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ODCTE
Biotechnology

Survey of Biotechnology

This course is designed to introduce students to areas and concepts involved in Biotechnology. Students will learn to apply scientific methods of study and concepts through research and hands-on experiments. This course will strengthen the students' knowledge of science and give them a better understanding of various biology, chemistry, and botany concepts. Students will attend field trips and seminars that will reinforce the need for biotechnology in today's workforce. They will also explore the ethics involved concerning biotechnology.

Biotechnology I

This is a course that will familiarize the student with common laboratory glassware, utensils, and equipment. They will become skillful at using micropipettes, centrifuges, autoclaves, pH meters, and microscopes. Laboratory safety and precision/accuracy with equipment will be emphasized. The course will provide students with applicable knowledge of the scientific method, preparation and staining of microscope slides, cell structure and identification, and preparation of chemical solutions. Aseptic technique will be covered as well as preparation of culture media and specimen handling protocols. The students will also be able to maintain a pure cell culture and test for microbial sensitivity. Isolation, amplification, and characterization of DNA and proteins will be covered. Throughout the course, advanced math skills will be used for scientific notation, significant figures, conversion factors, percentages, and creating and integrating graphs for laboratory analysis and reporting.

Biotechnology II

This course is an advanced continuation of Biotechnology I. It will provide the student with practice in in vitro DNA synthesis reactions, programming and use of thermal cyclers for PCR reactions, utilization of real time PCR, Southern and Western blotting techniques, protein extraction and analysis, ELISA technology, and maintenance of animal cell lines.

Advanced Biotechnology I

This is a course that is intended for students who have excelled in Biotechnology I and II. It will challenge them to gain knowledge in upper-level biochemistry, microbiology, and lab techniques. Lab reports are an integral part of this course, as well as bio-informatics. Students will be expected to do independent research projects.

Advanced Biotechnology II

This is a course that is intended for students who have excelled in Biotechnology I and II and have taken Advanced Biotechnology I. This course encompasses upper-level biochemistry, microbiology, and lab techniques. Lab reports are an integral part of this course, as well as bio-informatics. Students will be expected to do independent research projects.

Biotechnology Capstone

This course is the culmination of all the knowledge gained and laboratory experience that the CareerTech Biotechnology student has acquired throughout the program. This course could look different depending on the area, school, or student. The student could be paired with a scientist as a mentor in a biotechnology industry as a lab scientist intern. He/She would work in varied roles in order to get a full picture and scope of what it takes to be employed in a biotechnology industry. The student could have a pipeline project that would require them to bring all aspects of acquired knowledge and skills to one final project. A final paper and review about the capstone experience is part of the course. Hours vary per schedule but should total 120 hours.

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Biotechnology Academy

Standard

Survey of Biotechnology

A. Introduction to Biotechnology
1. Define biotechnology
2. List the steps in the Scientific Method
3. Prepare a laboratory report
4. Practice lab safety
5. Become familiar with terms associated with Biotechnology
6. Discuss the history of Biotechnology and its discoveries
7. Maintain a contaminant free experiment

B. Genetics
1. Become familiar with terms used in the study of genetics
2. Discuss the difference between Meiosis and Mitosis
3. Discuss genetic engineering and its uses
4. Make a model DNA molecule
5. Extract DNA from cells
6. Determine phenotype and genotype using the Punnet Square

C. Impacts of Biotechnology
1. Discuss the pros and cons related to the use of Biotechnology
2. Identify the impacts of Biotechnology through its results
3. Write a position paper directed toward an ethical issue within Biotechnology
4. Identify regulatory agencies involved in Biotechnology
5. Discuss career opportunities within Biotechnology
6. Determine the environmental impact of Biotechnology by experimenting with salt and plant growth
7. Hypothesize on the future role of Biotechnology

D. Biotechnology and Plants
1. Become familiar with terms used in plant Biotechnology
2. Discuss the uses of Biotechnology in plants
3. Discuss the impact of plant Biotechnology on agriculture and the economy
4. Perform micro propagation
5. Perform plant tissue culture

E. Biotechnology and Animals
1. Become familiar with terms used in animal Biotechnology
2. Discuss the uses of Biotechnology in animals

3. Identify the applications of animal Biotechnology
4. Write an opinion statement and debate an issue pertaining to animal Biotechnology

F. Microbial Biotechnology
1. Become familiar with terms used in microbial Biotechnology
2. Identify microorganisms used in microbial Biotechnology
3. Discuss the benefits of microbial Biotechnology
4. Discuss fermentation and its importance
5. Study microbial Biotechnology through the construction of a biodegradation experiment

Industry Alignments
Biotechnology Industry Standards

Curriculum Resources
Clark & Russell, (2000), Molecular Biology Made Simple and Fun, Cache River Press.

Barnum, Susan R., (2007), Biotechnology: An Introduction, Brooks/Cole.

Daugherty, Ellyn, (2007), Biotechnology: Science for the New Millennium, Paradigm Publishing.

Thieman and Palladino, (2004), Introduction to Biotechnology, Pearson Benjamin Cummings.

Micklos and Freyer, (2003), DNA Science: A First Course, Cold Spring Harbor Press.

Alcamo, (2001), DNA Technology: The Awesome Skill, Harcourt Academic Press.

Campbell and Reece, (2005), Biology: AP Edition, Pearson Benjamin Cummings.

