



Missouri Department of Higher Education

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NEW PROGRAM PROPOSAL FORM

Sponsoring Institution(s): East Central College 1964 Prairie Dell Road Union, MO 63084

Program Title: Chemical Technology

Degree/Certificate: Associate of Applied Science

Options: None

Delivery Site(s): Main Campus

CIP Classification: 41.0301 (Please provide a CIP code)

Implementation Date: Summer 2012

Cooperative Partners: Not applicable

AUTHORIZATION:

Jean A. McCann, Vice-President, Instruction

Name/Title of Institutional Officer	Signature	Date
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Form NP – New Program Proposal

PROGRAM CHARACTERISTICS AND PERFORMANCE GOALS

East Central College
1964 Prairie Dell Road
Union, MO 63084

Program Name: Chemical Technology, AAS

CIP Code: 41.0301 (Chemical Technology/Technician)

Date: November 12, 2011

Student Preparation

- **Any special admissions procedures or student qualifications required for this program which exceed regular university admissions, standards, e.g., ACT score, completion of core curriculum, portfolio, personal interview, etc. Please note if no special preparation will be required.**

East Central College is an open admission, comprehensive community college. All students, at entry to the college, complete a series of placement tests. Results of the tests guide admissions staff in placement of students in appropriate coursework. Students seeking an AAS or Certificate in Chemical Technology will complete this battery of tests and be placed accordingly. No special entry process or qualification is required.

- **Characteristics of a specific population to be served, if applicable.**

Not applicable.

Faculty Characteristics

- **Any special requirements (degree status, training, etc.) for assignment of teaching for this degree/certificate.**

Faculty teaching in the Chemical Technology program must meet one or both of the following special requirements:

A faculty member and/or the program director must have a minimum of a master's degree in chemistry or chemical technology or related field and extensive chemical technology work experience. A program director will also have experience teaching in a program that trains chemical technologists for industrial laboratory work.

Any other faculty teaching coursework in the program must have a minimum of a master's degree in Chemical Technology, Chemistry (analytical preferred), Chemical Engineering or related field and demonstrate current knowledge in course content through appropriate professional development activities. Faculty must also have work experience in the field.

Whether a faculty member or program director, required credentials will include extensive experience with industrial laboratory equipment and instrumentation.

- **Estimated percentage of credit hours that will be assigned to full time faculty. Please use the term "full time faculty" (and not FTE) in your descriptions here.**

Full time faculty will teach a minimum of 75% of the credit hours in the program. The specialty nature of much of the coursework in Chemical Technology will require strategic use of adjuncts in particular areas of programming. The college anticipates that full time faculty, with the appropriate credentials, will teach the core program offerings in the degree and certificate and rely on adjuncts in specialty areas as described.

- **Expectations for professional activities, special student contact, teaching/learning innovation.**

All students completing the degree or certificate program will enroll in and successfully complete Chemical Technology III; this course includes activities will help students know and understand the work requirements in the profession, gain valuable experience in a professional laboratory, and learn hands on the special types of industrial laboratory work that chemical technologists perform. Within this course students will also design experiments and procedures in compound analysis using appropriate instrumentation and equipment.

Students in the program will also work closely with the faculty in maintaining and troubleshooting laboratory equipment and instrumentation.

Enrollment Projections

- **Student FTE majoring in program by the end of five years.**

Please see Student Enrollment Projection information below.

- **Percent of full time and part time enrollment by the end of five years.**

It is anticipated that full time enrollment will approximate 80% and part time will be 20%. With the current unemployment figures and student enrollments among adults seeking retraining, the college expects enrollment that is higher among full time students for at least the first two to three years of the program.

Please see the Student Enrollment Projection information below for enrollment projection details.

