

Health Science Cluster

Educational programs in this cluster prepare students to plan, manage, and provide therapeutic services, diagnostic services, health informatics, support services, and biotechnology research and development.

Diagnostic Services – Medical Lab Pathway

Students will learn to use tests and evaluations that aid in the detection, diagnosis, and treatment of diseases, injuries or other physical conditions.

Diagnostic Services – Phlebotomy Pathway

Students will learn the safety and techniques used in phlebotomy, and the skills and knowledge required for infection control.

Diagnostic Services – Non-invasive Technology in Healthcare Pathway

Students will learn to use tests and various non-invasive procedures, including EKGs, that aid in the detection of diseases.

Health Informatics - Health Information Management Pathway

Students will apply medical office skills and knowledge related to the business side of healthcare and medical information, including medical insurance and coding.

Health Informatics – Health Information Technology Pathway

Students will learn the skills used for electronic medical records, the Health Information Exchange, telemedicine, mobile apps and kiosks, and other technology used in the healthcare field.

Support Services Pathway

Students will learn skills and acquire knowledge used in the therapeutic environment for the delivery of healthcare, such as central supply, patient transport, and diet and nutrition services.



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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Biological Scientists	Master's Degree	\$71,000	20
Biomedical Engineers	Bachelor's Degree	\$72,300	30
Environmental Scientist and Specialists	Bachelor's Degree	\$51,500	60
Medical Technologists HOT	Bachelor's Degree	\$53,000	210
Medical and Health Services Managers HOT	Bachelor's Degree + Work Experience	\$87,000	510
Diagnostic Medical Sonographers	Associate's Degree	\$59,400	50
Radiologic Technologists	Associate's Degree	\$51,000	240
Informatics Nurse Specialists	Bachelor's Degree	\$78,700	450
Medical Records & Health Information Technicians	High School	\$30,300	250
Dietitians & Nutritionists HOT	Bachelor's Degree	\$52,300	110
Registered Nurses HOT	Associate's Degree	\$63,200	3,300
Medical and Health Services Managers HOT	Bachelor's Degree	\$87,000	510
Pharmacists HOT	Advanced Degree	\$111,500	230
Physical Therapists HOT	Advanced Degree	\$78,800	130

Biotechnology Research and Development Pathway

Students will acquire the skills and knowledge required in bioscience human health research and development, and learn how scientists study new disease treatments and invent medical devices to assist patients and improve the accuracy of diagnostic tests.

Therapeutic Services – Nursing Pathway

Students will learn patient care skills that include vital signs, personal care, patient transfer (adhering to the guidelines of the Georgia Medical Care Foundation), and leading to the opportunity to take the Certified Nursing Assistant (CNA) assessment that is helpful for advancing in a nursing career and applying to many nursing schools.

Therapeutic Services – Public Health Pathway

Students will focus on knowledge and skills related to public health, such as providing care, treatment, counseling, and health education information with the goal of changing the health status of the patient over time.

Therapeutic Services – Dental Science Pathway

Students will apply skills used in dental health occupations through practical applications, office procedures, patient management, dental charting, chair-side assisting, dental terminology, and pathology. Students will also learn practical applications of oral health and nutrition, pharmacology and anesthesia, radiology, laboratory procedures, and other specialty areas in dentistry.

Therapeutic Services – Pharmacy Pathway

Students will learn pharmacy calculations and operations, as well as, investigating the career options of pharmacy and how pharmacy skills are needed by other healthcare professions, such as nursing, physician assistants, and physicians.

Therapeutic Services – Emergency Medical Responder Pathway

Students will learn how to help protect the public in an emergency event, including being the first responder at the scene of a traffic accident or medical emergency that requires putting out a fire, treating injuries, or other vital functions.

Therapeutic Services – Public Safety Communications Pathway

Students will apply and learn how emergency management and 911 centers coordinate the efforts of all public safety personnel, including fire and law enforcement in a particular county, district, or community.

Therapeutic Services - Physical Medicine – Personal Trainer Pathway

Students will learn the skills and knowledge involved in physical or occupational therapy careers; as well as, focusing on kinesiology and related skills used in a personal trainer or physical therapy aide role.

Therapeutic Services – Physical Medicine - Sports Medicine Pathway

Students will apply the care, treatment, counseling and health education information related to a career in sports medicine; as well as, injury prevention and skills used in an athletic trainer aide role.

Therapeutic Services – Allied Health & Medicine Pathway

Students will learn about the more than 200 health careers and 80 professions represented in Allied Health, including how technicians (assistants) and therapists/technologists are trained to perform procedures, evaluate patients, diagnose conditions, develop treatment plans; as well as, determining appropriateness and rationale for various treatment plans.

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GACollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.



Dr. John D. Barge, State School Superintendent
"Making Education Work for All Georgians"

Student Plan of Study – Therapeutic Services (Nursing)

Name _____ Date _____ School _____
 Parent/Guardian Signature _____ Date _____ Advisor/Counselor Signature _____ Date _____

Current Area of Interest: Health Science/Therapeutic Services (Nursing) - This PLAN OF STUDY should serve as a guide for the next four years. **Courses listed in this plan are only recommended coursework and should be individualized to meet each student's educational and career goals. All plans will meet minimum high school graduation requirements. Applicants to University System of Georgia and the Technical College System of Georgia institutions should be advised that meeting minimum requirements will not guarantee admission. Postsecondary institutions may set additional requirements.**

