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# Student Plan of Study – Manufacturing

Georgia Department of Education
Richard Woods, Georgia's School Superintendent
*"Educating Georgia's Future"*

Name_____ Date_____ School_____

Parent/Guardian Signature_____ Date_____ Advisor/Counselor Signature _____ Date_____

*Current Area of Interest:* ***Manufacturing/Manufacturing Technology*** *- 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 the 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.*

**Manufacturing**

| 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 | 9th Literature & Composition or Approved Dual Enrollment Course<br>1 credit<br>Credit Earned ☐ | 1 CCGPS Cord. Algebra<br>2 CCGPS Analytic Geometry<br>3 CCGPS Accel Cord. Algebra/Analytic Geometry<br>4 CCGPS Accel Analytic Geometry B/Adv. Algebra<br>1 credit *<br>Credit Earned ☐ | Biology or Approved Dual Enrollment Course<br>1 credit *<br>Credit Earned ☐ | American Government/Civics or AP Government/ Politics US or Approved Dual Enrollment Course<br>½ credit<br>Credit Earned ☐ | Health<br>½ credit<br>Credit Earned ☐<br>Personal Fitness<br>½ credit<br>Credit Earned ☐<br>*** VI. CTAE Pathway Total 3 credits | **Advanced Academic Pathways**<br>English/Language Arts, Math, Science, Social Studies<br>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.<br>AP, Dual Enrollment and Georgia Virtual School courses may be available. |
| 10 | 10th Literature & Composition or World Literature & Composition or Approved Dual Enrollment Course<br>1 credit<br>Credit Earned ☐ | 1 CCGPS Analytic Geometry<br>2 CCGPS Adv Algebra<br>3 CCGPS Accel Analytic Geometry/Adv. Algebra<br>4 CCGPS Pre-Calculus<br>1 credit *<br>Credit Earned ☐ | Physical Science or Physics or AP Physics or Approved Dual Enrollment Course<br>1 credit *<br>Credit Earned ☐ | World History or AP World History or Approved Dual Enrollment Course<br>1 credit<br>Credit Earned ☐ | 21.44100 Foundations of Manufacturing & Materials Science or Approved Dual Enrollment Course<br>1 credit<br>Credit Earned ☐ | **World Language Pathways**<br>**Two credits are 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 three credits in one language. The third course may reflect an AP, IB or Dual Enrollment designation.<br>Georgia Virtual School and ACCEL courses may be available. |
| 11 | American Literature/ Composition or AP English Language & Composition/American Lit or Approved Dual Enrollment Course<br>1 credit<br>Credit Earned ☐ | 1 CCGPS Adv. Algebra<br>2 CCGPS Pre-Calculus<br>3 CCGPS Accel Pre-Cal<br>4 CCGPS Cal or AP Cal<br>1 credit *<br>Credit Earned ☐ | Chemistry or Environmental Science or Earth Systems or AP/IB or Approved Dual Enrollment Course<br>1 credit *<br>Credit Earned ☐ | United States History or AP US History or IB History of the Americas or Approved Dual Enrollment Course<br>1 credit<br>Credit Earned ☐ | 21.44500 Robotics & Automated Systems or Approved Dual Enrollment Course<br>1 credit<br>Credit Earned ☐ | **Fine Arts/Performing Arts Pathways**<br>Visual Arts, Dance, Music, Journalism, Theater<br>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.<br>AP, Dual Enrollment and Georgia Virtual School courses may be available. |
| | At the end of the 11th grade, students planning to enter a University System of Georgia Institution or Technical College System of Georgia Institution should take the appropriate admissions test (SAT, ACT, Compass). | | | | | Legend:<br>*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.<br>*Math: Select Math sequence 1, 2, 3, 4, based on 9th grade entry course.<br>**Students must complete Two credits of the same world language for admission to University System of Georgia institutions.<br>*** Students should complete a CTAE pathway and take the related end of pathway assessment. |
| 12 | Advanced Composition or British Literature or AP/IB English Literature & Composition or Approved Dual Enrollment Course<br>1 credit<br>Credit Earned ☐ | CCGPS Pre-Cal or Calculus or AP Calculus or AP Stats or IB Math or Approved Dual Enrollment Course<br>1 credit *<br>Credit Earned ☐ | Any other of the previous courses or Meteorology or Astronomy or Approved Dual Enrollment Course<br>1 credit *<br>Credit Earned ☐ | Econ/Business/Free Enterprise or AP Macro Econ or AP Micro Econ or IB Econ or Approved Dual Enrollment Course<br>½ credit<br>Credit Earned ☐ | 21.44400 Production Enterprises or Approved Dual Enrollment Course<br>1 credit<br>Credit Earned ☐ | |
| Sample Elective Courses | Other English Elective Courses:<br>Literary Types/Composition<br>Journalism<br>Oral/Written Communication<br>Speech | Other Math Elective Courses:<br>Adv Math Decision Making<br>Math of Ind. & Govern.<br>Math of Finance | Other Science Elective Courses:<br>Foundations of Electronics or Physics or AP/IB Science | Other Social Studies Elective Courses:<br>Current Issues or World Geography or AP/IB Social Studies | Other CTAE Elective Courses:<br>Other CTAE elective courses are available to complete a related pathway | NOTE: Local systems may offer core courses in a different sequence; 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 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 |
|---|---|---|---|
| Industrial Engineers | Bachelor's Degree | $76,880 | 250 |
| Industrial Production Managers | Bachelor's Degree | $84,900 | 100 |
| Industrial Machinery Mechanics | High School | $45,100 | 330 |