STUDENT ENROLLMENT PROJECTIONS

Year	1	2	3	4	5
Full Time	8	10	14	16	20
Part Time	2	2	4	6	10
Total	10	12	18	22	30

Student and Program Outcomes

- **Number of graduates per annum at three and five years after implementation.**

East Central College anticipates the following number of graduates:

End of three years: 10

End of five years: 12

- **Special skills specific to the program.**

East Central College anticipates student acquisition of the following skills in the Chemical Technology Program:

- The use of appropriate industrial laboratory equipment
- The use of instrumentation for element analysis
- Quality control in industrial and chemical laboratories
- Analytical skills
- Equipment and instrument troubleshooting
- Preparing appropriate reports
- Design of experiments and procedures

- **Proportion of students who will achieve licensing, certification, or registration.**

No licensure or certification is planned at this time. The college continues to use the American Chemical Society (ACS) standards for course design and assessment. The ACS has program information related to the study of Chemical Technology that will be used in the program assessment.

- **Performance on national and/or local assessments, e.g., percent of students scoring above the 50th percentile on normed tests; percent of students achieving minimal cut-scores on criterion-referenced tests. Include expected results on assessments of general education and on exit assessments in a particular discipline as well as the name of any nationally recognized assessments used.**

Students completing the AAS, Chemical Technology, will be expected to test using WorkKeys at program completion. In particular, students completing the program will be expected to test above the 50th percentile on both the Reading for Information and Applied Mathematics portions of the test.

In addition, students completing the program will test using the American Chemical Society assessments. Students will be expected to test above the 50th percentile at exit from the program.

- **Placement rates in related fields, in other fields, unemployed.**

East Central College anticipates placing 100% of its graduates from the program in work specific to the acquired skills or a closely related field. Using the 180 day follow up of graduates, the college will review initial placements and survey employers regarding skills acquired and employer satisfaction.

The college will also work closely with the established Chemical Technology Advisory Committee on placements, job skill acquisition, work place skills, and employee and employer satisfaction surveys.

- **Transfer rates, continuous study.**

East Central College awards the Associate of Applied Science degree as a workforce preparation degree. Students seeking to transfer to a baccalaureate program in Chemical Technology or a related field may wish to pursue an Associate of Arts degree with selected coursework as electives. The college will pursue appropriate articulation agreements with institutions that award such a degree and maintain this information for students.

Program Accreditation

- **Institutional plans for accreditation, if applicable, including accrediting agency and timeline. If there are no plans to seek specialized accreditation, please provide reasons.**

East Central College follows the American Chemical Society (ACS) guidelines in course and program design in Chemistry (AA) and Chemical Technology. The ACS does not accredit Chemical Technology programs but provides guidelines in curriculum and assessment. Any testing or certification established by the ACS will be used. East Central College will pursue other options for program accreditation.

Alumni and Employer Survey

- **Expected satisfaction rates for alumni, including timing and method of surveys**
- **Expected satisfaction rates for employers, including timing and method of surveys**

East Central College has formed an advisory board to assist in the ongoing curriculum and program development work. The advisory board will be a resource to the college in determining satisfaction rates among employers.

Surveys and other assessment tools will be administered to alumni following the program assessment plan. East Central College anticipates that both alumni and employers will

report an average or above average satisfaction rate with the program, program faculty, career preparation skills, job placement, and other criteria relating to the program. The college uses this information to improve programs and program offerings.

Market Demand

Programming in Chemical Technology supports industry by providing trained laboratory professionals to apply basic scientific and chemical principles to industrial and other laboratory environments. In addition, graduates will apply their knowledge of industrial laboratory procedures and equipment in troubleshooting, diagnostics, analysis and maintenance.

Trained professionals fill positions such as laboratory assistant, research assistant, quality control, chemical technicians, food science laboratory technicians, and all other laboratory positions. Agencies hiring such professionals include any business or industry operating a laboratory, food science laboratories and chemical/biological/plant laboratories. Some students may also find employment in health science laboratories.

The Missouri Economic Research and Information Center (MERIC, www.missourieconomy.org) Missouri Hot Jobs report, projecting the average outlook for positions through 2018, lists the following positions, for which a graduate of the chemical technology program would be trained:

- Medical and Clinical Laboratory Technicians
- Environmental Engineering Technicians
- Biological Technicians
- Chemical Technicians
- Food Science Technicians

Average salaries (projected) for these positions range from: \$16.34 per hour to \$25.65 per hour.