Grade Level	I. English/Language Arts Total 4 credits	II. Math Total 4 credits	III. Science Total 4 credits	IV. Social Studies Total 3 credits	V. Health/Personal Fitness Total 1 credit	VII. Possible electives in additional pathways (students should check the local course description catalog for these and other electives) Total 4 credits
9	9 th Literature & Composition or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	*1 CCGPS Cord Alg 2 CCGPS Analytic Geom 3 CCGPS Accel Cord Alg/Analytic Geom 4 CCGPS Accel Analytic Geom BI/Adv Alg 1 credit Credit Earned <input type="checkbox"/>	*Biology or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	American Government/Civics or AP Government/ Politics US or Dual Enrollment 1/2 credit Credit Earned <input type="checkbox"/>	Health 1/2 credit Credit Earned <input type="checkbox"/> Personal Fitness 1/2 credit Credit Earned <input type="checkbox"/> *** VI. CTAE Pathway Total 3 credits	Advanced Academic Pathways English/Language Arts, Math, Science, Social Studies An advanced academic pathway may be followed in any one of the content subjects listed above. Upon graduation, students earn an advanced academic pathway when they complete the required coursework to include at least one AP or one IB or one Dual Enrollment course. An advanced academic pathway should also include at least two credits in one world language. AP, Dual Enrollment and Georgia Virtual School courses may be available.
10	10 th Literature & Composition or World Literature & Composition or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	*1 CCGPS Analytic Geom 2 CCGPS Adv Algebra 3 Accel Analytic Geom/Adv Alg 4 CCGPS Pre-Calculus 1 credit Credit Earned <input type="checkbox"/>	*Physical Science or Physics or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	World History or AP World History or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	*25.52/100 Intro to Healthcare Science or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	World Language Pathways **2 credits required for admissions to University System Institutions For a listing of world language courses offered at your high school, please check with your advisor, counselor, or local course description catalog. A world language pathway may be followed in any of the world language areas included in the state list of approved courses. Upon graduation, students earn a world language pathway when they complete 3 units in one language. The third course may reflect an AP, IB or Dual Enrollment designation. Georgia Virtual School and ACCEL courses may be available.
11	American Literature/Composition or AP English Language & Composition/American Lit or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	*1 CCGPS Adv Alg 2 CCGPS Pre-Calculus 3 CCGPS Accel Pre-Cal 4 CCGPS Cal or AP Cal 1 credit Credit Earned <input type="checkbox"/>	*Chemistry or Environmental Science or Earth Systems or AP/IB or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	United States History or AP US History or IB History of the Americas or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	***Proposed course Essentials of Healthcare or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	Fine Arts/Performing Arts Pathways Visual Arts, Dance, Music, Journalism, Theater A fine arts pathway may be followed in any one of the five areas listed above. Upon graduation, students complete a fine arts/performing arts pathway when three courses have been successfully completed in any one of the five areas. A student should consult a counselor or advisor for related coursework. AP, Dual Enrollment and Georgia Virtual School courses may be available.
12	Advanced Composition or British Literature or AP English Literature & Composition or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	CCGPS Pre-Calculus or Calculus or AP Calculus or AP Statistics or IB Math or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	Any other of the previous courses or Human Anatomy & Physiology or Epidemiology or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	Econ/Business/Free Enterprise or AP Macro Econ or AP Micro Econ or IB Econ or Dual Enrollment 1/2 credit Credit Earned <input type="checkbox"/>	***Proposed course Nursing Essentials or Dual Enrollment 1 credit Credit Earned <input type="checkbox"/>	Legend: *Science: Approved 4th Sciences may be used to meet both the required science and required elective in a Career, Technical and Agricultural Education (CTAE) sequence of courses; see Fourth Science Requirements for more information. Student may take science courses in any sequence. *Math: Select Math sequence 1, 2, 3, 4, based on 9 th grade entry course. **Students must complete 2 years (2 credits) of the same world language for admission to University System of Georgia institutions. *** Students should complete a CTAE pathway and take the related end of pathway assessment. ***Proposed courses are under development and review. NOTE: All courses do not follow the same sequence at the local level; not all local systems offer every pathway. Students should explore all credit possibilities including Georgia's Virtual School Program , Dual Enrollment , Advanced Placement (AP), International Baccalaureate (IB) and Work-Based Learning (WBL) to reach their educational and career goals.
Sample Elective Courses	Other English Elective Courses: Literary Types/Composition Journalism Oral/Written Communication Speech	Other Math Elective Courses: Adv Math Decision Making Math of Industry & Govern Math of Finance	Other Science Elective Courses: Microbiology Biochemistry or Organic Chemistry Sci Research III or IV	Other Social Studies Elective Courses: Humanities Current Issues Psychology Sociology	Other CTAE Elective Courses: AP and Georgia Virtual School may be available for CTAE courses	

Healthcare Science

SAMPLE Pathway OCCUPATIONS			
See *Georgia's HOT Careers to 2020 for more information on high-skilled, high-wage and high-demand occupations.			
Occupation Specialties	Entry Level of Education Needed	2012 Annual Wage	Annual Openings 2012-2020
*Registered Nurses	Associate's Degree	\$63,200	3,300
*Medical and Health Services Managers	Bachelor's Degree	\$87,000	510
*Healthcare Social Workers	Advanced Degree	\$46,800	220

Source: Georgia Department of Labor/ONET

Go to [GAcollege411](http://www.GAcollege411.org) at <http://www.GAcollege411.org> for more information about your education and career planning, including valuable financial aid information that includes grants and scholarships.

*** Current Georgia Graduation Rule			
Coursework	Credits	Coursework	Credits
I. English/Language Arts	4	V. Health & Physical Education	1
II. Math	4	VI. **Career, Technical & Agricultural Education and/or ***World Languages, and or Fine Arts	3
III. *Science	4	VII. Electives	4
IV. Social Studies	3	TOTAL	23

*Selected [4th Science](#) courses may be used to meet both the required science and required elective in CTAE sequence of courses.

**Students must complete 3 credits to complete CTAE pathway and take the end of pathway assessment.

***Students must complete 2 years of the same world language for admission to Georgia Board of Regents colleges/universities.

**** Current graduation requirements should be met in all content areas.

NOTE: This plan represents minimum graduation requirements. Local systems may require additional coursework.

Postsecondary Transition:

- Students who will continue their education in a Program of Study at one of University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at [Staying On Course](http://www.usg.edu/student_affairs/documents/Staying_on_Course.pdf). (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
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- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize [GAcollege411](#) to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple [dual enrollment](#) program opportunities, including Accel, Dual HOPE, Move On When Ready and Articulation.

Possible Student Pathway Credentialing Opportunities:

Certified Nursing Assistant (CNA)
National Healthcare Association-Certified Patient Care Technician (NHA-CPCT)-Students may sit for this exam if they take an additional 4th course, 25.52600 Allied Health & Medicine
American Red Cross CPR and First Aid Certification

*Related Pathway Occupations:	Other Related Health Science Occupations:
Certified Nursing Assistants (CNA) Licensed Practical Nurses (LPN) Registered Nurses (RN) Specialized Nursing Athletic Trainers Home Health Aides Anesthesiologist Assistants Athletic Trainers	Medical Assistant Occupational Therapist / Assistants Physical Therapist / Assistants Physician's Assistants Recreation Therapists Respiratory Therapists Surgical Technicians *ONET Online

Therapeutic Services/Nursing

Careers in the Therapeutic Services pathway are focused primarily on changing the health status of the patient over time. Health professionals in this pathway work directly with patients and may provide care, treatment, counseling, and health education information. National labor market information indicates that eight out of the top twenty fastest-growing occupations are in the Health Science industry. (*Occupational Outlook Handbook, 2012*)

Occupations in the Health Sciences represent the largest and fastest-growing industry in the United States employing over 10 million workers in more than 200 careers. Those considering a nursing career should have a strong desire to help others, a genuine concern for the welfare of patients and clients, and an ability to deal with people of diverse backgrounds in stressful situations.