Biotechnology I

A. Scientific Method

B. Laboratory Math

C. Scientific Notation

D. Significant Figures

E. Conversion Factors

F. Percentages

G. Creating & Integrating Graphs for Lab Analysis & Reporting

H. Laboratory Skills & Methods

I. Preparation & Staining of Slides

J. Cell Structure Identification

K. Preparation of Solutions

L. Aseptic Technique

M. Preparation of Culture Media

N. Specimen Handling Protocols

O. Maintain a Pure Cell Culture

P. Test for Microbial Sensitivity

Q. Laboratory Utensils & Equipment

R. Precision and Accuracy with Equipment

S. Laboratory Safety

T. Basic Biotech Knowledge

U. Isolation of DNA & Proteins

V. Amplification of DNA & Proteins

W. Characterization of DNA & Proteins

Industry Alignments
Biotechnology Industry Standards

Curriculum Resources
Clark & Russell, (2000), Molecular Biology Made Simple and Fun, Cache River Press.

Barnum, Susan R., (2007), Biotechnology: An Introduction, Brooks/Cole.

Daugherty, Ellyn, (2007), Biotechnology: Science for the New Millennium, Paradigm Publishing.

Thieman and Palladino, (2004), Introduction to Biotechnology, Pearson Benjamin Cummings.

Micklos and Freyer, (2003), DNA Science: A First Course, Cold Spring Harbor Press.

Alcamo, (2001), DNA Technology: The Awesome Skill, Harcourt Academic Press.

Campbell and Reece, (2005), Biology: AP Edition, Pearson Benjamin Cummings.

Biotechnology II

A. In vitro DNA Synthesis Reactions

B. Programming & Use of Thermal Cyclers for PCR reactions

C. Utilization of real time PCR

D. Southern & Western Blotting Techniques

E. Protein Extraction & Analysis

F. ELISA technology

G. Maintenance of animal cell lines

H. Advanced Bio-Informatics

I. Diagnostic Biotechnology: Forensics, RFLP DNA fingerprinting, disease diagnosis

J. Biofuels

K. Bioremediation

L. Pharmaceutical Production

M. Gene Therapy

N. Human Genome Project

Industry Alignments
Biotechnology Industry Standards

Curriculum Resources
Clark & Russell, (2000), Molecular Biology Made Simple and Fun, Cache River Press.

Barnum, Susan R., (2007), Biotechnology: An Introduction, Brooks/Cole.

Daugherty, Ellyn, (2007), Biotechnology: Science for the New Millennium, Paradigm Publishing.

Thieman and Palladino, (2004), Introduction to Biotechnology, Pearson Benjamin Cummings.

Micklos and Freyer, (2003), DNA Science: A First Course, Cold Spring Harbor Press.

Alcamo, (2001), DNA Technology: The Awesome Skill, Harcourt Academic Press.

Campbell and Reece, (2005), Biology: AP Edition, Pearson Benjamin Cummings.

Advanced Biotechnology I

A. RNAi

B. Animal cell cultures-mammalian, insect

C. Advanced Potein expression systems

D. Microarray screening and analysis

E. gDNA and cDNA gene library production and screening

F. Advanced nucleic acid techniques-design PCR primers, probe labeling

G. Bio-Informatics

H. Independent Research Projects

Industry Alignments
Biotechnology Industry Standards

Curriculum Resources
Clark & Russell, (2000), Molecular Biology Made Simple and Fun, Cache River Press.

Barnum, Susan R., (2007), Biotechnology: An Introduction, Brooks/Cole.

Daugherty, Ellyn, (2007), Biotechnology: Science for the New Millennium, Paradigm Publishing.

Thieman and Palladino, (2004), Introduction to Biotechnology, Pearson Benjamin Cummings.

Micklos and Freyer, (2003), DNA Science: A First Course, Cold Spring Harbor Press.

Alcamo, (2001), DNA Technology: The Awesome Skill, Harcourt Academic Press.

Campbell and Reece, (2005), Biology: AP Edition, Pearson Benjamin Cummings.

Advanced Biotechnology II

A. gDNA and cDNA gene library production and screening
B. Advanced nucleic acid techniques-design PCR primers, probe labelling
C. Bio-Informatics
D. Independent Research Projects

Industry Alignments
Biotechnology Industry Standards

Curriculum Resources
Clark & Russell, (2000), Molecular Biology Made Simple and Fun, Cache River Press.

Barnum, Susan R., (2007), Biotechnology: An Introduction, Brooks/Cole.

Daugherty, Ellyn, (2007), Biotechnology: Science for the New Millennium, Paradigm Publishing.

Thieman and Palladino, (2004), Introduction to Biotechnology, Pearson Benjamin Cummings.

Micklos and Freyer, (2003), DNA Science: A First Course, Cold Spring Harbor Press.

Alcamo, (2001), DNA Technology: The Awesome Skill, Harcourt Academic Press.

Campbell and Reece, (2005), Biology: AP Edition, Pearson Benjamin Cummings.

Biotechnology Capstone

A. Biotechnology skills acquired in prerequisite courses

B. Soft skills necessary for employment

C. Content knowledge acquired in Biotechnology I, II, and Advanced Biotechnology

D. Accountability Measures, Assessments, or Evaluation Procedures

Industry Alignments
Biotechnology Industry Standards

Curriculum Resources
Clark & Russell, (2000), Molecular Biology Made Simple and Fun, Cache River Press.

Barnum, Susan R., (2007), Biotechnology: An Introduction, Brooks/Cole.

Daugherty, Ellyn, (2007), Biotechnology: Science for the New Millennium, Paradigm Publishing.

Thieman and Palladino, (2004), Introduction to Biotechnology, Pearson Benjamin Cummings.

Micklos and Freyer, (2003), DNA Science: A First Course, Cold Spring Harbor Press.

Alcamo, (2001), DNA Technology: The Awesome Skill, Harcourt Academic Press.

Campbell and Reece, (2005), Biology: AP Edition, Pearson Benjamin Cummings.

