

*Promoting Rigorous Career and
Technical Education Programs of Study
Through Statewide or Multi-State
Articulation Agreements*

**2008-2010 Project Application
CFDA #84.051C**

**Submitted to the U.S. Department of
Education**



Prepared by the Florida Department of Education

Abstract

Florida's Statewide Biotechnology Program of Study

The goal of the Florida Department of Education is to build capacity to develop and promote a rigorous Biotechnology Program of Study that incorporates the key elements identified in the Carl D. Perkins Career and Technical Education Act of 2006. (Public Law 109-270)

Through a partnership with the Florida Department of Education (Division of Workforce Education, Division of Community Colleges, Office of Articulation), the State University System, the University of Florida, the Employ Florida Banner Center for Biotechnology, the Employ Florida Banner Center for Excellence (Secondary/Career Academies), and Workforce Florida, Inc., a statewide articulation agreement (secondary to associate degree) will be developed in the biotechnology pathway.

The impetus for development of a biotechnology program of study stems from the fact that new statewide initiatives are being implemented to expand Florida's biotechnology industry. The establishment of Scripps Florida, the Burnham Institute, the Torrey Pines Institute for Molecular Studies, the Max Planck Florida Institute, Oregon Health & Science University's Vaccine and Gene Therapy Institute, and the Mann Research Center along with creation of new companies, and establishment of the University of Florida Center of Excellence for Regenerative Health Biotechnology (UF CERHB) are some of the catalysts of this growth, and represents an investment of nearly \$1 billion by the state of Florida. Along with this expansion is the need to fill technical positions with trained and qualified professionals for current and emerging occupations in the area of biotechnology. Currently, there is a shortage of trained personnel capable of manufacturing biological and medical products.

As delineated in the application, two high schools currently offer the secondary biotechnology curriculum and seven community colleges offer an A.S. degree in biotechnology. The major programmatic and policy actions to be undertaken as part of this project include:

- A comprehensive occupational analysis of current and emerging occupations in the biotechnology cluster/pathway to include identification of foundational knowledge and skills along with key skill requirements to be incorporated into the statewide biotechnology program of study.
- A comprehensive analysis of secondary and postsecondary courses that must be aligned and incorporated into the statewide biotechnology program of study.
- Review (and revision if deemed appropriate) of teacher and faculty certification requirements.
- Development and promotion of a statewide articulation agreement, which will establish a minimum number of credits that will be awarded to students under this program of study.

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Project Narrative for Florida's Statewide Biotechnology Program of Study

The proposed project is designed to build capacity to develop and promote a rigorous, statewide biotechnology program of study that incorporates the following key elements identified in the Carl D. Perkins Career and Technical Education Act of 2006:

- Incorporate secondary education and postsecondary education elements.
- Include coherent and rigorous content aligned with challenging academic standards and relevant career and technical content in a coordinated, non-duplicative progression of courses that align secondary education with postsecondary education to adequately prepare students to succeed in postsecondary education.
- Include the opportunity for secondary education students to participate in dual or concurrent enrollment programs or other ways to acquire postsecondary education credits.
- Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree.

Description of Project Design and Infrastructure: Florida's Biotechnology Articulation

Consortium

The project will be carried out using a partnership that will be known as the Florida Biotechnology Articulation Consortium. The Consortium will be responsible for the development and promotion of the statewide biotechnology program of study with accompanying statewide articulation (secondary to associate degree). The program of study will be designed to improve the rigor and quality of this career and technical education program area, which will be demonstrated through performance measures described in the project

announcement. The Consortium will be comprised of the following key members qualified to assess and confirm the rigor of the program of study:

- **The Florida Department of Education (FLDOE)** (Division of Workforce Education, Division of Community Colleges, Division of Public Schools and the Office of Articulation), the state agency responsible for the administration of secondary and postsecondary career and technical education in Florida.
- **The Florida Board of Governors**, the state agency responsible for Florida's public state university system.
- **Workforce Florida Inc.**, a governing board responsible for development of Florida's workforce.
- **University of Florida's Center for Excellence for Regenerative Health Biotechnology**, a biomedical translational research center, with multiple industry partnerships (BioFlorida), and which also houses:
 - **The Employ Florida Banner Center for Biotechnology**, a center which aims to ensure Florida's booming biotechnology industry has the highly skilled workforce it needs to continue to grow. The center is creating new courses to train current biotech workers who need to upgrade their skills and prepare people interested in careers in the industry for new, in-demand jobs.
- **University of Florida's Center for Precollegiate Education and Training**, a center which promotes and supports the use of the facilities and faculty of the research university in the preparation and enhancement of science and technology teaching at the secondary education level.

