New Program Request Form

CA1

General Information

Institution Submitting Proposal	Manhattan Area Technical College
Name and Title of Contact Person	Marilyn Mahan, Vice President of Instructional Services
Title of Proposed Program	Advanced Applied Laboratory Technician Certificate
Proposed Suggested CIP Code	41.0000
Degree/Certificate Program Description	Certificate – This certificate program prepares students to apply scientific principles and technical skills in support of a variety of laboratories. The program includes instruction in standard laboratory practices and procedures; techniques for analysis, testing and inspection; laboratory instrumentation and equipment operation and maintenance; laboratory and materials handling safety; and computer applications that would apply to the broad spectrum of biotechnology industries including health and medical, industrial and environmental, food and agriculture, as well as other emerging industries in the growing field of biotechnology. This advanced certificate program requires a prior degree award in a science field as well as specific science course work.
Number of Credits for the degree and/or certificate	32
Academic Unit	Allied Health / Science
Proposed Date of Initiation	August 2010
Specialty Accrediting Agency	N/A
Location(s) of Program	Manhattan, Kansas; student laboratory locations across the state for this collaborative program
Summary of Demand for the Program (including source of data)	With our region's success in acquiring the National Bio- and Agro-Defense Facility (NBAF) and the developing animal science/biotech corridor (which includes MATC's service region), our advanced bio-technician certificate training is both timely and essential. NBAF and the many related industries that will follow require a workforce trained in bioscience, with the skills to work in Biosafety Level (BL) 3 and BL 4 facilities. MATC intends to develop

	and provide this type of technical training. The Advanced Laboratory Technician Certificate is an advanced technical certificate, providing an additional opportunity in the career pathway within the laboratory technology field. This level of applied training and education can be achieved through numerous pre-selected pathways. One path may begin with high school graduates (entry-level bio-technician training), progressing to an Associate's Degree using medical laboratory technology, agri-biotechnology, or other biotechnology associates degrees. A second path would be considered a reverse matriculation where a person holding a Bachelor's or higher degree in a science-related field, yet without applied laboratory expertise, would continue in this specialized training for work as a technician in a laboratory setting specifically geared toward the type of research to be conducted at the NBAF facility or the many symbiotic companies that will be located in this region.
Listing of other similar programs in state/region (including enrollments and capacity)	Cloud County Community College, AAS in Bio-Technology (41.0101) – Fewer than 15 enrolled in Intro to Biotechnology on both the Cloud County and Geary County campuses Spring 2010 Johnson County Community College, AAS & Certificate in Bio-Technology (41.0101, 41.0301) – Fall 2009 147 declared majors – 126 degree seeking and 26 certificate seeking
Date Institution entered into Program Inventory	February 2, 2010

Signature of College Official_____ February 2, 2010

Signature of KBOR Official_____ Date

Manhattan Area Technical College
Advanced Applied Laboratory Technician
32 Credit Hour Certificate Program

Program Description

- Provide a complete catalog description for the proposed program.

  This Advanced Applied Laboratory Technician certificate program prepares students to apply scientific principles and technical skills in support of a variety of laboratories. The skill development will be accomplished by offering laboratory experiences leading to competency, which is beyond offering the principles of testing or theory. Skill development will include instruction in standard laboratory practices and procedures; techniques for analysis, testing and inspection; laboratory instrumentation and equipment operation and maintenance; laboratory and materials handling safety; and computer applications that would apply to the broad spectrum of biotechnology industries including health and medical, industrial and environmental, food and agriculture, as well as other emerging industries in the growing field of biotechnology.

  This advanced certificate program requires a prior degree award in a science field as well as specific science course work. The 32 credit hour program can be completed in two semesters with additional time to complete an internship in a specific area, i.e. food science, animal science, plant science, or other laboratory/research area.

- List and describe the admission requirements and the graduation requirements for the proposed program.

  Admission Requirements
  - Background check (must be completed prior to the Internship)
  - Degree (A.S., A.A.S., B.S., M.S.) in life sciences or chemistry
  - Completion of two of the three biology courses
    - Cell Biology
    - Principles of Biology
    - Modern Genetics
  - Chemistry I
  - Chemistry II
  - General Microbiology

  Graduation requirements
  - Successful completion of 27 technical credit hours.
  - Successful completion of a 5 credit hour internship.

- List and describe the specific objectives for the proposed program.

  - To provide crosscutting industry-wide technical laboratory competencies that will create career lattices for movement across industry subsectors, thereby creating an agile workforce

(Employment and Training Administration, United States Department of Labor, www.doleta.gov).

- To educate students in the fundamental laboratory skills needed to contribute to the biotechnical laboratory. These skills include lab safety, protein isolation and separation techniques, cell culture, use of recombinant DNA, quality control, and competency in common current biotechnical laboratory procedures.

- To provide specific but practical training in the workplace skills that would support a smoother transition of students into the technical environment of bioscience and related industries. The skills gained will be of enormous value to certificate holders entering the biotechnology workforce by providing them with an edge over other job applicants.

- Describe how the proposed program relates to the institutional mission.

  The mission of Manhattan Area Technical College is to provide quality technical and general education to prepare individuals to pursue technologically advanced careers and lead productive lives.

  Using techniques at the forefront of modern laboratory technology, the Advanced Applied Laboratory Technician certificate will prepare workers with the technical skills needed to meet the anticipated demand from bioscience industry employers as well as research companies in the animal science corridor. This unique program will generate a new, highly trained workforce for an emerging high skill, high wage, and high demand career.

Demand for the Program

- Describe the student demand for the program and how the level of interest was determined.

  Determining student demand for an emerging workforce in the broad area of laboratory or biotechnology is a challenge. The impetus for this advanced certificate revolves around preparing the future workforce for the laboratories and research facilities that will be located or relocated in this region. The goal is to attract students with the prospect of jobs that correlate to industry demand in the region. Appendix A contains letters of support from the following:

  - Kansas Bioscience Authority, Thomas V. Thornton, President and CEO
  - Manhattan Area Chamber of Commerce, Lyle Butler, CEO
  - Kansas State University, R. W. Trewyn, PhD, Vice President for Research

  In the publication *Educating Biotechnicians for Future Industry Needs* (A report from a conference sponsored by the National Science Foundation and the American Association of Community Colleges, April 28-30, 2008. (Link to Bio-Tech Final Report), it was noted that "80% of the students enrolled in biotech programs at Austin Community College have already earned at least bachelor's degrees, usually in a science or technology field. The post baccalaureate students, sometimes referred to as reverse articulation students, come to the community college to learn the laboratory skills they need to gain entry with biotech employers in their area"(p. 14). "The traditional progression from high school to college to work no longer applies to the many adult students who enter and exit postsecondary educational institutions multiple times even after they have earned degrees and begin careers" (*Educating Biotechnicians for Future Industry Needs, p. 12).* While Manhattan Area Technical

College cannot report that same reverse articulation across the board, the college does enroll many students with associates degrees or degrees from universities coming to the college to take the nursing or medical laboratory technology programs. We anticipate that trend to continue as we work collaboratively with both two-year and four-year institutions to move students into skilled technical laboratory technician careers.

Dr. Beth Montelone, Interim Director for the Bio-Research Institute and Associate Dean of the College of Arts and Sciences at Kansas State University, has indicated that the skills of a laboratory technician are critical to the research industry. While the bachelor or associate'degree prepared individuals come with a foundational knowledge of science and biotechnology, the laboratory skills of these individuals are critical. At the *Educating Biotechnicians for Future Industry Needs* conference, educators and professionals reported that two-year colleges provide associate degrees and certificates and university research facilities offer employment; however, gaps exist between these educational sectors and the real world (p. 15). The goal of the advanced laboratory technician certificate at Manhattan Area Technical College is to fill that gap.

- Identify employer demand/labor market need, employment trends and projections (existing and anticipated openings), and estimated starting wages. Provide sources of data.

  "The biotech industry is hungry for skilled workers, but there are concerns that difficulties in finding such workers could impede the industry's growth in the United States" (*Educating Biotechnicians for Future Industry Needs,* p. 8).

  At the *Educating Biotechnicians for Future Industry Needs* conference, keynote speaker James C. Greenwood, President and Chief Executive Officer of the Biotechnology Industry Organization (BIO), applauded community colleges for providing "the gateway for many career paths in our industry," and encouraged them to continue focusing on basic biotechnology skills. "Our companies need workers with knowledge of molecular biology, biochemistry, and cell culture. They need workers who can perform basic research, operate standard lab equipment, understand instrumentation, and follow established lab protocols. Specific procedures for advanced skills can be taught by companies' inhouse education programs, but only if workers have the basic foundations in practical laboratory procedures. We need workers with excellent team work, record-keeping, and communications skills." Greenwood noted that technicians who possess these technical skills and soft skills are able to pursue careers "not just in basic research, but jobs in drug discovery, translational research, clinical research, and FDA compliance. Lab skills and experience are also part of a good background for careers outside the labs such as biotech marketing, licensing, technical services, and managing intellectual property" (*Educating Biotechnicians for Future Industry Needs,* p. 8).

  According to the *US Occupational Outlook Handbook*, (Link to US OOH), employment of science technicians is projected to grow about as fast as the average for all occupations, although employment change will vary by specialty. Job opportunities are expected to be best for graduates of applied science technology programs who are well trained on equipment used in laboratories or production facilities.

  Employment change. Overall employment of science technicians is expected to grow by 12 percent during the 2008–18 decade, about as fast as the average for all occupations. The continued growth of scientific and medical research—particularly research related to biotechnology—will be the

primary driver of employment growth, but the development and production of technical products should also stimulate demand for science technicians in many industries.

Employment of biological technicians should increase by 18 percent, faster than average, as the growing number of agricultural and medicinal products developed from the results of biotechnology research boosts demand for these workers. Also, an aging population and continued competition among pharmaceutical companies are expected to contribute to the need for innovative and improved drugs, further spurring demand. Most growth in employment will be in professional, scientific, and technical services and in educational services.

Employment of agricultural and food science technicians is projected to grow by 9 percent, about as fast as average. Research in biotechnology and other areas of agricultural science will increase as it becomes more important to balance greater agricultural output with protection and preservation of soil, water, and the ecosystem. In addition, there will be increased research into the use of agricultural products as energy sources, also known as biofuels.

Jobs for forensic science technicians are expected to increase by 20 percent, which is much faster than average. Employment growth in state and local government should be driven by the increasing application of forensic science techniques, such as DNA analysis, to examine, solve, and prevent crime.

Job prospects. In addition to job openings created by growth, many openings should arise from the need to replace technicians who retire or leave the labor force for other reasons. Job opportunities are expected to be best for graduates of applied science technology programs who are well trained on equipment used in laboratories or production facilities. As the instrumentation and techniques used in industrial research, development, and production become increasingly more complex, employers will seek individuals with highly developed technical skills.

Projections Data (About this section)

Projections data from the National Employment Matrix

Occupational Title	SOC Code	Employment, 2008	Projected Employment, 2018	Change, 2008-18	
				Number	Percent
Science technicians	—	270,800	302,600	31,800	12
Agricultural and food science technicians	19-4011	21,900	23,800	1,900	9
Biological technicians	19-4021	79,500	93,500	14,000	18
Chemical technicians	19-4031	66,100	65,500	-500	-1
Geological and petroleum technicians	19-4041	15,200	15,400	200	2
Nuclear technicians	19-4051	6,400	7,000	600	9
Environmental science and protection technicians, including health	19-4091	35,000	45,200	10,100	29
Forensic science technicians	19-4092	12,800	15,300	2,500	20

Projections data from the National Employment Matrix

Occupational Title	SOC Code	Employment, 2008	Projected Employment, 2018	Change, 2008-18	
				Number	Percent
Forest and conservation technicians	19-4093	34,000	36,900	2,900	9

Earnings (About this section)

Median hourly wages of science technicians in May 2008 were as follows:

Nuclear technicians	$32.64
Geological and petroleum technicians	25.65
Forensic science technicians	23.97
Chemical technicians	20.25
Environmental science and protection technicians, including health	19.34
Biological technicians	18.46
Agricultural and food science technicians	16.34
Forest and conservation technicians	15.39

In March 2009, the average annual salary in the Federal Government was $39,538 for biological science technicians, $55,527 for physical science technicians, and $42,733 for forestry technicians.

The *Kansas Occupational Outlook* data for 2004-2014 identifies growth in the following occupations: food scientists and technologists, agricultural and food science technicians, biological technicians, chemical technicians, and environmental science and protection technicians, including health. While the growth is modest, the projection was completed prior to the announcement of the National Bio- and Agro-Defense Facility's relocation to Manhattan, Kansas.

Regional Outlook. While the data from the *US Occupational Outlook Handbook* speaks favorably to the employment need in general for those trained in biotechnology, the employment outlook for this region is very promising when considering the opportunities NBAF brings. The skills gained by students completing the Advanced Applied Laboratory Technician certificate will be cross-cutting. In other words, employment opportunities within a research community such as Manhattan will allow certificate graduates to obtain gainful employment in the medical sector, research laboratory sectors at Kansas State University, start-up companies with a bio-technology focus, as well as any other laboratory that requires skilled technicians. According to a hiring official of Kelly Scientific, the most significant development in biotech over the next years will be the *lack of a qualified workforce to meet the needs of the emerging technologies.*

NBAF will be a bio-containment facility for studying foreign animal and animal-to-human diseases. During its normal operations, it will employ approximately 500 individuals (300 of whom will be scientists) with an annual payroll of $25 million to $30 million. Construction will begin in 2010, and the facility should open by 2015. We must be ready with trained, skilled workers in advance of the 2015 opening date, and the Advanced Applied Laboratory Technician Certificate will accomplish this.

Researchers at this type of facility need support staff to assist them in conducting their research efficiently. (It is said that 100 staff, some of whom are technicians, are required to support the work of one scientist.) The Plum Island research facility (which will be replaced by NBAF) employs the following types of technicians:

- Agricultural Engineering Technician
- Biological Science Aide
- Biological Science Technician (Plants)
- Biological Science Technician (Soil)
- Biological Science Technician (Insects)

Since the announcement of NBAF, additional research labs/related industries have been inquiring about locating in the region. It is estimated that up to 100 additional bioscience businesses/ industries will become established in the Manhattan area as a result of the NBAF decision – and these will require trained technicians as well. Companies recently announcing their move to Manhattan include Megastarter, Midwest Research Institute, and the ARS Center for Grain and Animal Health research (formerly ABADRL). While scientists and the technologists are being encouraged to relocate to the area, many support employees (technicians) such as those listed below will not find it economically feasible to relocate their families in response to the company's movements. Therefore, it is imperative that a regional workforce be developed to meet the needs of these projects.

