuit knDwledge and cDmpDnent actiDns in a circuit

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**Appendix C (continued)**

**Merced College**

**Course Outline**

1. Course Number: ELCT 35 and Title: Microcontrollers, Programming, & Interfacing w/ Robotics Applica
2. Units 4 Hours: Lecture (Weekly): 2 (Per Term): 0 Lab (Weekly): 6 (Per Term): 0 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 0

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to:

ELCT 34   
Linked Student Learning Outcomes:

Test output conditions of digital logic circuits with LED's and/or 7-segment display devices

Write test reports, analyze electrical data, and obtain electronics data from the Web and current literature, including catalogs and magazine articles

Analyze TTL and CMOS integrated circuit devices and their use in digital circuits

Evaluate binary-, octal-, and hexadecimal-based number systems,

Construct digital logic circuits from schematic diagrams

Measure digital circuit inputs/outputs with digital test equipment, digital voltmeters and the oscilloscope

Examine digital circuits on digital trainers

Properly and safely use power sources and various types of electronics equipment to provide power to various circuits and test these circuits for proper operation

Analyze and construct D flip-flop , J-K flip-flop, ripple counter and shift register circuits on digital trainers

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

Advisory Skills: Upon entering the course it is recommended that the student be able to:

ENGL 85 or ENGL 41   
Linked Student Learning Outcomes:

Vocabulary development to decipher author's meaning: 1. Analyze denotation and connotation 2. Identify figurative language 3. Analyze tone and bias 4. Identify different levels of diction

Reading Comprehension appropriate to college-level texts: 1. Identify and paraphrase main ideas, supporting details, and inferences within reading selections 2. Outline and map reading selections 3. Determine the author's purpose and audience 4. Anaiyze rhetorical forms for development 5. Analyze patterns of organization 6. Analyze the extended meaning of texts through word choice 7. Infer tone 8. Analyze point of view

College-level critical reading and thinking skills: 1. Recognize argument structures 2. Evaluate authority and claims in arguments 3. Recognize deductive and inductive reasoning 4. Recognize and evaluate fallacies 5. Examine language elements to decipher author's meaning 6. Apply critical reading and thinking skills to reading on the World Wide Web

Limitation on Enrollment: NONE

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This course covers basic principles of constructing and programming 8-bit Programmable Intelligent Computer (PICmicro) microcontrollers found in computerized systems with emphasis in robotics applications. Characteristics, capabilities, and limitations of other microcontrollers are discussed. RISC (Reduced Instructions Set Computing), hardware structure, programming language and interfacing methods are also covered.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

PIC Microcontrollers. - by Nebojsa Matic, Mikroelektronika 2006 (on-line Free)  
Programming PIC Microcontrollers in BASIC by Nebojsa Matic-  
Mikroelektronika 2006 (on-line Free)  
Development System for PIC16F8X Families. - Mikroelektronika  
Robotics with the Boe-Bot by Andy Lindsay - Ver 2.2, Parallax 2005  
Boe-Bot Robot Trainer - Parallax  
Scientific Calculator (TI-36 or equivalent suggested)

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Choose the requirements of a typical microcontroller system
   2. Differentiate between Harvard versus von Neuman Block Architectures
   3. Understand basic microcontrollers hardware: a. Binary-, Octal-, and Hexadecimal-based number systems, b. Input/Output signals and Serial Communication c. Identify basic Digital Logic and basic Analog Devices from schematic diagrams d. 0 flip-flop, J-K flip-flop, ripple counter, and shift register used in digital systems e. Displaying digital signals on LCD and LED 7 Segment Displays f. Analyze and construct circuits on digital trainers from schematic diagrams
   4. Compare the architectures of a commonly used 16F84 and Basic Stamp microcontrollers
   5. Create a flow chart programming diagram application for the 16F84 microcontroller
   6. Analyze and write a program for Boe-Bot Robot In one of the following programming languages: "Flow Code", "PBASIC" or "Assembly"
   7. Appraise hardware and software needs for a specific application
   8. Construct interfacing circuits necessary for various PICmicro controlled Robots

Student Learning Objectives:

1. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * 1. Weekly assignments from the textbook  
        2. Industrial related the students for special topics would utilize magazines and  
        publications.
   3. Required Writing Assignments:
      * 1. The students will develop flow charts and write machine and assembly language  
        programs.  
        2. The students will read reports and articles to prepare papers on special topics as  
        assigned by the Instructor.
   4. Learning Activities Required Outside of Class:
      * The students will develop programs for different applications as assigned.
   5. Assignments or Activities that Demonstrate Critical Thinking:

The students will evaluate and analyze word problems to develop flow charts and produce written computer programs.

* 1. Lab Content and scope:
     + Supplying the Microcontroller 16F84
     + Programming and controlling LED Diodes
     + Programming with Push Buttons
     + Programming on an optocoupler on an input line
     + Programming on an output line
     + Connecting a Relay to a microcontroller via Transistor
     + Programming the Optocoupler and the Relay connected to the microcontroller
     + Programming the microcontroller to generate sound
     + Input Shift Register 74HC597
     + Output Shift Register 74HC595
     + Connecting a Seven Segment Display in Multiplex Mode
     + The 16 X 2 line Hitachi HD44780 Display
     + Programming the LCD Display
     + Serial Communication - Send Text via RS232
     + Boe-Bot Robot- Navigation
     + Boe-Bot Robot - Tactile Navigation
     + Boe-Bot Robot - Light Sensitive Navigation with Photoresistors
     + Boe-Bot Robor - Navigating with Infrared Headlights

1. Methods of Instruction:

  Lecture  
  Demonstration  
  Other - Multi-media presentation equipment including LCD projectors and smart boards  
  Other - "Show and Tell" demonstrations  
  Other - Laboratory presentations and assignments  
  Other - Textbook, homework and reading assignments  
  Other - Field tripsllndustry visitations  
  Other - Guest presenters

1. Methods of Evaluation:

Other - Skill and knowledge tests and quizzes based upon textbook material including problems from previously assigned homework and material presented during lectures and laboratory periods.  
Other - Homework assignments, laboratory and project reports  
Other - Demonstration of special projects as assigned  
Other - Participation in laboratory assignments in cooperation with other students.

1. COURSE CONTENT

A. Introduction to microcontrollers  
1. Memory Unit  
2. Central Process Unit  
3. Bus  
4. Input-Output Unit  
5. Serial Communication  
6. Timer Unit  
7. Watchdog  
8. Analog-to-Digital Converter  
B. Microcontroller PIC 16F84  
1. Introduction: CPU, CISC, RISC, Pin Description  
2. Clock Generator, RC Oscillator  
3. Central Processing Unit  
4. Ports  
5. Memory Organization  
6. Interrupts  
7. EEPROM Data Memory  
C. Assembly Language Programming  
1. Introduction  
2. Representing Numbers in Assembly  
3. Assembly Language Elements  
4. Control Directives:  
a. #DEFINE, INCLUDE, CONSTAN, VARIABLE  
b. SET, EQU, ORG, END, IF, ELSE, ENDIF, WHILE, ENDW  
c. IFDEF, IFNDEF, CBLOCK, ENDC,  
d. DB, DE, DT, \_CONFIG, PROCESSOR  
D. MPLAB Program  
I. Installing the Program - MPLAB  
2. Designing a Project  
3. Crating an Assembler File  
4. Writing a Program  
5. MPSIM Simulator  
E. Macros and Subprograms  
1. Macros  
2. SUbprograms  
3. Macros Used in Examples  
F. Boe-Bot Hardware and Software  
1. Installing the Software  
2. Setting up the Hardware and Testing the System  
3. First Program,. Intro to ASCII Code  
G. The Boe-Bot Servo Motors  
1. How to Track Time and Repeat Actions  
2. Connecting the Servo Motor  
3. How to Store Values  
F. Other Single-chip microprocessors:  
1. Microcontroller families  
2. The 8051 family  
3. Architecture and programming model of the 8051  
4. Imbedded microcontrollers

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**Appendix C (continued)**

**Merced College**

**Course Outline**

1. Course Number: ELCT 42A and Title: Principles & Applications of Programmable Logic Controllers
2. Units 2 Hours: Lecture (Weekly): 1 (Per Term): 0 Lab (Weekly): 3 (Per Term): 0 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 0

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to: NONE

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

Advisory Skills: Upon entering the course it is recommended that the student be able to:

ELCT 41   
Linked Student Learning Outcomes:

Construct motor control circuits following a RLL Line Diagram

Inspect and maintain industrial equipment and motor control configurations which may include sensors and devices

Analyze electrical relay-ladder-logic (RLL) control circuits and diagnose problems

Assess equipment and motor control requirements currently found in industry with electronics principl

Interpret an industrial motor control circuit with Relay Ladder Logic(RLL) line diagrams

ENGL 81   
Linked Student Learning Outcomes:

Apply strategies to determine and increase vocabulary 1. Examine and apply word parts 2. Analyze context clues 3. Identify transitional words and phrases

Comprehend reading selections at an 11th grade level 1. Locate and assess stated main ideas (topic sentences) 2. Formulate and compose unstated (implied) main ideas 3. Distinguish between major and minor details 4. Evaluate inferences with increased proficiency 5. Recognize and apply transitional words and phrases 6. Identify organizational patterns

Apply study skills to reading materials 1. Examine and apply a study system 2. Create outlines and maps for reading selections

Apply critical reading skills to 11th grade textbooks   
1. Evaluate fact and opinion   
2. Analyze author's purpose   
3. Recognize bias and tone   
4. Identify arguments   
5. Analyze creative and critical thinking

ENGL 84   
Limitation on Enrollment: NONE

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This course provides electrical and industrial electronic students with basic skills and technical exposure to programmable logic controllers (PLC s). The subjects studied include terminology, programming methods, and operation of the programmable logic controller. The students will program and operate modern PLCs as a part of laboratory assignments.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Frank D. Petruzella, *Programmable Logic Controllers*, McGraw Hill. (2005).  
USB Flash Memory Stick (64MB or Larger)  
GE Fanuc Logic Master Series 90 Lab Exercises Manual, PLC -Training GE, Wille Electric  
Scientific type calculator  
Scientific calculator (TI-36 or equivalent)

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Identify and describe the basic hardware for micro sized Programmable Logic Controllers
   2. Examine number systems and codes used in Programmable Logic Controllers
   3. Analyze binary concepts and Booiean aigebra used in Programmable Logic Controllers
   4. Create simple programs for a Programmable Logic Controller using basic Ladder Logic programming concepts
   5. Differentiate between relay ladder schematics and ladder logic programs
   6. Distinguish between "On-Delay" and Off-Delay Timer Instruction
   7. Create an "Up-Counter" or "Down-Counter" within a Ladder Logic program
   8. Identify the use of and be able to apply controi and sequencer instructions in developing a useful Programmable Logic Controiler program
   9. Demonstrate methods for proper instailation and preventive maintenance of Programmabie Logic Controilers
   10. Inspect and determine the location of faults in a Programmable Logic Controilers
   11. Examine the operation of transducers used in conjunction with Programmable Logic Controilers
   12. Explain the function of the major components of a process control

Student Learning Objectives:

1. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * 1) Weekly assignments wiil be given from the textbook and from the GE Lab Exercise Manual.  
        2) Data manuals and specification sheets wiil be studied as needed throughout the course.
   3. Required Writing Assignments:
      * 1) Laboratory reports or assignments from lab activity manual containing numerous problems and  
        questions requiring written answers will be assigned.  
        2) Select technical parameters related to advanced circuits or solid state electronics  
        from current literature, data sheets, and catalogs.
   4. Learning Activities Required Outside of Class:
      * 1) Weekly reading assignments from the text and lab manual.  
        2) Extensive weekly homework assignments.  
        3) Evaluation of data and writing of lab reports.
   5. Assignments or Activities that Demonstrate Critical Thinking:

  The solving of weekly homework assignments from the textbook.  
  The interpretation of data from experiments in order to draw conclusions and write the required reports.