Based on an aging population and a retiring workforce, the demand for health care workers will remain high through the year 2020. As Therapeutic Services career roles change, professionals in this pathway will find increased opportunities to work independently. Additionally, an increasing number of career opportunities are becoming available outside of the traditional hospital setting.

Educational levels vary from occupation to occupation. Most Health Science occupations require additional education after high school and require that potential employees acquire the appropriate certification and/or licensing.

Health Science industry workers must have a solid background in math, science, communications, and technical skills, be knowledgeable in their subject area, have the ability to communicate with others, and inspire trust and confidence when working with patients.

Rapid job growth is expected in hospital outpatient facilities, such as same-day surgery, rehabilitations, and chemotherapy. Growth is also expected in nursing care facilities and in home health care. Registered Nurses with a bachelor's degree will have better job prospects in supervisory and managerial positions than those with either an associate's degree or a diploma. The pay scale will increase as students specialize in earning certifications to be nurse practitioners, nurse anesthetists and clinical nurse specialists.

Transportation, Distribution & Logistics Cluster

Educational programs in this cluster prepare students for the planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional and technical support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.

Automobile Maintenance and Light Repair Pathway

Students will learn how to research applicable vehicle and service information, service history, precautions, and technical service bulletins. Basic tasks to be covered include fluid changes, belt replacement, brake, and tire service.

Automobile Service Technology Pathway

Students will learn intermediate tasks such as servicing transmissions, drive trains and axles, power steering, and electrical systems.

Master Automobile Service Technology Pathway

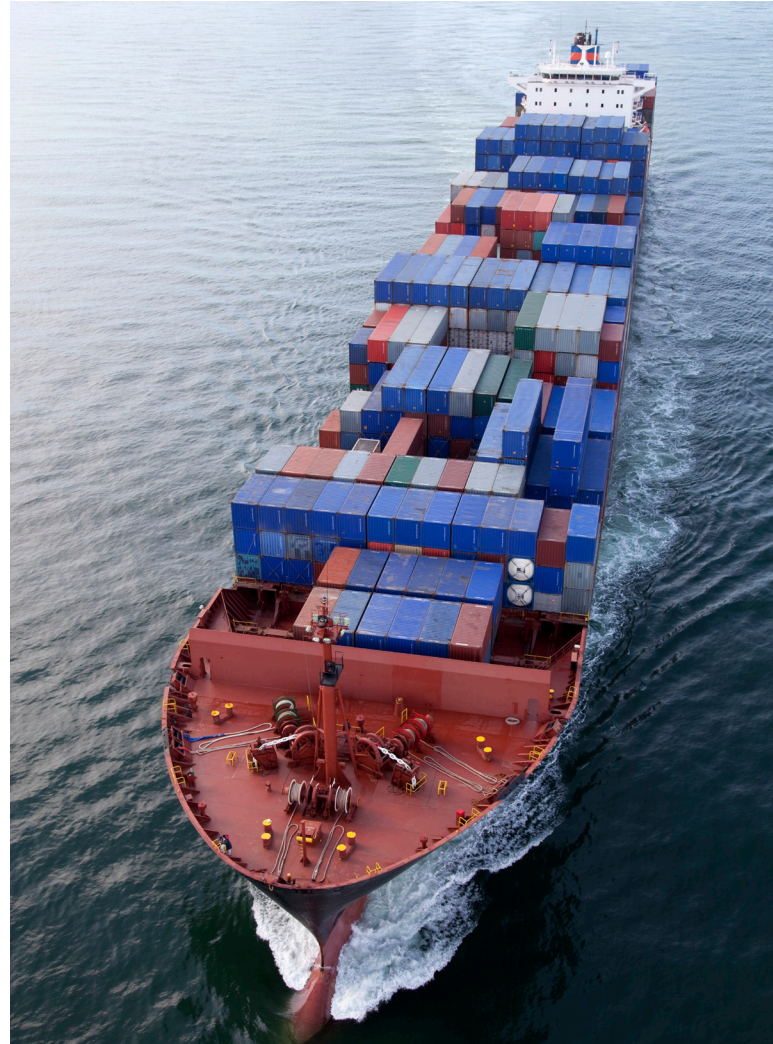
Students will demonstrate an understanding of the components within automobile sub-systems, as well as, the advanced tasks related to automobile service.

Painting and Refinishing Pathway

Students will apply the skills needed to obtain a career in the automotive refinish industry, as well as, learning hands-on applications in a project-based setting.

Nonstructural Analysis and Damage Repair Pathway

Students will utilize hands-on applications in a project-based setting to complete the skills needed to obtain an entry-level job in the field of non-structural damage repair.



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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Automotive Technician & Mechanics	High School or Registered Apprenticeship	\$33,400	570
Automotive Body & Related Repairers	High School or Registered Apprenticeship	\$40,600	100
Air Traffic Controllers	Associate's Degree	\$123,800	40
Commercial Pilots	Some College	\$88,800	80
Aircraft Mechanics & Service Technicians	Some College	\$54,100	40
Transportation Equipment Painters	High School	\$40,300	40
Logistics Managers	Bachelor's Degree	\$68,900	130
Storage & Distribution Managers	Bachelor's Degree	\$77,900	179
Motorboat Mechanics & Service Technicians	Some College	\$35,520	50

Transportation, Distribution & Logistics Cluster

Mechanical and Electrical Components Pathway

Students will learn how to repair and replace mechanical and electrical components affected in a collision.

Structural Analysis and Damage Repair Pathway

Students will learn the theoretical and practical applications needed for an entry-level position, as well as, learn to analyze and restore vehicle structural damage to factory specifications.

Flight Operations Pathway

Students will learn the practice of efficient, safe, and cost-effective methods utilized in the aerospace industry, and may build, maintain, repair, and service aircraft equipment and machinery.

Aircraft Maintenance Pathway

Students will apply and learn skills related to weight and balance, tube bending and flaring, hose fabrication, hardware identification, safety wiring, budgeting, ordering parts and tools, precision measurements, instruments, electrical symbols, and troubleshooting; as well as, Federal Aviation Administration (FAA) regulations.

Distribution and Logistics Pathway

Students will acquire a fundamental understanding of the logistics and supply chain industry for motor carriers, railroad, air, freight, and ocean carriers; as well as, preparing for employment in the logistics and supply chain management industry.

Marine Engine Technology Pathway

Students will learn and apply basic skills that include shop and boat safety, safe and appropriate use of tools and measuring devices, technical writing, shop management, and marine engine computer applications.

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

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- Students should utilize GAcademy411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.

Agriculture, Food & Natural Resources Cluster

Educational programs in this cluster prepare students for the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources; including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

Students interested in applying knowledge and skills related to animal systems, may consider completing one of the following pathways.