- **The Employ Florida Banner Center for Secondary Career Academies**, a center which was established by Workforce Florida, Inc., to address curriculum, employer and education-targeted industry requirements in sectors that are most critical to Florida's economic future.
- **Key faculty and administrators** representing secondary and postsecondary education institutions, who are familiar with career and technical education courses, industry-recognized standards and technical skill proficiencies in the Biotechnology cluster/pathway.

Representatives from each Consortium member will be involved in all phases and aspects (planning, developing, and implementing the statewide biotechnology program of study) of this undertaking. These representatives will be able to answer questions and influence decisions, will have excellent knowledge of the program of study to be developed, and have the authority to communicate information to decision-makers. The expertise offered by each partner creates an infrastructure upon which a successful program of study is built; a collaborative environment with a commitment to create a competitive workforce in Industrial Biotechnology, by offering articulation pathways to high skill, high wage, high demand career opportunities to students, and support Florida's economic development investment in the biotechnology industry as a driver of Florida's economy.

Members of the Florida Biotechnology Articulation Consortium will work together and build upon what has already been established independently by members. If funded, the Consortium will further align efforts and extend impact throughout the state. The collaborative partnerships

with regional workforce boards and corporate biotechnology-based network are integral to the success of this project, specifically with respect to promoting biotechnology workforce training programs, recruiting eligible students, assessing skills, aptitudes and abilities, assisting with registration, and identifying positions for program graduates. In addition to the statewide delivery of training, if funded the Consortium will address and offset core issues factoring into the decline of the science, technology, engineering, and mathematics-based (STEM) workforce.

Through the Consortium infrastructure, previously developed curricula will be enhanced and expanded, and assistance with the establishment of career academies for biotechnology will be provided. Career opportunities in biotechnology, which many high school and college students are not aware of, will be promoted directly through outreach and training programs provided to teachers and school counselors.

Description of the Rationale for the Proposed Statewide Biotechnology Program of Study

The impetus for the development of a statewide biotechnology program of study stems from the fact that new statewide initiatives are being implemented to expand Florida's biotechnology industry. The establishment of Scripps Florida, the Burnham Institute, the Torrey Pines Institute for Molecular Studies, the Max Planck Florida Institute, the Oregon Health & Science University's Vaccine and Gene Therapy Institute, and the Mann Research Center, along with creation of new companies, and establishment of the University of Florida Center for Excellence for Regenerative Health Biotechnology (UF CERHB) are some of the catalysts of this growth, and represent an investment of nearly \$1 billion by the state of Florida. Along with this expansion is the need to fill technical positions with trained and qualified professionals for

current and emerging occupations in the high skill, high wage, high demand area of biotechnology.

Alachua County (Region 9), home to University of Florida's Center for Excellence for