* 1. Lab Content and scope:
     + A. PLC Basic Instructions
     + B. Timers
     + C. Counters
     + D. Data Move Instructions
     + E. Comparison Instructions
     + F. Sub-routines Instructions
     + G. Sub-routines Instructions
     + H. Jump Instructions
     + I. Label and MCR Instructions
     + J. Advanced Data Move Instructions
     + K. Sequencers
     + L. Shift Registers
     + M. Math Instructions
     + N. Data Move, Comparison
     + O. Data Conversion

1. Methods of Instruction:

  Lecture  
  Demonstration  
  Other - Media presentation equipment Computer-generated PPP, slide presentations and including VCR tapes  
  Other - "Show and Tell" Laboratory demonstrations  
  Other - Field trips/lndustry visitations  
  Other - Guest presenters

1. Methods of Evaluation:

Other - Skill and knowledge tests and quizzes based upon textbook material including problems from previously assigned homework and material presented during lectures and laboratory periods.  
Other - Homework assignments from the text book and laboratory project exercises.  
Other - Demonstration of special projects as assigned.  
Other - Participation in laboratory assignments in cooperation with other students.

1. COURSE CONTENT

1. Programmable logic Controllers (PLCc): Overview   
a. Parts of a PLC  
b. Principles of Operation  
c. PLC Size and Application  
Identify and describe the basic hardware for micro sized Programmable Logic Controllers  
2. PLC Hardware Components   
a. The I/O Section, Analog and Special Modules  
b. The CPU  
c. Memory and Programming Devices  
Examine number systems and codes used in Programmable Logic Controllers  
3. Number Systems and Codes   
a. Decimal, Binary and Octal Numbering Systems  
b. The BCD and Gray Code  
Examine number systems and codes used in Programmable Logic Controllers  
Analyze binary concepts and Booiean aigebra used in Programmable Logic Controllers  
4. Fundamentals of Logic   
a. The Binary Concept, AND, OR and NOT Functions  
b. Boolean Algebra  
c. Developing Circuits from Boolean Expressions  
d. Programming World-Levei Logic Instructions  
Create simple programs for a Programmable Logic Controller using basic Ladder Logic programming concepts  
Differentiate between relay ladder schematics and ladder logic programs  
5. Basic of PLC Programming   
a. PLC Programming Languages  
b. Relay-Type Instructions  
c. Instruction Addressing  
d. Entering the Ladder Diagram  
Create simple programs for a Programmable Logic Controller using basic Ladder Logic programming concepts  
6. Developing Fundamental PLC Wiring Diagrams and Ladder Logic Programs   
a. Electromagnetic Control Relay  
b. Motor Starters  
c. Transducers and Sensors  
d. Converting Relay Schematics into PLC Programs  
Create simple programs for a Programmable Logic Controller using basic Ladder Logic programming concepts  
Examine the operation of transducers used in conjunction with Programmable Logic Controilers  
7. Programming Timers  
a. Mechanical Timing Relay  
b. Timer Instructions  
c. On-Delay and Off-Delay Timer Instruction  
Distinguish between "On-Delay" and Off-Delay Timer Instruction  
8. Programming Counters  
a. Counter Instructions  
b. Up-Counter and Down-Counter  
c. Combining Counter and Timer Functions  
Create an "Up-Counter" or "Down-Counter" within a Ladder Logic program  
9. Program Control Instructions  
a. Master Control Reset Instruction  
b. Jump Instructions and Subroutines  
c. Data Manipulation Program  
Identify the use of and be able to apply controi and sequencer instructions in developing a useful Programmable Logic Controiler program  
Demonstrate methods for proper instailation and preventive maintenance of Programmabie Logic Controilers  
10. Data Manipulation Instructions  
a. Data Transfer Operations  
b. Data Compare Instructions  
c. numerical Data I/O Interfaces  
Demonstrate methods for proper instailation and preventive maintenance of Programmabie Logic Controilers  
Inspect and determine the location of faults in a Programmable Logic Controilers  
11. Math Instructions  
a. Basic Math Instructions  
b. File Arithmetic Operations  
Analyze binary concepts and Booiean aigebra used in Programmable Logic Controllers  
12. Sequencer and Shift Register Instructions  
a. Mechanical Sequencer  
b. Sequencer Instructions and Programs  
c. Shift Registers  
Identify the use of and be able to apply controi and sequencer instructions in developing a useful Programmable Logic Controiler program  
13. Basic Process Control and data Acquisition Systems  
a. Types of Processes  
b. Structure of Control Systems  
Explain the function of the major components of a process control

**Appendix C (continued)**

**Merced College**

**Course Outline**

1. Course Number: ELCT 42B and Title: Advanced Topics in Plc Programming (applications of Electronics
2. Units 2 Hours: Lecture (Weekly): 1 (Per Term): 0 Lab (Weekly): 3 (Per Term): 0 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 0

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to: NONE

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

Advisory Skills: Upon entering the course it is recommended that the student be able to:

ELCT 42A   
Linked Student Learning Outcomes:

Examine number systems and codes used in Programmable Logic Controllers

Demonstrate methods for proper instailation and preventive maintenance of Programmabie Logic Controilers

Examine the operation of transducers used in conjunction with Programmable Logic Controilers

Identify and describe the basic hardware for micro sized Programmable Logic Controllers

Identify the use of and be able to apply controi and sequencer instructions in developing a useful Programmable Logic Controiler program

Create an "Up-Counter" or "Down-Counter" within a Ladder Logic program

Distinguish between "On-Delay" and Off-Delay Timer Instruction

Analyze binary concepts and Booiean aigebra used in Programmable Logic Controllers

Differentiate between relay ladder schematics and ladder logic programs

Create simple programs for a Programmable Logic Controller using basic Ladder Logic programming concepts

Inspect and determine the location of faults in a Programmable Logic Controilers

Limitation on Enrollment: NONE

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This course provides exposure to advanced industrial Programmable Logic Controllers (PLC). The course is addressed to electrical and industrial electronic students interested in understanding and programming Allen Bradley types of PLC. The subjects studied include terminology, hardware configuration, programming methods, and operation of modern programmable logic controller. The students will learn how to set up a PLC and develop various industry-like programs as a part of laboratory assignments.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Frank D. Petruzella, *Programmable Logic Controllers*, McGraw Hill. (2006).  
Marty McKensley, *Allen Bradley PLC Lab Exercises*, Wille Electric. (2006).  
Allen Bradley MicroLogix Series PLC Trainer  
USB Flash Memory Stick (64MB or Larger)  
Scientific calculator (TI-36 or equivalent)

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Examine the basic hardware configuration and operation of an advanced industrial Programmable Logic Controller (PLC)
   2. Differentiate between Timers, Counters, Shift Registers
   3. Create programs using ladder logic (programming language) for PLC
   4. Set up a PLC system following technical specifications
   5. Select and install appropriate input transducers and signal conditioning for a variety of industry-like applications
   6. Examine and correct electrical noise and grounding problems associated with PLC systems
   7. Analyze and explain possible problems caused by voltage variations and surges, leaky inputs and outputs, and internal programmer failure
   8. Experiment control and sequencer instructions in developing a useful PLC program
   9. Inspect and determine the location of faults in a Programmable Logic Controllers
   10. Identify and describe typical applications of a modern Programmable Logic Controllers
   11. Write reports on assigned projects concerning PLC's and related subjects

Student Learning Objectives:

1. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * 1) Weekly assignments will be given from the textbook and from the Allen Bradley Lab Exercise Manual.  
        2) Data manuals and specification sheets will be studied as needed throughout the course.
   3. Required Writing Assignments:
      * 1) Laboratory reports or assignments from lab activity manual containing numerous problems and  
        questions requiring written answers will be assigned.  
        2) A special subject report related to advanced PLC configuration or solid state electronics  
        from current literature, data sheets, and Internet resources may be assigned.
   4. Learning Activities Required Outside of Class:
      * 1) The solving of weekly homework assignments from the textbook and Lab Manual.  
        2) The interpretation of data from experiments in order to draw conclusions and  
        develop written reports.
   5. Assignments or Activities that Demonstrate Critical Thinking:
   6. Lab Content and scope:
      * A. PLC Basic Logic Instructions
      * B. Timers
      * C. Counters
      * D. Data Move and Comparison Instructions
      * E. Sub-routines, Jump, Label and MeR Instructions
      * F. Advanced Data Move Instructions
      * G. Sequencers
      * H. Shift Registers
      * I. Math Instructions
      * J. Data Move, Comparison
      * K. Data Conversion
      * L. Laboratory and project reports  
        • Record and organize technical information in laboratory notebooks  
        • Obtain technical data from the Internet, trade literature, catalogs  
        to further knowledge of industrial components and equipment
2. Methods of Instruction:

  Lecture  
  Demonstration  
  Other - Media presentation equipment Computer-generated PPP, slide presentations and including VCR tapes  
  Other - "Show and Tell" Laboratory demonstrations  
  Other - Textbook, homework and reading assignments  
  Field Trips  
  Other - Industry visitations  
  Visiting Lecturers

1. Methods of Evaluation:

Other - Skill and knowledge tests and quizzes based upon textbook material including problems from previously assigned homework and material presented during lectures and laboratory periods.  
Other - Homework assignments from the text book and laboratory project exercises.  
Other - Demonstration of special projects as assigned.  
Other - Participation in laboratory assignments in cooperation with other students.

1. COURSE CONTENT

A Hardware and components  
Examine the basic hardware configuration and operation of an advanced industrial Programmable Logic Controller (PLC)  
Set up a PLC system following technical specifications  
Select and install appropriate input transducers and signal conditioning for a variety of industry-like applications  
B. Number systems and codes  
Create programs using ladder logic (programming language) for PLC  
C. Fundamentals of controlling programmable  
Logic controllers, Basic Logic Instructions  
Examine the basic hardware configuration and operation of an advanced industrial Programmable Logic Controller (PLC)  
Examine and correct electrical noise and grounding problems associated with PLC systems  
Analyze and explain possible problems caused by voltage variations and surges, leaky inputs and outputs, and internal programmer failure  
D. Basic concepts of Programming a PLC in Ladder Logic,  
800lean Language and Function Chart  
Examine the basic hardware configuration and operation of an advanced industrial Programmable Logic Controller (PLC)  
Create programs using ladder logic (programming language) for PLC  
E. Wiring diagrams and ladder programs  
Create programs using ladder logic (programming language) for PLC  
Set up a PLC system following technical specifications  
F. Programming timers and counters  
Select and install appropriate input transducers and signal conditioning for a variety of industry-like applications  
Examine and correct electrical noise and grounding problems associated with PLC systems  
Analyze and explain possible problems caused by voltage variations and surges, leaky inputs and outputs, and internal programmer failure  
G. Program control instructions  
Differentiate between Timers, Counters, Shift Registers  
Create programs using ladder logic (programming language) for PLC  
H. Data manipulation and math instructions,  
Data Move, Comparison and Conversion  
Differentiate between Timers, Counters, Shift Registers  
Create programs using ladder logic (programming language) for PLC  
I. Fault diagnosis and correction  
Examine and correct electrical noise and grounding problems associated with PLC systems  
Analyze and explain possible problems caused by voltage variations and surges, leaky inputs and outputs, and internal programmer failure  
Inspect and determine the location of faults in a Programmable Logic Controllers  
J. Transducer operation and signal conditioning  
Select and install appropriate input transducers and signal conditioning for a variety of industry-like applications  
K. System installation, maintenance, and operation  
Examine the basic hardware configuration and operation of an advanced industrial Programmable Logic Controller (PLC)  
Set up a PLC system following technical specifications  
L. Laboratory and project reports  
Record and organize technical information in laboratory notebooks  
Obtain technical data from the Internet, trade literature, catalogs  
to further knowledge of industrial components and equipment

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**Appendix C (continued)**

**Merced College**

**Course Outline**

1. Course Number: ELCT 56 and Title: Introduction to Mechatronics
2. Units 4 Hours: Lecture (Weekly): 2 (Per Term): 36 Lab (Weekly): 6 (Per Term): 108 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 144

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to:

ELCT 31   
Linked Student Learning Outcomes:

Read technical literature, specification sheets, and catalogs to obtain component information and to be able to ascertain circuit trends and methods used to develop circuits in the electronics industry

Interpret DC circuits from schematics diagrams and written descriptions

Recognize schematic symbols

Analyze circuits to determine electrical parameters using Ohm's law, Kirchhoff's current and voltage laws, and network theorems analysis

Construct RL, RC and RLC circuits and evaluate the circuits frequency responses

Be familiar with electronics bench techniques and the use of computer-aided software for simulated circuit construction and virtual instrumentation

Calculate resistance, current, voltage drops, and power in series and parallel circuits with a direct current power source

Construct a DC circuit from a schematic

ELCT 42A   
Linked Student Learning Outcomes:

Select proper programming instructions in order to develop a PLC program from a written description.