High School Career and Technology Education

Grades 9-12

JULY 2010

Highly Qualified Requirements At a Glance
No Child Left Behind Act of 2001

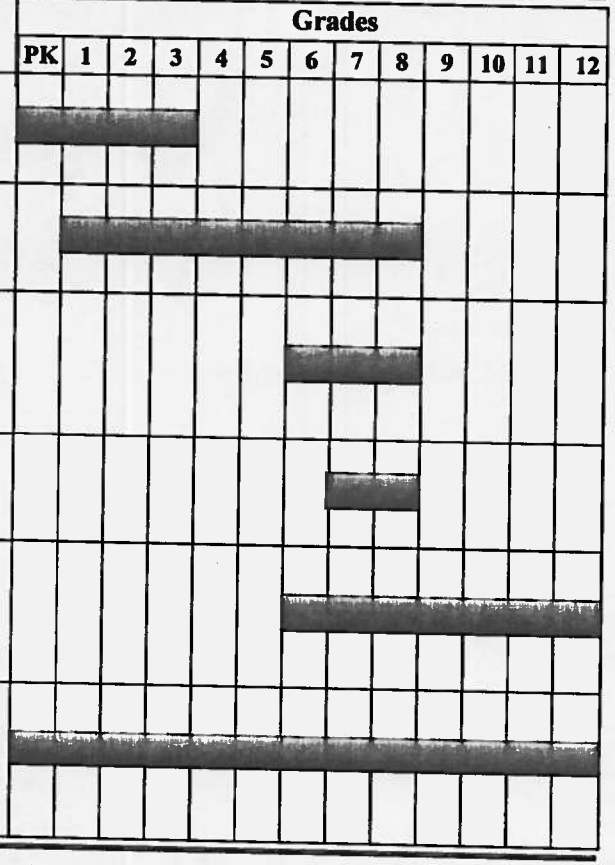
Form HQR

According to the *No Child Left Behind Act of 2001*, teachers of early childhood education, elementary education and core academic subjects (English, reading, language arts, mathematics, science, foreign languages, civics and government, economics, the arts [art and music], history, and geography) must be highly qualified by June 30, 2006.

OKLAHOMA
STATE DEPARTMENT of EDUCATION
JANET BARRESI
STATE SUPERINTENDENT of PUBLIC INSTRUCTION

Overview of Requirements for Highly Qualified Teachers

CORE ACADEMIC SUBJECT TEACHER - What does it take to be highly qualified?
Early Childhood - Grades Pre-Kindergarten (PK)-3 Early Childhood Education certificate **PLUS** Early Childhood Education test **OR** build HOUSSE* in Early Childhood Education
Elementary Education - Grades 1-8 Self-contained Elementary Education certificate **PLUS** Elementary Education test **OR** build HOUSSE* in Elementary Education
Middle Level - Grades 6-8 Departmentalized (Except 7-8 Math) Elementary Education or specific subject area certificate **PLUS** specific subject area test (does not include Elementary Education test) **OR** build HOUSSE* in specific subject area taught **OR** see ADDITIONAL OPTIONS on next page
Math - Grades 7-8 Appropriate Math certificate (Oklahoma Statute) **PLUS** Appropriate Math test **OR** build HOUSSE* in Math **OR** see ADDITIONAL OPTIONS on next page
Secondary Specific Subject Area - Grades 6-12 Appropriate certificate in specific subject area **PLUS** appropriate specific subject area test **OR** build HOUSSE* in specific subject area taught **OR** see ADDITIONAL OPTIONS on next page
Art, Music, Foreign Languages and Reading Specialist - Grades PK-12 Appropriate certificate in specific subject area **PLUS** appropriate specific subject area test **OR** build HOUSSE* in specific subject area taught **OR** for middle level/secondary see ADDITIONAL OPTIONS on next page.



For appropriate certificate refer to the *Certification Guide for School Staff Assignments* online at the Professional Standards Web site at <http://www.sde.state.ok.us>.
*HOUSSE: High Objective Uniform State Standard of Evaluation

➤ A beautiful certificate frame is available for purchase to display your teacher/administrator certificate. For information see page 112. ◄

Special Education Highly Qualified Requirements At a Glance

Form HQR

No Child Left Behind Act of 2001

According to the *No Child Left Behind Act of 2001*, teachers of early childhood education, elementary education and core academic subjects (English, reading, language arts, mathematics, science, foreign languages, civics and government, economics, the arts [art and music], history, and geography) must be highly qualified by June 30, 2006.

OKLAHOMA STATE DEPARTMENT of EDUCATION
JANET BARRESI

Highly Qualified Requirements for Special Education Teachers who are Providing Direct Instruction and are the Teacher of Record for Core Academic Subjects

What does it take for a Special Education teacher to be highly qualified?

Special Education - Grades PK-12

Veteran teachers in the Profession PRIOR TO December 3, 2004, are required to have

Certificate in Special Education **PLUS**

Build HOUSSE* *single* core subject areas **OR** pass appropriate test for single core subject area. Middle level or secondary teachers have additional options below.

Special Education - Grades PK-12

New teachers to the Profession AFTER December 3, 2004, are required to have

Special Education Certificate **AND** appropriate certificate for grade level in Early Childhood **OR** Elementary Education.

Middle or Secondary Education requires passing subject area test in secondary, 6-12 or 7-12 subject area in whatever core subject the teacher is assigned to teach. A teacher who is certified in math, science, or language arts may attempt to use a HOUSSE** procedure to become highly qualified in additional core subjects. This option is available only within two years of date of employment.

Special Education teachers who are not teacher of record may utilize the collaborative/co-teaching model.

Special Education teachers and core academic teachers are encouraged to consider the collaborative/co-teaching model as a service delivery option. Co-teaching will allow more individualized instruction in the general classroom, increase access to the general education curriculum for special education students, and decrease the stigma for students with special needs. Teachers can benefit from the professional support exchange of teaching practices as they work collaboratively together.

Additional Options to be Highly Qualified for Middle Level or Secondary: (Not an option for PK-5 early childhood/elementary education or 6-8 elementary education self-contained classes.)