Salary Information for Lab Assistant

Job Title	**Low**	**High**
Lab Assistant I	$22,457	$37,404
Lab Assistant II	$26,524	$43,024
Lab Assistant III	$32,103	$53,842

Source: Salary.com 66502 zip code

The curriculum that has been developed, with input from a variety of research institutions and businesses and industries serving on the Program Advisory Committee, along with the information provided from our research, meets the current needs of the industry. While it is not known how many companies will be located in this region nor what the specific focus of all those companies will be, the curriculum has been developed to be flexible and fluid to meet a variety of needs. The identified competencies and program outcomes were developed with input from multiple departments at Kansas State University, including animal science, food science, plant pathology, veterinary diagnostic laboratory, and the division of continuing education. Depending on the needs of any particular company, the curriculum can be modified in both content and delivery to ensure that industry needs are met.

- Show demand from the local community. Provide letters of support from at least three potential employers.

At the program advisory committee meeting held on November 19, attendees provided the following comments in support of the development of an advanced laboratory certificate training program:

- Dr. Gary Anderson, College of Veterinary Medicine, KSU – There is a gap that needs to be filled with the laboratory setting including laboratory safety. The questions is, Where do we need to be? Not, where are we now? Testing within this setting should be on proficiency—doing the task over and over and performing consistently at a high level.
- Dr. Duane Davis, Professor of Animal Science, KSU – Undergraduate and graduate science courses teach the principles of testing, not competency development.
- Dr. Curtis Kastner, Director of the Food Science Institute, KSU – this certificate would expect "performance" levels for students, i.e. a proficiency level for every competency.
- Dr. Beth Montelone, Interim Director for BRI and Associate Dean for College of Arts and Sciences – students need to come with a strong knowledge-base and then develop the skills through the advanced laboratory training.

While the comments from the PAC attendees are from the university level, their comments echo the research and concerns from business and industry—students come to a variety of laboratory settings from a variety of educational levels. Critical to any laboratory is the foundational knowledge as well as the skill of the technician. Advanced applied laboratory technician skills would be transferable to any laboratory setting.

The Manhattan Area Chamber of Commerce letter of support states that "the Chamber has been informed that over the next 10-15 years up to 50 bioscience companies related to NBAF could locate to MATC's service area. These impressive numbers along with the anticipated 200 employees at NBAF to support the 300 researchers and scientists means that as a region and state we must respond to the workforce needs of this rapidly growing industry."

A review of the program advisory committee shows the variety of individuals involved in creating this program. The program was designed with input from the industries in the region that would hire students completing the advanced laboratory technician certificate. The industry partners identified competencies required and the proficiency level required; those competencies were then associated with specific courses. Consequently, business and industry, as validated by the attached letters of support, created the program to ensure a skilled workforce in the region. Following are the companies/individuals who wrote letters of support (Appendix A):

- Kansas State Veterinary Diagnostic Laboratory, Gary A. Anderson, DVM, MS, PhD
- Edenspace Corporation, Janet Dean, Human Resource Officer
- Kansas State University, Biosecurity Research Institute, Julie Johnson, Assistant Vice President for Research Compliance, Biosafety Officer; Beth Montelone, Associate Dean, College of Arts & Sciences, Interim Director; Scott Rusk, Director, Pat Roberts Hall

- Describe any business/industry partnerships specific to the proposed program.

  Internship is a requirement of the program. Because this program is preparing laboratory technicians for the businesses to come, specific letters of commitment are not available at this time. As the program matures and companies locate to our area, we will actively pursue internship opportunities.

Duplication of Existing Programs

- Identify other similar programs in the state based on CIP code, title and content. For each of the similar programs provide the following: Name of the institution, Name of the Program, Number of students enrolled, Number of slots available.

  While there are other institutions in Kansas with programs in biotechnology or medical laboratory technology, no program addresses the "gap" that exists for skilled laboratory technicians. The focus of the biotechnology AAS and certificate programs at both Cloud County Community College and Johnson County Community College provide the essential and required science background and the laboratory skills associated with content-specific curriculum. The focus of the Advanced Applied Laboratory Technician Certificate program at Manhattan Area Technical College is to advance those students with basic understanding of science and laboratory background to a level of skill proficiency that meets industry needs. Through the completion of a 5 credit hour internship, students will perfect and tailor their skills to a specific laboratory setting. The curriculum addresses the recommendations that emerged out of the *Educating Biotechnicians for Future Industry Needs* conference:

  (1) Instruction in written and verbal communication, and "soft skills" such as teamwork and time management;
  (2) Core curriculum courses that transfer and articulate from high school to two-year and four-year degree programs;
  (3) A strong theoretical understanding of the entire manufacturing process encompassing upstream and downstream processes;
  (4) The introduction of emerging technologies in basic biotechnology courses; and
  (5) The redesign of standard microbiology and biology curricula to include applications in industrial and environmental biotechnology.

- Provide evidence that, if other similar programs exist, collaboration was pursued.

  The content for this program as well as the prior preparation required is unique; therefore, collaboration in the traditional sense of the word and the traditional model for the Kansas Board of Regents is difficult to apply to this certificate program. In its truest sense of the word, this is a reverse certificate, one that requires completion of a degree program as well as specific science courses **prior** to entry into the program.

  This certificate program is being developed with collaboration at the forefront. The program was designed with input from the business and industry sector as well as the Regents universities and community college sectors. MATC will require students to have completed their prerequisite coursework and degree from an accredited community college or university. MATC's area of expertise is in teaching the technical skills required to work in a laboratory setting, applying the language and skills developed in previous course work.

  Cloud County Community College and Kansas State University have been involved in the development of this program since August 2009 when the first meeting was held to introduce the concept of an advanced laboratory technician program. Several departments/divisions of Kansas State University (Department of Plant Pathology, School of Veterinary Medicine, Division of Food Sciences, Division of Continuing Education) became aware of MATC's plan to develop advanced level courses for biotechnician training. Faculty and directors from these programs believed that MATC's

courses could provide theoretical and particularly applied instruction to help students gain laboratory competencies in the upper-level biotechnical courses they were taking. Representatives from both institutions began meeting to discuss the potential for sharing biotechnology curriculum. Now an active partnership with KSU, and secondarily with Johnson County Community College's Biotechnology program, has begun coordinating and aligning credit courses from all three institutions that can be accessed by students at each college. Letters of support for collaboration include the following (See Appendix A):

- Kansas State University Division of Continuing Education, Sue Maes, Dean
- Cloud County Community College, Kim Krull, Vice President for Academic Affairs

The partners began the process of determining appropriate coursework for biotechnology training that would culminate in a KSU certificate in Agriculture Biotechnology. The review included courses currently offered at both institutions, as well as new courses that would be appropriate. The result is shown in the table below. Interestingly, *over half the required courses come from MATC's Advanced Applied Laboratory Technician training.* KSU intends to list these courses in their catalog and will enroll students, but will contract with MATC to actually provide the classes. The table below reflects the collaborative work that has emerged to move this initiative forward.

	REQUIRED COURSES FOR KSU AGRICULTURE BIOTECHNOLOGY CERTIFICATE	**Cr Hrs**	**Responsible Institutions**	**Curriculum Dev. Needed**
Foundational Laboratory Techniques	Laboratory Safety	2	JCCC, **MATC**, KSU	Yes
	Biotechnology Methods and Procedures I	3	**MATC**	Yes
	Biotechnology Methods and Procedures II	4	**MATC**	Yes
Biotechnology Concepts/Lab Applications	Biotechnology Methods and Procedures III	4	**MATC**	Yes
	Biotechnology	3	KSU	No; align with online format
	Agricultural Biotechnology Laboratory	2	KSU	No; align with online format
Production Agriculture and Food Processing	Multidisciplinary Overview Food Safety and Security	2	KSU	No; align with online format
	Food Protection and Defense: Essential Concepts	2	KSU	No; align with online format
	OPTIONAL COURSES	**Cr Hrs**	**Responsible Institutions**	**Curriculum Dev. Needed**
Theory and Techniques	Overview: Agriculture Biotechnology Careers	3	JCCC, **MATC**, KSU	Yes
	Immunology	3	KSU	No
	Immunology Lab	2	KSU	No

- Provide extensive evidence and rational for why collaboration was not a viable option and why there is a need for a duplicative program.

  This is **not** a duplicative program. While students gain laboratory experience in their undergraduate work at a community college or university through their application of theory to laboratory experiences, this certificate program addresses the gap between theory and foundational competencies in the real world of the laboratory technician. Collaboration **is** occurring; the content is being developed jointly, including the development of content for online delivery of the smaller portion of didactic content with extensive hands-on skill development in a laboratory setting. The intention of this program is to deliver all lectures online with skill development occurring in laboratories at multiple locations including other two-year colleges in Kansas. Students completing their laboratory course work in a different location will also pursue internship opportunities in those locations or in any laboratory throughout the United States. The focus of this certificate program is not on the principles of laboratory testing; the focus is on developing competency in laboratory skills.

Program Information

- Identify by prefix, number, title, and description (including prerequisites) courses to be required or elective in the proposed program.

  Prerequisites

  Prior to entry into the Advanced Applied Laboratory Technician Certificate program, students must have completed an AAS, AS, BS or higher degree in a science field that includes course work in the following areas:

  - Completion of two of the following three courses:
    - Cell Biology
    - Principles of Biology
    - Modern Genetics
  - Chemistry I
  - Chemistry II
  - General Microbiology

  Technical Specialty

  BIO 210 Laboratory Operations (4 credits) This course is an introduction to technical writing, technical math and common regulations used in the laboratory. The class offers practice in document design and editing. The types of correspondence include memos, letters, e-mail, reports, and instructional manuals. The laboratory math component prepares students for the advanced problem solving applications associated with laboratory practice.

  BIO 225 Laboratory Safety (2 credits) This course will enable the student to practice the secure use and handling of biological and chemical materials. Other topics covered will include safety procedures in Biosafety Level 2 and 3 labs, infectious disease, food security and national security agencies and regulations.

  BIO 226 Laboratory Safety Lab (1 credit)

BIO 250 Biotechnology Methods & Procedures I (2 credits) This course introduces the basic skills and knowledge necessary in a biological or chemical laboratory. Emphasis is placed on good manufacturing practices, safety, solution preparation, and equipment operation and maintenance following standard operating procedures. Terminology for the molecular biology lab as well as immunological concepts will be reviewed. Additionally, procedures for keeping records and a laboratory notebook will be covered as well as basic concepts of patents and other intellectual property.

BIO 251 Biotechnology Methods & Procedures I Lab (3 credits)

BIO 260 Biotechnology Methods & Procedures II (2 credits) This course introduces students to the basic techniques used in culturing tissues and cells. Topics covered include sterile and aseptic technique, media preparation, cell count and viability, cryopreservation, subculturing and research applications using cell cultures

BIO 261 Biotechnology Methods & Procedures II Lab (3 credits)

BIO 270 Biotechnology Methods & Procedures III (2 credits) This course will prepare students to use general strategies to purify proteins. Specific methods include determining specific activities for enzymes, extraction of proteins from bacterial cells, salting out, dialysis, ion exchange chromatography and polyacrylamide gel electrophoresis.
BIO 271 Biotechnology Methods & Procedures III Lab (3 credits)

BIO 280 Biotechnology Methods & Procedures IV (2 credits) This course will enable students to work with a small-scale laboratory processes utilizing prokaryotic or eukaryotic cells in fermentation procedures. Topics include batch process records, fermentation theory, and medium formulation, techniques used for cell harvesting, cell disruption and fractionation methods, as well as distillation, liquid-liquid extraction, different types of chromatography and emerging technologies for product recovery. Upon completion, students should be able to set up a fermentor; grow prokaryotic and eukaryotic cells, and isolate and collect various fractions derived from fermentation.

BIO 281 Biotechnology Methods & Procedures IV Lab (3 credits)

BIO 299 Internship (5 Credits) This internship allows students to gain real job experience in the biotechnology industry before completion of the certificate. The intern will be placed in an industry involved in one of the program's focus areas and should last 5 weeks.

- If the proposed program includes multiple curricula (tracks, concentrations, emphases, options, specializations), identify courses unique to each alternative.

  This certificate program is developed to meet the needs of a broad spectrum of businesses and industries, as well as research facilities that employ or will employ laboratory technicians. The program is designed to provide crosscutting industry-wide competencies to make it possible to create career lattices within the industry. The program is not designed to narrowly focus on a single occupational career ladder or industry sector within the bioscience field. Instead, the program is designed to support the development of an agile workforce to respond quickly to the various laboratory technician needs that will emerge as this corridor continues to evolve.

- Provide a Program of Study/Degree Plan outline for the proposed program including semester-by-semester outline that delineates required and elective courses.

  The traditional model of delivery, i.e. a semester-by-semester curriculum, will be modified to fit a flexible schedule as well as flexible delivery. The intention of the Program of Study is to be responsive to the needs of business and industry as well as to accommodate intensive laboratory experiences for the students. Students will be required to take the courses in the order in which they have been described; however, it is possible that course work might be delivered in a modular format, a condensed format, during an interim semester basis, or other alternative form of delivery. Typically, students would complete the coursework in two semesters with the internship occurring after completion of that coursework. See Appendix B for a suggested Program of Study/Degree Plan.

- Provide a copy of the competency profile or a comprehensive list of competencies developed for the proposed program.

  See Appendix C.

- Indicate any internship and/or opportunities for students to apply the knowledge and skills attained.

  As stated earlier, internships are critical to this certificate, especially as this region continues to emerge as a leader in biotechnology, and multiple businesses and industries emerge with a range of needs. The five credit hour internship requirement will allow students to focus on a specific area of interest, including animal, plant, food, entomology, or medical, as well as opportunities with incubator companies located at NISTAC **(**National Institute for Strategic Technology Acquisition and Commercialization) in Manhattan or research labs at Kansas State University. Additionally, because this program is developed with collaboration at the forefront, internship opportunities will be identified in the animal science corridor, from Salina, Kansas, to Columbia, Missouri.

- Identify the career cluster and pathway to which the proposed program belongs.

  The broad category of *Health Science Career Cluster; Biotechnology Research and Development Pathway:* Careers in the Biotechnology Research and Development pathway involves bioscience research and development as it applies to human health. The emerging One Health concept, a worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans and animals (One Health Link, 11/16/2009), more completely identifies our desire to create a program with broad implications in the field of laboratory technology. According to the website, "the synergism achieved will advance health care for the 21st century and beyond by accelerating biomedical research discoveries, enhancing public health efficacy, expeditiously expanding the scientific knowledge base, and improving medical education and clinical care."

  To put this program into a specific cluster/pathway while the field is emerging is not representative of one of the outcomes of the program—to provide crosscutting industry-wide technical laboratory competencies that will create career lattices for movement across industry subsectors, thereby creating an agile workforce (Bioscience Competency Model, Employment and Training Administration, United States Department of Labor).