Animal Production & Processing Pathway
 Animal / Mechanical Systems Pathway
 Agriculture Leadership in Animal Production Pathway
 Companion Animal Systems Pathway
 Veterinary Science Pathway
 Equine Science Pathway
 Food Animal Systems Pathway



Students interested in applying knowledge and skills related to forestry/natural resources systems, may consider completing one of the following pathways.

Forest / Renewable Energy Pathway
 Agriculture Leadership in Aquaculture Pathway
 Forest Mechanical Systems Pathway
 Agriculture Leadership in Forest Science Pathway
 Forest / Natural Resources Management Pathway
 Forestry Management Systems Pathway
 Forestry / Wildlife Systems Pathway
 Environmental Agriculture Systems Pathway



Students interested in applying knowledge and skills related to plant systems, may consider completing one of the following pathways.

Horticulture / Mechanical Systems Pathway
 Agriculture Leadership in Plant Science Pathway
 Agriculture Leadership in Horticulture Pathway
 Landscape Management Systems Pathway
 Plant and Floral Design Systems Pathway
 Plant and Landscape Systems Pathway
 Plant and Floriculture Systems Pathway



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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Buyers & Purchasing Agents, Farm Products	High School	\$63,400	20
Environmental Engineers	Bachelor's Degree	\$71,900	60
Environmental Scientists & Environmental Specialists	Bachelor's Degree	\$51,500	60
Veterinarians	Advanced Degree	\$79,300	10
Food Science Technicians	Associate's Degree	\$29,700	20
Animal Trainers	High School	\$21,900	30
Agricultural Inspectors	Bachelor's Degree	\$40,900	20
Soil & Plant Scientists	Bachelor's Degree	\$68,100	10
Agricultural Education Teachers	Bachelor's Degree	\$42,000	16

Agriculture, Food & Natural Resources Cluster

Students interested in applying knowledge and skills related to agriculture mechanical systems, may consider completing one of the following pathways.

Agriculture Mechanics & Electrical Systems Pathway
Agriculture Mechanics Metal Fabrication Pathway
Agriculture Energy Systems Pathway
Agriculture Mechanics Systems Pathway

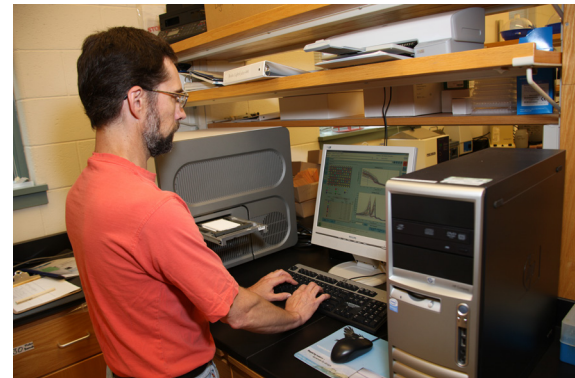


Students interested in applying knowledge and skills related to food science systems, may consider completing one of the following pathways.

Food Products & Processing Systems Pathway
Agriculture Leadership in Product Processing Pathway

Students interested in applying knowledge and skills related to diversified agriculture systems, may consider completing one of the following pathways.

Horticulture and Forest Science Pathway
Plant and Mechanical Systems Pathway
Animal and Horticulture Systems Pathway
Forestry and Animal Science Systems Pathway
Agriscience Systems Pathway
Agribusiness Systems Pathway



Industry-Validated Credentials

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- Students should utilize GAcademy411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.

Law, Public Safety, Corrections & Security Cluster

Educational programs in this cluster provide students with the basic knowledge and skills for careers in the legal system, public safety, protective services, and homeland security, including professional and technical support services.

Corrections Services Pathway

Students will learn how to oversee individuals who have been arrested and awaiting trial or who have been convicted of a crime and sentenced to serve time in a jail, prison, or correctional facility. While the primary mission of corrections is protection of the public, many people in this field are involved with the treatment, education, and reintegration of offenders.

Law Enforcement Services Pathway

Students will be exposed to essential skills and knowledge that are useful in law enforcement, criminal investigations, and forensics. Students may utilize crime scene investigative skills, along with science and mathematics to help solve crimes.

Security and Protective Services Pathway

Students will explore the types of security services, as well as the issues and security concerns faced in various work environments and industries, such as cyber security and securing data on mobile devices.



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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Detectives & Criminal Investigators	Bachelor's Degree	\$45,600	180
Legal Secretaries	High School	\$40,900	300
Attorneys HOT	Advanced Degree	\$137,700	690
Paralegals & Legal Assistants	Bachelor's Degree	\$45,300	360
Probation Officers and Correctional Treatment Specialists	Bachelor's Degree	\$34,200	100
Emergency Medical Technicians & Paramedics	Associate's Degree	\$29,500	190
Firefighters	Some College	\$35,500	440
Detectives & Criminal Investigators	Bachelor's Degree	\$45,600	160
Police & Sheriff's Patrol Officers	Some College	\$37,400	710
Security Managers (All Managers)	Bachelor's Degree	\$101,800	540
Business Operations Security Specialists	Bachelor's Degree	\$66,000	600

Law, Public Safety, Corrections & Security Cluster

Fire and Emergency Services – Emergency Medical Responder Pathway

Students will learn how to help protect the public in an emergency event, including being the first responder at the scene of a traffic accident or medical emergency that requires putting out a fire, treating injuries, or other vital functions.

Fire and Emergency Services – Public Safety Communications Pathway

Students will learn and apply how emergency management and 911 centers coordinate the efforts of all public safety personnel, including fire and law enforcement in a particular county, district, or community.

Fire and Emergency Services – Firefighting Pathway

Students will learn general emergency protocol for fire and emergency units, which are often the first to an emergency scene requiring putting out a fire, treating injuries, or performing other vital functions. This pathway leads to postsecondary studies in fire science.

Legal Services – Legal Administrative Services Pathway

Students will analyze the structure of the American legal system while examining constitutional legal issues. Knowledge of the components, participants, and steps of a criminal trial and a civil suit, including the appeals process is an essential part of this course.

Legal Services – Applications of Law Pathway

Students will apply the structure of the American legal system while examining constitutional legal issues. Knowledge of the components, participants, and steps of a criminal trial and a civil suit, including the appeals process, is an essential part of this course. Participation in mock trials will be a large component of this course.

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

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- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcademy411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.

Advanced Academic, Fine Arts & World Language Pathways

Educational programs in these pathway areas prepare students for career opportunities that will lead to multiple postsecondary options for advanced studies and skills. Students will be able to use these skills in a university or college setting and/or many career fields.

Advanced Academic Pathway

Students may complete an Advanced Academic pathway when three courses from English language arts, mathematics, science, or social studies have been successfully completed and additional criteria met.