Analyze a circuit diagram with logic gate functions (NOT, AND, OR, NAND, NOR, XOR and XNOR) in order to create an equivalent ladder logic PLC program.

Examine complex PLC application programs in order to develop software troubleshooting skills.

Inspect various hardware components of a micro size Allen Bradley Programmable Logic Controller (PLC) for proper operation.

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

Advisory Skills: Upon entering the course it is recommended that the student be able to:

ELCT 42B   
Linked Student Learning Outcomes:

Examine the basic hardware configuration and operation of an advanced industrial Programmable Logic Controller (PLC)

Identify and describe typical applications of a modern Programmable Logic Controllers

Differentiate between Timers, Counters, Shift Registers

Set up a PLC system following technical specifications

Select and install appropriate input transducers and signal conditioning for a variety of industry-like applications

Limitation on Enrollment: NONE

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This course introduces students to mechatronics, the rapidly developing field that integrates mechanical, electronic and software engineering in the service of advanced manufacturing. Students will develop an interdisciplinary and integrated approach to design, manufacturing and troubleshooting mechatronics systems. Students will learn how various components such as electronic sensors, electro-pneumatic valves, actuators, motors, and robotic arms work, and how they can be integrated with other mechanical components into complex automated systems. OSHA safety training and certification will be included. Hands-on experience in building and programming a variety of mechatronics projects that simulate real-life industrial automated systems will be provided in laboratory activities.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Ebel F. at al., *Festo Learning Systems Automation Technology*, Festo Didactic GmbH & Co. (2008).  
Huttner A. et al., *Festo Learning MecLab*, Festo Didactic GmbH & Co. (2008).  
Schellmann B. et al., *Festo Process Automation Workbook*, Festo Didactic GmbH & Co. (2009).  
Sun Equipment Corporation. 5. Compact Mechatronic Load System ? User?s Guide and Experiments, CML-61600. Sun Equipment Corporation , 03-15-2010.  
OSHA Regulations pertaining to automated systems (http://www.osha.gov/SLTC/robotics/index.html)

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.
   2. Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.
   3. Construct mechatronics projects using industrial electropneumatic components and programming software.
   4. Set up a production line with MecLab mechatronics trainers to develop familiarity with problem solving strategies: from identifying faults to evaluating solutions.

Student Learning Objectives:

Applies to all SLOs.

A. Differentiate various industrial components (valves, actuators, distributors, sensors, relays and switches), their function and symbolic notation, and apply this knowledge to interpret schematic diagrams of mechatronics systems.

B. Program and simulate a virtual modular control system containing basic industrial electropneumatic components using FluidSIM graphical programming and simulation software.

C. Select appropriate industrial electropneumatic components (e.g. valves and actuating elements, proximity sensors, actuating double-acting cylinders) and assemble them into a variety of applications (e.g. stacking magazine, conveyor, handling industry) while observing pertinent OSHA safety regulations.

D. Evaluate and troubleshoot a training production line composed of a conveyor, stacking station and a handling station and demonstrate ability to apply problem solving strategies in identifying malfunctions and generating solutions to resolve them.

1. Course Content and Scope:
   1. Course Content, in outline form (attach on separate sheet)
   2. Required Readings:
      * 1. Weekly assignments will be given from the textbooks, lab manuals and from the FluidSIM software e-learning modules.  
        2. Data manuals, specification sheets, and parts catalogs as needed throughout the course will be studied.
   3. Required Writing Assignments:
      * 1. Practice problems and answer sheets requiring written solutions will be assigned regularly.  
        2. Practical laboratory activities, software simulation exercises, construction and troubleshooting will be assigned at each session.
   4. Learning Activities Required Outside of Class:
      * None, except reading and writing assignments detailed above.
   5. Assignments or Activities that Demonstrate Critical Thinking:

Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram. End of chapter review questions and problems will be assigned after each lecture and laboratory activities.  
Set up a mechatronics project as per the schematic diagram and use FluidSIM to run the application program in order to identify and correct errors.   
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software. End of chapter review questions and problems will be assigned after each lecture and laboratory activities.  
Set up a mechatronics project as per the schematic diagram and use FluidSIM to run the application program in order to identify and correct errors.   
Construct mechatronics projects using industrial electropneumatic components and programming software. End of chapter review questions and problems will be assigned after each lecture and laboratory activities.  
Set up a mechatronics project as per the schematic diagram and use FluidSIM to run the application program in order to identify and correct errors.   
Set up a production line with MecLab mechatronics trainers to develop familiarity with problem solving strategies: from identifying faults to evaluating solutions. End of chapter review questions and problems will be assigned after each lecture and laboratory activities.  
Set up a mechatronics project as per the schematic diagram and use FluidSIM to run the application program in order to identify and correct errors.

* 1. Lab Content and scope:
     + Electrical and electronics components, power supplies and instruments.
     + Introduction to Festo Fluid SIM simulation software.
     + FluidSIM virtual pneumatic and electronic components and  diagrams.
     + Introduction to Festo MecLab training Stations.
     + Valves, Actuators, Sensors familiarization, symbols and applications.
     + MecLab Stack Magazine Station parts identification, assembly and desasembly.
     + Programming and testing the MecLab Stack Magazine Station.
     + MecLab Conveyor Station parts identification, assembly and dessasembly.
     + Programming and running the MecLab Conveyor Station.
     + MecLab Handling Station parts identification, assembly and dessasembly.
     + Programming and running the MecLab Handling Station.
     + PICO Programmable Logic Controllers (PLCs)
     + Introduction to Siemens PICO Programmable Logic Controller configuration and programming with FluidSIM software.

Introduction to Allen Bradley Micro800 Programmable Logic Controller configuration and "Function Block" programming.

* + - Festo EduKit PA components identification and functions.
    - Introduction to EduKit Level, Flow and Pressure Controls.
    - Coupling the MecLab Stations to simulate a production line.

1. Methods of Instruction:

Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram. Lecture  
Class Discussion  
Laboratory Practice of Skills  
Multi-media  
Observation and Demonstration  
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software. Lecture  
Class Discussion  
Laboratory Practice of Skills  
Multi-media  
Observation and Demonstration  
Construct mechatronics projects using industrial electropneumatic components and programming software. Lecture  
Class Discussion  
Laboratory Practice of Skills  
Set up a production line with MecLab mechatronics trainers to develop familiarity with problem solving strategies: from identifying faults to evaluating solutions. Lecture  
Class Discussion  
Laboratory Practice of Skills  
Observation and Demonstration

1. Methods of Evaluation:

Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram. Class Participation  
Class Work  
Lab Activities  
Simulation  
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software. Class Participation  
Class Work  
Lab Activities  
Simulation  
Construct mechatronics projects using industrial electropneumatic components and programming software. Class Participation  
Class Work  
Lab Activities  
Simulation  
Set up a production line with MecLab mechatronics trainers to develop familiarity with problem solving strategies: from identifying faults to evaluating solutions. Class Participation  
Class Work  
Lab Activities  
Simulation

1. COURSE CONTENT

Automation Technology as an Engineering Science.  
- Key development milestones in the history of automation technology  
- Effects of automation on people  
OSHA Safety Regulations in Industrial Automation  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Electrical Engineering Basics.  
- How do engineers work  
- Technical Drawings, parts lists, circuit diagrams, calculations and simulation  
Fundamentals of Electrical Engineering  
- Direct Current, Alternating Current  
- Electrical and electronics components and applications  
- Function and structure of power supplies units  
Measurements in electrical circuits  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.  
Intro to MecLab FluidSIM (MLFS)  
- FluidSIM software requirements and installation  
- Introduction to Simulating and Creating Circuits  
- FluidSIM basic functions  
- FluidSIM special functions  
- Developing GRAFCET diagrams  
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.  
Construct mechatronics projects using industrial electropneumatic components and programming software.  
FluidSIM Virtual Components.  
- FluidSIM Menus.  
- Pneumatic Components functions and symbols  
- Pneumatic Components diagrams and applications  
- Electrical and Digital Components (American Standard)  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.  
Construct mechatronics projects using industrial electropneumatic components and programming software.  
Introductory to MecLab and Logic Control Systems.  
- MecLab learning system overview  
- Basic Boolean operations  
- Logic Control systems with memory functions (standard function block)  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.  
Valves, Actuators and Sensors  
- Single and Double Acting Cylinders  
- One Way Flow Control Valve  
- 3/2 and 4/2 Way Valves  
- 4/2-Way Solenoid Valve  
- Retro Reflective Sensor and applications  
- Diffuse Sensors and applications  
- Inductive Sensors and applications  
- Types of Mechanical Grippers and their working principles  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.  
Construct mechatronics projects using industrial electropneumatic components and programming software.  
Programmable Logic Controllers (PLCs)..  
- Introductory to PICO (Siemens) PLC  
- Introductory to Micro800 (Allen Bradley) PLC  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.  
Construct mechatronics projects using industrial electropneumatic components and programming software.  
Festo MecLab Stack Magazine Station.  
- Introduction to Stack Magazine Station  
- Stack Magazine Station's components anf thair functions  
- The sequences of a production process  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Construct mechatronics projects using industrial electropneumatic components and programming software.  
Set up a production line with MecLab mechatronics trainers to develop familiarity with problem solving strategies: from identifying faults to evaluating solutions.  
Stack Magazine Station Operation.  
- Stack Magazine Station's 4/2-way and 3/2-way solenoid valves symbols and operations   
- Create electrical circuit diagrams with FluidSIM  
- Create pneumatic circuit diagrams with FluidSIM  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.  
Construct mechatronics projects using industrial electropneumatic components and programming software.  
Festo MecLab Conveyor Station.  
- Conveyors used in industries  
- Conveyor Station's components and their functions  
- The sequence of a production process  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.  
Construct mechatronics projects using industrial electropneumatic components and programming software.  
Conveyor Station Operation.  
- Create a conveyor application circuit diagram with FluidSIM simulation software for a PICO (Siemens) PLC  
- Create a conveyor application circuit diagram for the Allen Bradley Micro800 PLC  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.  
Construct mechatronics projects using industrial electropneumatic components and programming software.  
Set up a production line with MecLab mechatronics trainers to develop familiarity with problem solving strategies: from identifying faults to evaluating solutions.  
Festo MecLab Handling Station.  
- Introduction to Festo MecLab Handling Station  
- Handling Station's components  
- The function of electro-pneumatic circuits  
- The sequence of production process  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.  
Construct mechatronics projects using industrial electropneumatic components and programming software.  
Handling Station Operation.  
- Initial considerations  
- Analysis of the flow control valves, sensors and actuators  
- Create circuit diagrams and programming using FluidSIM  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.  
Construct mechatronics projects using industrial electropneumatic components and programming software.  
Set up a production line with MecLab mechatronics trainers to develop familiarity with problem solving strategies: from identifying faults to evaluating solutions.  
Industrial Production Line.  
- Production Line elements  
- Coupling the MecLab Stations to create a production line system  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Construct mechatronics projects using industrial electropneumatic components and programming software.  
Set up a production line with MecLab mechatronics trainers to develop familiarity with problem solving strategies: from identifying faults to evaluating solutions.  
Festo EduKit PA (Process Automation) Basic.  
- Introduction to Process Automation  
- Introduction to manual measurements  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Construct mechatronics projects using industrial electropneumatic components and programming software.  
Intro to Festo EduKit PA (Process Automation) Basic.  
- Introduction to Closed-Loop Control  
- Level Control  
- Flow Control  
- Pressure Control  
Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.   
Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.  
Construct mechatronics projects using industrial electropneumatic components and programming software.