- Describe the proposed program's curriculum integration/articulation plan (tech prep, 2+2 etc.).

  The Advanced Applied Laboratory Technician articulation flowchart (see Appendix D) visually explains the multiple avenues for entry into the advanced certificate program. Students completing the following degrees as well as meeting the program prerequisites would be eligible to apply to the program:

  1) Associate of Applied Science or Associate of Science degrees with an emphasis in biotechnology, biology, chemistry, medical laboratory technology, or other appropriate science degrees. Students with this background would be able to advance their job opportunities as a laboratory technician through this certificate program.
  2) Bachelor Degree, Master degree, or higher with an emphasis in biology, chemistry, or other types of science curricula. Students with this higher-skill level would be able to move into laboratory technician positions with the opportunity to advance more rapidly into research assistant positions.

  MATC has created options for students who would like to explore the laboratory technician career pathway. Following are two options developed through a Workforce Solutions Grant as well as a grant developed in cooperation with the Manhattan Adult Learning Center:

  1) MATC has created a course entitled Introduction to Biotechnology Careers that will be offered in an online format for students at the high school level or students exploring laboratory career choices. Through a **grant** entitled **Kan-Go: Transitioning Adult Learners from Adult Education to Biotechnician Training** in partnership with the Manhattan Adult Learning Center this course was developed specifically to be offered to students at the Adult Learning Center to help them explore the laboratory career opportunities that are or will be available in this region. This course will also be offered to high school students to use as an elective credit within the health sciences or science career cluster.
  2) Through a **Workforce Solutions Fund Grant** through the Department of Commerce awarded in February 2009, MATC partnered with the WIRED grant in the Kansas City area to offer the 150 clock hour Basic Applied Laboratory Technician Training program. MATC will offer its first training opportunity in the spring of 2010. This entry-level program is open to a variety of students, including high school students, retraining workers, or students with degrees.

- List any specialized accreditation required and/or available for the proposed program and describe the institution's plan to achieve that accreditation.

  At this time, there are no third-party credentialing opportunities for students nor are there any outside accrediting agencies for programs such as this. However, one of the recommendations that came out of the *Educating Biotechnicians for Future Industry Needs* conference is for educational institutions to develop a process to reach agreement on standards for accreditation of biotech programs and certification of academic credentials for biotechnicians. MATC would be honored to be a part of this process to ensure that both the training and the content have met business and industry standards.

- Identify any existing industry-recognized credentials related to this program.

  At this time one credential has been identified: Registered Biosafety Professional (RBP) from the American Biological Safety Association Criteria for registry.

- **Provide all syllabi for the proposed program.**

  All course outlines are provided in Appendix E. Syllabi, documents distributed to students, will be developed as the courses are offered.

Faculty

- Describe faculty qualifications and/or certifications required to teach in the proposed program.

  Requirements for faculty to teach in this program will be determined by each specific course to identify those individuals qualified in the specific laboratory topics, including academic preparation, laboratory experience, and expertise in the field.

- Describe and list current faculty and their credentials who will be faculty for the proposed program.

  There are no faculty at MATC at this time who would teach in this program. The development of the program is led by Barbara Wenger, MS, MT (ASCP), MATC's Allied Health Distance Education Coordinator. Ms. Wenger is qualified to teach a portion of the program courses; however, partnerships will be pursued with Kansas State University, Cloud County Community College, and Johnson County Community College, as well as collaboration with industry partners to identify faculty with appropriate credentials to teach the required curriculum.

- Identify the number and credentials of new faculty to be hired.

  This is an area of discussion as we are looking to collaborate with others at multiple sites. At MATC proper, two to three adjunct faculty will be hired initially. As the program grows, appropriately credentialed faculty will be hired to meet the needs of particular businesses and industries. Oversight of the program will be covered by the Allied Health Distance Education Coordinator.

- Indicate the proposed full-time to part-time faculty ratio; student to faculty ratio; and number of adjunct faculty required for program start up and sustainability.

  Given the space currently available to instructing this curriculum, the ratio of full-time to part-time faculty will be 0:2. Student to faculty ratio will be 6:1. Two to three adjunct faculty will be hired initially with additional adjunct faculty hired as the program is rolled out.

Cost and Funding for Proposed Program

- Provide evidence of adequate resources including projected staff requirements, advising services, physical facilities, instructional equipment, instructional materials, library requirements, contractual services or clinical placements to support and sustain the proposed program.

  MATC is prepared to support this new certificate program in the following areas:

- Advising services – 1 admissions director, 1 vice president of student services, 1 counselor, 2 student services assistants
- Instructional equipment – through the successful awarding of two Workforce Solutions Grants, equipment has been purchased to support the initial instruction of this certificate program. Additional grant funding will be pursued for areas not covered
- Instructional materials – companies have been identified to support the medical laboratory technology partnership program and will be able to support the Advanced Applied Laboratory Technology Certificate Program.
- Library – students have access to MATC's library that has access to several databases as well as KSU's library. With the implementation of a new data management system at MATC, students will be able to access library resources via the Internet from wherever they are located.
- Contractual services – currently MATC has a leasing agreement with the Via Christi Hospital system for a small room that has been set up as a mini-medical technology laboratory. This space, while extremely small, can initially serve the students. Additional space is also being identified within the Via Christi Hospital, as well as laboratory space at partnering institutions.
- Internships – the number of research laboratories as well as other laboratories is sufficient to meet the needs for the students that will be in this program.

At this time, capacity for the Advanced Applied Laboratory Technician certificate program at MATC is limited to the current space available—six full-time and ten part-time students in a laboratory setting at the leased space at Via Christi's Sunset Campus in Manhattan. However, because of the collaborative design of this program, unlimited numbers of students will be able to access the lecture courses online and enroll in the laboratory courses at various times in the lab and at partner locations throughout Kansas.

One of the greatest challenges facing Manhattan Area Technical College for this program as well as for all the other allied health programs is physical space. Because of the growth in this region and the newly identified technology training needs, it is imperative that additional facilities be constructed to meet those and other yet to be determined needs. Therefore, MATC has contracted with Universal Construction as the construction management at risk company to help make preliminary plans for a Health and Sciences facility to accommodate the growing needs of the allied health industry in this region. MATC's foundation office, grant writer, and President are actively pursuing sources of funding to build this much-needed facility. Should this building plan come to fruition, it will house the training facility for the Advanced Applied Laboratory Technology certificate program and will be available for additional collaborative ventures.

Following are specific August 2010 start-up costs associated with this certificate program with all coursework delivered at MATC:

Budget Item	Costs	Revenue	Revenue Source
Faculty Salaries/Benefits	$16,000	$16,000	Student tuition and reallocated college funds
Equipment	$5,000	$5,000	Carl Perkins Grant; reallocated college funds
Supplies	$8,000	$8,000	Student fees;

			reallocated college funds
Leased Space	$5,000	$5,000	Shared with fees collected from MLT and BIO laboratory courses that utilize/share the same space

- Provide detail on **CA-1a form.**

  Included in Appendix F with the CA-1a form is narrative from the Workforce Solutions Grant that was submitted in January 2010. While this grant was not successful, it does speak to the needs of a program such as this. The Department of Commerce has supported the initial efforts to create this program, as is evidenced by the number of grant dollars that have been awarded to MATC (see below—total amount awarded from Department of Commerce is $336,672). While some of those dollars were designated as start-up costs for the Medical Laboratory Technology collaborative program with Seward County Community College, those dollars have been extended to support start-up efforts of the Advanced Applied Laboratory Technician Certificate Program, i.e. Allied Health Distance Education Coordinator, equipment, supplies, curriculum development, and renovation of a small space at Via Christi's Mercy Regional Hospital Sunset Campus to serve as a medical laboratory.

  To be a state-of-the-art program, the request in January 2010 was appropriate. However, the program can begin with reduced funds and a less-aggressive plan (see CA-1a form). While it is ideal to have a full-time coordinator/instructor leading a program such as this, the instruction can begin with adjunct faculty and continued oversight by the Allied Health Distance Education Coordinator. Should the USDA Higher Education Challenge grant that is being submitted by Kansas State University with MATC realizing a small portion of those funds, the program will be able to develop a portion of its curriculum into an online delivery format, a necessary outcome to increase the capacity of trained biotechnology-level laboratory technicians not only in this region, but in the state as a whole.

- Describe any grants or outside funding sources that will be used for the initial start up of the new program and to sustain the proposed program.

  $210,760 Workforce Solutions Fund – Technology-Based Learning for Health Career Training – This grant was awarded in December 2008 to develop the collaboration between Manhattan Area Technical College and Seward County Community College for the delivery of their Medical Laboratory Technician AAS degree in a blended format. Didactic portions of the curriculum are delivered online with the hands-on training delivered in Manhattan. Hours earned at MATC will be transferred to Seward County Community College for the awarding of the degree. Equipment purchased through this grant will also be used by the Advanced Applied Laboratory Technology (AALT) Certificate Program. The model for instructional delivery is also a basis for the development of the AALT Certificate Program.

  $138,912 Workforce Solutions Fund – Biotechnician Certificate/Advanced Biotechnician Certificate – Award letter dated March 2009 states: "The review committee noted that MATC will play an important role in biotechnician training because of your location and the

impending growth in your area. The committee also noted your cooperation with KU Med Center and existing area partners with biotech companies."

$30,560 KAN-GO: Transitioning Adult Learners from Adult Education to Postsecondary Education – Grant was awarded in September 2009 in part to scholarship students to attend the 150-clock hour Basic Applied Laboratory Technician Training and to develop a 2 credit hour online course entitled "Overview of Bio-Technology Careers" to be delivered to a wide variety of audiences.

$233,356 Workforce Solutions Fund – ***Not Awarded*** – January 2010 – Advanced Applied Laboratory Technician Training partnership – Narrative from the grant that identifies MATC's commitment to this project to serve this region:
"Since receiving the WSF award, we have been engaged in initiating the activities required to accomplish project goals. We have met with industry and educational partners, investigated a variety of potential courses appropriate to the advanced certificate, and worked with a consultant who is helping guide our project. These efforts have been both promising and exciting and have led us to new industry contacts, additional post-secondary partners, and the potential to provide biotechnical training far beyond our initial expectations. We are currently engaged in a joint project with Kansas State University (KSU) and Johnson County Community College (JCCC) to develop an Ag Biotechnology Certificate. We find ourselves in a unique position – our original project has generated new opportunities that reach beyond the boundaries of MATC. To meet these challenges, we need to 'think bigger'. We are requesting additional Workforce Solutions funds to *meet newly identified needs* for biotechnician training within and beyond our region."

$72,878 USDA Higher Education Challenge Grant submitted through Kansas State University's Division of Continuing Education – ***Pending*** – February 2010 – total amount requested for all partners is $499,689 for three years for all partners to develop portions of the curriculum for integration into several programs within KSU.

$451,550 **TOTAL GRANT DOLLARS AWARDED AND PENDING FOR IMPLEMENTATION OF AN ADVANCED APPLIED LABORATORY TECHNOLOGY CERTIFICATE PROGRAM**. The vision for movement into this laboratory technology arena began in August 2008 with the first grant proposal. It is apparent that the support from the Kansas Department of Commerce is indicative of the need for this type of training to be developed. Additionally, the support of Kansas State University for this certificate program identifies collaboration among higher education institutions within Kansas—a Kansas Board of Regents priority!

Program Review and Assessment

- Describe the process and frequency for review of the program content including competencies.

Faculty and administration review the effectiveness of individual instructional programs on a three-year rotational basis. Such review may lead to recommendations for modifications of practice, changes in content and courses, and expansion or discontinuance of the program of instruction. Areas of the program that are reviewed specifically include mission, objectives of the program, and learning outcomes; relevance of curriculum; faculty credentials; budgetary requirements of the

program; enrollment, graduation, and placement data, including wages; and any other items that are unique to the program being reviewed. New programs are reviewed annually in a modified form and three years after the initial introduction of the program.

Rationale: The on-going review of programs of study assists the College in meeting its mission by:

1. Determining the manner in which individual programs support the mission of the College;
2. Demonstrating program accountability to students, stakeholders, and funding sources, such as the State of Kansas;
3. Indicating where improvements could be undertaken within programs related to curricular and program changes based on data-driven decision-making;
4. Assisting programs in preparing to secure and/or renew individual program accreditation from national/state/regional accrediting agencies;
5. Enhancing awareness of individual programs, increasing visibility, and providing information for promotional efforts related to program enrollment;
6. Encouraging celebration of program success;
7. Providing foundation for program interaction with Board of Directors; and
8. Allowing College to meet the HLC requirement for on-going program review.

- Describe the process and frequency for review of the level of program success and process for remediation of areas of concern.

Once the program has gone through the Program Review cycle, the program data are reviewed to identify achievement of benchmarks, goals, or other curricular expectations. Should the data reveal deficiencies or concerns, the program may be asked to complete specific components of the review process or complete another program review the following year. Depending on the particular findings of the program review, the program may be placed on automatic review with a directive to submit a corrective action plan that addresses specific performance concerns.

Program Approval at the Institution Level

- Summarize the institutional process undertaken for approval of the proposed program.

Before the Advanced Applied Laboratory Technician Certificate Program moved forward, it was approved in concept by the MATC President's Cabinet and the Executive Cabinet (President, Vice President of Instruction, Vice President of Administrative Services, and Vice President of Student Services). In this particular situation, the concept was formed with the awarding of a Workforce Solutions Grant to develop the curriculum for this program. The grant was written and, consequently, awarded based on the industries that are expected to come to the region in the next several years because of the National Bio- and Agro-Defense Facility's (NBAF) relocation to Manhattan. The intention of this program is to provide a trained workforce in the region to meet business and industry, as well as research laboratory, demand for trained laboratory technicians.

A Program Advisory Committee (PAC) was formed to establish the workforce needs in the region. The KBOR New Program Request Form was utilized as the basis for beginning the "discovery" process for a new program, paying particular attention initially to the following sections: Demand for the Program, including survey data from the region, Duplication of Existing Programs, and Cost and Funding for Proposed Program. Once those areas were determined to be favorable, the rest of the document was prepared with input directly from business and industry to ensure that the program meets the demand of the workforce in the region. Once the PAC approved the curriculum,

including outcomes, competencies, and specific courses, that documentation was moved into the internal process for approval, including the curriculum committee (see Appendix G).

Upon approval by the curriculum committee, the program was presented to the MATC Board of Directors for their formal approval (see Appendix H). Throughout the entire process, the Board of Directors has been kept in the loop regarding the regional demand for this occupation.

- Provide copies of the Program Advisory Board Minutes (including a list of the members and business connection to program), Curriculum Committee Minutes, Governing Board Minutes for the meeting at which the new program was approved.