Advanced Academic Pathway in English Language Arts Criteria:

1. Students need to earn four units of credit in English language arts; and
2. The student's chosen English language arts pathway will include at least one Advanced Placement course, or one International Baccalaureate course, or one postsecondary course that fulfills a core graduation requirement in English language arts; and
3. Students need to complete two units of sequential course credit in one world language.



Advanced Academic Pathway in Mathematics Criteria:

1. Students need to earn four units of credit in mathematics; and
2. The student's chosen mathematics pathway will include at least one Advanced Placement course, or one International Baccalaureate course, or one postsecondary course that fulfills a core graduation requirement in mathematics; and
3. Students need to complete two units of sequential course credit in one world language.

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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
College / University Professors	Advanced Degrees	\$53,117	75
Actuaries	Bachelor's Degree	\$99,961	90
Scientists	Bachelor's Degree	\$70,778	21
Physicists	Bachelor's Degree	\$75,161	5
Chemists	Bachelor's Degree	\$44,543	42
Hydrologists	Bachelor's Degree	\$67,738	2

Advanced Academic, Fine Arts & World Language Pathways

Advanced Academic Pathway in Science Criteria:

1. Students need to earn four units of credit in science; and
2. The student's chosen science pathway will include at least one Advanced Placement course, or one International Baccalaureate course, or one postsecondary course that fulfills a core graduation requirement in science; and
3. Students need to complete two units of sequential course credit in one world language.

Advanced Academic Pathway in Social Studies Criteria:

1. Students need to earn three units of credit in social studies; and
2. The student's chosen social studies pathway will include at least one Advanced Placement course, or one International Baccalaureate course, or one postsecondary course that fulfills a core graduation requirement in social studies; and
3. Students need to complete two units of sequential course credit in one world language.

Fine Arts Pathway

1. Students may complete a Fine Arts pathway when three courses from Visual Arts, Theatre, Dance, Music, or Journalism have been successfully completed.
2. All three courses should be taken within one of the five Fine Arts pathways.

World Language Pathway Criteria:

1. Students need to earn three units of credit in one world language; and
2. The student's chosen world language pathway will include three distinct high school courses in one world language or include two distinct high school courses in one world language and a third reflecting an Advanced Placement course, where Advanced Placement courses in world language are offered; or a third reflecting an International Baccalaureate course, where International Baccalaureate courses in world language are offered, or one postsecondary enrollment course in the same world language reflecting a third course at the college level.

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcademy411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.

Architecture & Construction Cluster

Educational programs in this cluster prepare students for careers in designing, planning, managing, building, and maintaining the built environment.

Architectural Drawing and Design Pathway

Students will learn drafting techniques through the study of geometric construction; as well as, an introduction to computer-aided drafting and design.

Carpentry Pathway

Students will first master basic safety skills, including ladders, scaffolding, trenching, and safety harnesses. In addition, students will be introduced to the State of Georgia Building Codes; as well as, skills needed to lay rafters, stairs and walls, and properly frame doors and windows.

Electrical Pathway

Students will learn the theoretical information regarding various conductors and properties, types of insulation, point of termination principles, and Ohm's Law calculations; as well as, identifying types of wire and cable and selection of electrical boxes and fittings.

Masonry Pathway

Students will demonstrate theoretical competency in general estimation of masonry materials, concrete footings, paving applications, masonry steps, flue chimney building codes, and concrete applications.

Plumbing Pathway

Students will examine the proper use of fittings, drains, waste and venting, copper tubing and steel piping, and the installation of hangers and supports, pipe sizing, residential fixtures and appliances.



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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Carpenters	High School	\$35,700	730
Construction Managers	Associate's Degree	\$78,300	490
Architectural & Civil Drafters	Associate's Degree	\$49,700	40
Surveyors	Bachelor's Degree	\$44,200	30
Cost Estimators HOT	Bachelor's Degree	\$57,300	210
Electricians	High School	\$40,700	340
HVACR Mechanics & Installers	Some College	\$38,500	150
Sheet Metal Workers	High School	\$41,500	160
Welders, Cutters, & Welder Fitters	High School	\$32,400	480

Architecture & Construction Cluster

Machining Operations Pathway

Students will learn introductory skills needed for operation of lathe and milling machines, and other trade equipment; as well as, acquiring skills needed to be successful as a machinist.

Welding Pathway

Students will develop knowledge and apply safe-operating skills needed to demonstrate the proper set of oxyfuel and shield metal arc welding equipment; as well as, creating accurate cuts and performing washing and gouging procedures, checking welding codes and reviewing work pieces, imperfections, common test methods, and evaluating proper work and equipment setups.

Sheet Metal Pathway

Students will master basic sheet metal techniques and basic trade mathematics; as well as, identifying the rate, selection, and use of steel and other metals to develop and fabricate basic sheet metal projects. In addition, students will learn basic parallel line development and skills using fasteners, hangers, and other support systems.

Heating, Ventilation, Air-Conditioning Refrigeration (HVACR) Pathway

Students will develop skills and knowledge for concepts of conditioning air within a given space; as well as, learn about the skills needed to install hardware and systems used by HVACR technicians.

Heating, Ventilation, Air-Conditioning Refrigeration (HVACR)-Electrical Pathway

Students will learn about refrigeration and heating processes of electronic circuitry; as well as, acquire introductory skills and knowledge needed for conduit bending and installation.

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

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Human Services Cluster

Educational programs in this cluster prepare students for employment in career pathways that relate to families and human needs such as counseling and mental health services, family and community services, personal care, and consumer services.

Nutrition & Food Science Pathway

Students will acquire knowledge about food choices for optimal health for a lifetime, earn fourth science credits, and discuss the basic chemistry concepts of food science and evaluate the effects of processing, preparation, and storage on the quality, safety, wholesomeness, and nutritive value of foods.

Housing & Community Management Pathway

Students examine consumer relations and provide a knowledge base for persons interested in a consumer's perspective of the housing marketplace. Housing issues and policies affecting and affected by consumers are emphasized.

Interiors, Fashion & Textiles Pathway

Students will have an opportunity to explore foundations in interior design, fashion, and textiles in this pathway. There will be a focus on principles and elements of design, fundamentals of fashion, textiles, and merchandising.