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**Appendix C (continued)**

**Merced College**

**Course Outline**

1. Course Number: ELCT 57 and Title: Advanced Topics in Mechatronics/Automated Systems
2. Units 5 Hours: Lecture (Weekly): 3 (Per Term): 54 Lab (Weekly): 6 (Per Term): 108 Counseling and Non-Credit (Weekly): 0 (Per Term): 0

Number of "in the classroom" hours: 162

1. ENTRANCE SKILLS:

Prerequisite: Before entering the course the student should be able to:

ELCT 32   
Linked Student Learning Outcomes:

Differentiate between semiconductor diodes, transistors, and integrated operational amplifiers in order to analyze an electronic circuit diagram containing these components.

Assemble an electronic circuit containing semiconductor components and integrated circuits according to a given schematic circuit diagram.

Measure electrical parameters in a given electronic circuit with semiconductor devices using electronic testing equipment.

ELCT 42B   
Linked Student Learning Outcomes:

Examine various hardware components of an Allen-Bradley (AB) SLC-500 Programmable Logic Controller (PLC) in order to set up a functional control system.

Analyze the PLC hardware configuration and the Ladder Logic application program in order to identify and troubleshoot faulty components and/or programming errors.

Select proper instructions from the AB- RSLogix 500 programming software ?Instruction Palate? in order to create a PLC program.

Describe the AB-SLC 500 ?Processor Files? structure.

ELCT 56   
Linked Student Learning Outcomes:

Differentiate between various industrial electro-pneumatic components of an automated Mechatronics project diagram.

Set up a production line with MecLab mechatronics trainers to develop familiarity with problem solving strategies: from identifying faults to evaluating solutions.

Construct mechatronics projects using industrial electropneumatic components and programming software.

Design virtual modular control systems using FluidSIM, specialized mechatronics/automation software.

1-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

2-Way Co-requisite Skills: During the course the student should acquire the ability to: NONE

Advisory Skills: Upon entering the course it is recommended that the student be able to: NONE

Limitation on Enrollment: NONE

Recency and Other Measures of Readiness: NONE

1. Catalog Description:

This course introduces students to advanced mechatronics systems that integrate complex mechanical, electronic, pneumatics and PLC programming software applications. Students will develop an interdisciplinary and integrated approach to design, manufacturing and troubleshooting mechatronics systems. Students will learn how various components such as electronic sensors, electro-pneumatic valves, actuators, motors, and robotic arms work, and how they can be integrated with other mechanical components into complex automated systems. OSHA safety training and certification will be included. Hands-on experience in building and programming a variety of mechatronics projects that simulate real-life industrial automated systems will be provided through laboratory activities.

1. Typical Text(s), Author/Edition, Publication Date(s) and Supplies

Sun Equipment Corporation, *Comprehensive Mechatronics Control System*, Ontario, CA Sun Equipment Corporation. (2009).  
SMC International Training. 1. Industrial Process Control IPC-200 ?User Manual? . SMC International Training , 08-01-2010.  
SMC International Training. 2. Industrial Process Control IPC-200 ?Practical Activities Manual?. SMC International Training , 08-01-2010.

1. Student Learning Outcomes: Upon successful completion of the course, the student should be able to verbally or in writing:
   1. Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.
   2. Prepare an Industrial Process Control System in order to create a PID (Proportional-Integral-Derivative) experiment.
   3. Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application.
   4. Set up the industrial process control "Filing Station? trainer in order to create an application program and run the experiment.
   5. Test a complex mechatronics system in order to identify faulted mechanical, electronic, and electro-pneumatic components.

Student Learning Objectives:

1. Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.
2. Inspect the conveyor belt mechanism of the CMW-61300?s comprehensive mechatronics trainer in order to identify its main components as stepper motors, photo-electric sensors, reluctive/inductive proximity sensors, AC solenoids and explain the components functions.
3. Prepare an Industrial Process Control System in order to create a PID (Proportional-Integral-Derivative) experiment.
4. Analyze the functions of the IPC-200 ?Production Plant Station? with analog control (SCADA- Supervisory Control And Data Acquisition), identifying the manipulations performed in the plant and the elements used to perform these operations.
5. Evaluate a Production Plant Station?s digital control functions, in order to determine the manipulations performed by the elements involved in a process control application.
6. Assess which solenoid valves, buttons/switches, lights and other safety devices are involved in controlling the fluid flow (distilled water) in one of the three ?Deposit? Tanks of the Production Station trainer.
7. Set up the industrial process control "Filing Station? trainer in order to create an application program and run the experiment.
8. Create a PLC (Programmable Logic Controller) ?Ladder-Logic? diagram that monitors the detection of a container and the filling fluid level using the IPC-200 ?Filling Station? trainer.
9. Test a complex mechatronics system in order to identify faulted mechanical, electronic and electro pneumatic components.
10. Set up and run one of the IPC-200 mechatronics automated process control trainers in order to evaluate its functions, identify possible faulty components, programming bugs, and to develop familiarity with problem solving strategies.
11. Course Content and Scope:
    1. Course Content, in outline form (attach on separate sheet)
    2. Required Readings:
       * 1. Weekly assignments will be given from the textbooks, lab manuals and from the E-learning modules, software.  
         2. Data manuals, specification sheets, as needed throughout the course will be studied.
    3. Required Writing Assignments:
       * 1. Practice problems and answer sheets requiring written solutions will be assigned regularly.  
         2. Practical laboratory activities, software simulation exercises, disassembly/assembly/tune-ups of mechanical, electrical, electro-pneumatic components and/or troubleshooting exercises will be assigned at each session.
    4. Learning Activities Required Outside of Class:
       * Reading from textbook and handouts provided tot he students.  
         Homework Assignments
    5. Assignments or Activities that Demonstrate Critical Thinking:

Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer. End of chapter review questions and practice problems will be assigned after each lecture.   
Constructing and troubleshooting mechatronics projects and applications of electropneumatic components.   
Prepare an Industrial Process Control System in order to create a PID (Proportional-Integral-Derivative) experiment. End of chapter review questions and practice problems will be assigned after each lecture.   
Constructing and troubleshooting mechatronics projects and applications of electropneumatic components.   
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application. End of chapter review questions and practice problems will be assigned after each lecture.   
Constructing and troubleshooting mechatronics projects and applications of electropneumatic components.   
Set up the industrial process control "Filing Station? trainer in order to create an application program and run the experiment. End of chapter review questions and practice problems will be assigned after each lecture.   
Constructing and troubleshooting mechatronics projects and applications of electropneumatic components.   
Test a complex mechatronics system in order to identify faulted mechanical, electronic, and electro-pneumatic components. End of chapter review questions and practice problems will be assigned after each lecture.   
Constructing and troubleshooting mechatronics projects and applications of electropneumatic components.

* 1. Lab Content and scope:
     + Lab is integrated with and contains the same content as lecture.

1. Methods of Instruction:

Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer. Lecture  
Class Discussion  
Laboratory Practice of Skills  
Small Group Discussion  
Prepare an Industrial Process Control System in order to create a PID (Proportional-Integral-Derivative) experiment. Lecture  
Class Discussion  
Laboratory Practice of Skills  
Multi-media  
Small Group Discussion  
Experiments  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application. Lecture  
Class Discussion  
Laboratory Practice of Skills  
Small Group Discussion  
Experiments  
Set up the industrial process control "Filing Station? trainer in order to create an application program and run the experiment. Lecture  
Class Discussion  
Laboratory Practice of Skills  
Small Group Discussion  
Experiments  
Test a complex mechatronics system in order to identify faulted mechanical, electronic, and electro-pneumatic components. Lecture  
Class Discussion  
Laboratory Practice of Skills  
Multi-media  
Small Group Discussion

1. Methods of Evaluation:

Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer. Class Participation  
Class Work  
Exams/Tests  
Lab Activities  
Group Projects  
Prepare an Industrial Process Control System in order to create a PID (Proportional-Integral-Derivative) experiment. Class Participation  
Class Work  
Exams/Tests  
Lab Activities  
Group Projects  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application. Class Participation  
Class Work  
Exams/Tests  
Lab Activities  
Group Projects  
Set up the industrial process control "Filing Station? trainer in order to create an application program and run the experiment. Class Participation  
Class Work  
Exams/Tests  
Lab Activities  
Group Projects  
Test a complex mechatronics system in order to identify faulted mechanical, electronic, and electro-pneumatic components. Class Participation  
Class Work  
Exams/Tests  
Lab Activities  
Group Projects

1. COURSE CONTENT

 Introduction to 3-axis Robotic Arm Mechanism  
- Pneumatic Gripper  
- DC Motor  
- Photo Microsensor  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
 Introduction to Conveyor Belt Mechanism  
- Introduction to stepper-motors and drivers  
- Introduction to Sensors  
- AC Solenoid  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
 Introduction to the "Comprehensive Mechatronics System" trainer.  
- System Configuration  
- Introduction to Individual Mechanisms  
- Electric Control Unit and System I/O Table  
- Pick and Place Arm Mechanism  
- Conveyor Belt Mechanism  
- PLC Wiring  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
Test a complex mechatronics system in order to identify faulted mechanical, electronic, and electro-pneumatic components.  
IPC-200 Industrial Process Control Trainer General Presentation.  
- Harduare configurartions  
- Software requirements  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
IPC-200 Production Station  
- Station Functions  
- Integral Parts  
- The Station's Technical Specifications  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application.   
IPC-200 Filling Station  
- Station Functions  
- Integral Parts  
- The Station's Technical Specifications  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application.   
Set up the industrial process control "Filing Station? trainer in order to create an application program and run the experiment.  
The Palletising Station  
- Station Function  
- Integral Parts  
- The Station's Technical Specifications  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application.   
Installation and Commissioning  
-Basic Requirements  
- Handling and Packaging  
- Installation  
- Commissioning  
- Implementation Procedure  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application.   
IPC-200 Maintenance and Inspection  
- Inspection Points  
- Maintenance Procedures  
- Troubleshooting  
- Safety  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application.   
Test a complex mechatronics system in order to identify faulted mechanical, electronic, and electro-pneumatic components.  
Electropneumatic Diagrams.  
- Pneumatic Circuits Station Production Module  
- Pneumatic Circuits Bottling Module  
- Pneumatic Circuit Warehouse Module  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application.   
Set up the industrial process control "Filing Station? trainer in order to create an application program and run the experiment.  
Test a complex mechatronics system in order to identify faulted mechanical, electronic, and electro-pneumatic components.  
Inputs and Outputs  
- Action  
- Symbols  
- Type  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
Prepare an Industrial Process Control System in order to create a PID (Proportional-Integral-Derivative) experiment.  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application.   
Set up the industrial process control "Filing Station? trainer in order to create an application program and run the experiment.  
Test a complex mechatronics system in order to identify faulted mechanical, electronic, and electro-pneumatic components.  
IPC-200 Electrical Diagrams.  
- IPC-200 System Block Diagrams  
- Bottling Module Power Circuits  
- Bottling Modules Inputs and Outputs Diagrams   
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application.   
Set up the industrial process control "Filing Station? trainer in order to create an application program and run the experiment.  
Test a complex mechatronics system in order to identify faulted mechanical, electronic, and electro-pneumatic components.  
Running IPC 201 in "Stand Alone Module".  
- The Production Module SCADA installation  
- Running in Manual Mode  
- "Closed Regulation Loops"  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
Prepare an Industrial Process Control System in order to create a PID (Proportional-Integral-Derivative) experiment.  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application.   
Set up the industrial process control "Filing Station? trainer in order to create an application program and run the experiment.  
Test a complex mechatronics system in order to identify faulted mechanical, electronic, and electro-pneumatic components.  
IPC-202 Bottling Module.  
- Running the IPC-202 Bottling Module  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application.   
Test a complex mechatronics system in order to identify faulted mechanical, electronic, and electro-pneumatic components.  
IPC-203 Warehousing Module  
- Running the Warehousing Module  
Examine technical documentation of a conveyor belt mechanism of a mechatronics trainer.  
Evaluate a Production Plant Station?s digital control functions in order to determine the manipulations performed by the elements involved in a process control application.   
Test a complex mechatronics system in order to identify faulted mechanical, electronic, and electro-pneumatic components.