  Attached as Appendix I are the following documents:
  PAC Members
  PAC Minutes

If requesting Perkins approval for the proposed program, submit a completed Perkins Program Verification form. See Appendix J

Submit the completed application and supporting documents to the following:

Director of Technical Programs & Curriculum
Kansas Board of Regents
1000 SW Jackson, Ste. 520
Topeka, KS 66612-1368

Appendix A

Letters of Support

Partners in Bioscience Growth

November 23, 2009

Barbara Wenger
Manhattan Area Technical College
3136 Dickens Ave.
Manhattan, KS 66503

Dear Ms Wenger:

The Kansas Bioscience Authority was pleased to learn of MATC's plan to develop an Advanced Applied Laboratory Technician certification program. Based on the information we have received, and upon our mission within the State of Kansas, we are unable to provide any financial support to you at this time.

Although we cannot provide any financial assistance, it is our firm belief that programs such as the proposed Advanced Applied Laboratory Technician certification are of vital importance to our ongoing efforts to create and expand the bioscience industries in Kansas. As such, we wholeheartedly endorse this program as an effective means by which to provide a qualified, educated workforce to the coming NBAF project, and to the many bioscience firms and laboratories within the State of Kansas. We wish you the best of luck and we look forward to the possibility of collaborating with you in the future.

Sincerely,

Thomas V. Thornton
President and CEO

Kansas Bioscience Authority
25501 West Valley Parkway, Suite 100 • Olathe, KS 66061 • p 913/397-8300 • f 913/397-8003 • www.kansasbioauthority.org

Manhattan
Area Chamber of Commerce

Leading Businesses. Leading Communities.℠

February 11, 2009

Dr. Robert Edleston, President/CEO
Manhattan Area Technical College
3136 Dickens Avenue
Manhattan, KS 66503

Dear Dr. Edleston,

As we share in the excitement of the decision to build the NBAF facility in Manhattan, our community is also called upon to meet new workforce demands. It is critical that our institutions of higher learning respond by developing appropriate training and preparing the types of workers needed in the bioscience industry.

As a Level 3 and Level 4 laboratory, NBAF will be seeking lab technicians trained at the Associate Degree level and higher. As a leader in technical education in our region, Manhattan Area Technical College is the logical provider of this type of training. The Manhattan Area Chamber of Commerce fully supports MATC's efforts to develop training for laboratory workers who will become employed by NBAF and the many related companies who will locate in Manhattan.

At this time our Chamber has been informed that over the next 10-15 years up to 50 bioscience companies related to NBAF could locate in MATC's service area. These impressive numbers along with the anticipated 200 employees at NBAF to support the 300 researches and scientists means that as a region and state we must respond to the workforce needs of this rapidly growing industry.

The Manhattan Area Chamber of Commerce commits to the following in support of MATC's proposal for Workforce Solutions funding:

- Regular communication with MATC leadership regarding bioscience companies seeking to locate in Manhattan
- Access to Chamber members via the Chamber Board of Directors and related committees to seek community-wide financial and in-kind support for program and facility expansion at MATC
- Advocacy for the development of biotechnical training at MATC, including curriculum development and facility improvement.
- Showcasing the training programs to all prospective bioscience companies

Sincerely,

Lyle Butler, President/CEO

501 Poyntz Avenue • Manhattan, KS 66502-6005
785-776-8829 • Fax 785-776-0679 • www.manhattan.org • chamber@manhattan.org

K-STATE
Kansas State University

Vice President for Research
108 Anderson Hall
Manhattan, KS 66506-0113
785-532-5110
Fax: 785-532-6507

November 12, 2009

Dr. Robert Edleston, President and CEO
Manhattan Area Technical College
3136 Dickens Avenue
Manhattan, KS 66503

Dear Dr. Edleston:

On behalf of Kansas State University it is my pleasure to provide full endorsement for Manhattan Area Technical College's (MATC's) efforts to prepare a highly trained and robust workforce in industries that make up the multifaceted biotechnology research enterprise within this region. It's clear that K-State and MATC provide synergistic education and training support across the biotechnology spectrum.

While it the duty of K-State to provide scientists and graduate level professionals to meet the needs of animal and health sciences, we recognize that MATC is the responsible agency within our region for the preparation of the technician level workforce.

By providing training and education at the technical certificate, associate of applied science degree, and advance certificate levels, MATC makes opportunities available to a variety of individuals. Whether it be facilitating a career pathway for a high school student or providing continuing education for those already in the workforce, MATC helps people prepare to meet industry needs.

Together Kansas State University and Manhattan Area Technical College will continue to move forward, helping Kansas succeed in its efforts to create and maintain a healthier world in which everyone can prosper.

Sincerely,

R. W. Trewyn, Ph.D.
Vice President for Research

Kansas State Veterinary Diagnostic Laboratory
1800 Denison Avenue
Manhattan, KS 66506-5703
866-512-5650 785-532-5650
785-532-4481 FAX

December 3, 2009

Dr. Robert Edleston, President
Manhattan Area Technical College
3136 Dickens Avenue
Manhattan, KS 66503

Dear Dr. Edleston:

On behalf of Kansas State Veterinary Diagnostic Laboratory (KSVDL), it is a distinct pleasure to provide full endorsement for Manhattan Area Technical College's (MATC's) efforts to prepare a highly trained and robust workforce in industries that make up the multifaceted biotechnology research enterprise of our region.

While it is the duty of K-State to provide scientists and graduate-level professionals to meet the needs of animal and public health sciences, we recognize it is the responsibility of MATC to prepare the technician-level workforce within our region. We firmly belief that programs such as the proposed Advanced Applied Laboratory Technician certificate are of vital importance to the ongoing efforts to create and expand bioscience industries in Kansas.

By providing training and education at the technical certificate, associate of applied science degree, and advanced certificate levels, MATC makes many opportunities available to a wide variety of individuals. Whether it be facilitating a career pathway for a high school student or providing continuing education for those already in the workforce, MATC helps people prepare to meet industry needs.

Again, the KSVDL wholeheartedly endorses the Advanced Applied Laboratory Technician certificate at MATC as an effective means to provide a qualified, educated workforce to the coming NBAF and ABADRL projects and to the many bioscience firms and laboratories within the State of Kansas. We pledge our full support and enthusiastically look forward to future collaborative efforts.

Sincerely,

Gary A Anderson, DVM, MS, PhD
Director
Professor, Diagnostic Medicine/Pathobiology

edenspace

February 12, 2009

Dr. Robert Edleston, President/CEO
Manhattan Area Technical College
3736 Dickens Ave.
Manhattan, KS 66503

Dear Dr. Edleston,

Edenspace Systems Corporation strongly supports Manhattan Area Technical College's application for Workforce Solutions funding to develop bio-technician training. This initiative will effectively develop our workforce and meet anticipated needs in the field of bio-scientific research.

Our commitment includes:

- Helping identify occupational skills and specific training needed to secure a job in the bio-tech industry;
- Projecting, identifying and communicating our occupational skills training and employment needs into the near and long-term future;
- Advising the college to develop curriculum that addresses identified occupational skills; and
- Possible internships/mentorships for qualified program students.

Edenspace Systems Corporation is committed to our community. Our workforce is our most valuable asset, and we recognize the value of investing our time and money into training future employees.

Sincerely,

Janet B. Dean

Janet B. Dean, SPHR
Administrative Manager
Edenspace Systems Corporation

Edenspace Systems Corporation • 1500 Hayes Drive • Manhattan, Kansas 66502 • (785) 587-8200 • Fax (785) 539-3185 • www.edenspace.com

K-STATE
Kansas State University
Biosecurity Research Institute
1041 Pat Roberts Hall
Manhattan, KS 66506 -7600
785-532-1333
Fax: 785-532-0973
E-mail: brihome@ksu.edu

January 30, 2010

Dr. Robert Edleston, CEO & President
Manhattan Area Technical College
3136 Dickens Ave
Manhattan, KS 66503

Dear Dr. Edleston,

The purpose of this letter is to express our support for the Advanced Applied Laboratory Technician certificate which Manhattan Area Technical College is developing. The National Bio- and Agro-Defense Facility (NBAF) will soon be built here in Manhattan. Bioscience companies in need of skilled personnel are already located in this area, and many more have expressed interest in locating branches here in order to facilitate collaborative work with NBAF. An effectively trained and prepared workforce will be an asset to research and development missions of both the NBAF and private industry.

The Advanced Applied Laboratory Technician certificate is extremely important to this process. We endorse this program as an effective means for providing a qualified, educated workforce that will meet the needs of the NBAF and the many bioscience firms and laboratories in the Manhattan area and the State of Kansas.

As a research institute with collaborative ties to NBAF and the regional bioscience industry, we wish you success with this initiative and look forward to providing technical input as appropriate to support the project.

Sincerely,

Julie Johnson, Ph.D., CBSP
Assistant Vice President for Research Compliance
Biosafety Officer, Biosecurity Research Institute
Kansas State University

Beth Montelone, Ph.D.
Associate Dean, College of Arts & Sciences
Interim Director, Biosecurity Research Institute
Kansas State University

Scott Rusk, M.S.
Director, Pat Roberts Hall
Kansas State University

Kansas State University
Division of Continuing Education
13 College Court Building
Manhattan, KS 66506-6001
http://www.dce.k-state.edu/

January 26, 2010

Dr. Robert Edleston, President/CEO
Manhattan Area Technical College
3136 Dickens Avenue
Manhattan, KS 66503

Dear Dr. Edleston:

The Kansas State University Division of Continuing Education is pleased to endorse Manhattan Area Technical College's Advanced Applied Laboratory Technician Certificate.

The Division of Continuing Education is focused on meeting students' needs through a variety of coursework delivered via distance learning technology. The Advanced Applied Laboratory Technician Certificate will provide instruction to prepare students to work in laboratories at biosafety levels 1-4, and offers broad applications for additional skill development for students in KSU's agricultural biotechnology programs. Theory-based coursework will be provided via distance learning technology which will extend the influence of this training beyond our institutional borders.

The Division of Continuing Education will assist MATC to develop the courses in a format appropriate for distance learning. We will work with the relevant programs and departments at KSU to include the courses as electives for their students, and we will serve as a central point of contact at KSU for this coordination.

Kansas State University's Division of Continuing Education wholeheartedly endorses the Advanced Applied Laboratory Technician certificate as an effective means to develop a skilled, knowledgeable workforce for employment in biotechnology laboratories in the state, nation, and/or internationally. With the relocation of the National Bio and Agro-Defense Facility (NBAF) to Manhattan, and our positioning in the Animal Science/Biotech Corridor, this program will provide a workforce more suitably trained to work in laboratory settings where higher level safety standards are required. We pledge our support and look forward to future collaborative efforts.

Sincerely,

Sue C Maes

Dr. Sue Maes
Dean
Division of Continuing Education

Cloud County Community College
www.cloud.edu

Concordia Campus
2221 Campus Drive
P.O. Box 1002
Concordia, KS 66901
(785) 243-1435
1-800-729-5101
FAX 785-243-1043

Geary County Campus
631 Caroline Avenue
Junction City, KS 66441
(785) 238-8010
FAX 785-238-2898

Online & Outreach

February 1, 2010

Dr. Robert Edleston, President
Manhattan Area Technical College
3136 Dickens Avenue
Manhattan, KS 66503

Dear Dr. Edleston,

Cloud County Community College (CCCC) has appreciated the opportunity to work collaboratively with Manhattan Area Technical College (MATC) as you have developed the Advanced Applied Laboratory Technician Certificate. With the National Bio- and Agro-Defense Facility planning to locate in Manhattan and the animal science/bioscience/biotechnology corridor that will subsequently develop, the need for advanced and specialized laboratory technical training will be essential. CCCC believes your advanced certificate will provide another pathway for students to complete additional training beyond our College's approved AAS and Certificate programs in Agri-Biotechnology.

CCCC's programs will allow graduates to seek employment within the bioscience and biotechnology industry upon completion of their coursework but with the opportunity to acquire advanced technical laboratory skills through MATC, they will have even more options for employment. CCCC does not see MATC's Advanced Applied Laboratory Technician Certificate as a duplication of our program, but instead supports it as an opportunity for possible articulation for our students to gain additional instrumentation, lab analysis, testing and computer application skills. CCCC looks forward to continuing our collaborative work with MATC to promote technical skill development and training for this emerging industry.

Sincerely,

Kimberly W. Krull

Kimberly W. Krull
Vice President for Academic Affairs

Appendix B

Program of Study

Program of Study

Prerequisites

Completion of an AAS, AS, BS or higher degree in a science field that includes course work in the following areas:

- Completion of two of the following three courses:
  - Cell Biology
  - Principles of Biology
  - Modern Genetics
- Chemistry I
- Chemistry II
- General Microbiology

Technical Specialty (32 credit hours)

Semester 1
BIO 210 Laboratory Operations (4 cr. hr.)
BIO 225 Laboratory Safety (2 cr. hrs.)
BIO 226 Laboratory Safety Lab (1 cr. hr.)
BIO 250 Biotechnology Methods & Procedures I (3 cr. hrs.)
BIO 251 Biotechnology Methods & Procedures I Lab (2 cr. hrs.)

Semester 2
BIO 260 Biotechnology Methods & Procedures II (2 cr. hrs.)
BIO 261 Biotechnology Methods & Procedures II Lab (3 cr. hrs.)
BIO 270 Biotechnology Methods & Procedures III (2 cr. hrs.)
BIO 271 Biotechnology Methods & Procedures III Lab (3 cr. hrs.)
BIO 280 Biotechnology Methods & Procedures IV (2 cr. hrs.)
BIO 281 Biotechnology Methods & Procedures IV Lab (3 cr. hrs.)

Semester 3
BIO 299 Biotechnology Internship (5 cr. hrs.)