Regenerative Health

Biotechnology (CERHB) and

University of Florida's

Center for Precollegiate

Education and Training

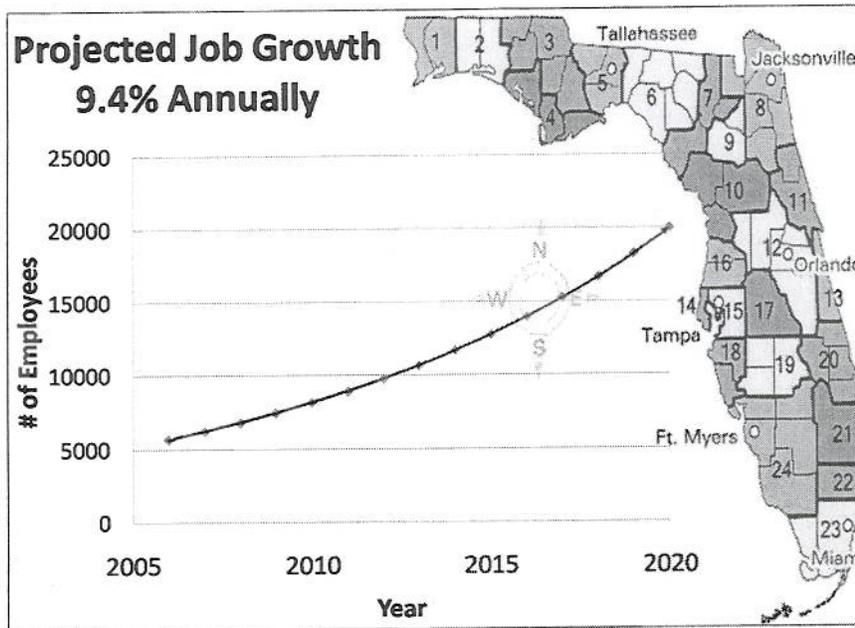
(CPET) currently has

Florida's highest

concentration of

biotechnology companies

(44) fueled by technology



created at the University of Florida (UF). These entities employ more than 1,000 people from Regions 8, 9 and 10, and based on 2008/09 survey from Enterprise Florida an additional 321 employees will be required by existing companies by 2011 and an additional 200 jobs are projected, based on new company creation. UF employs more than 1,500 health science investigators who are making discoveries that lead to therapies and new companies. Jacksonville (Region 8) is home to large companies like Johnson and Johnson and Medtronic that are continually recruiting qualified employees. Major research institutes have been lured to Florida by state-funded investments and are expected to immediately employ 4,678 people and spawn numerous biotechnology companies. By 2020 Scripps Florida, and the Max Planck Florida Institute (Region 21), the Burnham Institute (Region 12), the Torrey Pines Institute for Molecular

Studies, Oregon Health & Science University's Vaccine and Gene Therapy Institute, and the Mann Research Center (Region 20), and their spin-off companies are expected to require 17,444 qualified professional and technical personnel to support biotechnology-based research and product development. The creation of the Florida Biotechnology Articulation Consortium will help establish a trained workforce that is prepared to meet the demand.

In 2007, UF CERHB conducted a needs assessment and pipeline study to determine current and future needs of companies in Florida. Surveys were distributed to 133 identified companies statewide, from which a projection of new hires and immediate training needs was obtained and utilized to develop state-supported curricula for workforce development. Based on these surveys, employment in the biotechnology-based industry in Florida is anticipated to increase annually at a rate of at least 9.4% for the next five years (43% projected increase), exceeding the national rate of 19.4% between 2002 and 2012 for biological technicians, and 19.0% for biological scientists (U.S. Bureau of Labor Statistics, National Employment Data). Identified in both the industry surveys and statewide focus groups is the demand for training in technical skills, regulatory compliance, biomanufacturing, and careers in quality control, quality assurance, and facilities management that support the development of new products suitable for use in humans. Companies have expressed a lack of experienced workers to meet current product development needs. A critical factor for industry growth is the availability of skilled workers who possess the knowledge and skill sets specific to industrial biotechnology; workers who in the past have not been taught in traditional academic or career and technical education programs.

Description of how Eligible Applicant Intends to Implement the Required Project Activities

The Florida Department of Education will utilize the following three-phase approach to implement the required project activities: a ***research phase***, with specific tasks and activities; a ***program of study development phase***, with specific tasks and activities for developing the program of study that will be comprised of secondary and postsecondary elements and include opportunities for dual enrollment and articulated credit; and a ***statewide articulation development phase***, with accompanying tasks to fulfill the required project goals.

Research Phase – Prior to actual program of study development, an extensive research phase will be undertaken by the members of the aforementioned Florida Biotechnology Articulation Consortium. The Consortium will conduct a comprehensive analysis of the current and future “state” of the biotechnology industry in Florida. This analysis will include the following tasks and activities:

1. Accurate projections and identification of current and emerging biotechnology occupations. Common research methodologies such as surveys, interviews, reviews of existing research (i.e. 2007 UF CERHB Pipeline Study) will be utilized by the Consortium to develop an occupational projections report to include an assessment of regional workforce demands. Consortium members will access resources from their respective organizations to assist with informing the analysis.
2. Identification of foundational knowledge and skills applicable to a broad range of biotechnology occupations, as well as skill requirements/competencies for specific

biotechnology occupations that will be incorporated into the statewide biotechnology program of study.