- Complete an undergraduate major or coursework equivalent to undergraduate major (24 semester hours) in academic subject taught (Does not include elementary education coursework or special education coursework) **OR**
- Hold a Graduate Degree in subject area taught (Does not include elementary education graduate degree or special education graduate degree) **OR**
- Hold certification through National Board for Professional Teaching Standards in core academic subject taught.

*HOUSSE: High Objective Uniform State Standard of Evaluation

➤ A beautiful certificate frame is available for purchase to display your teacher/administrator certificate. For information see page 112. ◄

HIGHLY QUALIFIED TEACHER

According to the *No Child Left Behind Act of 2001*, teachers of early childhood education, elementary education and core academic subjects (English, reading, language arts, mathematics, science, foreign languages, civics and government, economics, the arts [art and music], history, and geography) must be highly qualified by June 30, 2006:

No Child LEFT BEHIND PUBLIC LAW 107-110

High School Career and Technology Education

Any Course Given for High School Mathematics or Science Credit

Highly qualified teachers must have:

- At least a bachelor's degree AND
- Appropriate career tech license/certificate in subject(s) taught.

+

- Passed a state certification test appropriate to mathematics or science taught.

or

- Completed an undergraduate academic major or coursework equivalent to an undergraduate academic major (24 semester hours of subject-specific coursework) in math or science as documented by the teacher's official transcript.

or

- Completed a graduate degree in math or science.

or

- Holds certification through National Board for Professional Teaching Standards in mathematics/science taught.

or

- Demonstrated competency in mathematics/science taught based on a High Objective Uniform State Standard of Evaluation (HOUSSE). See middle level/secondary HOUSSE, page 57.

NOTE: The career technology center must supply to the sending school a copy of the documentation showing that the teachers of mathematics and science credit courses are highly qualified.

➤ A beautiful certificate frame is available for purchase to display your teacher/administrator certificate. For information see page 112. ➤

No Child Left Behind
PUBLIC LAW 107-110

OPTION E
MIDDLE LEVEL (Grades 6, 7, & 8) AND SECONDARY LEVEL (Grades 9-12)

Form HQ3
June 2004

Oklahoma's High Objective Uniform State Standard of Evaluation (HOUSSE) — Checksheet for Demonstrating Subject Competency

To be completed for each core academic subject area taught.
(English, reading, language arts, mathematics, science, foreign languages, civics and government, economics, fine arts [art and/or music], history, and geography)

Name: _____ Teacher Number: _____ Core Academic Subject Area: _____

START — BUILD YOUR HOUSSE — 100 Points = Highly Qualified

National Board Certification in any subject	(Column 1) Coursework in the Core Academic Subject Area	ARROW (Column 2) Years of Satisfactory Teaching Experience in an Accredited School	ARROW (Column 3) Service in the Core Academic Subject Area	ARROW (Column 4) Awards, Presentations, and Publications in Academic Content Area	ARROW (Column 5) Legislative Authorized Academic Institutes* or Professional Development	ARROW (Column 6) Achievement of Students Taught (Optional)
IN OKLAHOMA IF NATIONAL BOARD CERTIFIED YOU ARE HIGHLY QUALIFIED	Must be content-specific to core academic subject area Semester hours of content coursework with a grade of "C" or better. An EDUCATED or any other education prefix is not acceptable except for teaching hours. or Credits earned using the College-Level Examination Program (CLEP) are acceptable provided they are reflected on the official transcript. Semester hours of content coursework taught in an institution of higher education are acceptable	Must be employed as a full-time teacher, teaching the core academic subjects any portion of the day Rationale: A. State-mandated professional development, 1981 B. State-mandated uniform teacher evaluation system, 1986 C. State *Priority Academic Student Skills (PASS)* objectives, 1993	Must be content-specific to core academic subject area Serves as a: - Department chair/team leader - Mentor teacher - Cooperating teacher for intern/student teacher - Academic club sponsor - Academic judge - Membership in a regional, state, or national professional content organization - Officer in a regional, state, or national professional content organization - Serve on a local, state, or national committee to develop, select, evaluate, or validate content standards, curriculum, or assessments - Other (Provide documentation)	Must be content-specific to core academic subject area - District teacher of the year - State teacher of the year finalist - State teacher of the year - Milken Family Foundation National Educator Award - Present academic content at local, state, regional, or national professional meetings - Published a content article in regional, state, or national journal - Presidential Awards for Excellence in Mathematics and Science Teaching - Outstanding Educator Awards from content professional organizations	Must be content-specific to core academic subject area (one point per clock hour) - Professional Development Institute– Math = 30 points* - Professional Development Institute– Science = 30 points* Professional development 1 point per clock hour - Algebra for All (College Board model) - Pre AP/AP training in subject area or - Professional development related to *Priority Academic Student Skills (PASS)* - 1993	Must be content-specific to core academic subject area - First, second, or third place in student academic competition such as collegiate interscholastic meet - Documented increase in student test scores
STOP HERE 100 Points	- 4 points per semester hour earned or taught	A. Fall 1981 - Spring 1986 1 point per year B. Fall 1986 - Spring 1993 2 points per year C. Fall 1993 – To present 3 points per year Maximum 49 points.	- 10 points for any one item. - 20 points for two or more items. (Documentation required.) Maximum 20 points.	- 10 points for any one item. - 20 points for two or more items. (Documentation required.) Maximum 20 points.	•____ points Math PDI •____ points Science PDI •____ points Algebra for All •____ points AP training •____ points per Professional Development clock hour (Documentation required.) Maximum 30 points.	- 10 points for any one item. - 20 points for two or more items. (Documentation required.) Maximum 20 points.
	# Hours _____ X 4 = _____	# Years Experience: A. B. C.			Institute: _____ Prof. Dev. Hours: _____	
	TOTAL Points:	TOTAL Points:	TOTAL Points:	TOTAL Points:	TOTAL Points:	TOTAL Points:

HOUSSE options provided by the Oklahoma State Department of Education to help schools comply with the federal mandates of No Child Left Behind.