Appendix C

Competency Profile

Competencies for Advanced Applied Laboratory Technician Program
(as identified by the Program Advisory Committee)

General Work Skills

1. Basic Math (fractions, percentages, metric system)
2. Communication (Electronic, oral , written) appropriate at the entry level position
3. Organization Skills
4. Time management
5. Critical Thinking
6. Professional Behavior

Industry-Related Skills

1. Aseptic Technique
2. Following Procedures (SOP's)
3. Documentation/Recording, maintenance of log books
4. Basic Laboratory procedures
   a. Making Reagents
   b. Using scales
   c. Manipulation of pipettes and micro pipettes
   d. Maintenance of basic laboratory equipment
   e. Centrifugation
   f. Using microscopes
   g. Use and maintenance of chemical and bio safety hoods/cabinets
   h. Washing/cleaning of glassware
   i. Ordering of supplies
   j. Proper storage of reagents and supplies
   k. Simple Assays
      i. Growing Cells
      ii. Basic ELISA
      iii. Protein electrophoresis
5. Inventory and Supply Maintenance
6. Upkeep of Equipment/Work Area
7. Utilization of safety equipment and personal protective equipment

Industry-Related Knowledge

1. Basics of statistical process control
2. Math (Graphing, Ratios, Conversions)
3. Safety regulations (OSHA, Blood Borne Pathogens, etc.)
4. Basics of Microbiology
5. Regulatory Standards

a. 21 CFR
b. cGMP and laboratory application
c. ISO standards

6. Identifying problems or inconsistencies in results
7. Quality Control and Quality Assurance Practices
8. Basic process and responsibilities in a life science company
   a. R&D
   b. Operations

c. Quality Department

Desired Attributes

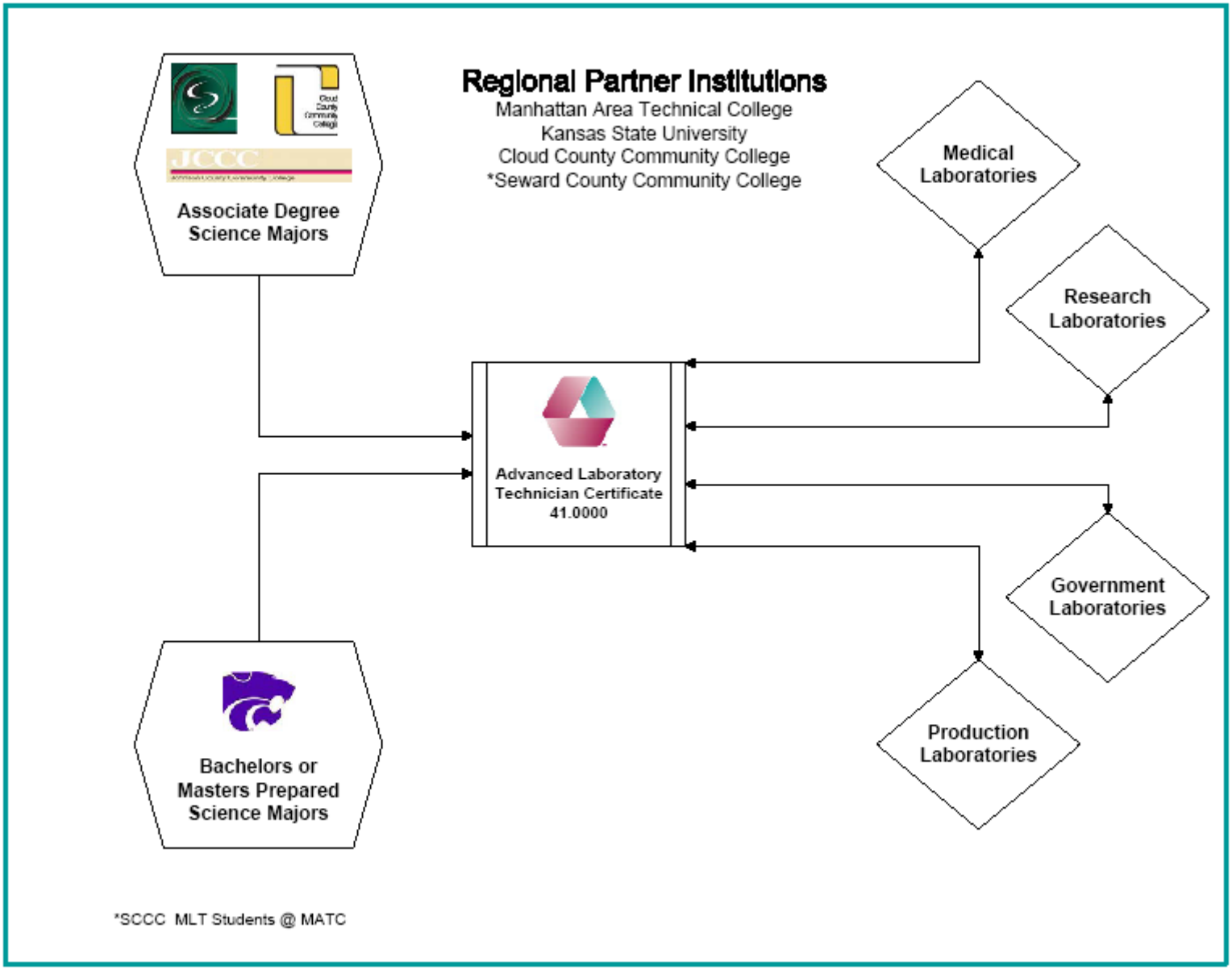
1. Accountability
2. Confidentiality
3. Flexibility
4. Integrity
5. Positive Attitude
6. Reliability
7. Team Player
8. Safety Consciousness
9. Continuously Learning
10. Sense of urgency

Competencies Specific to Course Content

1. Demonstrate the use of appropriate personal safety equipment in the laboratory
2. Demonstrate the correct packaging, shipping and handling of biological specimens
3. Demonstrate correct decontamination methods of various materials
4. Explain the major aspects concerning infectious agents
5. Demonstrate cGMP and cGLP while in the laboratory
6. Properly prepare solutions and dilutions according to laboratory procedures
7. Demonstrate proper maintenance procedures for common laboratory equipment and instruments
8. Be able to distinguish between different shapes and appearances of cells to discern contamination of a production culture
9. List common cell types used in production: Bacteria, yeast, fungi, mammalian cells.
10. Strict practice of Safety Procedures
11. Prepare and Dispose of chemicals and reagents
12. Demonstrate correct, efficient use of equipment/instruments
13. Practice correct storage, purification, quantification, and concentration while working with DNA
14. Evaluate various fermentation and bio-processing applications
15. Validate the principles and importance of sterility in industrial fermentations
16. Demonstrate aseptic technique and sterility control procedures
17. Complete external measurement of fermentation parameters
18. Recover spent fermentation broth
19. Calculate the efficiency of a fermentation process
20. Demonstrate preparation of seed inoculums
21. Operate a fermentation high performance liquid chromatography system
22. Demonstrate compliance with regulatory and ecological guidelines in the operation and design of fermentation processes

Appendix D

Articulation Flowchart


Regional Partner Institutions
Manhattan Area Technical College
Kansas State University
Cloud County Community College
*Seward County Community College
Associate Degree Science Majors
Bachelors or Masters Prepared Science Majors
Advanced Laboratory Technician Certificate 41.0000
Medical Laboratories
Research Laboratories
Government Laboratories
Production Laboratories
*SCCC MLT Students @ MATC

Appendix E

Course Outlines

COURSE OUTLINE

BIO 210 Laboratory Operations (4 credits)

Course Description This course is an introduction to technical writing, technical math and common regulations used in the laboratory. The class offers practice in document design and editing. The types of correspondence include memos, letters, e-mail, reports, and instructional manuals. The laboratory math component prepares students for the advanced problem solving applications associated with laboratory practice.

Prerequisite(s) None

Purpose of Course This course introduces students to the major concepts of technical communication (audience analysis, ethics, and graphics), the major kinds of correspondence documents (letters, memos, instructions, reports), executive summaries, oral presentations, and the basics of using library databases and the Internet. Technical math (fractions, ratios, statistics, metric system) will be covered. Also discussed will be common laboratory regulations.

Required Materials

Textbook(s): *Workplace Communications*. Sharon J. Gerson and Steven M. Gerson. Upper Saddle River, New Jersey: Pearson, 2007 ISBN: 0-13-228808-7
Elementary Technical Mathematics, 9th Edition by Ewen & Nelson; ISBN #0-495113492

Learning Outcomes

The intention is for the student to be able to

1. Identify effective oral and written communicate.
2. Compose clear, concise memos, letters, and electronic communication.
3. Prepare an effective cover letter, resumes, and thank you letters.
4. Solve technical applications problems using logical, mathematical procedures
5. Solve theoretical and strictly quantitative problems using numeric, algebraic, and geometric methods
6. Practice within laboratory regulations

Course Competencies

Actions that are essential to achieve the learning outcomes:

1. Write letters, memos, email and short report formatting guidelines. Concentrate on format, sentence structure, tone, and audience.
2. Write Cover letters, resumes, and thank you letters.
3. Write a Standard Operating Procedure relevant to a laboratory task
4. Solve applications word problems involving integers and rational numbers
5. Solve applications word problems using algebraic procedures
6. Solve problems involving measurements accurately and using correct notation
7. Solve problems involving proportions

Method of Delivery/Instruction

X Face-to-face ☐ Blended **X** Online

COURSE OUTLINE
BIO 225 Laboratory Safety (2 credits)

Course Description This course will enable the student to practice the secure use and handling of biological and chemical materials in a laboratory setting. Topics covered will include safety procedures in Biosafety Level 2 and 3 labs, infectious disease, food security and national security agencies and regulations.

Prerequisite(s) None

Purpose of Course This course applies theoretical concepts of safety to the laboratory environment with the anticipated result of student ability to engage in safe practice in a variety of laboratory settings.

Required Materials

Textbook(s): Basic Laboratory Methods for Biotechnology, 2nd ed Lisa Seidman and Cynthia J Moore, Pearson

Learning Outcomes

The intention is for the student to be able to

1. Work safely in laboratories or various safety levels
2. Practice safe and legal disposal of bio-hazardous materials
3. Make valid hazard and risk assessments

Course Competencies

Actions that are essential to achieve the learning outcomes:

1. Demonstrate the use of appropriate personal safety equipment in the laboratory
2. Demonstrate the correct packaging, shipping and handling of biological specimens
3. Demonstrate correct decontamination methods of various materials
4. Explain the major aspects concerning infectious agents

Learning Units

I. OSHA 10 Training
II. Principles of Biosafety and Containment
III. Biological Risk Assessment
IV. Sterilization & Disinfection
V. Regulations, Standards & Guidelines
VI. Emergency Planning & Response

Method of Delivery/Instruction

☐ Face-to-face ☐ Blended X Online

COURSE OUTLINE
BIO 226 Laboratory Safety Lab (1 credit hour)

Course Description This course will enable the student to practice the secure use and handling of biological and chemical materials in various laboratory environments. Other topics covered will include safety procedures in Biosafety Level 2 and 3 labs, infectious disease, food security and national security agencies and regulations.

Prerequisite(s) Concurrent with BIO 225 Laboratory Safety

Purpose of Course This course applies theoretical concepts of safety to the laboratory environment resulting in safe student practice in various laboratories.

Required Materials

Textbook(s): Basic Laboratory Methods for Biotechnology, 2nd ed Lisa Seidman and Cynthia J Moore, Pearson

Learning Outcomes

The intention is for the student to be able to

1. Work safely in laboratories or various safety levels
2. Practice safe and legal disposal of bio-hazardous materials
3. Make valid hazard and risk assessments

Course Competencies

Actions that are essential to achieve the learning outcomes:

1. Demonstrate the use of appropriate personal safety equipment in the laboratory
2. Demonstrate the correct packaging, shipping and handling of biological specimens
3. Demonstrate correct decontamination methods of various materials
4. Explain the major aspects concerning infectious agents

Learning Units

I. OSHA 10 Training
II. Principles of Biosafety and Containment
III. Biological Risk Assessment
IV. Sterilization & Disinfection
V. Regulations, Standards & Guidelines
VI. Emergency Planning & Response

Method of Delivery/Instruction

X Face-to-face ☐ Blended ☐ Online

COURSE OUTLINE
BIO 250 Biotechnology Methods & Procedures I (Introduction)
3 credits

Course Description This course introduces the basic skills and knowledge necessary to work in a biological or chemical laboratory. Emphasis is placed on good manufacturing practices, safety, solution preparation, and equipment operation and maintenance following standard operating procedures. Terminology for the molecular biology lab and immunology will be reviewed.

Prerequisite(s) BIO 210 Laboratory Operations, BIO 225 Laboratory Safety, and BIO 226 Laboratory Safety Lab

Purpose of Course: Upon completion, students should be able to prepare and perform basic laboratory procedures using labware, solutions, and equipment according to cGLP.

Required Materials

Textbook(s): Basic Laboratory Methods for Biotechnology, 2nd ed Lisa Seidman and Cynthia J Moore, Pearson

Learning Outcomes

The intention is for the student to be able to

1. Prepare solutions by proper mixing and diluting practices
2. Troubleshoot commonly used instruments and equipment in the laboratory
3. Read, understand, and follow SOPs

Course Competencies

Actions that are essential to achieve the learning outcomes:

1. Demonstrate cGMP and cGLP while in the laboratory
2. Properly prepare solutions and dilutions according to laboratory procedures
3. Demonstrate proper maintenance procedures for common laboratory equipment and instruments

Learning Units

I. Overview of Biotechnology
II. OSHA 10
III. Math
IV. Weights & Measures
V. cGMP
VI. Equipment
VII. Asceptic Technique
VIII. Intro to Microbiology
IX. Manufacturing a Product
X. Operations Overview

Method of Delivery/Instruction

☐ Face-to-face ☐ Blended **X** Online

COURSE OUTLINE
BIO 251 Biotechnology Methods & Procedures I Lab (Introduction)
2 credits

Course Description This course introduces the basic skills and knowledge necessary to work in a biological or chemical laboratory. Emphasis is placed on good manufacturing practices, safety, solution preparation, and equipment operation and maintenance following standard operating procedures. Terminology for the molecular biology lab and immunology will be reviewed.

Prerequisite(s) BIO 210 Laboratory Operations, BIO 225 Laboratory Safety, and BIO 226 Laboratory Safety Lab

Purpose of Course: Upon completion, students should be able to prepare and perform basic laboratory procedures using labware, solutions, and equipment according to prescribed protocols.

Required Materials

Textbook(s): Basic Laboratory Methods for Biotechnology, 2nd ed Lisa Seidman and Cynthia J Moore, Pearson

Learning Outcomes

The intention is for the student to be able to

1. Prepare solutions by proper mixing and diluting practices
2. Troubleshoot commonly used instruments and equipment in the laboratory
3. Read, understand, and follow SOPs

Course Competencies

Actions that are essential to achieve the learning outcomes:

1. Demonstrate cGMP and cGLP while in the laboratory
2. Properly prepare solutions and dilutions according to laboratory procedures
3. Demonstrate proper maintenance procedures for common laboratory equipment and instruments

Learning Units

I. Overview of Biotechnology
II. OSHA 10
III. Math
IV. Weights & Measures
V. cGMP
VI. Equipment
VII. Asceptic Technique
VIII. Intro to Microbiology
IX. Manufacturing a Product
X. Operations Overview

Method of Delivery/Instruction

X Face-to-face ☐ Blended ☐ Online

COURSE OUTLINE
BIO 260 Biotechnology Methods & Procedures II (Proteomics) (2 credits)

Course Description This course will prepare students to use general strategies to purify proteins. Specific methods include determining specific activities for enzymes, extraction of proteins from bacterial cells, salting out, dialysis, ion exchange chromatography and polyacrylamide gel electrophoresis, ELISA's, electrophoreses and microarrays

Prerequisite(s) BIO 210 Laboratory Operations, BIO 225 Laboratory Safety, and BIO 226 Laboratory Safety Lab

Purpose of Course This course supports student understanding of gene function, handling of production, processing and maintenance and identification necessary in the biotechnology laboratory.