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**Appendix D**

**BRYAN DONNELLY, M.A.**

**Contact Information**

Merced College 5570 Michelle Court

3600 M Street Merced, CA 95340

Merced, CA 95348-2898 (209) 385-6891

(209) 386-6769

donnelly.b@mccd.edu

**Education**

St. Mary’s College of California, Moraga M.A. in Leadership

University of San Francisco, San Francisco B. S. in Management

**Employment**

2009 – Present Merced Community College District / Merced, CA

*Professor* for the Fire Technology program. Instructor of certified courses and curriculum content for degree attainment, coordination with emergency response agencies, fiscal control of programs in assigned area, and duties as assigned by area dean. Currently developing new curriculum for a proposed Paramedic program to align with local and regional emergency response employers’ recruiting needs for personnel trained and able to pass the National Certification exam.

1983 – 2009 Merced City Fire Department / Merced, CA

*Firefighter (1983-1989), Fire Captain (1989-1996), Chief Officer (1996-2009),*

Certified Firefighter I, Firefighter II, Fire Officer, Chief Officer, and Fire Marshal. Performed administrative duties, supervision, and policy development relating to prevention, operations, support, logistics, hazardous materials, rescue, medical, public relations, and information; supervised emergency activities, personnel, and equipment.

1987 – 2008 Medi-Flight of Northern California / Modesto, CA

*Mobile Intensive Care Flight Paramedic*. Performed advanced life support, care, and rescue of sick and injured patients in need of aeromedical evacuation and transport.

1981 – 1997 Riggs Ambulance Service / Merced, CA

*Mobile Intensive Care Paramedic*. Provided basic and advanced life support to ill and injured patients; administered advance cardiac and trauma life support; and served as the Paramedic field training officer and disaster preparedness coordinator.

1983 – 1993 Merced County Coroner’s Office / Merced, CA

*Investigative Deputy Coroner*. Investigated, documented, and organized information, evidence, and property relating to accidental, criminal, and natural decedents.

1981 – 1986 California Dept. of Fish & Game, Fisheries Management &

Wildlife Protection

*Deputy State Peace Officer.* Performed studies, collected research data, educated, and enforced the laws for species preservation.

**Awards, Recognition, Service**

*Firefighter of the Year,* Merced City Fire Department (1994, 2006)

*Employee of the Year* nominee, City of Merced (2006)

***Emergency Medical Services***

Trauma Triage Committee, Helicopter Utilization Task Force, Medical Dispatch Committee, Policy and Procedure Committee, Quality Assurance Committee, Disaster Response Task Force, Emergency Medical Services for Children Committee, Contract Compliance Committee, Quality Assurance Committee; Board of Directors; Northern California Training Officers Associations; California Chiefs Association (1996-1998).

## *Certifications*

***California State Fire Marshal certifications:***

Firefighter I, Firefighter II

Fire Officer

Chief Officer

Explosives: Recon and Recognition

Strike Team Leader, all risk

Plans Examiner qualified

Fire Protection Specialist qualified

Fire Investigator I, II

Division Group Supervisor (trainee)

***National Fire Academy:***

Management of Emergency Medical Services

Advanced Leadership Issues in EMS

Hazardous Materials Incident Management

Chemistry of Hazardous Materials

Instructional Methodology

Command and Control of Major Operations

Executive Planning

Code Enforcement; Systems Approach

***California Specialized Training Institute (Office Of Emergency Services, OES):***

Hazardous Materials Specialist

Hazardous Materials/Environmental Crimes Investigator

Mass Decontamination

Hospital Operations

Emergency Medical Response to Weapons of Mass Destruction

***American Heart Association and Medical Affiliations:***

State and Regional Mobile Intensive Care Paramedic.

Advanced Cardiac, Pediatric, Neonatal and Pre-Hospital Life Support

# *Instructor Credentials*

***California State Fire Marshal****:*

Emergency Care of the Sick and Injured

Fire Command 1A  
Fire Command 1B  
Fire Control 3  
Fire Management 1  
Fire Management 2A  
Fire Prevention 1A  
Haz Mat First Responder Awareness Level  
Haz Mat First Responder Operational Level  
Haz Mat First Responder Operational, Decontamination

***National Fire Academy****:*

Chemistry of Hazardous Materials

Emergency Response to Terrorism; Basic Concepts

### Emer. Response to Terrorism: Strategic Considerations for Command Officers

***California Specialized Training Institute (Office Of Emergency Services, OES):***

Hazardous Materials - Awareness

#### Operations

Incident Command/Scene Manager

Decontamination

#### Medical Operations

***Regional Emergency Medical Services Agency****:*

Multi-casualty Incident Response

Medical Helicopter Landing Zone Operations

**Appendix E**

**EUGEN CONSTANTINESCU, M.S.**

**CONTACT INFORMATION**

Merced College 1126 Solstice Avenue

Electronics Department Merced, California 95348

3600 M Street (209) 384-7966

Merced, CA 95348

(209) 381-6598

Constantinescu.e@mccd.edu

**EDUCATION**

Teaching Credentials 1998, CSU Sacramento

M.S. - Electronics Engineering 1972, “Polytechnica University of Bucharest,” Romania

B.S. - Electronics Engineering 1966, Military Academy, Brasov, Romania

**APPOINTMENTS**

**2000 - Present** Electronics Instructor, Industrial Technology / Merced College

**2004 - Present** Electronics Department Head / Merced College

**1991 - 2000** Electronics Instructor / Modesto High School

Regional Occupational Programs / Modesto City Schools

**1988 - 1990** Program Manager, Electrical Engineering Department / Romanian National Institute for Standards / Bucharest, Romania

**1984 - 1988** Quality Assurance Engineer / AEROFINA, Avionics Equipment  
 Manufacturing Plant / Bucharest, Romania

**1972 - 1984** Electrical Engineer / “Polytechnica University of Bucharest”,

Romania

**1970 - 1972** Electronics Technician / “Polytechnica University of Bucharest,”

Romania

**1966 - 1970** Ground Crew Specialist Radar & Radio, Maintenance and Repair,  
 / Military Air Force, Romania

**SYNERGISTIC ACTIVITIES**

1. **Electronics Curriculum Development**

* Explore avenues (including collaboration with the NSF-CREATE Consortium) to develop new programs to qualify students for jobs in Advanced Technological fields like Mechatronics and Renewable Energy sectors, which includes skills in deploying and maintaining wind, water, and solar power management equipment.
* Develop a Biomedical Instrumentation technician program at Merced College to prepare students to work in medical equipment maintenance, calibration and troubleshooting. Established contact and collaboration with local hospitals and medical practices that employ technicians for servicing biomedical instrumentation equipment.
* Develop an innovative, new survey course titled “The World of Electricity and Electronics” that meets the Natural Sciences Breadth Requirement for graduation at Merced College. The principles and practice of scientific discovery and reasoning were introduced via the study of electricity and electronics. The course explores applications of electronics in daily life and serves as a gateway class into the Electronics Departments’ programs.
* Outreach businesses to develop partnerships with local industry and maintain an active Advisory Committee.
* Periodically review and update curriculum and programs to stay current with local industry standards and job skill requirements.
* Develop Articulation Programs with high schools and California State Universities.
* Develop marketing materials and activities to promote the electronics department program offerings among college students and into the community.

1. **Facilities/Teaching Resources**

* Developed ten state-of-the-art electronics teaching workstations equipped with modern electronic test and measuring equipment. Conceived and designed prototype trainer modules for Laboratory activities at Merced College.
* Maintained and repaired broken electronics lab equipment.

1. **Instructional Resources**

* Design and build ten, Allen Bradley Programmable Logic Controller Trainers that will be instrumental in teaching industrial electronics classes, including necessary skills for Solar, and Wind Technologies.

**COLLABORATORS & OTHER AFFILIATIONS**

Dr. Kathleen Alfano, College of Canyons / Valencia, CA, NSF-ATE CREATE Consortium: develop new programs on Solar, Wind and Mechatronics at Merced College.

Dean Jim Andersen, Merced College and Karyn Wiens, the Work Force Development Coordinator: provides specialized training on programmable controllers for local industry.

Member, EPSILON-PI-TAU, an International Honorary Organization for Professions in Technology, since 2007.

Member, California Industrial Technology Education Association (CITEA), since 1996.