100 Points = Highly Qualified
Total of columns 1-6: _____

A beautiful certificate frame is available for purchase to display your teacher/administrator certificate. For information see page 112.

8000 AGRICULTRURE EDUCATION		
CLASS CODE	**ASSIGNMENT**	**Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56**
8001	Agricultural Exploration and Orientation	7511 Career and Technology Agriculture **or** 7550 Agriculture Education
8002	Agriscience Exploration and Orientation (1 semester)	
8003	Agriscience Exploration and Orienttion (1 quarter year)	
8004	Introduction to Agriscience	
8005	Agriscience II	
8006	Introduction to Plant and Soil Science	7509 Trade & Industrial Education **or** 7511 Career and Technology Agriculture **or** 7550 Agriculture Education
8007	Agriculture Crop Production	7511 Career and Technology Agriculture **or** 7550 Agriculture Education
8008	Advanced Biological Plant Science	
8009	Introduction to Agricultural Power and Technology	
8010	Agricultural Power and Technology	
8011	Agricultural Structures	
8012	Introduction to Animal Science	7509 Trade & Industrial Education **or** 7511 Career and Technology Agriculture **or** 7550 Agriculture Education
8013	Livestock Production	
8014	Small Animal Care and Veterinary Assisting	
8015	Equine Science	
8016	Advanced Biological Animal Science	
8017	Introduction to Food Science	7511 Career and Technology Agriculture **or** 7550 Agriculture Education
8018	Food and Biotechnology	
8019	Introduction to Agribusiness Management	
8020	Agricultural Sales and Marketing	
8021	Employment in Agribusiness (Senior Course Only)	
8022	Introduction to Agricultural Communications	
8023	Agricultural Leadership and Personal Development	
8024	Print and Broadcast Journalism in Agricultural Communication	
8025	Introduction to Natural Resources and Environmental Science	
8026	Pasture and Range Management	
8027	Wildlife Science and Management	
8028	Forestry	
8029	Introduction to Horticulture	7509 Trade & Industrial Education **or** 7511 Career and Technology Agriculture **or** 7550 Agriculture Education
8030	Greenhouse Production and Floral Design	
8031	Landscape and Nursery Production	

8100 BUSINESS AND INFORMATION TECHNOLOGY		
CLASS CODE	**ASSIGNMENT**	**Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56**
8101	Business and Computer Technology	7513 Business Education **or** 7514 Career & Technology Business
8102	Business Information Technology Internship	
8103	Fundamentals of Administrative Technologies	7513 Business Education **or** 7514 Career & Technology Business **or** 7501 Marketing Education
8104	Administrative Technologies II	7513 Business Education **or** 7514 Career & Technology Business
8105	Office Administration & Management	
8106	Career Major Capstone	
8107	Accounting I	7513 Business Education **or** 7514 Career & Technology Business **or** 7501 Marketing Education
8108	Accounting II	
8109	Computerized Accounting	7513 Business Education **or** 7514 Career & Technology Business
8110	Payroll Accounting	
8111	Financial Accounting	
8112	Entrepreneurship: Business Development	7513 Business Education **or** 7514 Career & Technology Business **or** 7501 Marketing Education
8113	Entrepreneurship: Business Management	
8114	Human Resources Concepts	7513 Business Education **or** 7514 Career & Technology Business
8115	Employee and Labor Relations	
8118	Business & Personal Finance	
8120	Banking & Financial Services	
8121	Network/Client Operating Systems	7509 Trade & Industrial Education **or** 7513 Business Education **or** 7514 Career & Technology Business
8122	Server Operating Systems	
8123	Network Management	
8124	Fundamentals of Unix/Linux	
8125	Network and Routing Fundamentals	
8126	Routing, Switching, and WAN Technologies	
8127	Telcom and Network Cabling	
8128	Advanced Routing and Remote Access Networks	
8129	Multilayer Switching and Internetwork Support	
8130	Principals of Information Assurance	
8131	Network Security	
8132	Enterprise Security Management	
8133	Secure Electronic Commerce	
8134	Cyber Forensics	
8136	Computer Repair and Troubleshooting I	
8137	Computer Repair and Troubleshooting II	
8138	Computer Repair and Troubleshooting III	

8100 BUSINESS AND INFORMATION TECHNOLOGY (continued)		
CLASS CODE	ASSIGNMENT	Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56
8139	Fundamentals of Database Development	7509 Trade & Industrial Education or 7513 Business Education or 7514 Career & Technology Business
8140	Database Design and Programming	
8141	SQL and PL/SQL Database Applications Development	
8142	Database Administration	
8143	Modeling Languages	
8144	Forms Development	
8149	Desktop Publishing and Graphic Design	
8150	Multimedia & Image Management Techniques	
8151	Digital Editing and Production Photography	
8153	Fundamentals of Web Design	
8154	Design Tools and Electronic Marketing Strategies	
8155	Advanced Design Techniques	
8156	Advanced Digital Animation	
8157	Web Scripting Foundations	
8158	E-Commerce Site Production	
8159	Scripting Language Fundamentals	
8160	Advanced Programming	
8161	Systems Analysis, Design and Testing	
8162	Advanced Scripting Languages	
8163	Software Configuration Management	
8164	Business Communications & Project Management	
8165	C++ Programming	
8166	C# Programming	
8167	Visual Basic .NET Programming	
8168	User Interface Design	
8169	Fundamentals of Technology	7501 Marketing Education or 7509 Trade & Industrial Education or 7513 Business Education or 7514 Career & Technology Business
8170	Bilingual Interpersonal Communications I	
8177	Business Communications	7509 Trade & Industrial Education or 7513 Business Education or 7514 Career & Technology Business
8178	Personal Finance	7501 Marketing Education or 7509 Trade & Industrial Education or 7513 Business Education or 7514 Career & Technology Business
8179	Intro to Entrepreneurship	
8180	Math of Finance	7509 Trade & Industrial Education or 7513 Business Education or 7514 Career & Technology Business
8182	Windows XP Command Line	
8183	Planning and Maintaining Server Network Infrastructure	
8184	Active Directory Infrastructure	