Required Materials

Textbook(s): Clark, D., Pazdernik, N. (2009). *Biotechnology Applying the Genetic Revolution,* London: Elsevier Academic Press

Learning Outcomes

The intention is for the student to be able to

1. Demonstrate understanding of gene function
2. Successfully use protein arrays
3. Successfully run gene identification methods (Western Blots, electrophoresis, HPLC, Mass Spectrometry, PCR)

Course Competencies

Actions that are essential to achieve the learning outcomes:

1. Be able to distinguish between different shapes and appearances of cells to discern contamination of a production culture
2. List common cell types used in production: Bacteria, yeast, fungi, mammalian cells.

Learning Units

I. Protein Extraction
II. Chromatography Techniques
III. Electrophoretic Techniques
IV. ELISA Procedures

Method of Delivery/Instruction

☐ Face-to-face ☐ Blended **X** Online

COURSE OUTLINE
BIO 261 Biotechnology Methods & Procedures II Lab (Proteomics) (3 credits)

Course Description This course will prepare students to use general strategies to purify proteins. Specific methods include determining specific activities for enzymes, extraction of proteins from bacterial cells, salting out, dialysis, ion exchange chromatography and polyacrylamide gel electrophoresis, ELISA's, electrophoresis and microarrays

Prerequisite(s) BIO 210 Laboratory Operations, BIO 225 Laboratory Safety, and BIO 226 Laboratory Safety Lab

Purpose of Course This course supports student understanding of gene function, handling of production, processing and maintenance and identification necessary in the biotechnology laboratory.

Required Materials

Textbook(s): Clark, D., Pazdernik, N. (2009). *Biotechnology Applying the Genetic Revolution,* London: Elsevier Academic Press

Learning Outcomes

The intention is for the student to be able to

1. Demonstrate understanding of gene function
2. Successfully use protein arrays
3. Successfully run gene identification methods (Western Blots, electrophoresis, HPLC, Mass Spectrometry, PCR)

Course Competencies

Actions that are essential to achieve the learning outcomes:

1. Be able to distinguish between different shapes and appearances of cells to discern contamination of a production culture
2. List common cell types used in production: Bacteria, yeast, fungi, mammalian cells.

Learning Units

I. Protein Extraction
II. Chromatography Techniques
III. Electrophoretic Techniques
IV. Southern and Western Blot Techniques
V. ELISA Procedures

Method of Delivery/Instruction

X Face-to-face ☐ Blended ☐ Online

COURSE OUTLINE

BIO 270 Biotechnology Methods & Procedures III (Cell and Tissue Culture Techniques) (2 credits)

Course Description This course introduces students to the basic techniques used in culturing cells. Topics covered include sterile and aseptic technique, media preparation, cell count and viability, cryopreservation, subculturing, and research applications using cell cultures

Prerequisite(s) BIO 210 Laboratory Operations, BIO 225 Laboratory Safety, and BIO 226 Laboratory Safety Lab

Purpose of Course Upon successful completion of this course, students will be able to demonstrate technical skills related to culturing cells. Students will become familiar with the techniques of feeding, subculturing, counting and storing their cell lines. Students must also be able to maintain sterile conditions and avoid contamination of cultures.

Required Materials

Textbook(s): Basic Laboratory Methods for Biotechnology, 2nd ed Lisa Seidman and Cynthia J Moore, Pearson

Learning Outcomes

The intention is for the student to be able to

1. Maintain sterile conditions
2. Maintaining growth conditions of cultures
3. Demonstrate quantification and preservation methods of cell cultures

Course Competencies

Actions that are essential to achieve the learning outcomes:

1. Strict practice of Safety Procedures
2. Prepare and Dispose of chemicals and reagents
3. Demonstrate correct, efficient use of equipment/instruments
4. Practice correct storage, purification, quantification, and concentration while working with DNA
5. Perform Southern and Western Blots

Learning Units

I. Cell culture equipment and safety
II. Sterile and aseptic technique
III. Biology of the culture cell
IV. Contamination
V. Culture vessels
VI. Cell culture media
VII. Cell differentiation
VIII. Primary cultures
IX. Feedback
X. Subculturing cells
XI. Cell counting
XII. Cryopreservation
XIII. Cytotoxicity assays
XIV. Tissue culture applications

Method of Delivery/Instruction

☐ Face-to-face ☐ Blended **X** Online

COURSE OUTLINE
BIO 271 Biotechnology Methods & Procedures III Lab (Cell and Tissue Culture Techniques)
(3 credits)

Course Description This course introduces students to the basic techniques used in culturing cells. Topics covered include sterile and aseptic technique, media preparation, cell count and viability, cryopreservation, subculturing, and research applications using cell cultures.

Prerequisite(s) BIO 210 Laboratory Operations, BIO 225 Laboratory Safety, and BIO 226 Laboratory Safety Lab

Purpose of Course Upon successful completion of this course, students will be able to demonstrate technical skills related to culturing cells. Students must be able to maintain sterile conditions and avoid contamination of cultures. They must also become familiar with the techniques of feeding, subculturing, counting and storing their cell lines.

Required Materials

Textbook(s): Basic Laboratory Methods for Biotechnology, 2nd ed Lisa Seidman and Cynthia J Moore, Pearson

Learning Outcomes

The intention is for the student to be able to

1. Maintain sterile conditions
2. Maintaining growth conditions of cultures
3. Demonstrate quantification and preservation methods of cell cultures

Course Competencies

Actions that are essential to achieve the learning outcomes:

1. Strict practice of Safety Procedures
2. Prepare and Dispose of chemicals and reagents
3. Demonstrate correct, efficient use of equipment/instruments
4. Practice correct storage, purification, quantification, and concentration while working with DNA

Learning Units

I. Cell culture equipment and safety
II. Sterile and aseptic technique
III. Biology of the culture cell
IV. Contamination
V. Culture vessels
VI. Cell culture media
VII. Cell differentiation
VIII. Primary cultures
IX. Feeding cells
X. Subculturing cells
XI. Cell counting
XII. Cryopreservation
XIII. Cytotoxicity assays
XIV. Tissue culture applications

Method of Delivery/Instruction

X Face-to-face ☐ Blended ☐ Online

COURSE OUTLINE
BIO 280 Biotechnology Methods & Procedures IV (Fermentation) (2 credits)

Course Description This course will enable students to work with a small-scale laboratory processes utilizing prokaryotic or eukaryotic cells in fermentation procedures. Topics include batch process records, fermentation theory, and medium formulation, techniques used for cell harvesting, as well as distillation, liquid-liquid extraction, different types of chromatography and emerging technologies for product recovery. Upon completion, students should be able to set up a fermentor; grow prokaryotic and eukaryotic cells, and isolate and collect various fractions derived from fermentation.

Prerequisite(s) BIO 210 Laboratory Operations, BIO 225 Laboratory Safety, and BIO 226 Laboratory Safety Lab

Purpose of Course: Upon successful completion of this course, students will be able to explain and demonstrate technical skills related to common fermentation procedures.

Required Materials

Textbook(s): P.F. Stanbury and A. Whitaker. *Principles of Fermentation Technology*. Pergamon Press.
Arnold L. Demain and Nadine A. Solomon. *Manual of Industrial Microbiology and Biotechnology*. American Society for Microbiology..

Learning Outcomes

The intention is for the student to be able to

1. Demonstrate aseptic technique and sterility control procedures
2. Operate a fermentation high performance liquid chromatography system
3. Comply with regulatory and ecological guidelines in the operation and design of fermentation processes

Course Competencies

Actions that are essential to achieve the learning outcomes:

1. Evaluate various fermentation and bio-processing applications
2. Validate the principles and importance of sterility in industrial fermentations
3. Demonstrate aseptic technique and sterility control procedures
4. Complete external measurement of fermentation parameters
5. Recover spent fermentation broth
6. Calculate the efficiency of a fermentation process
7. Demonstrate preparation of seed inoculums
8. Operate a fermentation high performance liquid chromatography system
9. Comply with regulatory and ecological guidelines in the operation and design of fermentation processes

Learning Units

I. Fermentation Theory
II. Chromatography Methods

Method of Delivery/Instruction

☐ Face-to-face ☐ Blended **X** Online

COURSE OUTLINE
BIO 281 Biotechnology Methods & Procedures IV Lab (Fermentation) (3 credits)

Course Description This course will enable students to work with a small-scale laboratory processes utilizing prokaryotic or eukaryotic cells in fermentation procedures. Topics include batch process records, fermentation theory, and medium formulation, techniques used for cell harvesting, as well as distillation, liquid-liquid extraction, different types of chromatography and emerging technologies for product recovery. Upon completion, students should be able to set up a fermentor; grow prokaryotic and eukaryotic cells, and isolate and collect various fractions derived from fermentation.

Prerequisite(s) BIO 210 Laboratory Operations, BIO 225 Laboratory Safety, and BIO 226 Laboratory Safety Lab

Purpose of Course: Upon successful completion of this course, students will be able to explain and demonstrate technical skills related to common fermentation procedures.

Required Materials

Textbook(s): P.F. Stanbury and A. Whitaker. *Principles of Fermentation Technology*. Pergamon Press.
Arnold L. Demain and Nadine A. Solomon. *Manual of Industrial Microbiology and Biotechnology*. American Society for Microbiology..

Learning Outcomes

The intention is for the student to be able to

1. Demonstrate aseptic technique and sterility control procedures
2. Operate a fermentation high performance liquid chromatography system
3. Comply with regulatory and ecological guidelines in the operation and design of fermentation processes

Course Competencies

Actions that are essential to achieve the learning outcomes:

1. Evaluate various fermentation and bio-processing applications
2. Validate the principles and importance of sterility in industrial fermentations
3. Demonstrate aseptic technique and sterility control procedures
4. Complete external measurement of fermentation parameters
5. Recover spent fermentation broth
6. Calculate the efficiency of a fermentation process
7. Demonstrate preparation of seed inoculums
8. Operate a fermentation high performance liquid chromatography system
9. Comply with regulatory and ecological guidelines in the operation and design of fermentation processes

Learning Units

I. Fermentation Theory
II. Chromatography Methods

Method of Delivery/Instruction

X Face-to-face ☐ Blended Online

COURSE OUTLINE
BIO 290 Biotechnology Internship (5 credits)

Course Description This internship allows students to gain real job experience in the biotechnologyindustry before completion of the certificate. The intern will be placed in an industry involved in one of the program's focus areas.

Prerequisite(s) Successful completion of all other courses in the Advanced Biotechnician Certificate program.

Purpose of Course The internship will provide advanced students the opportunity to develop job and career-related skills while in a work setting. Upon successful completion of this course, the student should be able to apply classroom knowledge to an actual work situation.

Learning Outcomes
The intention is for the student to be able to

1. Exhibit reliability for the performance of laboratory procedures by assuring the reliability of the results gained.
2. Accept responsibility to share knowledge of values with others to improve analysis results
3. Perform with accuracy and technical proficiency common laboratory procedures.

Course Competencies
Actions that are essential to achieve the learning outcomes:

1. Demonstrate entry level competencies in the laboratory
2. Demonstrate professional behaviors
3. Demonstrate technical skills required for accurate and efficient laboratory testing.
4. Correlate laboratory results for accurate interpretation of meaning and possible diagnosis

Method of Delivery/Instruction

☐ Face-to-face ☐ Blended ☐ Online

Appendix F

CA-1a

KBOR CA-1a Form (2009)

IMPLEMENTATION YEAR

Fiscal Summary for Proposed Academic Programs

Institution: Manhattan Area Technical College
Proposed Program: Advanced Applied Laboratory Technician Certificate

Part I. Anticipated Enrollment	Implementation Year	
	Full-Time	Part-Time
A. Headcount:	6	10
B. Total SCH taken by all students in program	16	
Part II. Program Cost Projection		
A. In implementation year one, list all identifiable General Use costs to the academic unit(s) and how they will be funded..		
	Implementation Year	
Base Budget Salaries	Adjunct faculty @ $500/credit hour (32 credit hours) $16,000	
Other Expenses	Equipment - $5000 Supplies - $8,000	
Total	$29,000	

Indicate source and amount of funds:

Student tuition – 32 credit hours at $90 per credit hour x 6 full-time students $17,280
16 credit hours at $90 per credit hour x 10 part-time students $14,400

Additional grant funding will be identified to fully implement the program to achieve the intended outcome—a well trained workforce prepared to meet the needs of business and industry.

Submit the completed document to the following:

Director of Technical Programs & Curriculum
Kansas Board of Regents
1000 SW Jackson, Ste. 520
Topeka, KS 66612-1368

Below is the narrative from the January 2010 Workforce Solutions Fund grant that was not awarded. However, the information provided in this narrative serves as a foundation for future funding opportunities that will be pursued.

Background: Nearly one year ago, Manhattan Area Technical College was awarded a Workforce Solutions Grant to develop and implement an **entry-level biotechnician (BT) certificate** and an **advanced biotechnician certificate (now called Advanced Applied Laboratory Technician Certificate)** to prepare workers with the specific laboratory skills needed to meet the anticipated demand from bioscience industry employers. Our intention for these two programs, as well as our Medical Lab Technician training, is to provide a career ladder in the biotech/lab sciences field that begins with training high school graduates (entry-level BT certificate), progresses to an AAS Degree through MATC's MLT (or other community college science) program, and provides additional specialized training for Associate-Bachelor-Advanced Degree students to gain specific lab skills geared toward the type of research to be conducted at NBAF and related facilities. We were awarded Workforce Solutions funds (WSF) to support this work.

Since receiving the initial WSF award, we have been engaged in initiating the activities required to accomplish project goals. We have met with industry and educational partners, investigated a variety of potential courses appropriate to the advanced certificate, and worked with a consultant who is helping guide our project. These efforts have been both promising and exciting and have led us to new industry contacts, additional postsecondary partners, and the potential to provide biotechnical training far beyond our initial expectations. We are currently engaged in a joint project with Kansas State University (KSU) and Johnson County Community College (JCCC) to develop an Ag Biotechnology Certificate. We find ourselves in a unique position—our original project has generated new opportunities that reach beyond the boundaries of MATC. To meet these challenges, we need to "think bigger." We are requesting additional Workforce Solutions funds to *meet newly identified needs* for biotechnician training within and beyond our region.