Member, California Council of Electronics Instructors CCEI), since 1995.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Qty**  **Appendix F** | **Description** | **Price** | **Total** | **Grand Total** | **When *Earliest* Needed?** | | | | | **Total Years 1-3** |
|  | **AH - Emergency Medical Tech** |  |  |  | **Year 1** | **Year 2** | | **Year 3** | |  |
| 1 | Moulage or Casualty Simulation Equipment | 914.00 | 914.00 |  | $914.00 | |  | |  | $914.00 |
| 6 | Box Trauma Dressings | 76.10 | 456.60 |  | $456.60 | | $456.60 | | $456.60 | $1,369.80 |
| 1 | per student Pen Lights (or provided by the student) | 3.10 | 3.10 |  | $3.10 | | $3.10 | | $3.10 | $9.30 |
| 1 | per student Scissors (or provided by the student) | 2.29 | 2.29 |  | $2.29 | | $2.29 | | $2.29 | $6.87 |
| 4 | Stethoscopes (or provided by the student) | 49.95 | 199.80 |  | $199.80 | |  | |  | $199.80 |
| 4 | Blood pressure cuffs - adult sizes | 31.25 | 125.00 |  | $125.00 | |  | |  | $125.00 |
| 4 | Blood pressure cuffs - child size | 31.25 | 125.00 |  | $125.00 | |  | |  | $125.00 |
| 4 | Bag-valve-mask devices - adult size | 3.09 | 12.36 |  | $12.36 | |  | |  | $12.36 |
| 4 | Bag-valve-mask devices - pediatric size | 3.09 | 12.36 |  | $12.36 | |  | |  | $12.36 |
| 2 | Oxygen tank with regulator and key (Must be operational and maintain a minimum of 500psi.) | 99.95 | 199.90 |  | $199.90 | |  | |  | $199.90 |
| 4 | Oxygen masks non-rebreather - adult | 1.63 | 6.52 |  | $6.52 | |  | |  | $6.52 |
| 4 | Oxygen masks non-rebreather - child | 1.78 | 7.12 |  | $7.12 | |  | |  | $7.12 |
| 4 | Nasal cannulas | 4.95 | 19.80 |  | $19.80 | |  | |  | $19.80 |
| 2 | boxes Alcohol preps | 3.25 | 6.50 |  | $6.50 | | $6.50 | | $6.50 | $19.50 |
| 56 | Gloves - (small, medium, large, and extra large, non-latex) (each student has one box of an appropriate size available during the course) | 8.49 | 475.44 |  | $475.44 | | $475.44 | | $475.44 | $1,426.32 |
| 6 | packages 4x4 sponges (non sterile) | 4.39 | 26.34 |  | $26.34 | | $26.34 | | $26.34 | $79.02 |
| 5 | boxes 5x9 sponges (non sterile) | 68.79 | 343.95 |  | $343.95 | | $343.95 | | $343.95 | $1,031.85 |
| 36 | rolls Rolled gauze (non sterile) | 5.59 | 201.24 |  | $201.24 | | $201.24 | | $201.24 | $603.72 |
| 5 | Occlusive dressings | 67.89 | 339.45 |  | $339.45 | | $339.45 | | $339.45 | $1,018.35 |
| 2 | Traction splint devices 1 Hare adult, 1 SAGAR adult | 289.45 | 578.90 |  | $578.90 | |  | |  | $578.90 |
| 2 | Cervical-thoracic spinal immobilization device for extrication, with straps | 21.49 | 42.98 |  | $42.98 | |  | |  | $42.98 |
| 2 | Long spine boards with securing devices | 191.95 | 383.90 |  | $383.90 | |  | |  | $383.90 |
| 15 | 3 of each size Cervical collars (small, regular, medium, large, and extra large) NOTE: may substitute 6 adjustable devices NOTE: Soft collars and foam types are not acceptable | 9.23 | 138.45 |  | $138.45 | |  | |  | $138.45 |
| 2 | Head immobilization materials/devices | 83.20 | 166.40 |  | $166.40 | |  | |  | $166.40 |
| 1 | Ambulance stretcher | 517.89 | 517.89 |  | $517.89 | |  | |  | $517.89 |
| 2 | Blood glucose monitoring devices | 44.95 | 89.90 |  | $89.90 | |  | |  | $89.90 |
| 2 | Portable suction devices | 748.95 | 1,497.90 |  | $1,497.90 | |  | |  | $1,497.90 |
| 3 | Rigid suction catheters | 0.63 | 1.89 |  | $1.89 | |  | |  | $1.89 |
| 3 | Flexible suction catheters | 0.63 | 1.89 |  | $1.89 | |  | |  | $1.89 |
| 2 | of each size Oropharyngeal airways | 5.49 | 10.98 |  | $10.98 | |  | |  | $10.98 |
| 2 | of each size Nasopharyngeal airways | 4.95 | 9.90 |  | $9.90 | |  | |  | $9.90 |
| 2 | of each size Rigid splints (6 inch, 12 inch, 18 inch, 24 inch, and 36 inch) | 4.39 | 8.78 |  | $8.78 | |  | |  | $8.78 |
| 2 | Burn sheets | 5.69 | 11.38 |  | $11.38 | |  | |  | $11.38 |
| 2 | OB kits | 9.59 | 19.18 |  | $19.18 | |  | |  | $19.18 |
| 2 | CPR Manikins - adult | 253.70 | 507.40 |  | $507.40 | |  | |  | $507.40 |
| 2 | CPR Manikins - child | 688.49 | 1,376.98 |  | $1,376.98 | |  | |  | $1,376.98 |
| 2 | CPR Manikins - infant | 428.49 | 856.98 |  | $856.98 | |  | |  | $856.98 |
| 56 | 1 box of 50 per student CPR face shields or similar barrier device (or provided by the student) | 14.95 | 837.20 |  | $837.20 | | $837.20 | | $837.20 | $2,511.60 |
| 56 | 1 per student Pocket mask (or provided by the student) | 11.79 | 660.24 |  | $660.24 | | $660.24 | | $660.24 | $1,980.72 |
| 1 | Semi-Automatic Defibrillator or AED training device |  | - |  | $596.00 | | $0.00 | | $0.00 | $596.00 |
| 1 | box IV Catheter - Butterfly | 21.39 | 21.39 |  | $21.39 | | $21.39 | | $21.39 | $64.17 |
| 1 | box IV Catheter - 24 Gauge | 158.00 | 158.00 |  | $158.00 | | $158.00 | | $158.00 | $474.00 |
| 1 | box IV Catheter - 22 Gauge | 158.00 | 158.00 |  | $158.00 | | $158.00 | | $158.00 | $474.00 |
| 1 | box IV Catheter - 20 Gauge | 158.00 | 158.00 |  | $158.00 | | $158.00 | | $158.00 | $474.00 |
| 1 | box IV Catheter - 18 Gauge | 158.00 | 158.00 |  | $158.00 | | $158.00 | | $158.00 | $474.00 |
| 1 | box IV Catheter - 16 Gauge | 158.00 | 158.00 |  | $158.00 | | $158.00 | | $158.00 | $474.00 |
| 1 | box IV Catheters central line catheter or intra-cath |  | - |  | $0.00 | | $0.00 | | $0.00 | $0.00 |
| 1 | unit Monitor/Defibrillator | 15,000.00 | 15,000.00 |  | $15,000.00 | |  | |  | $15,000.00 |
| 1 | unit Arrhythmia Simulator | 1,295.00 | 1,295.00 |  | $1,295.00 | |  | |  | $1,295.00 |
| 1 | box Electrodes |  | - |  | $0.00 | | $0.00 | | $0.00 | $0.00 |
| 2 | unit Intubation Manikin-adult | 995.00 | 1,990.00 |  | $1,990.00 | |  | |  | $1,990.00 |
| 2 | unit Intubation Manikin - pediatrics | 1,525.00 | 3,050.00 |  | $3,050.00 | |  | |  | $3,050.00 |
| 3 | set each type Laryngoscope Handle and Blades - one complete set curved and straight, sizes 0 through 4 | 268 | 804 |  | $804.00 | |  | |  | $804.00 |
| 3 | set Endotracheal Tubes - 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, and 9.0 | 249.00 | 747.00 |  | $747.00 | |  | |  | $747.00 |
| 2 | Esophageal Tracheal Double Lumen Airway Device |  | 0 |  | 0 | | 0 | | 0 | $0.00 |
| 1 | Stylets - boogies, introducers adult and pediatric | 400 | 400 |  | $400.00 | |  | |  | $400.00 |
| 1 | box 1 cc Syringes | 10.99 | 10.99 |  | $10.99 | |  | |  | $10.99 |
| 1 | box 3 cc Syringes | 9.19 | 9.19 |  | $9.19 | | $9.19 | | $9.19 | $27.57 |
| 1 | box 5 cc Syringes | 15.79 | 15.79 |  | $15.79 | | $15.79 | | $15.79 | $47.37 |
| 1 | box 10-12 cc Syringes | 16.69 | 16.69 |  | $16.69 | | $16.69 | | $16.69 | $50.07 |
| 1 | box 20 cc Syringes | 22.59 | 22.59 |  | $22.59 | | $22.59 | | $22.59 | $67.77 |
| 2 | IV Infusion Arm | 510.00 | 1,020.00 |  | $1,020.00 | |  | |  | $1,020.00 |
| 5 | bags each IV Fluids: 100cc, 250cc, 500cc, 1000cc | 3.29 | 16.45 |  | $16.45 | | $16.45 | | $16.45 | $49.35 |
| 5 | sets each IV Tubing - 10gtt and 60gtt | 4.69 | 23.45 |  | $23.45 | | $23.45 | | $23.45 | $70.35 |
| 1 | case Blood tubing | 225 | 225 |  | $225.00 | | $225.00 | | $225.00 | $675.00 |
| 2 | Sharps containers | 5.69 | 11.38 |  | $11.38 | | $11.38 | | $11.38 | $34.14 |
| 1 | for each skill Invasive Skills Manikin – Cricothyrotomy Central Line, Tension Pneumothorax NOTE: A single manikin equipped for all skills, or a combination of manikins to cover all skills, is acceptable. |  | - |  | $1,015.00 | | $340.00 | | $340.00 | $1,695.00 |
| 1 | for each skill Training Devices for intraosseous and sternal intraosseous, adult and pediatric NOTE: A single device equipped for all skills, or a combination of devices to cover all skills, is acceptable. |  | - |  | $1,990.00 | | $0.00 | | $0.00 | $1,990.00 |
| 6 | 3 Ea. Adult and pediatric Magill forceps | 12 | 72 |  | $72.00 | | $72.00 | | $72.00 | $216.00 |
| 2 | Hemostat forceps | 12.89 | 25.78 |  | $25.78 | |  | |  | $25.78 |
| 2 | box IV tourniquets | 3.49 | 6.98 |  | $6.98 | | $6.98 | | $6.98 | $20.94 |
| 3 | Scalpels | 19.69 | 59.07 |  | $59.07 | | $59.07 | | $59.07 | $177.21 |
| 2 | Simulated Drug Box | 475.00 | 950.00 |  | $950.00 | |  | |  | $950.00 |
| 1 | Consultant, Scope of Work for legal application, accreditation, contracts | 25,000.00 | 25,000.00 |  | $25,000.00 | |  | |  | $25,000.00 |
| 1 | Yearly costs for required Medical Director. Estimated $70/hr for 10 hrs. per month (meetings, scope, reviews) 12 mo/year |  | 16,800.00 |  |  | | $8,400.00 | | $8,400.00 | $16,800.00 |
|  | TEAS test X 24 students ($35 each) |  | 1,680.00 |  |  | | $840.00 | | $840.00 | $1,680.00 |
| 1 | Personnel costs- program estimated at 33-35 units. 24 instructional units (2) semesters (9 units clinical/internships)- 1 Full time professor equivalent. 12 units Instruction and 3 units release time per semester. |  |  |  |  | | $58,000.00 | | $58,000.00 | $116,000.00 |
| 1 | Additional time for specialty instruction, skills, clinical, and field evaluation- adjunct and/or overload = est. additional 240 hrs |  |  |  |  | | $10,800.00 | | $10,800.00 | $21,600.00 |
|  | Awaiting costs from Purchasing |  |  |  |  | |  | |  | $0.00 |
|  | Note: Full time Professorship costs seem low- Benefits etc.. |  |  |  |  | |  | |  | $0.00 |
|  |  |  |  |  |  | |  | |  | $0.00 |
|  |  |  | - | $ 37,778.64 | **$66,379.64** | | **$83,022.33** | | **$83,022.33** | **$232,424.30** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **WORKSHEET** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **CO 572**  **Appendix G** | **4/1/2013 16:52** |  |  |  |  |  | **Ag. Mfg. DoL TAA CCCT (Carry-over 7/1/12-9/30/12) 2012-2013** | | | | | |  |  |  |  |
| **ACCOUNT** | **NAME** | **GROSS EXPENSES** | **PERCENT** | **CODE** | **Salary/Range/Start Date** | **MONTHS** | **ALLOCATED EXPENSES** | **STRS** | **PERS** | **FICA** | **H&W** | **SUI** | **W/C** | **IP** | **TOTAL BENEFITS** | **TOTAL EXPENSES** |
| **CERT** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.51227.601300.572 | Anderson, Robert (Lead Dean) | $135,936.00 | 0.81670 | 18 | A-6 | 2/3 | $1,110.14 | 91.59 | 0.00 | 16.11 | 147.58 | 12.21 | 16.77 | 6.66 | $290.92 | $1,401.06 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.51227.601400.572 | Andersen, Jim (Dean) | $124,347.00 | 1.05950 | 18 | A-5 | 2/3 | $1,317.48 | 108.69 | 0.00 | 19.10 | 186.84 | 6.95 | 20.48 | 7.90 | $349.96 | $1,667.44 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.51228.649900.572 | Hollister, Christine | $6,016.41 | 34.000 | 18 | 13-3 | 1 mo. | $2,045.58 | 168.76 | 0.00 | 29.66 | 0.00 | 22.50 | 30.91 | 12.27 | $264.10 | $2,309.68 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.51420.011600.572 | Fishman, D. Ag/Mfg. (SU12) | $5,000.00 | 100.000 | 9 |  | Stipend | $5,000.00 | 0.00 | 0.00 | 72.50 | 0.00 | 55.00 | 75.55 | 0.00 | $203.05 | $5,203.05 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.51420.094500.572 | Nagano, Jeff (FA12) | $0.00 | 100.000 | 9 |  | Stipend | $0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.51420.093400.572 | Constantinescu, Eugen Elect. (FA12) | $3,000.00 | 100.000 | 9 |  | Stipend | $3,000.00 | 0.00 | 0.00 | 43.50 | 0.00 | 33.00 | 45.33 | 0.00 | $121.83 | $3,121.83 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.51420.095650.572 | Boyle, Steve Wldg (SU12) | $5,000.00 | 100.000 | 9 |  | Stipend | $5,000.00 | 0.00 | 0.00 | 72.50 | 0.00 | 55.00 | 75.55 | 0.00 | $203.05 | $5,203.05 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.51420.630000.572 | Other, AgMtg TBD (168 hrs.) | $0.00 | 100.000 | 11 | $40.50 | Hrly | $0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  |  | $369.04 | $0.00 | $253.37 | $334.42 | $184.66 | $264.59 | $26.83 |  |  |
| **CLASS / MGMT** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.52120.649900.572 | Assistant (TBD) | $0.00 | 34.000 | 1 | 16-1 | 1 mo. | $0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  |  | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |  |  |
| **EXPENSES** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.54310.011600.572 | Instr Supplies-Ag. Mfg. | $12,500.00 | 100.000 |  |  |  | $12,500.00 |  |  |  |  |  |  |  | $0.00 | $12,500.00 |