8100 BUSINESS AND INFORMATION TECHNOLOGY (continued)		
CLASS CODE	ASSIGNMENT	Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56
8185	Server Infrastructure Design	7509 Trade & Industrial Education or 7513 Business Education or 7514 Career & Technology Business
8186	Regulatory Compliance and Auditing	
8187	Installing and Maintaining Desktop Applications	
8188	Design Tools and Electronic Marketing	
8189	Non-Linear Digital Production	
8190	Advanced Digital Video Tools and Techniques	
8191	Digital Media Production	
8192	Non-Linear Digital Editing	
8193	Audio Production	
8194	Broadcast Production	
8195	Studio Production (IT)	
8196	Remote/Field Production (IT)	
8197	Advanced Effects for Motion Graphics	
8203	Audio Tools and Techniques	
8204	Intermediate Sound Production	
8205	Advanced Animation Techniques	
8206	2D Animation Techniques	
8207	Fundamentals of 3D Motion Graphics	
8208	3D Animation	
8209	3D Modeling and Rigging Techniques	
8210	Web Authoring Languages	
8211	Web Authoring Tools	
8212	Web Application Technologies	
8213	Interactive Marketing Techniques	
8214	Flash Application Development	
8215	Advanced Flash Application Development	
8216	Layout Design Techniques	
8217	Server-Side Scripting	
8218	Web Application Development	
8219	Advanced Computer Applications for the Law office	
8220	Principles of Animation	
8221	Event and Project Planning Management	7501 Marketing Education or 7509 Trade & Industrial Education or 7513 Business Education or 7514 Career & Technology Business
8222	Programming Fundamentals	7509 Trade & Industrial Education or 7513 Business Education or 7514 Career & Technology Business
8223	Network Security Awareness	
8224	Cross Platform Game Programming	

8100 BUSINESS AND INFORMATION TECHNOLOGY (continued)		
CLASS CODE	**ASSIGNMENT**	**Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56**
8225	Basic Programming	7509 Trade & Industrial Education **or** 7513 Business Education **or** 7514 Career & Technology Business
8226	Resort and Tourism Management	7501 Marketing Education **or** 7509 Trade & Industrial Education **or** 7513 Business Education **or** 7514 Career & Technology Business
8227	Business Management for Travel and Tourism	
8228	Fundamentals of Video Game Design	7509 Trade & Industrial Education **or** 7513 Business Education **or** 7514 Career & Technology Business
8229	Customer Assistance	7501 Marketing Education **or** 7509 Trade & Industrial Education **or** 7513 Business Education **or** 7514 Career & Technology Business
8230	JAVA Programming	7509 Trade & Industrial Education **or** 7513 Business Education **or** 7514 Career & Technology Business
8231	Non-Linear Editing II	
8232	Video Animation	

8400 FAMILY AND CONSUMER SCIENCE		
CLASS CODE	**ASSIGNMENT**	**Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56**
8403	Parenting & Child Development	7505 Occupational Home Economics **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences
8404	Consumer Education	
8405	Food Preparation and Nutrition I	7505 Occupational Home Economics **or** 7517 Vocational Home Economics
8406	Housing and Home Environments I	
8407	Marriage & Family Life	
8408	Leadership, Education and Achievement Program (LEAP)	7505 Occupational Home Economics **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences
8409	Academic Commitment to Education (ACE)	
8410	Life Management	7505 Occupational Home Economics **or** 7517 Vocational Home Economics
8411	Teen Living Skills	
8412	Personal Development	
8413	Overview of the Fashion Industry	No Longer Offered
8414	Career Orientation 60	7505 Occupational Home Economics **or** 7517 Vocational Home Economics
8415	Family and Consumer Sciences I	
8416	Family and Consumer Sciences II	
8419	Career and Technology Cooperative Family and Consumer Sciences I	7505 Occupational Home Economics **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences
8420	Career and Technology Cooperative Family and Consumer Sciences II	

8400 FAMILY AND CONSUMER SCIENCE (continued)		
CLASS CODE	**ASSIGNMENT**	**Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56**
8421	Food Preparation and Nutrition II	7505 Occupational Home Economics **or** 7517 Vocational Home Economics
8422	Early Care Professionals	7505 Occupational Home Economics **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences
8425	Textiles and Apparel Assembly	7505 Occupational Home Economics **or** 7509 Trade & Industrial Education **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences
8426	Culinary Basic Skills	
8428	Culinary Advanced Skills	7505 Occupational Home Economics **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences
8430	Life Management 30	7505 Occupational Home Economics **or** 7517 Vocational Home Economics
8431	Life Management 60	
8434	Family and Consumer Sciences IA	
8435	Family and Consumer Sciences IB	
8436	Family and Consumer Sciences IIA	
8437	Family and Consumer Sciences IIB	
8438	Personal Development 30	
8439	Personal Development 60	
8440	Teen Living Skills 30	
8441	Teen Living Skills 60	
8443	Chemistry of Foods	7505 Occupational Home Economics **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences
8446	FACS Capstone	
8448	Introduction to Hospitality and Tourism	7505 Occupational Home Economics **or** 7509 Trade & Industrial Education **or** 7513 Business Education **or** 7514 Career & Technology Business **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences
8449	Adult and Family Living 60	7505 Occupational Home Economics **or** 7517 Vocational Home Economics
8452	Leadership and Management	7505 Occupational Home Economics **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences

8400 FAMILY AND CONSUMER SCIENCE (continued)		
CLASS CODE	**ASSIGNMENT**	**Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56**
8453	Lodging Management I	7505 Occupational Home Economics **or** 7513 Business Education **or** 7514 Career & Technology Business **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences
8454	Lodging Management II	
8455	Life Management with Personal Financial Literacy	7505 Occupational Home Economics **or** 7517 Vocational Home Economics
8456	Personal Financial Literacy with Teen Living Skills	
8457	Travel and Tourism Capstone	7505 Occupational Home Economics **or** 7513 Business Education **or** 7514 Career & Technology Business **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences
8459	Teaching and Learning in Elementary, Secondary, and Adult Education	7505 Occupational Home Economics **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences
8460	Touring Oklahoma	7505 Occupational Home Economics **or** 7513 Business Education **or** 7514 Career & Technology Business **or** 7517 Vocational Home Economics **or** 7559 Occupational Family & Consumer Science **or** 7575 Career & Technology Family & Consumer Sciences
8461	Housing and Home Environments II	7505 Occupational Home Economics **or** 7517 Vocational Home Economics

8558 HEALTH CAREERS		
CLASS CODE	**ASSIGNMENT**	**Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56**
8551	Health Careers I	Any secondary certification
8552	Health Careers II	
8553	Health Careers III	
8554	Health Careers Capstone	
8556	Sports Medicine	
8557	Biomedical Technology	
8333	Anatomy and Physiology	6003 Biology **or** 6050 Biological Sciences

8600 MARKETING EDUCATION		
CLASS CODE	**ASSIGNMENT**	**Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56**
8601	Intro to Fashion Design and Marketing	7501 Marketing Education **or** 7505 Occupational Home Economics
8602	Marketing Fundamentals	7501 Marketing Education **or** 7509 Trade & Industrial Education **or** 7559 Occupational Family & Consumer Science
8603	Fashion Marketing	7501 Marketing Education **or** 7505 Occupational Home Economics
8604	Advanced Fashion Marketing	
8605	Customer Service	7501 Marketing Education **or** 7509 Trade & Industrial Education **or** 7513 Business Education **or** 7514 Career & Technology Business **or** 7559 Occupational Family & Consumer Science
8606	Business Management and Supervision	7501 Marketing Education
8607	Sales and Sales Promotion	
8608	Professional Sales	
8609	Intro to Sports Marketing	
8610	Sports and Entertainment Marketing	
8611	Business and Marketing Communications	7501 Marketing Education **or** 7509 Trade & Industrial Education **or** 7559 Occupational Family & Consumer Science
8612	Advertising Strategies	7501 Marketing Education
8613	Marketing Research	
8614	Intro to Business/Marketing	7501 Marketing Education **or** 7509 Trade & Industrial Education
8615	Marketing Economics	7501 Marketing Education
8616	Entrepreneurship	7501 Marketing Education **or** 7509 Trade & Industrial Education
8617	Advanced Entrepreneurship	7501 Marketing Education
8618	International Business and Marketing	
8619	E-Commerce Marketing	
8620	Entrepreneurship Awareness	
8621	Public Relations Marketing	
8622	Marketing Internship	
8623	Employment Essentials	7501 Marketing Education **or** 7509 Trade & Industrial Education
8624	Product and Service Sales	
8625	Buying and Merchandising	
8626	Sports and Entertainment Management	7501 Marketing Education
8627	Global Markets and Trade	

8700 SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS		
CLASS CODE	**ASSIGNMENT**	**Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56**
8701	Survey of Biotechnology	6003 Biology **or** 6050 Biological Sciences
8702	Biotechnology I	
8703	Biotechnology II	
8704	Advanced Biotechnology I	
8705	Biotechnology Capstone	
8706	Principles of Biomedical Sciences	
8707	Human Body Systems	
8708	Medical Interventions	
8709	Introduction to Engineering Design	5550 Advanced/Secondary Mathematics **or** 6015 Physics **or** 7509 Trade & Industrial Education **or** 8550 Technology Engineering
8710	Principles of Engineering	
8711	Digital Electronics	
8712	Computer Integrated Manufacturing	
8713	Civil Engineering and Architecture	
8714	Biotechnical Engineering	
8715	Aerospace Engineering	
8716	Engineering Design and Development	
8717	Advanced Biotechnology II	6003 Biology **or** 6050 Biological Sciences
8718	Biomedical Health Careers	6003 Biology **or** 6050 Biological Sciences **or** 6001 Anatomy & Physiology
8719	Biomedical Innovation	6003 Biology **or** 6050 Biological Sciences
4750/ 4612	Trigonometry/Pre-Calculus	5517 Trigonometry **or** 5505 Calculus **or** 5550 Advanced/Secondary Mathematics
4412	Algebra II	5501 Algebra **or** 5513 Linear Algebra **or** 5552 Intermediate Mathematics **or** 5550 Advanced/Secondary Mathematics
4520	Geometry	5511 Geometry **or** 5552 Intermediate Mathematics **or** 5550 Advanced/Secondary Mathematics
4612	Pre-AP Calculus	5505 Calculus **or** 5550 Advanced/Secondary Mathematics
4615	AP Calculus AB	
4616	AP Calculus BC	
4760	AP Statistics	5515 Statistics **or** 5550 Advanced/Secondary Mathematics
5035	AP Biology	6003 Biology **or** 6050 Biological Sciences
5051	Pre-AP Chemistry	6006 Chemistry
5055	AP Chemistry	
5121	AP Environmental Science	6003 Biology **or** 6050 Biological Sciences
5211	Pre-AP Physics	6015 Physics
5215	AP Physics B	6015 Physics
5216	AP Physics C-Mathematics	6015 Physics