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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Financial Analysts	Bachelor's Degree	\$78,000	250
Credit Analysts HOT	Bachelor's Degree	\$61,400	100
Wholesale & Retail Buyers	Bachelor's Degree	\$58,800	90
Interior Designers	Bachelor's Degree	\$46,280	100
Dietitians & Nutritionists	Bachelor's Degree	\$50,000	80
Food Scientists & Technologists	Bachelor's Degree	\$47,900	10
Massage Therapists	Some College	\$38,300	160
Barbers	Some College	\$27,200	40
Personal Financial Advisors HOT	Bachelor's Degree	\$97,000	150

Human Services Cluster

Personal Care Services - Cosmetology Pathway

Students will master state rules and regulations, professional image, bacteriology, chemistry fundamentals, safety, and anatomy and physiology. Introductory competencies in the fundamental theory related to diseases and disorders of skin and hair will be covered; as well as, skills required for hair cutting, permanent waving and relaxing, and basic hair and scalp treatments.

Personal Care Services – Barbering Pathway

Students will master state rules and regulations, professional image, bacteriology, chemistry fundamentals, safety, and anatomy and physiology. Introductory competencies in the fundamental theory related to diseases and disorders of skin and hair will be covered; as well as, skills required for hair cutting, permanent waving and relaxing, and basic hair and scalp treatments.

Personal Care Services – Esthetics Pathway

Students will master the safety, infection control, nutrition, customer service, skin analysis, cleansing and exfoliation methods, detailed anatomy, and physiology related to cytology (cells). Additional topics covered include the integumentary, muscular, nervous, and circulatory systems; as well as, detailing diseases and disorders of the integumentary system (skin).

Personal Care Services – Nails Pathway

Students will master the skills for proper ethics and customer care, sanitation, sterilization and infection control, government standards and regulations, anatomy and physiology of the hands, arms and legs, nail structure, and diseases and disorders; as well as, manicure and pedicure skills.

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

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Information Technology Cluster

Educational programs in this cluster prepare students to build linkages in information technology occupations for entry level, technical, and professional careers related to the design, development, support and management of hardware, software, multimedia, and systems integration services.

Web & Digital Design Pathway

Students will create, design and produce interactive multimedia products and services used in business, training, entertainment, communications, and marketing.

Programming Pathway

Students will learn essential skills involved in the design, development, implementation, and maintenance of computer systems and software, requiring knowledge of computer operating systems, programming languages, and software development.

Computer Science Pathway

Students will prepare for entry level, technical, and professional IT careers, including the design, development, implementation, and maintenance of computer systems and software, as well as knowledge of computer operating systems, programming languages, and software development required of cutting-edge technologies.



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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Computer System Analysts HOT	Bachelor's Degree	\$78,000	810
Application Software Developers	Bachelor's Degree	\$85,700	350
Computer Support Specialists HOT	Some College	\$45,600	990
Network and Computer System Administrators	Bachelor's Degree	\$73,000	580
Computer and Information Systems Managers HOT	Bachelor's Degree	\$111,400	370
Computer Network Support Specialists	Some College	\$45,600	190
Web Developers	Bachelor's Degree	\$79,600	350
Informatics Nurse Specialists	Bachelor's Degree	\$72,000	810

Information Technology Cluster

Information Support & Services Pathway

Students will learn to deploy and implement computer systems and software; as well as, provide technical assistance and manage information systems through the creation of technical documentation and information management systems.

Networking Pathway

Students will understand and apply the necessary steps for network analysis, planning, and implementation to include the design, installation, maintenance, and management of network systems.

Health IT (Information Technology) Pathway

Students will learn to connect the healthcare industry with information technology skills that include the design, development, support, and management of hardware, software, multimedia, and systems integration services. Students will connect healthcare industry skills with information technology skills that include capturing, managing, and processing diagnostic images and clinical data.



Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

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Support Services for Special Populations

Coordinated Career Academic Education

Coordinated Career Academic Education (CCAIE) and Project Success (PS) programs provide intervention support services to Career, Technical, and Agricultural Education (CTAE) students. Student participation in these courses is only available through teacher referral. These courses are not a career pathway.

These support services provide additional opportunities for students to sharpen academic and employability skills in their chosen Career, Technical, and Agricultural Education (CTAE) pathway. Through participation in a CCAIE and/or PS program, students learn about the world of work by achieving academic challenges, project-based learning activities, and participating in a Career and Technical Student Organization (CTSO) aligned with their career goal. The courses in this category are not part of any pathway and do not count toward pathway completion.

CCAIE Level I course / Project Success I course

CCAIE Level I: Career Foundations and Leadership - teaches students the academic skills needed to graduate from high school, along with the introductory employability skills necessary to obtain employment. Other topics covered include basic safety and health, teamwork, work ethic, basic personal finance, career technical student organizations, self-assessment, career pathways, career readiness, and employment performance. There is no pre-requisite for this course.

CCAIE Level II course / Project Success II course

Career Essentials and Leadership - teaches students the skills necessary to graduate from high school, along with the intermediate employability skills needed to obtain and maintain employment. Students will develop the skills to utilize academic concepts in school, on the job, at home, and in work-based learning settings. In this course, students will create or evaluate their individualized career plan, while learning about successful employment practices that involve personal safety and health issues, negative and positive work behaviors, effective leadership practices, legal situations, and effective technology usage. There is no pre-requisite for this course.

CCAIE Level III course

Career Transition and Leadership - teaches students the academic skills needed to graduate from high school, along with advanced employability skills needed to obtain and maintain employment. Students will learn how to apply for and obtain work-based learning opportunities; revise individualized career plans; utilize community resources; use critical-thinking skills in school, home, and in the workplace; make ethical choices; as well as, adapt to changes in the workplace. There is no prerequisite for this course.



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Support Services for Special Populations

Career and Technical Instruction

The Georgia Career and Technical Instruction (CTI) support service is designed to assist high school students with disabilities who are enrolled in Career, Technical, Agricultural Education (CTAE) courses. In these courses students acquire employability skills that ease their transition to postsecondary education or the workforce. The role of the CTI Coordinator is to provide individualized special education transition support to students served under an Individualized Education Plan (IEP) that is necessary for them to achieve their desired postsecondary outcome goal. Career and Technical Instruction program courses are not considered part of the CTAE Career Clusters/Pathways.



Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

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- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.

Finance Cluster



Educational programs in this cluster prepare students to plan and implement related services for financial and investment planning, banking, insurance, and business financial management.

Advanced Accounting Pathway

Students will build skills related to making strategic decisions to report, obtain, save, protect, and grow the financial assets of businesses and individuals. Finance students will use computation, analytical, and interpersonal skills to record, classify, summarize, analyze, and communicate a business's financial information/business transactions for use in management decision making.

Business Accounting Pathway

Students will learn the language of business and financial literacy to navigate financial decisions and make informed choices related to managing finances and budgeting, saving and investing, living independently, earning and reporting income, buying goods and services, using credit, banking, and protecting against risk.