3. Review (and revision if deemed appropriate) of current core competencies in the areas of manufacturing technology, product testing assays, regulatory compliance systems, quality control testing, product manufacturing (biologics, devices, drugs, etc.), and quality assurance.

Program of Study Development Phase – Once the critical occupational research (delineated above) has been completed, an extensive program of study development phase will be undertaken by the members of the Consortium to develop the core elements of the biotechnology program of study. The Consortium will utilize the *Program of Study State Template* developed by the Florida Department of Education, Division of Workforce Education, which incorporates the core elements identified in the Perkins Act. A copy of the state template has been included in the optional narrative file section of this electronic application package. The following program of work will guide the Consortium in development of a statewide biotechnology program of study.

1. *Identification of Secondary Biotechnology Program of Study Elements*
 - a. The Consortium will develop protocols for validating the academic and career content standards to ensure consistency at each level of program of study development. Furthermore, such protocols will be replicated and utilized for additional program of study development beyond the project period end date.

- b. The Consortium will conduct a course by course analysis of the existing secondary Industrial Biotechnology curriculum to determine if the necessary content and skills/competencies identified in the aforementioned “research phase” are delivered via the existing curriculum. A copy of the secondary Industrial Biotechnology curriculum frameworks has been included in the optional narrative section of this electronic application package. In addition, the Florida Department of Education (FLDOE) recently revised the “Sunshine State Standards,” which provide specific student performance standards and benchmarks that outline what students should know and be able to do upon completion of each course, including academic expectations and technical skills. This will necessitate the revision of the existing curriculum to incorporate the new standards, while maintaining its integrity and relevance to ensure successful transition into postsecondary programs.

FLDOE’s Division of Workforce Education is in the midst of a three-year career and technical education curriculum review and revision process. All curriculum frameworks organized under the federally recognized 16 career clusters are being reviewed and revised accordingly. Should this project be awarded federal funds by the Office of Vocational and Adult Education (OVAE), the Division will ensure that the secondary Industrial Biotechnology curriculum will be revised in consultation with the members of the Consortium during the first year of the project.

At present, the secondary Industrial Biotechnology curriculum includes topics in regulatory compliance, quality systems, process development, and biomanufacturing. The curriculum was developed by the University of Florida Center for Excellence for Regenerative Health Biotechnology through a National Science Foundation-funded program. Introductory concepts are currently being delivered in the high school curriculum and advanced specialized coursework for the community college biotechnology programs. Throughout the United States few programs exist that include this training and they tend to be concentrated in the existing biotechnology clusters of California, Massachusetts, Maryland, New Jersey, Pennsylvania, and North Carolina.

Biomanufacturing involves the controlled production of biotechnological or biomedical products including biopharmaceuticals; diagnostic test materials; enzymes, antibodies, and other protein products; transgenic plants and animals; and biomedical implants and devices. The challenge of manufacturing these products requires that every worker have the technical expertise to carefully complete procedures in compliance with federal regulations. Biomanufacturing personnel must be highly skilled, reliable, and attentive with a high level of integrity. Regulatory Affairs, a career track in industrial biotechnology of which few students are aware, impacts workers at all levels and involves ensuring that products developed and manufactured can be approved for marketing and distribution. Quality Systems (careers in quality control and quality assurance) are required to demonstrate that

products to be used in humans, raw materials, and the facilities and procedures meet established specifications.

High school students who enroll in the secondary Industrial Biotechnology program will participate in all aspects of Industrial Biotechnology: business (legal and intellectual property, entrepreneurial activities, networking, budgets, profit, marketing, organizational structure), manufacturing, facility operations, quality control, quality assurance, and regulatory affairs to assimilate specific learning and knowledge objectives that ensure future success in a corporate setting. With this foundation, they will be prepared for articulation leading to specialization within the community college programs.