In both Franklin County and Phelps County, and their respective regions, no program of study in Chemical Technology exists. In addition, the program would provide an additional option for students seeking study and/or job preparation in a STEM field.

Business and Industry Partners

ECC has enjoyed support from local and regional business and industry. These key industry partners will assist the college in program development, advisory committee work and initial placement of students. Feedback from these industries will be important as the program matures.

Regional partners to support program design include:

Trilogy Laboratory	Washington, MO
St. John's Mercy Hospital	Washington MO
Phelps Country Regional Medical Center	Rolla MO
Brewer Science	Rolla, MO

Financial Projections

Funding for program start up in Chemical Technology was received as a grant award from the Training for Tomorrow grant program out of the governor's office, in

Funding for the program start up has been provided from the Training for Tomorrow grant; these grant dollars were awarded following a competitive grant process out of the governor's office in Spring 2010.

No additional state aid is requested as part of the program development and start up.

Is "new" money requested or is "old" money going to be used? What is the nature of the "old" money?

East Central College anticipates that once the AAS in Chemical Technology degree and certificate are fully operational, any additional expenses incurred by the program will be offset by the tuition generated. Once approved, and as equipment is needed, the college will apply for enhancement grant funding to meet any specific equipment needs.

The college has more than adequate facilities for the course offerings necessary to meet the requirements of the AAS in Chemical Technology; the new Health Science Building has three state of the art chemistry labs and a chemistry instrumentation room.

PROGRAM STRUCTURE

AAS Chemical Technology

Total credits required for graduation: 67 credit hours

Residency requirements, if any:

The East Central College residency requirement for the AAS degree requires that students complete 15 of the last 30 credit hours in the degree program at East Central College; within those 15 credit hours must be two courses taken from the major/degree area

General education:

Courses (specific courses OR distribution area and credits):

FS	1001 Student Success	1
PE	1081 Intro to Fitness & Wellness	1
EN	1223 English Comp I	3
BI	1323 Principles of Biology	3
BI	1332 Principles of Biology Labortory	2
PS	1203 US Govt: Nat & State	3
	Humanities Requirement	3
MT	1505 Precalculus	5
EN	1333 English Comp II	3

Total, General Education Requirement 24 Credits

Major requirements:

General Chemistry I, Lecture and Lab	5
General Chemistry II, Lecture and Lab	5
College Physics I, Lecture and Lab	5
Organic Chemistry I, Lecture and Lab	5
Organic Chemistry II, Lecture and Lab	5
Intro to Computers (or programming course)	3
New Intro to Chemical Technology	1
New Chemical Technology I	2
New Analytical Chemistry, Lecture and Lab	5
New Chemical Technology II	2
New Chemical Technology III, Lecture and Lab	5
Total, Major Requirements	43 Credits

Free elective credits: 0

Semester by Semester Outline

Fall	Cr Hrs
FS 1001 Foundation Seminar	1
CHT Intro to Chemical Technology	1
Oral Communications/Humanities	3
MT 1505 Precalculus	5
EN 1223 English Comp I	3
CH General Chemistry I, Lecture and Lab	5
Total	18

(Summer)	Cr Hrs
BI 1323 Principles of Biology	3
BI 1332 Principles of Biology Laboratory	2
Total	5

Spring	Cr Hrs
CH General Chemistry II, Lecture and Lab	5
PH College Physics I, Lecture and Lab	5
EN 1333 English Comp II	3
CHT Chemical Technology I	2
Total	15

Fall		Cr Hrs
CH	Organic Chemistry I, Lecture and Lab	5
New	Analytical Chemistry, Lecture and Lab	5
PS	1203 US Govt: Nat & State	3
New	Chemical Technology II	2
		Total 15

Spring		Cr Hrs
CH	Organic Chemistry II, Lecture and Lab	5
CHT	Chemical Technology III, Lecture and Lab	5
	Intro to Computers (or programming course)	3
PE	1081 Intro to Fitness & Wellness	1
		Total 14