ITEM	COMMERCE FUNDS			MATCHING FUNDS	TOTAL
Salaries/Personnel	**Year 1**	**Year 2**	**Year 3**		
Biotechnology Programs Coordinator	$55,000	$30,000	$10,000	$25,000/Yr 2 from Perkins $45,000/Yr 3 from Perkins and MATC; $70,000 total match	$165,000
Adjunct instructors (for teaching)	0	0	9,000	0	9,000
Curriculum dev (adjunct faculty and subject matter experts)	13,500	13,500	0	5,000/year for 2 years in-kind match from KSU and JCCC for 10,000 total match	37,000
Inst Technologist (.5 FTE)	19,200	9,200	0	10,000/Year 2 (Perkins) 19,200 / Year 3 (Perkins and MATC); 29, 200 total match	57,600
Lab Assistant	0	0	8,640	0 (Years 1 & 2 provided through WSF Funds 2009 award)	8,640
Benefits (BT Coordinator) @ 20%	11,000	11,000	5,500	5,500 /Year 3 only (MATC)	33,000

Benefits Instr. Tech @ 15%	2,880	1,440	0	4,320 total match for Years 2 & 3 (MATC)	8,640
Benefits Lab Asst @ 15%	0	0	1,296	0	1,296
Salary and benefits: VP of Instruction @ 3% of salary	0	0	0	2,340/year; 7,020 total (MATC)	7,020
Salary and benefits: VP Business Services @ 3% of salary	0	0	0	3,900/year; 11,700 total (MATC)	11,700
Salary and benefits: Dir. Workforce Dev. @ 10%	0	0	0	6,840/year; 20,520 total (MATC)	20,520
Salary: Allied Health Dist. Learning Coord. @ 10% FTE	0	0	0	4,040/year; for 1 year WS funds (MLT project)	4,040
Benefits: AHDL Coord @ 20%	0	0	0	808/year; for 1 year WS funds (MLT project)	808
Equipment					
Instruments for fermentation process taught in Biotech Method IV class		5,000	0	0	5,000
Supplies					
Consumable lab supplies	5,000	1,500	1,500	17,427 WS funds – MLT grant award; 3,500 Years 2 & 3 from student lab fees ($24,427 total)	32,427
Misc. office supplies	0	0	0	500/year; 1,500 total (MATC)	1,500
Internet service, copying, phone, etc.	0		0	1,500/year/4,500 total (MATC)	4,500
Furnishings for classroom					
• Faculty desks/chairs	1,800	0	0	2,000 (MATC)	3,800
• Student tables/chairs	2,100	0	0		2,100
• Overhead projector and screen	600	0	0		600
• Computers for staff	0	0	0	4,000 (MATC)	4,000
Other					
OSHA 10 training (from outside provider)	1,000	1,000	1,000	1,000/year; 3,000 total through from student tuition	6,000
Recruitment and marketing	0	0	0	2,000/year/6,000 total (MATC, KSU, JCCC)	6,000
Rental -- lab space at Mercy Regional (300 sq ft)	0	0	0	5,000/year; 15,000 total (MATC)	15,000
Wiring of classroom/office space at Mercy Regional (Sunset Campus)	11,750	0	0	$2,000 for minor repairs, painting (MATC)	13,700
Rental of classroom/office				21,500/year for 3 years; total	64,500

space				$64,500 (MATC)	
TOTALS	**$123,780**	**$72,640**	**$36,936**	**$290,035**	**$523,391**

$ 233,356 total requested from WS Funds

A. Budget Narrative

Funding needs:

MATC is requesting additional Workforce Solutions funds to meet the expanded scope of the Advanced Applied Laboratory Technician training resulting from our partnership with KSU and JCCC through:

- Compensation for a full-time Biotechnology Programs Coordinator for MATC who will oversee all aspects of current and future biotechnician training initiatives. Duties will include, but are not limited to: coordination with KSU and JCCC, identification and coordination of internship sites for program students, curriculum and online course development, faculty and staff hiring and training
- Hiring of subject matter experts to develop the additional coursework determined by project partners
- Providing a part-time lab assistant to maintain the lab facility, order supplies and materials, set up materials for instruction
- Providing an instructional technologist who will be fully trained in MATC's new learning management system and who will work with project faculty to create effective online coursework
- OSHA 10 training (required)
- Replacement supplies for lab instruction
- Wiring for Internet access for classroom/office space and classroom furnishings

Methodology and matching funds:

1. Biotechnology Programs Coordinator (1 FTE): MATC professional staff position at 226 days yearly; salary **$55,000** and benefits (at 20%) of **$11,000**, for Years 1-3.

2. Adjunct Instructors: Funding for adjunct instructors to teach biotech courses is provided in Years 1 & 2 by Workforce Solutions award #09-15. Additional WSF will provide salaries during Year 3 only. Based on $500/credit hour x 18 credit hours for total of **$9,000** (benefits do not apply).

3. Curriculum Development: Current faculty (off contract), adjunct faculty and/or subject matter experts will be hired to develop the additional courses identified for MATC's AALT certificate and KSU's Ag Biotechnology certificate. Based on $1,000 per credit hour for full course development and $500 for partial/shared (with partners) course development.

- *Overview Course* – partners will share in enhancing existing course from JCCC – 3 credit hours x $500 = **$1,500** ($3,000 in-kind match from KSU and JCCC)
- *Lab Operations Course*– MATC is sole developer of totally new course – 3 credit hours x $1,000 = **$3,000**
- *Lab Safety Course* – partners will share in enhancing existing course from JCCC – 2 credit hours x $500 = **$1,000** ($2,000 in-kind match from KSU and JCCC)
- *Biotech Methods and Procedures III and IV* – MATC will be the sole developer of totally new courses – 8 credit hours x $1,000 = **$8,000**

4. Instructional Technologist (.5 FTE): Hourly rate of $20 for 20 hr/week 48 weeks = **$19,200**

5. Lab Assistant: Based on 20 hours/week x 48 weeks @ $9.00/hr = **$8,640**

6. Lab Supplies: Estimated cost of replacement supplies for lab sections (reagents, cell culture materials, bacterial specimens, etc.) is $5,000 per academic year. WSF will cover replacement for

Yr 1 @ **$,5000**; in years 2-3, WSF will provide **$1,500** of costs, with student lab fees offsetting remainder with $7,000 (match).
7. OSHA 10 training: Estimated at $1,000 per semester, beginning fall 2010; total of 6 semesters = $6,000; half the cost from WSF and half will be offset each semester by student tuition ($3,000 match).
8. Wiring of classroom and office space: Mercy Regional Hospital/Sunset Campus will allow MATC to rent an additional room (@ 1200 square feet) for biotechnician training classroom and faculty/coordinator offices. Wiring for Internet access estimates: cables @ $600, misc. hardware @ $100, modem and switch @ $250, monthly service fee for Internet @ $300/month x 36 months = $10,800 for total cost of **$11,750**.
9. Furnishings for Biotech classroom: Faculty desks and chairs (3 faculty @ $600 each = **$1,800**), 12 seminar tables and chairs (12 tables @ $100 each, 12 chairs @ $75 each = **$2,100**), overhead projector and screen **($600)** for estimated total of **$4,500**.

Appendix G

MATC Curriculum Committee

Manhattan Area Technical College
Notice of Action Taken by the Curriculum Committee

Date of Action: 1/14/10

Description of Proposal: New program proposal for MATC to offer an Advanced Applied Laboratory Technician Certificate. This certificate prepares students with an AAS/BS or higher in a science to work in biological research laboratories.

Submitted by: Barb Wenger

Presented to Committee By: Barb Wenger

Summary of Committee Discussion: The need for this certificate is due to NBAF and other biological research laboratories locating in Manhattan and requiring a trained workforce. Certificate will be offered in coordination with K-State and will potentially be partially grant funded. Students will complete online lectures in conjunction with onsite lab work. Facilities currently not available at MATC. Lab classes will be taught by industry associated instructors. This will be an 11 month 32 credit hour certificate. Coursework will include Laboratory Safety, Laboratory Operations, Biotechnology Methods and Procedures, and a five credit hour internship.

Action Taken:

Approved ☒ Approved Pending Modifications ☐

Tabled for Later Discussion ☐ Rejected ☐

Explanation: Committee unanimously approves new program proposal.

Curriculum Committee Chairperson: Shannon Dated 1/29/10

Manhattan Area Technical College
Curriculum Committee Minutes
1/14/10 10:30 am Rm 402

Attendance: Carlie Shannon, Ben Eckart, Justin Pfeifer, Don Jensen, Carol Keltner, Rex Fair, Tammy Heine, Marilyn Mahan, Barbara Wenger, Donna Hobbs
Absent: Helen Estes , Nicole Fischer

1) Program Change Proposal AC - Presented by Linn Schroll
   Motion to approve – Tammy
   Second – Carlie
   Vote to accept was unanimous

2) Course Change Proposal BA – Presented by Carol Keltner
   BUS 210 perquisites change
   Motion to approve – Ben
   Second – Tammy
   Vote to accept was unanimous

   BUS 210 change to BUS 199
   Motion to approve – Tammy
   Second – Don
   Vote to accept was unanimous

3) Course Change Proposal EPD – Presented by Rex Fair
   Motion to approve – Carlie
   Second – Carol
   Vote to accept was unanimous

4) Course Change Proposals MAT – Presented by Carlie Shannon
   MAT 135 changes
   Motion to approve – Tammy
   Second – Rex
   Vote to accept was unanimous

   MAT 100 changes
   Motion to approve – Tammy
   Second – Don
   Vote to accept was unanimous

5) New Program Proposal Biotechnology Certificate – Presented by Barb Wenger

   Advanced Applied Laboratory Technician Certificate
   Motion to approve – Carlie
   Second – Carol
   Vote to accept was unanimous

   Next Meeting: 2nd Wednesday Feb 10 3:30 – 4:30

Appendix H

Board of Directors

The TECHNICAL COLLEGE
MANHATTAN AREA TECHNICAL COLLEGE

Board of Directors Agenda
Manhattan Area Technical College
November 10, 2009
Room 304: 6:30 p.m.

Board of Directors:

___ Brandon, Marla (Chair)	___ Karmann, Donna	___ Dr. Frieze, Todd
___ Green, Dick	___ Olsen, A.N. "Ole" (Vice Chair)	___ Dr. Wika, Norris
___ Loub, Arthur	___ Thornberg, Willie	___ Dr. Craft, David

Administration/Staff:

___ Dr. Edleston, Robert	___ Geisler, Tracy (Board Clerk)	___ Mahan, Marilyn
___ Daniel Davis (SGO President)	___ Bloodgood, Jane	___ Pfeifer, Justin
___ Delay, Norm (Fac. Senate)	___ Leslie Snead (Classified Senate)	___ Dr. Fogg, Richard

Program Visit: Nursing Technology, (Room 102) 6:00 p.m.

___ Call to Order

- Additions/Changes to Agenda

___ Consent Agenda (Items requiring BOD action)*

- Approval of Minutes (Attachment 1)*
- Expenditure Report (Attachment 2)*
- President's Monthly BOD report (Attachment 3)*
- Personnel Actions (Attachment 4)*
- Monitoring Report: Financial Condition (Attachment 5)*

___ General Agenda (Items possibly requiring BOD Action)

- New Vice President of Student Services
- Future Program Considerations
  - Advanced Bio-Tech Certificate
  - Facilities Maintenance
- Possible Budget Cuts

___ Discussion of Ends (Demonstration, Testimonial, or Report of Results related to Board Mission)

- Health and Sciences Building Update
- Jenzabar Update
- Dental Hygiene Update
- Winter Board Retreat Agenda (January 23, 2010: tentative)

___ Ownership Linkage (Related to Owner Expectations, "Gaps", Meeting Expectations, Identifying New Needs of Employers, etc….)

- BOD Reports

___ Incidental Information

- BOD Comments
- President's Comments
- Public Comments#

___ Evaluation of Board Process

Adjournment

Next Meeting: Tuesday, December 8, 2009 (Room 304) 6:00 p.m.

* **Requires BOD Action**

 # Submitted to Board Chair in writing prior to meeting; three minute limit.

Manhattan Area Technical College
Board of Directors Meeting
November 10, 2009
Open Session: 6:30 p.m.
Program Visit: Nursing Department 6:00 p.m.

1. The Board of Directors of the Manhattan Area Technical College met in regular session November 10, 2009 at 6:00 p.m. at Manhattan Area Technical College.

Members present:	Dr. David Craft Arthur Loub Dick Green Donna Karmann Ole Olsen Marla Brandon Willie Thornberg Norris Wika
Members absent:	Dr. Todd Frieze

Also present were Tracy Geisler, Administrative Assistant/Board Clerk; Jane Bloodgood, Vice President of Business Services; Marilyn Mahan, Vice President of Instructional Services; Justin Pfeifer, Vice President of Student Services; Dr. Richard Fogg, Associate Vice President of Institutional Advancement.

Faculty/Staff members: Thad Russell, Wes Chambers, Mark Claussen

2. CALL TO ORDER

   a. Marla Brandon called the meeting to order at 6:34 p.m.

3. AGENDA MODIFICATIONS & CONSENT AGENDA

   a. Dr. Norris Wika moved to approve the consent Agenda minutes and attachments. Art Loub seconded. Motion carried 8-0.

4. GENERAL AGENDA (items possibly requiring BOD action)

   a. Marla Brandon introduced Justin Pfeifer as our new Vice President of Student Services.

   b. Justin Pfeifer briefed the board on his future plans for Student Services.

c. Marilyn Mahan discussed the future program considerations; Advanced Bio-Tech Certificate and Facilities Maintenance. The Board was impressed with the program proposal and lauded the College for this initiative. The Board's charter is to submit the proposal as soon as feasible.

d. There was general discussion regarding upcoming budget cuts.

5. DISCUSSION OF ENDS (Demonstration, Testimonial or Report of Results related to Board Mission)

a. An update was given on the Health and Sciences Building.

b. Jane Bloodgood gave an update on the Jenzabar Database Managing System.

c. Marilyn Mahan updated the board on the Dental Hygiene Program.

d. Marla Brandon discussed the Winter Board Retreat Agenda. The retreat is set for January 23rd, 2010.

6. OWNERSHIP LINKAGE (Related to Owner Expectations, "Gaps", Meeting Expectations, Identifying New Needs of Employers, etc…)

a. None

7. INCIDENTAL INFORMATION

a. Jane Bloodgood reminded the board of the upcoming activities;
- December 12th – Graduation and Pinning, McCain Auditorium
- December 12th - Cycle Cross Race, MATC Campus

8. EVALUATION OF BOARD PROCESS

9. ADJOURMENT

10.

a. Marla Brandon, Board Chair, adjourned the meeting at 7:32 p.m.

b. Next Meeting – December 8, 2009 at 6:00 p.m. in room 304 at MATC.