The revised curriculum will align with the technical courses required in the postsecondary Biotechnology A.S. degree program. Upon revision of the curriculum, the Industrial Biotechnology courses will be incorporated into the secondary component of the program of study. Through this innovative program, curriculum in Industrial Biotechnology will introduce high school students to this applied field, complement community college biotechnology curricula, and give graduates additional career options. Students who complete the three-course sequence will be prepared for entry level positions, articulation into an A.S. degree program in biotechnology, or entrance into a four-year institution.

- c. The Consortium will conduct a course by course analysis of the academic courses in English, math, science, and social studies as well as elective offerings to determine the complimentary academic sequence of courses that align with the postsecondary elements, and will be incorporated into the secondary component of the program of study. The Consortium will ensure that the secondary elements comprising the program of study are of sufficient rigor to prepare students to meet Florida's high school graduation requirements and enter postsecondary education without need of remediation.

- d. Additionally, the Consortium will make recommendations for pre-requisite coursework, course grade requirements, minimum GPA requirements identifying successful completion of the secondary component of the biotechnology program of study, and identify industry-recognized certification(s) if available and appropriate. Other evaluation instruments that may be used to measure secondary technical skill attainment for the Perkins IV performance accountability system will also be identified, if available and appropriate.

2. *Identification of Postsecondary Biotechnology Program of Study Elements*

- a. The Consortium will develop protocols for validating academic and career content standards to ensure consistency at each level of program of study development. Furthermore, such protocols will be replicated and utilized for additional program of study development beyond the project period end date.

- b. Concurrent with the identification of secondary biotechnology program of study elements, the Consortium will conduct a course by course analysis of the required academic and career and technical courses that comprise the biotechnology A.S. degree program currently offered at Santa Fe Community College, Florida Community College at Jacksonville, Edison College, Indian River Community College, Palm Beach Community College, and Miami Dade College. Upon review (and revision if deemed appropriate) the postsecondary biotechnology sequence of courses, which align with the secondary components, will be incorporated into the postsecondary component of the program of study. The agreed upon courses, when successfully completed, will allow students to transfer to another community college or institution of higher education without losing credit for courses already completed. This provision will be delineated in the statewide articulation agreement.
- c. Additionally, the Consortium will make recommendations for pre-requisite coursework, course grade requirements, minimum GPA requirements identifying successful completion of the A.S. degree component of the biotechnology program of study, and identify industry-recognized certification(s) if available and appropriate. Other evaluation instruments that may be used to measure postsecondary technical skill attainment for the Perkins IV performance accountability system will also be identified if available and appropriate.

3. *Identification of Teacher and Faculty Certification Requirements*

The secondary Industrial Biotechnology curriculum offers both academic and career and technical education credit for the courses to provide relevant, hands-on learning opportunities for students. Florida requires career and technical education instructors to have two years of work experience in the field; therefore, teacher certification requirements will be reviewed by the Consortium. The following activities will be undertaken by the Consortium to address the certification requirements:

- a. Identify a path for teacher certification in biotechnology. Based on the limited number of experienced technicians in industrial biotechnology available in the state of Florida, an alternative route to certification will be recommended.
- b. Recommend the following alternative track toward teacher certification:
An experienced technician (three years experience or more) in the biotechnology manufacturing field with a baccalaureate; and (2) endorsement of an existing science (chemistry or biology) teacher with no hands-on experience in the industry. In this scenario the endorsement might consist of a part-time, year-long program offered by the state university system. The program could require ten, four-hour workshops and a 160-hour on-the-job/internship experience that would provide actual hands-on experiences in the biotechnology manufacturing industry. These experiences might be provided on a university campus as long as they replicate the actual experiences in industry. Any teacher with a certification in science could add this endorsement to his/her certificate and would be eligible to

teach the course. Any teacher who is currently teaching biotechnology that conforms to the suggested curriculum would be counted as an experienced technician and would not be required to take the endorsement preparation. Any experienced technician (three years experience or more) in the biotechnology manufacturing industry would not be required to take the endorsement but would be required to have a baccalaureate degree in an area of science and obtain a local district career and technical teaching certificate.