| 124.54310.093400.572 | Instr Supplies-Electr. | $16,723.00 | 100.000 |  |  |  | $16,723.00 |  |  |  |  |  |  |  | $0.00 | $16,723.00 |
| 124.54410.011600.572 | General supplies-Ag. Mfg. | $1,500.00 | 100.000 |  |  |  | $1,500.00 |  |  |  |  |  |  |  | $0.00 | $1,500.00 |
| 124.54410.093400.572 | General supplies-Electr. | $408.00 | 100.000 |  |  |  | $408.00 |  |  |  |  |  |  |  | $0.00 | $408.00 |
| 124.55100.011600.572 | Consultant-Ag. Mfg. | $4,332.00 | 100.000 |  |  |  | $4,332.00 |  |  |  |  |  |  |  | $0.00 | $4,332.00 |
| 124.55100.093400.572 | Consultant-Electr. | $2,166.00 | 100.000 |  |  |  | $2,166.00 |  |  |  |  |  |  |  | $0.00 | $2,166.00 |
| 124.55210.011600.572 | Conf Travel-Ag. Mfg. | $2,967.00 | 100.000 |  |  |  | $2,967.00 |  |  |  |  |  |  |  | $0.00 | $2,967.00 |
| 124.55210.093400.572 | Conf Travel-Electr. | $1,351.00 | 100.000 |  |  |  | $1,351.00 |  |  |  |  |  |  |  | $0.00 | $1,351.00 |
| 124.55211.011600.572 | Recruitment-Ag. Mfg. | $1,099.00 | 100.000 |  |  |  | $1,099.00 |  |  |  |  |  |  |  | $0.00 | $1,099.00 |
| 124.55211.093400.572 | Recruitment-Electr. | $712.00 | 100.000 |  |  |  | $712.00 |  |  |  |  |  |  |  | $0.00 | $712.00 |
| 124.55232.011600.572 | Training-Ag. Mfg. | $750.00 | 100.000 |  |  |  | $750.00 |  |  |  |  |  |  |  | $0.00 | $750.00 |
| 124.55232.093400.572 | Training-Electr. | $488.00 | 100.000 |  |  |  | $488.00 |  |  |  |  |  |  |  | $0.00 | $488.00 |
| 124.55310.011600.572 | Postage-Ag. Mfg. | $500.00 | 100.000 |  |  |  | $500.00 |  |  |  |  |  |  |  | $0.00 | $500.00 |
| 124.55310.093400.572 | Postage--Electr. | $250.00 | 100.000 |  |  |  | $250.00 |  |  |  |  |  |  |  | $0.00 | $250.00 |
| 124.55350.093400.572 | Accr. Fee-Electr. | $834.00 | 100.000 |  |  |  | $834.00 |  |  |  |  |  |  |  | $0.00 | $834.00 |
| 124.55360.011600.572 | Duplicating-Ag. Mfg. | $1,000.00 | 100.000 |  |  |  | $1,000.00 |  |  |  |  |  |  |  | $0.00 | $1,000.00 |
| 124.55360.093400.572 | Duplicating-Electr. | $500.00 | 100.000 |  |  |  | $500.00 |  |  |  |  |  |  |  | $0.00 | $500.00 |
| 124.55610.011600.572 | Contr. Service | $2,090.00 | 100.000 |  |  |  | $2,090.00 |  |  |  |  |  |  |  | $0.00 | $2,090.00 |
| 124.55610.649900.572 | Contr. Service (MC-DWI Employment Specialist II) | $0.00 | 100.000 |  |  |  | $0.00 |  |  |  |  |  |  |  | $0.00 | $0.00 |
| 124.55612.011600.572 | SI Software-Ag. Mfg. | $5,243.00 | 100.000 |  |  |  | $5,243.00 |  |  |  |  |  |  |  | $0.00 | $5,243.00 |
| 124.55612.093400.572 | SI Software-Electr. | $11,774.00 | 100.000 |  |  |  | $11,774.00 |  |  |  |  |  |  |  | $0.00 | $11,774.00 |
| 124.55800.000000.572 | Unallocated | $21,318.24 | 100.000 |  |  |  | $21,318.24 |  |  |  |  |  |  |  | $0.00 | $21,318.24 |
| 124.56410.011600.572 | Instr Equip-Ag. Mfg. | $22,954.00 | 100.000 |  |  |  | $22,954.00 |  |  |  |  |  |  |  | $0.00 | $22,954.00 |
| 124.56410.093400.572 | Instr Equip-Electr. | $14,268.00 | 100.000 |  |  |  | $14,268.00 |  |  |  |  |  |  |  | $0.00 | $14,268.00 |
| 124.56420.011600.572 | Equip-Ag. Mfg. | $874.00 | 100.000 |  |  |  | $874.00 |  |  |  |  |  |  |  | $0.00 | $874.00 |
| 124.56420.093400.572 | Equip-Electr. | $66.00 | 100.000 |  |  |  | $66.00 |  |  |  |  |  |  |  | $0.00 | $66.00 |
| 124.57321.000000.572 | Admin Allow(5% of Direct Cost)(33%) | $4,710.00 | 100.000 |  |  |  | $4,710.00 |  |  |  |  |  |  |  | $0.00 | $4,710.00 |
| **TOTALS** |  |  |  |  |  |  | **$148,850.44** | **$738.08** | **$0.00** | **$506.74** | **$668.84** | **$369.32** | **$529.18** | **$53.66** | **$1,432.91** | **$150,283.35** |
| **All Budget/Revenue/Awards are ESTIMATES** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Program Manager: Jim Andersen** |  |  |  |  | **Year 1 of 3** | |  |  | **124.48120.800000.572** | |  | **Yr. 1 Award** |  | **$139,259.00** |  | **$0.00** |
| **Deans: Bobby Anderson/Jim Andersen/Kevin Kistler** |  |  |  |  |  |  |  |  |  |  |  | **Spent 11/12** |  | **-$41,636.65** |  |  |
| **VP: Marianne Tortorici** |  |  |  |  |  |  |  |  |  |  | **moved from 571/BT30172** | | | **$52,600.00** |  |  |
|  |  |  |  |  |  |  |  |  |  |  | **moved from 571/BT30176** | | | **$61.00** |  |  |
| **Agreement #: TC-22498-11-60-A-6/CFDA #: 17.282/MC2146 and 2146A** | | |  |  |  |  |  |  |  |  |  | **Carry-over 12/13** |  | **$150,283.35** |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **DRAFT - WORKSHEET** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **582** | **4/1/2013 16:53** |  |  |  |  |  | **Ag. Mfg. DoL TAA CCCT 10/1/12-9/30/13** | | | |  |  |  |  |  |  |
| **ACCOUNT** | **NAME** | **GROSS EXPENSES** | **PERCENT** | **CODE** | **Salary/Range/Start Date** | **MONTHS** | **ALLOCATED EXPENSES** | **STRS** | **PERS** | **FICA** | **H&W** | **SUI** | **W/C** | **IP** | **TOTAL BENEFITS** | **TOTAL EXPENSES** |
| **CERT** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.51228.649900.582 | Hollister, Christine | $55,603.00 | 34.00 | 18 | 13-3 | 9 mos. | $18,905.02 | 1,559.66 | 0.00 | 274.12 | 4,607.75 | 207.96 | 285.65 | 113.43 | $7,048.57 | $25,953.59 |
| **2013-2014** | Hollister, Christine | $18,534.00 | 34.00 | 18 | 13-3 | 3 mos. | $6,301.56 | 519.88 | 0.00 | 91.37 | 1,535.92 | 69.32 | 95.22 | 37.81 | $2,349.52 | $8,651.08 |
|  |  |  |  |  |  |  | **$25,206.58** |  |  |  |  |  |  |  |  |  |
| 124.51420.011600.582 | Fishman, D. Ag/Mfg. (FA12/SP13) | $5,000.00 | 100.00 | 9 | Stipend | 10/9 | $5,000.00 | 0.00 | 0.00 | 72.50 | 0.00 | 55.00 | 75.55 | 0.00 | $203.05 | $5,203.05 |
| **2013-2014** | Fishman, D. Ag/Mfg. (2 units/FA13) | $0.00 | 100.00 | 9 | Stipend | 2/3 | $0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  | **$5,000.00** |  |  |  |  |  |  |  |  |  |
| 124.51420.093400.582 | Constantinescu, E. Mech(FA12/SP13) | $5,000.00 | 100.00 | 9 | V-18 | 10/9 | $5,000.00 | 0.00 | 0.00 | 72.50 | 0.00 | 55.00 | 75.55 | 0.00 | $203.05 | $5,203.05 |
| **2013-2014** | Constantinescu, E. Mech(2 units/FA13) | $2,000.00 | 100.00 | 9 | V-19 | 2/3 | $2,000.00 | 0.00 | 0.00 | 29.00 | 0.00 | 22.00 | 30.22 | 0.00 | $81.22 | $2,081.22 |
|  |  |  |  |  |  |  | **$7,000.00** |  |  |  |  |  |  |  |  |  |
| 124.51420.095650.582 | Boyle, Steve Wldg (FA12/SP13) | $5,000.00 | 100.00 | 9 | Stipend | 10/9 | $5,000.00 | 0.00 | 0.00 | 72.50 | 0.00 | 55.00 | 75.55 | 0.00 | $203.05 | $5,203.05 |
| **2013-2014** | Boyle, Steve Wldg (2 units/FA13) | $0.00 | 100.00 | 9 | Stipend | 2/3 | $0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  | **$5,000.00** |  |  |  |  |  |  |  |  |  |
| 124.51420.630000.582 | Anthony, Deziga, AgMtg (100 hrs.) | $4,613.00 | 100.00 | 11 | $46.13 | Hrly | $4,613.00 | 380.57 | 0.00 | 66.89 | 0.00 | 50.74 | 69.70 | 0.00 | $567.90 | $5,180.90 |
|  | Donaher, Kimberly. AgMtg. (25 hrs.) | $1,381.75 | 100.00 | 11 | $55.27 | Hrly | $1,381.75 | 113.99 | 0.00 | 20.04 | 0.00 | 15.20 | 20.88 | 0.00 | $170.11 | $1,551.86 |
|  |  |  |  |  |  |  | **$5,994.75** | **2,574.10** | **0.00** | **698.92** | **6,143.66** | **530.22** | **728.32** | **151.24** |  |  |
| **CLASS / MGMT** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.52120.649900.582 | Moran, Jessica | $24,344.00 | 34.00 | 1 | 16-1 | 8 mos. | $8,276.96 | 0.00 | 944.98 | 633.19 | 4,095.78 | 91.05 | 125.06 | 49.66 | $5,939.72 | $14,216.68 |
| **2013-2014** | Moran, Jessica | $9,615.00 | 34.00 | 1 | 16-2 | 3 mos. | $3,269.10 | 0.00 | 373.23 | 250.09 | 1,535.92 | 35.96 | 49.40 | 19.61 | $2,264.21 | $5,533.31 |
|  |  |  |  |  |  |  | **$11,546.06** | **0.00** | **1,318.21** | **883.28** | **5,631.69** | **127.01** | **174.46** | **69.27** |  |  |
| **EXPENSES** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.54310.011600.582 | Instr Supplies/Ag. Mfg. | $6,000.05 | 100.00 |  |  |  | $6,000.05 |  |  |  |  |  |  |  | $0.00 | $6,000.05 |
| 124.54310.093400.582 | Instr Supplies/Mech. | $7,000.00 | 100.00 |  |  |  | $7,000.00 |  |  |  |  |  |  |  | $0.00 | $7,000.00 |
| 124.54310.095650.582 | Instr Supplies/Wldg. | $1,000.00 | 100.00 |  |  |  | $1,000.00 |  |  |  |  |  |  |  | $0.00 | $1,000.00 |
| 124.54419.011600.582 | Assestment/Ag. Mfg. | $720.00 | 100.00 |  |  |  | $720.00 |  |  |  |  |  |  |  | $0.00 | $720.00 |
| 124.54419.093400.582 | Assestment/Mech. | $720.00 | 100.00 |  |  |  | $720.00 |  |  |  |  |  |  |  | $0.00 | $720.00 |
| 124.54419.095650.582 | Assestment/Wldg. | $720.00 | 100.00 |  |  |  | $720.00 |  |  |  |  |  |  |  | $0.00 | $720.00 |
| 124.55100.011600.582 | Consultant/Ag. Mfg. | $0.00 | 100.00 |  |  |  | $0.00 |  |  |  |  |  |  |  | $0.00 | $0.00 |
| 124.55210.011600.582 | Conf Travel/Ag. Mfg. | $1,500.00 | 100.00 |  |  |  | $1,500.00 |  |  |  |  |  |  |  | $0.00 | $1,500.00 |
| 124.55210.093400.582 | Conf Travel/Mech. | $7,500.00 | 100.00 |  |  |  | $7,500.00 |  |  |  |  |  |  |  | $0.00 | $7,500.00 |
| 124.55210.095650.582 | Conf Travel/Wldg. | $1,500.00 | 100.00 |  |  |  | $1,500.00 |  |  |  |  |  |  |  | $0.00 | $1,500.00 |
| 124.55211.011600.582 | Recruitment/Ag. Mfg. | $0.00 | 100.00 |  |  |  | $0.00 |  |  |  |  |  |  |  | $0.00 | $0.00 |
| 124.55232.011600.582 | Training/Ag. Mfg. | $300.00 | 100.00 |  |  |  | $300.00 |  |  |  |  |  |  |  | $0.00 | $300.00 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 124.55232.093400.582 | Training/Mech. | $300.00 | 100.00 |  |  |  | $300.00 |  |  |  |  |  |  |  | $0.00 | $300.00 |
| 124.55232.095650.582 | Training/Wldg. | $300.00 | 100.00 |  |  |  | $300.00 |  |  |  |  |  |  |  | $0.00 | $300.00 |
| 124.55310.011600.582 | Postage/Ag. Mfg. | $350.00 | 100.00 |  |  |  | $350.00 |  |  |  |  |  |  |  | $0.00 | $350.00 |
| 124.55310.093400.582 | Postage/Mech. | $350.00 | 100.00 |  |  |  | $350.00 |  |  |  |  |  |  |  | $0.00 | $350.00 |
| 124.55310.095650.582 | Postage/Wldg. | $350.00 | 100.00 |  |  |  | $350.00 |  |  |  |  |  |  |  | $0.00 | $350.00 |
| 124.55360.011600.582 | Duplicating/Ag. Mfg. | $200.00 | 100.00 |  |  |  | $200.00 |  |  |  |  |  |  |  | $0.00 | $200.00 |
| 124.55360.093400.582 | Duplicating/Mech. | $200.00 | 100.00 |  |  |  | $200.00 |  |  |  |  |  |  |  | $0.00 | $200.00 |
| 124.55360.095650.582 | Duplicating/Wldg. | $200.00 | 100.00 |  |  |  | $200.00 |  |  |  |  |  |  |  | $0.00 | $200.00 |
| 124.55612.011600.582 | SI Software/Ag. Mfg. | $0.00 | 100.00 |  |  |  | $0.00 |  |  |  |  |  |  |  | $0.00 | $0.00 |
| 124.55612.093400.582 | SI Software/Mech. | $20,000.00 | 100.00 |  |  |  | $20,000.00 |  |  |  |  |  |  |  | $0.00 | $20,000.00 |
| 124.55800.000000.582 | Unallocated | $13,255.17 | 100.00 |  |  |  | $13,255.17 |  |  |  |  |  |  |  | $0.00 | $13,255.17 |
| 124.56410.011600.582 | Instr Equip/Ag. Mfg. | $51,152.00 | 100.00 |  |  |  | $51,152.00 |  |  |  |  |  |  |  | $0.00 | $51,152.00 |
| 124.56410.093400.582 | Instr Equip/Mech. | $55,176.00 | 100.00 |  |  |  | $55,176.00 |  |  |  |  |  |  |  | $0.00 | $55,176.00 |
| 124.56410.095650.582 | Instr Equip/Wldg. | $0.00 | 100.00 |  |  |  | $0.00 |  |  |  |  |  |  |  | $0.00 | $0.00 |
| 124.57321.000000.582 | Admin Allow(5% of Direct Cost) | $11,112.00 | 100.00 |  |  |  | $11,112.00 |  |  |  |  |  |  |  | $0.00 | $11,112.00 |
| **TOTALS** |  |  |  |  |  |  | **$299,400.00** | **$5,148.20** | **$2,636.42** | **$3,164.40** | **$23,550.71** | **$1,314.46** | **$1,805.56** | **$441.02** | **$19,030.39** | **$258,683.00** |
| **All Budget/Revenue/Awards are ESTIMATES** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Program Manager: Jim Andersen** |  |  |  |  | **Year 2 of 3** |  |  |  | **124.48120.800000.582** | |  | **Yr. 2 Award** | | **$258,683.00** |  | **$0.00** |
| **Director: Christine Hollister** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Deans: Bobby Anderson/Jim Andersen/Kevin Kistler** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **VP: Marianne Tortorici** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Agreement #: TC-22498-11-60-A-6/CFDA #: 17.282/MC** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