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Occupation Specialties		Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Accountants and Auditors	HOT	Bachelor's Degree	\$71,500	1,190
Financial Analysts	HOT	Bachelor's Degree	\$78,000	250
Personal Financial Advisors		Bachelor's Degree	\$97,500	150
Loan Officers	HOT	Bachelor's Degree	\$72,100	300
Tax Preparers	HOT	High School	\$44,600	160
Claims Adjusters, Examiners and Investigators		Bachelor's Degree	\$58,000	270
Insurance Underwriters		Bachelor's Degree	\$61,000	110
Actuaries		Bachelor's Degree	\$94,100	30

Finance Cluster

Financial Services Pathway

Students will practice computation, analytical and interpersonal skills that are applied to banking, overseeing investments, managing insurance, and financial planning. Students will learn industry skills that are used by businesses and individuals to manage their money, investments, loans, stock or commodity markets, and credit. Students will learn skills to protect individuals and businesses from financial losses; and deliver services and products that transfer risk from an individual or business to an insurance company.



Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

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- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.

Government & Public Administration Cluster

Educational programs in this cluster prepare students to plan and execute government functions at the local, state and federal levels, including governance, national security, foreign service, planning, revenue and taxation, and regulations.

Public Management and Administration Pathway

Students will develop oral and written communication skills, business employability skills, and learn about the differing roles of government for careers such as a city manager, city council member, county clerk, court administrator, executive director, charitable foundation officer, industrial foundation officer, office manager, analysis officer, and program administration officer.

Air Force, Army, Marine Corps, and Navy Junior Reserve Officer Training Corps (JROTC) Pathways

JROTC pathways offer students the opportunity to enroll in a leadership/citizenship program, while instilling self-esteem, teamwork, and self-discipline.



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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Administrative Services Managers	High School	\$84,100	450
Human Resources Managers	Bachelor's Degree	\$97,400	80
Urban & Regional Planners	Advanced Degree	\$53,900	20
Social & Community Managers	Bachelor's Degree	\$56,200	190
Postal Service Mail Carriers	High School	\$54,000	310
Nursing Administrators; Registered Nurses (Civilian)	Commissioned Officer	N/A	N/A
Computer Programmers (Civilian)	Enlisted	N/A	N/A

Government & Public Administration Cluster

The main JROTC goals are to have students graduate from high school, attend institutions of higher learning, and pursue meaningful careers particularly in the areas of science, technology, engineering, and mathematics. Furthermore, after all required studies are completed, students are better prepared to become responsible and productive citizens and more successful in future endeavors.



Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

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Business Management & Administration Cluster

Educational programs in this cluster prepare students for careers in planning, organizing, directing, and evaluating business functions essential to efficient and productive business operations.

Business and Technology Pathway

Students will build skills that facilitate business operations through information and communication management, data processing and collection, and project tracking; and focus on careers that plan, organize, direct, and evaluate all or part of a business organization through the allocation and use of financial, human, and material resources.

Entrepreneurship Pathway

Students will align business goals that focus on planning, organizing, coordinating, and controlling the resources needed to produce and provide goods and/or services that lead to owning and operating a small business.

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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Administrative Services Managers	High School	\$84,100	450
Supervisors of Office & Administrative Support	High School	\$51,100	2,180
Management Analysts HOT	Bachelor's Degree	\$98,300	1,500
Human Resources Managers	Bachelor's Degree	\$97,400	80
Training and Development Specialists HOT	Bachelor's Degree	\$58,100	400
Labor Relations Specialists	Some College	\$35,300	110
Small Business Owner/Entrepreneurs	Some College	\$90,000	210

Business Management & Administration Cluster

Human Resources Management Pathway

Students will focus on the staffing activities that involve planning, recruitment, selection, orientation, training, performance appraisal, compensation, and safety of employees; while maintaining, monitoring, controlling, and planning the use of financial resources to ensure the financial well-being of a business.



Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

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Science, Technology, Engineering, & Mathematics Cluster



Educational programs in this cluster prepare students to plan, manage, and provide scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.

Engineering and Technology Pathway

Students will combine hands-on projects and rigorous curriculum to be prepared for challenging postsecondary engineering and technology programs; and build solid technical writing, comprehension, calculation, problem-solving, and technical skills. Students are encouraged to take relevant math and science courses, such as advanced algebra, chemistry, calculus, geometry, trigonometry, physics, design, and engineering concepts.

Engineering Drafting and Design Pathway

Students will learn that drafting and design is the process of turning ideas of how things should be constructed into technical drawings. These drawings are based on sketches and calculations made by engineers, surveyors, architects, and/or scientists. The drawings provide visual guidelines such as dimensions,

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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Electronics Engineers	Bachelor's Degree	\$82,600	160
Electrical & Electronic Engineering Technicians	Associate's Degree	\$56,800	90
Biomedical Engineers	Bachelor's Degree	\$72,300	100
Mechanical Engineers	Bachelor's Degree	\$74,700	110
Civil Drafters	Associate's Degree	\$49,700	40
Electrical Drafters	Some College	\$56,900	20

Science, Technology, Engineering, & Mathematics Cluster

materials to be used, and procedures to be followed to build everything from manufactured products such as spacecraft, automobiles, and industrial machinery to structures such as homes, office buildings, and oil and gas pipelines.

Electronics Pathway

Students will build, test, troubleshoot, repair, and modify developmental and production electronic components, parts, and systems, such as computer equipment, missile control instrumentation, electron tubes, test equipment, and machine tool numerical controls, applying principles and theories of electronics, electrical circuitry, engineering mathematics, electronic and electrical testing, and physics.



Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

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Hospitality & Tourism Cluster

Educational programs in this cluster prepare students for employment in career pathways that relate to families and human needs such as restaurant and food/beverage services, lodging, travel and tourism, recreation, amusement, and attractions.

Culinary Arts Pathway

Students will complete a variety of skills required by the restaurant and food industry such as knife skills, cooking techniques, menu planning, food purchasing and costing, food safety and sanitation, and front of the house service.

Hospitality, Recreation & Tourism Pathway

Students will apply knowledge and skills in marketing, management, promotions, and selling which are required for success in the travel, lodging, tourism, and recreation industries.

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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Food Service Managers	Some College	\$37,800	30
Meeting, Convention & Event Planners HOT	Bachelor's Degree	\$45,000	170
Chefs & Head Cooks	Some College	\$37,900	90
Sports Marketing Managers	Bachelor's Degree	\$60,000	10
Set and Exhibit Designers	Bachelor's Degree	\$37,000	20
Lodging Managers	Bachelor's Degree	\$45,100	60

Hospitality & Tourism Cluster

Sports and Entertainment Marketing Pathway

Students will apply knowledge and skills in all areas of marketing to promote brands by using sports and entertainment celebrities and events to connect with broad or individual targeted groups of consumers.



Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

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Marketing Cluster

Educational programs in this cluster prepare students to plan, manage, and perform marketing activities to reach organizational objectives that include brand management, professional sales, merchandising, marketing communications, promotions, and market research.

Marketing and Management Pathway

Students will focus on managing the processes responsible for identifying, anticipating, and satisfying customer requirements in a manner that is profitable for the business. Student skills include management and entrepreneurship, marketing, buying and merchandising, marketing communications and promotion, professional sales, marketing information management and research, channel management, global marketing, and Internet/online marketing.

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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Advertising and Promotions Managers	Bachelor's Degree	\$100,300	70
Wholesale and Retail Buyers	Bachelor's Degree	\$58,800	90
Online Merchants	Bachelor's Degree	\$66,000	600
Sales Managers, Entrepreneurships	Bachelor's Degree	\$106,400	550
Management Analysts HOT	Bachelor's Degree	\$80,700	2,080
Public Relations and Fund Raising Managers	Bachelor's Degree	\$86,200	80
Marketing Research Analysts and Marketing Specialists	Bachelor's Degree	\$59,100	270

Marketing Cluster

Fashion, Merchandising, and Retail Management Pathway

Students learn how designers, manufacturers, merchandisers, and retailers collaborate to market and sell thousands of products. Student skills will focus on managing processes related to visual merchandising, buying, researching, advertising, promoting, and selling products globally.

Marketing Communications and Promotions Pathway

Students learn that marketing communication and promotion is primarily concerned with increasing demand for a product/service, positioning a product/service, and differentiating a product/service. Student skills will include generating in-depth oral and written communications, learning marketing communications in relation to specific products and services; using promotions as a key component of the marketing mix, and affecting product/service branding and customer buying behaviors.

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

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Arts, Audio Video Technology & Communications Cluster

Educational programs in this cluster prepare students to design, produce, exhibit, perform, write, and publish multimedia content that includes visual and performing arts and design, journalism, and entertainment services.

Audio-Video Technology and Film Pathway

Students will design, manufacture, operate and/or repair audiovisual equipment; create presentations of sound, video, and data in a variety of formats; gather information, prepare broadcasts, build sets, and operate equipment used to record and transmit programs and/or motion pictures; and operate sound mixing and/or video editing equipment.

Graphics Communication Pathway

Students will create, develop, produce, and distribute products that incorporate words and/or pictorial images to convey information, ideas, and feelings, as well as utilizing the technologies of printing, publishing, packaging, electronic imaging, and related industries.

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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Desktop Publishers	Associate's Degree	\$37,800	30
Graphic Designers HOT	Bachelor's Degree	\$49,900	390
Multimedia Artist and Animators	Bachelor's Degree	\$54,900	150
Camera Operators, Television, Video and Motion Picture	Bachelor's Degree	\$47,300	30
Film and Video Editors	Bachelor's Degree	\$45,600	10

Arts, Audio Video Technology & Communications Cluster

Graphics Design Pathway

Students will communicate visually using typography and/or images to convey information; as well as, utilizing a range of cognitive skills, problem-solving skills, aesthetics, and crafts that include typography, visual arts, illustration, photography, and layout.



Industry-Validated Credentials

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Postsecondary Transition:

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Education & Training Cluster

Educational programs in this cluster prepare students to plan, manage, and provide education and training services, and related learning support services such as administration, teaching/training, administrative support, and professional support services.

Early Childhood Care & Education Pathway

Students will demonstrate the planning, managing, and providing of education and training services; as well as, related learning support services such as administration, teaching/training, administrative support, and professional support services in an Early Childhood Care setting.

Teaching as a Profession Pathway

Students will examine the teaching profession, study contemporary issues in education, and participate actively in an internship with a teacher mentor.



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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Pre-School Teachers	Associate's Degree	\$24,500	730
Teachers Assistants	High School	\$18,800	1670
Education Administrators, Preschool and Childcare Center/Program	Advanced Degree	\$43,900	70
Postsecondary Business Teachers HOT	Advanced Degree	\$85,200	120
Middle School Teachers, except Special Education and Career Technicians HOT	Bachelor's Degree	\$54,200	790

Education & Training Cluster



Industry-Validated Credentials

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Manufacturing Cluster



Educational programs in this cluster prepare students to plan, manage, and perform the processing of materials into intermediate or final products, and the related professional and technical support activities such as production planning and control, maintenance, and manufacturing/process engineering.

Integrated Manufacturing Technology Pathway

Students will familiarize themselves with related careers and develop fundamental technological literacy as they learn about the history, systems, and processes of manufacturing; apply their knowledge of computer aided design (CAD), computer numerical control (CNC), robotics, computer assisted manufacturing (CAM), programmable logic controllers (PLC), automated guided vehicles (AGV), and computer integrated manufacturing (CIM); and learn how businesses engage in the production of products beginning with pre-production activities and continuing through post-production activities.

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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Industrial Engineers	Bachelor's Degree	\$76,880	250
Industrial Engineering Technicians	Associate's Degree	\$48,330	45
Industrial Machinery Mechanics	High School	\$42,500	293

Manufacturing Cluster

Mechatronics Pathway

Students will master the integrated and automated systems of Mechatronics that encompasses a wide range of applications such as: Electronics, Mechanics, Fluid Power, Electrical Control Systems, Programmable Logic Controllers (PLC), Computers, and Robotics.

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

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Energy Cluster

Educational programs in this cluster prepare students for careers in planning, managing, and providing support and technical services related to the generation, transmission, and distribution of various types of energy; in addition to engineering design, construction, maintenance, and repair of these systems.

Energy Systems Pathway

Students will learn the characteristics, availability, conversion, control, transmission, and storage of energy and power; explore and apply the principles of electrical, fluid, and mechanical power; develop an understanding of the differences between nonrenewable, renewable, and inexhaustible energy sources and how these energy sources affect their world; research alternative energy sources to include the regional implications and economic, environmental, and sustainability issues; and evaluate the positive and negative impacts of nuclear power and its relevancy to various situations in today's society.



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Occupation Specialties	Entry Level of Education Needed	2012 Average Annual Wage	Annual Openings 2012-2020
Electrical Engineers	Bachelor's Degree	\$86,300	120
Industrial Production Managers	Bachelor's Degree	\$76,200	130
Equipment, Cable, Line Repairers/ Installers HOT	Some College	\$51,500	60

Energy Cluster

Energy and Power: Generation, Transmission, and Distribution Pathway

Students will develop an understanding of energy systems, applications, and efficiency; explore how energy is converted into useful services and the role of increased efficiency in providing those services with less resources; investigate different forms of efficiency improvements and conservation; design and convert efficient energy systems; explore energy and power systems technologies by using mechanical, electrical, fluid, and alternate systems; evaluate building styles, and the energy-efficient materials used in construction.

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

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