4. *Identification of Dual Enrollment/Articulated Credit Program of Study Elements-*

- a. Concurrent with the identification of secondary and postsecondary biotechnology program of study elements, the Consortium will identify the courses for secondary education students to participate in dual enrollment programs. They will be incorporated into the statewide biotechnology program of study.

The Consortium will study the existing local articulation agreements as a basis for identification of appropriate dual enrollment courses or other means of articulated credit.

Two articulation agreements have been established between the Santa Fe Community College biotechnology program and North Marion High School in Marion county, and Santa Fe High School in Alachua county, allowing completers of the high school program to bypass the introductory “Biotechnology Methods” course provided they successfully complete a comprehensive exam (80% grade minimum).

Statewide Articulation Development Phase – The Florida Board of Education has adopted a “Seamless Articulation and Maximum Access” goal as one of the goals of Florida’s K-20 educational system. This seamless articulation model provides career ladder opportunities for students as they acquire college credit while still in high school. These credentials and/or credits may articulate to a technical center, a community college, or a four-year college or university. Once the Consortium has identified the secondary and postsecondary elements of the statewide biotechnology program of study, the Consortium will conduct the following activities to develop and implement the statewide agreement component of the biotechnology program of study:

1. Obtain approval from the Articulation Coordinating Committee to develop a statewide articulation agreement in biotechnology. The Articulation Coordinating Committee (ACC) is a K-20 advisory body appointed by the Commissioner of Education. It is comprised of representatives from all levels of public and private education: the State University System, the Community College System, independent postsecondary institutions, public schools, nonpublic schools, and career and technical education. It is a forum for discussing and coordinating ways to help students move easily from institution to institution and from one level of education to the next. Primary responsibilities include approving common prerequisites across program areas, approving course and credit-by-exam equivalencies, overseeing implementation of statewide articulation agreements, and recommending articulation policy changes to the State Board of Education, the Board of Governors, and the Legislature.
2. Establish how postsecondary credit will be awarded to high school students under the program of study.

3. Establish the minimum number of postsecondary credits that will be honored by postsecondary institutions offering the comparable program as part of the statewide articulation agreement.
4. Identify the AAS/AS Degree Name and CIP numbers to be part of the statewide articulation agreement.
5. Identify the program admissions requirements required as part of the statewide articulation agreement.
6. Identify the validation mechanism if appropriate.
7. Identify the faculty certification requirements.
8. Identify the procedures and requirements for transferring secondary and community college coursework for credit.
9. Develop a timeline for the review cycle of the statewide articulation agreement to include a review of student participation, performance, and outcomes.
10. Upon development, present the proposed statewide articulation agreement to the Articulation Coordinating Committee for approval and adoption into the statewide articulation manual.

Description of how Eligible Applicant Intends to Develop Statewide Articulation Agreements for Additional CTE Programs of Study after the Project Ends

The Consortium model approach to development and implementation of statewide programs of study will be replicated after the project ends. The protocols and processes developed through this pilot project will be tested for effectiveness and if determined successful, will be customized for development of additional statewide programs of study. Through an existing statewide

curriculum review and revision process, additional statewide programs of study will be prioritized for development by targeting Florida's high skill, high wage, high demand occupations.

Description of how Eligible Applicant Intends to Provide, after Federal Funds End, Professional Development Opportunities Designed to Prepare Staff for Implementation of the Program of Study Developed under the Project

Through use of Perkins leadership funds, Florida will continue to fund an intermediary organization or "Professional Institute" to deliver professional development to academic and career and technical educators statewide. The Professional Institute's Advisory Committee has identified professional development in the area of program of study implementation to be a high priority. The Professional Institute will be responsible for the delivery of professional development for the statewide biotechnology program of study developed under this federal project.

In addition, for the pilot high schools offering the new biotechnology curriculum UF CERHB and UF CPET will conduct a two-week intensive training for teachers preparing to teach the biotechnology curriculum. The focus will be on preparative steps involved in implementing the hands-on components of the course, and incorporating an "industrial" perspective to the lessons. The training will be designed based on teacher input, in which they identify laboratory activities (media and buffer preparation, aseptic technique, pouring agar plates and tubes, preparing and staining agarose gels, storage and handling of microorganisms) where they feel large amounts of preparatory work is required, and that are in areas where they need extra guidance. The teachers will prepare classroom kits for these activities, and conduct practice runs of the hands-on activities/laboratories. Incorporated into these laboratories will be concepts and practices used in

industry, such as documentation (batch and test records, deviation reports, equipment logs), and ethical case studies. UF CERHB will offer this training statewide to increase awareness of the curriculum and to facilitate its implementation across the state.