**Appendix H**



**Appendix I**

Merced College

Office of Purchasing and Contracts

Contract Summary

Board Meeting of March 05, 2013

|  |  |
| --- | --- |
| Contract Number | Description |
| **MC2104A M. Tortorici (categorical)** | Amendment #2 of grant agreement with California Community Colleges Chancellor's Office and WPLRC Contract Ed. (11-7-11 to 12-30-12) Responsive Training Fund; grant #11-332-073; RTF Make it Happen Project. Income to District $349,600. |
| **MC2254 R. Taylor** | A maintenance agreement between Stanislaus Audio Video, Inc. and MCCD for audio and video equipment located in the District Board Room (01-01-2013 to 12-31-2013). Cost to District is $3,600. |
| **MC2256 M. Tortorici** | Affiliation agreement between Emanuel Medical Center and MCCD Allied Health (08-01-13 to 06-31-2014) for sonography program clinical experience . No Cost to the District. |
| **MC2257 M. Tortorici** | Agreement with Turlock Unified School District and MCCD WPLRC/Contract Ed. (02-01-2013 to 06-30-2013) for Customer Service Training (fee-based/not-for-credit). Income to District $2,456.50. |
| **MC2258 M. Tortorici** | Agreement with Laird Manufacturing, LLC and MCCD WPLRC/Contract Ed. (02-01-2013 to 06-30-2013) to provide Sexual Harassment training (fee-based/not-for-credit). Income to District $480.00. |
| **MC2259 M. Tortorici** | Agreement with United Way of Merced County and MCCD WPLRC/Contract Ed. (03-11-13 to 06-30-13) for Curriculum Development Planning, Consultation Services, Social Media Strategist Training and Planning (fee based/not-for-credit). Income to District $11,770. |
| **MC2260 J. Schultz** | An agreement between Disability Access Consultant, Inc. (DAC) and Merced Community College District (District) for a field survey in accordance with the accessibility standards and regulations for the ADA Standards and title 24 of the California Building Code of all college owned sites including the satellite campuses and locations (02-05-13 to 05-31-13) Cost to District not to exceed $78,000.(Board approved on 02-05-13) |
| **MC2261 M. Tortorici** | Affiliation agreement with Merced Vein and Vascular Center and Career Advancement Academy Medical Assistant program (02-06-13 to 03-08-15) for student laboratory experience. No cost to District. |
| **MC2262 J. Schultz** | Merced Community College lease agreement to lease ninety (90) acres of real property in known as Los Banos Farm property at Los Banos Campus to Kenneth Sadler for a period of five (5) years minus one (1) day (01-09-13 to 01-08-18). Income to the District is $18,000 per year. (Board approved on 02-05-2013) |
| **MC2263 M. Tortorici** | Agreement between First 5 Merced County and the Merced Child Care Development Center (CDC) (01-01-2013 to 06-30-2013) to enhance and improve early childhood development for children 0-5 years and their families in Merced County . Income to District $52,042.40. |
| **MC2146B M. Tortorici (categorical)** | Addendum to Memorandum of Understanding with the Trade Adjustment Assistance Community Grants Program "TAACCT" (03-24-11 to 09-30-14) to design and implement innovative education and training programs that will accelerate education and training of the target population to meet specific industry needs using a comprehensive research-based strategy including cohort enrollment, block schedules, embedded remediation, transformative technology and compressing classroom instruction resulting in sustainable systemic change, improved student support services, increased accountability and greater labor market. Income to District $500,000. |
| **MC2265 M. Tortorici** | Agreement with Hilmar Cheese Company and MCCD WPLRC/Contract Ed. (03-01-13 to 06-30-13) to provide Pivot Table and Intermediate Excel Training (fee based/not-for-credit). Income to District $1,600.00 |
| **MC2266 J. Schultz** | Higher Education Center (formally known as Tri-College Center) use agreement with UC Merced and MCCD for a period of five (5) years minus one (1) day (03-15-13 to 03-14-18). Direct expenses paid by UC Merced; No Direct Income to District |

**Appendix J**

**Merced College Organization Chart**

**TAA/CCCT Grant**

Paramedic Faculty

Mechatronics Faculty

Clerical Assistant

TAA/CCCT Grant Director

Dean of Instruction

Dean of Instruction

Acct/Tech Support

Vice President, Instruction

President

College Board