8700 SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS (continued)		
CLASS CODE	ASSIGNMENT	Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56
5217	AP Physics C-Electricity & Magnetism	6015 Physics
5336	Microbiology	6003 Biology or 6050 Biological Sciences

8800 TECHNOLOGY		
CLASS CODE	ASSIGNMENT	Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56
8801	Technology Engineering I (Grades 5-8)	5005 General Industrial Arts or 5550 Advanced/Secondary Mathematics or 5552 Intermediate Math or 5575 Mathematics-Middle/Junior High School or 6011 General Science or 6013 Physical Science or 6015 Physics or 6075 Science-Middle/Junior High School or 7509 Trade & Industrial Education or 8501 General Technology Education or 8550 Technology Engineering
8802	Technology Engineering II (Grades 6-8)	
8803	Technology Engineering III (Grades 7-8)	
8804	Gateway (GTT) - Grade 6	
8805	Tech Connect Agriculture, Food and Natural Resources - Grade 9	5005 General Industrial Arts or 7509 Trade & Industrial Education or 8501 General Technology Education or 8550 Technology Engineering
8806	Tech Connect Architecture & Construction - Grade 9	
8807	Tech Connect Arts, A/V Technology and Communications - Grade 9	
8808	Tech Connect Information Technology - Grade 9	
8809	Tech Connect Law, Public Safety and Security - Grade 9	
8810	Tech Connect Manufacturing - Grade 9	
8811	Tech Connect Transportation, Distribution and Logistics - Grade 9	
8812	Tech Connect Science, Technology, Engineering and Mathematics - Grade 9	
8813	Tech Connect Diversified Programs - Grade 9	
8814	Gateway (GTT) Grade 7	5005 General Industrial Arts or 5550 Advanced/Secondary Mathematics or 5552 Intermediate Math or 5575 Mathematics-Middle/Junior High School or 6011 General Science or 6013 Physical Science or 6015 Physics or 6075 Science-Middle/Junior High School or 7509 Trade & Industrial Education or 8501 General Technology Education or 8550 Technology Engineering
8815	Gateway (GTT) Grade 8	
8816	Tech Connect Agriculture, Food and Natural Resources - Grade 10	5005 General Industrial Arts or 7509 Trade & Industrial Education or 8501 General Technology Education or 8550 Technology Engineering
8817	Tech Connect Architecture & Construction - Grade 10	

8800 TECHNOLOGY (continued)		
CLASS CODE	**ASSIGNMENT**	**Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56**
8818	Tech Connect Arts, A/V Technology and Communications - Grade 10	5005 General Industrial Arts **or** 7509 Trade & Industrial Education **or** 8501 General Technology Education **or** 8550 Technology Engineering
8819	Tech Connect Information Technology - Grade 10	
8820	Tech Connect Law, Public Safety and Security - Grade 10	
8821	Tech Connect Manufacturing - Grade 10	
8822	Tech Connect Transportation, Distribution and Logistics - Grade 10	
8823	Tech Connect Science, Technology, Engineering and Mathematics - Grade 10	
8824	Tech Connect Diversified Programs - Grade 10	
8825	Advanced Technological Applications (ATA)	
8826	Advanced Design Applications (ADA)	
8827	Engineering Design (HS Capstone)	
8828	Foundations of Technology	
8829	Tech Connect Individual Coop Education	

8900 TRADE AND INDUSTRIAL EDUCATION		
CLASS CODE	**ASSIGNMENT**	**Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56**
8901	Advanced Desktop Publishing and Graphics Design (OHLAP Approved)	7509 Trade & industrial Education
8902	Advanced Web and Animation Design (OHLAP Approved)	
8903	Architectural Computer-Aided Drafting and Design (OHLAP Approved)	
8904	Engineering Computer-Aided Drafting and Design (OHLAP Approved)	
8905	Fundamentals of Computer-Aided Drafting and Design (OHLAP Approved)	
8906	Manufacturing Computer-Aided Drafting and Design (OHLAP Approved)	
8907	TCP Automotive IA (Two Hour)	
8908	TCP Automotive IB (Two Hour)	
8909	TCP Automotive IIA (Three Hour)	
8910	TCP Automotive IIB (Three Hour)	
8915	TCP Carpentry IA (Two Hour)	
8916	TCP Carpentry IB (Two Hour)	
8917	TCP Carpentry IIA (Three Hour)	
8918	TCP Carpentry IIB (Three Hour)	
8921	TCP-Cosmetology I	
8922	TCP-Cosmetology I-A	

8900 TRADE AND INDUSTRIAL EDUCATION (continued)		
CLASS CODE	**ASSIGNMENT**	**Code/Certification Required + MUST Meet Additional Highly Qualified Requirements if Given for Math or Science Credit – See page 56**
8923	TCP-Cosmetology II	7509 Trade & industrial Education
8924	TCP-Cosmetology II-A	
8925	TCP-Cosmetology III	
8926	TCP-Cosmetology III-A	
8927	TCP-Cosmetology IV	
8928	TCP-Cosmetology IV-A	
8929	TCP Welding IA (Two Hour)	
8930	TCP Welding IB (Two Hour)	
8931	TCP Welding IIA (Three Hour)	
8932	TCP Welding IIB (Three Hour)	
8935	TechConnect Plus Law Enforcement IA (Two Hour)	
8936	TechConnect Plus Law Enforcement IB (Two Hour)	
8937	TechConnect Plus Law Enforcement IIA (Three Hour)	
8938	TechConnect Plus Law Enforcement IIB (Three Hour)	
8939	Theory of CAD	
8940	Workforce Connection	
8941	Workforce Induction	
8942	Workforce Staging	