MATC Board Clerk Date

Approved:

Chair Date

Appendix I

Program Advisory Committee

Advenced Applied Laboratory Technician Certificate

Program Advisory Committee

	Dr	Stack	Jim	785.532.5692	jstack@ksu.edu
	Dr	Leslie	John	785-532-1335	jfl@ksu.edu
	Dr	**Todd**	**Richard**	785-532-0962	rbtodd@ksu.edu
	Dr	**Montelone**	**Beth**	A&S (785)532-6	bethmont@k-state.edu
	Dr	Fung	Daniel	785-532-1208	dfung@k-state.edu
	Dr	**Kastner**	**Curtis**	532-1234	ckastner@ksu.edu
	Ms	Norton	Emily	785-587-8200	norton@edenspace.com
	Dr	Nair	Ramesh	785-587-8200	nair@edenspace
	Dr	Stewart	Dave	785-532-5635	ads@k-state.edu
	Ms	**Krull**	**Kim**	785-243-1435 x	kkrull@cloud.edu
	Mr	Jackson	Chad	785.532.3907	cjackson@k-state.edu
	Dr	Adrianos	James	307.745.1517	james.adrianos@ars.usda.gov
	Dr	Johnson	Julie	785.532.1333	jajohns@k-state.edu.
	Dr	**Anderson**	**Gary**	785.532-4454	ganders@vet.k-state.edu
	Dr	Cates	Michael		cates@k-state.edu
	Dr	Gary	Keith	816.753.7700	kgary@kslifesciences.org
	Dr	**Dr. Wenske**	**Liz**	616.448.1497	eawenske@ku.edu
	Dr	Dr. Freeman	Lisa	785-532-4542	freeman@vet.k-state.edu
	Dr	**Freifeld**	**Jodi**		freifeld@k-state.edu
	Ms	Jay	Amanda	800.445.5777	
	Ms	**Beyer**	**Amy**	785.537.4479	ambeyer@msn.com
	Dr	Harrington	Keith	913.397.8300	harrington@kansasbioauthority.org
	Dr	**Maes**	**Sue**	785.532.3111	scames@k-state.edu
	Dr	**Minshall**	**Bettie**	785.532.2567	minshall@k-state.edu
	Dr	Wolfgram	Luanne		lwolfgra@jccc.edu
	Dr	Barnett	Micheal	785.236.9704	mbarnett@ventria
	Dr.	**McQuire**	**Bill**		
	Ms	**Castle**	**Cathy**		
	Dr	**Frouhart**	**Lou**		

COMMITTEE MEETING MINUTES
MANHATTAN AREA TECHNICAL COLLEGE

Committee Name: Biotechnology

Date: 5/26/09

Present: Elizabeth Wenske (KUMC), Richard Todd (KSU Plant Pathology), John Leslie (KSU Plant Path), Susan Symons (KS Commerce Reg. Apprenticeship), Kathy Hund (KS Commerce), Jim Stack (KSU Plant Path), Robert Edleston (MATC), Nancy Zenger-Beneda (Cloud County Community College), Lou Frohardt (CCCC), William McGuire (CCCC), Josh Coltrain (CCCC), Brenda Edleston (CCCC), Barbara Wenger (MATC), Sally Vonada (MATC)

Location: MATC 407B

Agenda Item	Discussion	Action/Responsibilities
1. Introductions/Program summaries	Each participant shared their position/role regarding biotechnician training. Cloud Co. Comm. College worked with Ventria and Edenspace to determine employment needs. They not have an application for Agri-Biotech program at the Board of Regents for approval. They will offer AS & AAS degrees. Their goal: develop entry-level lab techs. In the future, possible articulation with KSU and high schools. If approved, it will start Fall 2009. Identified employer needs include both low and high end of training; not necessarily a BS degree. CCCC focus is agriculture. They shared course list with participants.	
2.	MATC: Allied Health programs are being expanded to include training for "worker bee" technician to support area employers. We are collaborating/developing collaborations with SCCC and KSU Vet Tech, as well as developing an Advanced Biotechnician Certificate, INT Security, Advanced Control/HVAC technicians.	

3.	KSU: Jim Stack is the former Director of the BRI. A skilled workforce is key – within a 30 mile radius – we will need to train and re-train for years to come. John Leslie (Dept. Head) talked about PhD program in Genetics; at the undergrad level, animal sciences, agronomy can work into biotech programs. Richard Todd: Recently began a Genomic Biotech minor (Jan 09) aimed at seniors and graduates. It overlaps with several other departments. We need to develop a clear pathway for community college students to articulate.	We need to develop the infrastructure – companies will continue to change and grow. Basic skills are needed – generic form is better than being too specific. The companies will train to the specifics. Course alignment, transfer credits will need to be worked out. Can we share instructors? Can KSU faculty teach at CC level?
4.	Dr. Wenske reviewed the WIRED program model development (for high school graduates/workforce center clients – 150 contact hours of training. The first program had 12 students; about ½ are now employed and others are doing internships. WorkKeys Bronze level is required – but math is a challenge.	Use industry reps to teach and to host student interns. Leverage technical college and community college teaching (e.g., teach ESL to company employees).
5.	Susan Symons: Reviewed possibilities for registered apprenticeship in the field and distributed handout.	
6. Next steps	Another meeting to determine how we can work together. Should we bring in the KS Bioscience Authority? (Jim is already working with them.) Include Chambers of Commerce. What are the NBAF jobs?	Suggestions: • Collaborate on a "biotech" event to market and recruit • Search jobs from industry that require various levels of education • Talk to people in all areas of the company – many don't see the "whole picture" of employee needs. High school counselors need to be informed and involved. • Partner in a funding request? A needs analysis would be important.

Advanced Laboratory Technician Advisory Committee
Thursday, November 19, 2009
10 – Noon, Room 304

Agenda

1. Welcome / Overview

2. Introductions

3. Research regarding the need for this training

4. KBOR proposal review

    a. Needs
        i. Demand for this training – letters of support
        ii. Partnerships with business and industry—internships, laboratory space for instruction, instructional support
        iii. Internships and/or opportunities for students to apply the knowledge and skills attained
        iv. Specialized accreditations required for the program or industry-recognized credentials
    b. Challenges
        i. Faculty – qualifications and/or certifications required to teach
        ii. Resources
            1. Staffing
            2. Facilities
            3. Equipment
            4. Clinical placements
            5. Funding sources

5. Discussion of competencies presented

6. Curriculum – Program of Study / Degree plan

7. Next steps
    a. Follow-up/reflection – survey
    b. Letters of support
    c. Next meeting – **January 14, 2010, 10 a.m., Room 304, MATC**

COMMITTEE MEETING MINUTES
MANHATTAN AREA TECHNICAL COLLEGE

Committee Name: Advanced Applied Laboratory Technician

Date: Thursday, November 19, 2009

Present: Dr. Liz Wenske-Mullinax, KU Medical Center, Continuing Education, MATC Consultant; Dr. Richard Todd, Assistant Professor, Plant Pathology, KSU; Amy Beyer, Research Assistant, Plant Pathology, KSU; Dr. Curtis Kastner, Professor/Director of Food Science Institute, KSU; Dr. Beth Montelone, Professor/Associate Dean, College of Arts & Sciences, Interim Director, Biosecurity Research Institute, KSU; Jodi Freifeld, Curriculum Coordinator for OneHealth Kansas, KSU; Dr. Gary Anderson, Director, KSU Veterinary Diagnostic Laboratory, KSU; Sue Maes, Dean of Continuing Education/Co-Director for the Institute for Academic Alliances, KSU; Bettie Minshall, Program Coordinator, Continuing Learning, Continuing Education, KSU; Kim Krull, Dean of Instruction, Cloud County Community College; Dr. Bill McQuire, Cloud County Community College; Cathy Castle, Cloud County Community College; Dr. Lou Frohardt, Cloud County Community College

Invited: Dr. Jim Stack, KSU; Dr. John Leslie, KSU; Dr. Daniel Fung, KSU; Emily Norton, Edenspace; Dr. Ramesh Nair, Edenspace; Chad Jackson, KSU; Dr. James Adrianos, USDA; Dr. Julie Johnson, KSU; Dr. Michael Cates, KSU; Dr. Keith Gary, Kansas City Life Sciences; Amanda Jay; Dr. Keith Harrington, Kansas Bio-Authority; Dr. Luanne Wolfgram, Johnson County Community College; Dr. Michael Barnett, Ventria

Location: Manhattan Area Technical College

Agenda Item	Discussion	Action/Responsibilities
Welcome/Overview	Dr. Rob Edleston, President, MATC Marilyn Mahan, Vice President of Instruction, MATC	N/A
Introductions	See above list of attendees; attendees shared their interest in the proposed Advanced Applied Laboratory Technician Certificate program	N/A
Research regarding the need for the training	Marilyn reported how the program came about—recognition of the need for trained laboratory technicians in anticipation of the location of NBAF and other related business and industry as well as research facilities to the region. Marilyn identified research that identified a gap between the education gained at the associates or bachelors/masters	N/A

	degree level and the workplace skills required for a laboratory technician.	
Review of the KBOR proposal	<u>Needs</u> • Demand for this training – those present identified the need in their respective labs and the skills required; those present recognized the amount of hands-on training required • Partnerships with business and industry – need to identify internship locations, laboratory space for instruction, and instructional support • Internships and/or opportunities for students to apply the knowledge and skills attained • Specialized accreditations – those in attendance identified that this would not be important in their labs <u>Challenges</u> • Faculty – qualifications required • Resources, including staffing, facilities, equipment, clinical placements, funding resources Marilyn identified the need for collaboration, not coopetition. When asked the definition of collaboration, Marilyn stated that her definition is all parties identifying the need and working jointly to create a win/win. What collaboration might mean to each party could be different, depending on what they have to bring to the table.	Those present were asked to 1) Write letter of support for the training that is proposed in this advanced certificate, and 2) Write letter of support to provide internship, or 3) Write letter of support to provide laboratory space for instruction, or 4) Write letter of support for providing instructional support 5) Identify qualifications of faculty to teach the curriculum—academic degree, industry experience, any certifications 6) Identify resources for collaborative purposes—grants for additional funding to support instruction, equipment, and/or facilities; providing space for instruction; providing instructional staff
Discussion of competencies	• Barb presented the draft of competencies based on research. Dr. Wenske-Mullinax elaborated on the identified competencies based on her research as well as her experience in the field. Dr. Montelone explained that different labs need/practice different skills. Most of the discussion focused on two issues: 1) Which of these competencies are totally essential to efficient laboratory practice, and 2) How deeply is	1. Review the competencies that will be sent electronically 2. Identify the competencies that will specific to courses 3. Identify level of competence required for the technical skills

	it necessary to train in the other (molecular techniques) skills. The steering committee agreed that the skills listed under the categories of Lab Related Skills, Basic Lab Procedures, and industry-related knowledge were considered essential to complete this certificate. • Dr. Anderson made the point that, unlike grades, which could mean several things, this certificate should have defined, rigorous standards, concluding that an "A" might mean 90% accurate or it might mean 100%, a difference not acceptable in a laboratory setting. • Dr. Montelone mentioned that a graduate of KSU might be hirable, but a holder of this certificate would be a very attractive employee. Dr. Kastner agreed, saying that this certificate could create another pool of employees that might meet lab requirements better than workers from current hiring pools. • Dr. McGuire mentioned that MATC should look into the qualifications government labs have for any of their employees. • The additional certification for safety officers wasn't considered relevant at this time.	
Curriculum	• Barb Wenger reviewed the curriculum. Steering committee acknowledged the requirement of a degree in a science field prior to entering the advanced certificate program as well as the need to have two of three biology courses prior to entry into the program. There was no further discussion about the four BTM&P courses other than they were all necessary to develop the technician skill level required. • Dr. Kastner indicated that a certificate that could be accomplished in 11 months would be very desirable. He also asked about the possibility of developing this for online delivery as well. • Sue Maes made the point that to collaborate with	1. Refinement of the curriculum to include outcomes and competencies for each course 2. Discussion with CCCC and JCCC regarding the pathway of the associates degree students into the advanced certificate 3. Discussion with KSU Continuing Education for movement from the advanced certificate into a bachelors or masters program in particular. Need to develop the visual that shows multiple ways to manipulate within this career field.

	CCCC, JCCC, and KSU in such a manner that articulation was easy would be very important to the acceptance of the certificate. She suggested that the development of a career pathway that could lead in a variety of directions with a variety of results. She also asked about the possibility of the KSU Olathe campus using the curriculum.	
Next steps	• Barb indicated that they would be receiving a follow-up/reflection survey—all present indicated their willingness to receive further communication • Letters of support will be required. • Next meeting, if required, will be **Thursday, January 14, 10 a.m., Room 304, MATC**	Barb will be sending out a survey as well as asking for specific information to be submitted in support of the KBOR proposal. Barb and Marilyn will identify talking points that can be included in letters of support.
Adjournment	Meeting adjourned at noon	

Appendix J

Perkins Program Verification Form

KANSAS BOARD OF REGENTS
PERKINS APPROVED PROGRAM VERIFICATION

FY2010

Name of Institution: Manhattan Area Technical College **Date of Submission:** February 5, 2010

Program CIP Code: 41 **Program Name:** Advanced Applied Laboratory Technician Certificate

Program Status: ☒ Active ☐ Inactive

Award Level: ☐ AAS ☐ AS **Credit Hours Required:** **Total Technical Cr, Required:** 32

☒ Technical Certificate **Credit Hours Required:** 32 **Total Non-Tech Cr. Required:**

Certificates of Completion

☐ Adult-Short Term Training **Credit Hours Required:**

☐ Business & Industry Training **Credit Hours Required:**

☐ Apprenticeship **Credit Hours Required:**

Associate degree programs must have at least 55% of the total program credit hours from technical courses for Perkins approval.

R-Required E-Elective	T-Technical G-General Education	Course Name	Credit Hours
R	T	BIO 210 Laboratory Operations	4
R	T	BIO 225 Laboratory Safety	2
R	T	BIO 226 Laboratory Safety Lab	1
R	T	BIO 250 Biotechnology Methods & Procedures I	3
R	T	BIO 251 Biotechnology Methods & Procedures I Lab	2
R	T	BIO 260 Biotechnology Methods & Procedures II	2
R	T	BIO 261 Biotechnology Methods & Procedures II Lab	3
R	T	BIO 270 Biotechnology Methods & Procedures III	2
R	T	BIO 271 Biotechnology Methods & Procedures III Lab	3
R	T	BIO 280 Biotechnology Methods & Procedures IV	2
R	T	BIO 281 Biotechnology Methods & Procedures IV Lab	3
R	T	BIO 290 Biotechnology Internship	5

Signature of Administrator Title Date

Submit one copy to the Career and Technical Education office, Kansas Board of Regents, 1000 SW Jackson Street, Suite 520, Topeka, KS 66612-1368.

FOR STATE USE ONLY: ☐ **Approved for Perkins Funding** ☐ **Not Approved for Perkins Funding**

Director, Career and Technical Education Date