Description of Quality Management Plan to Achieve the Project Objectives

The Florida Department of Education (FLDOE) intends to implement a sound and effective management plan to ensure all objectives are achieved and required deliverables are met. The Office of the Vice Chancellor within the Division of Workforce Education will have lead responsibility for directing, managing, and coordinating the project. This organizational placement is a direct report to the Chancellor of the Division of Workforce Education.

In addition to the FLDOE's Divisions and Offices that will serve on the Florida Biotechnology Articulation Consortium, effective and successful implementation of the grant requires extensive coordination and collaboration with additional staff in key offices and divisions of the Department, including:

- The Office of Grants Management, which oversees all aspects of grants management and will have an integral role in implementing this project.
- The Office of Budget Management, which directs, coordinates, develops, manages, and maintains the Department of Education's operating budget and non-operating budget.
- The Comptroller's Office, which provides services in the areas of accounting, financial management information, payroll, and travel reimbursement to the Department's program administrators and to subgrant recipients as appropriate.

- The Division of Accountability, Research and Measurement, which provides education data and leadership to support high standards, continually improve achievement and facilitate student opportunities, and conduct research of the efficacy of Florida's education programs.
- The Division of Workforce Education, Office of Quality Assurance, which assures financial accountability, program quality, and regulatory compliance of recipients of state and federal funds.

Additionally, the University of Florida Center for Excellence for Regenerative Health Biotechnology will play a key role as the subgrantee of these funds and as such the FLDOE assures that procedures are in place to ensure that the subgrantee is complying with regulatory requirements and expending funds in accordance with all legal requirements.

The Center of Excellence for Regenerative Health Biotechnology, led by Dr. Richard Snyder, has successfully implemented two large initiatives (National Science Foundation funded "Florida Partnership for Industrial Biotechnology," and Florida's designated "Employ Florida Banner Center for Biotechnology") aimed at developing novel, rigorous and relevant curricula that provides academic and workforce opportunities for students in biotechnology. Both initiatives include over 40 industry, academic, and government agency partners, encompass statewide organizations, and entail comprehensive knowledge of K-20 education programs, including articulation agreements between secondary and post-secondary academic institutions.

As the exclusive subgrantee, the University of Florida's Center of Excellence for Regenerative Health Biotechnology has the resources and infrastructure to carry out the project activities required to meet the project goals. The Center was established with a \$10M grant from the State

of Florida, and received \$10.1 million in matching funds from the University of Florida to hire personnel and purchase and outfit buildings with state-of-the-art equipment used by the industry. The Center was also the recipient of a U.S. Department of Commerce award, receiving a \$2 million renovation grant from the Economic Development Administration (EDA) in February of 2004, for construction of the Center's biopharmaceutical manufacturing facility, and an additional \$1.2 million in state and federal funding for the establishment of the Education and Training center.

Description of the Eligible Applicant's Dissemination Plan

The Consortium will develop dissemination materials that describe Florida's process for designing and reaching agreement on the statewide biotechnology program of study. The materials will also delineate the process utilized for development of the accompanying statewide articulation agreement. In addition, the Consortium will share its expertise in program of study development at annual meetings of BioFlorida and other industry gatherings; at the Florida Association of Community Colleges, annual conferences for the Florida Association for Career and Technical Education, Florida Association of Science Teachers, and nationally at the National Career Pathways Network and National Science Teachers Association conferences. In addition, FLDOE will participate in the required technical assistance activities sponsored by the USDOE, wherein best practices will be shared.

In addition, the Florida Biotechnology Articulation Consortium process utilized for program of study development will be posted on each of the Consortium member's web site to facilitate the establishment of other key training programs using the Consortium blueprint. The Consortium

will also utilize expertise in teacher training to forge more extensive partnership opportunities with industries, regional schools and colleges, creating added value and increased visibility of the statewide biotechnology program of study.