Total AAS Chemical Technology Program Credits 67 Cr Hrs

Course Catalog: Chemical Technology

CHT 1201 1.0

Intro to Chemical Technology

This course is developed to help students to discover the dynamic, multifaceted, and exciting opportunities in the chemical industry, and skills needed for chemical technicians to meet the challenges in their field. Pre/Corequisite: MT 1505

CHT 1612 2.0

Chemical Technology I

This course is the first of the series of courses that will focus on the concepts and theories associated with skills needed by chemical technicians. Topics include the sample preparation and the process of analysis, acid/base equilibrium, volumetric analysis, introduction to chromatography (GC, GC-MS, TLC, HPLC) and spectroscopy (UV-vis, FTIR). Depending on the number of students, experiments involving specialized equipment may be done by rotating people through different instrumental stations. Prerequisite: MT 1505 and CH 1303/CH 1312 with a grade of "C" or better

CHT 2412 2.0

Chemical Technology II

This course is the second of the series of courses that will focus on the concepts and theories associated with skills needed by chemical technicians. Topics include the continuation preparation and the process of analysis, acid/base equilibrium, volumetric analysis, extraction, chromatography (GC, GC-MS, TLC, HPLC), and spectroscopy (UV-vis, FTIR). Depending on the number of students, experiments involving specialized equipment may be done by rotating people through different instrumental stations. Prerequisite: CHT 1612 and CH 1403/CH 1412 with a grade of "C" or better.

CHT 2502 2.0

Analytical Chemistry Lecture

CH 2502, Analytical Chemistry Lecture (2 credit hours) and CH 2513, Analytical Chemistry Laboratory (3 credit hours) require concurrent enrollment. These courses will present the principles of analytic chemistry with an emphasis on quantitative analysis. Topics include the process of analysis, acid/base equilibrium, volumetric and gravimetric analysis, potentiometric measurement, chromatography (GC, GC-MS, TLC, HPLC), and spectroscopy (UV-vis, FTIR). Depending on the number of students, experiments involving specialized equipment may be done by rotating people through different instrumental stations.

Prerequisite: CH 1403/CH 1412 with a grade of "C" or better Corequisite: CHT 2513

CHT 2513 3.0

Analytical Chemistry Lab

CH 2502, Analytical Chemistry Lecture (2 credit hours) and CH 2513, Analytical Chemistry Laboratory (3 credit hours) require concurrent enrollment. These courses will present the principles of analytic chemistry with an emphasis on quantitative analysis. Topics include the process of analysis, acid/base equilibrium, volumetric and gravimetric analysis, potentiometric measurement, chromatography (GC, GC-MS, TLC, HPLC), and spectroscopy (UV-vis, FTIR). Depending on the number of students, experiments involving specialized equipment may be done by rotating people through different instrumental stations.

Prerequisite: CH 1403/CH 1412 with a grade of "C" or better Corequisite: CHT 2502

CHT 2602 2.0

Chemical Technology III Lec

This course is the third of the series of courses that will focus on the concepts and theories associated with skills needed by chemical technicians. Topics includes advanced studies in acid/base equilibrium, volumetric analysis, extraction, chromatography (GC, GC-MS, TLC, HPLC), and spectroscopy (UV-vis, FTIR). Depending on the number of students, experiments involving specialized equipment may be done by rotating people through different instrumental stations. An internship with a local company will also have a graded component.

Prerequisite: CHT 2412 and CH 2303/CH 2312 with a grade of "C" or better.

Corequisite: CHT 2613

CHT 2613 3.0

Chemical Technology III Lab

This course is the third of the series of courses that will focus on the concepts and theories associated with skills needed by chemical technicians. Topics includes advanced studies in acid/base equilibrium, volumetric analysis, extraction, chromatography (GC, GC-MS, TLC, HPLC), and spectroscopy (UV-vis, FTIR). Depending on the number of students, experiments involving specialized equipment may be done by rotating people through different instrumental stations. An internship with a local company will also have a graded component.

Prerequisite: CHT 2412 and CH 2303/CH 2312 with a grade of "C" or better.

Corequisite: CHT 2602