Source: Georgia Department of Labor/ONET

| *Related Pathway Occupations: | Other Related Manufacturing Occupations: |
|---|---|
| Machinists | Mechanical Engineers |
| Layout Workers, Metal & Plastics | Industrial Engineers |
| Manufacturing Production Technicians | Multiple Machine Tool Setters, Operators & Tenders |
| Mechanical Engineering Technicians | Nuclear Power Reactor Operators, |
| Metal-Refining Furnace Operators | Patternmakers, Metal & Plastic |
| Millwrights | *ONET Online |

**For more information about your education and career planning, including valuable financial aid information that includes grants and scholarships, see your school counselor.**

****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 | |
| III. *Science | 4 | and/or ***World Languages, and/or Fine Arts | 3 |
| IV. Social Studies | 3 | VII. Electives | 4 |
| | | TOTAL | 23 |

*Selected 4th Science courses may be used to meet both the required science and required elective in a CTAE sequence of courses.
**Students must complete three credits to complete a CTAE pathway and take the end of pathway assessment.
***Students must complete two credits 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 the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Tests for admissions may from institution to institution. 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 US Military should take the ASVAB assessment.
- Students should utilize electronic college and career databases to select the most appropriate postsecondary opportunities to match their selected career field, including registered apprenticeships.
- Georgia's dual-credit programs have been combined into one program entitled Move on When Ready, in which high school students may earn their high school course credits while taking college courses.

**Possible Student Pathway Credentialing Opportunities:**

Students completing a pathway are eligible to take a Credentialing/End of Pathway Assessment (EOPA) upon successful completion of the three required courses in the pathway. For specific assessment information, refer to http://www.gadoe.org/Curriculum-Instruction-and-Assessment/CTAE/Pages/CTAE-Georgia-Assessments.aspx

**Manufacturing Technology**

Manufacturing is the production of goods for use or sale using labor and machines, tools, chemical and biological processing, or formulation. The term may refer to a range of human activity, from handicraft to high tech, but is most commonly applied to industrial production, in which raw materials are transformed into finished goods on a large scale. Such finished goods may be used for manufacturing other, more complex products, such as aircraft, household appliances or automobiles, or sold to wholesalers, who in turn sell them to retailers, who then sell them to end users – the "consumers".

Manufacturingoperates differently under different economic systems. In a free market economy, manufacturing is usually directed toward the mass production of products for sale to consumers at a profit. In a collectivist economy, manufacturing is more frequently directed by the state to supply a centrally planned economy. In mixed market economies, manufacturing occurs under some degree of government regulation.

Modern manufacturing includes all intermediate processes required for the production and integration of a product's components. Some industries, such as semiconductor and steel manufacturers, use the term fabrication instead.

The manufacturing sector is closely connected with engineering and industrial design. Examples of major manufacturers in North America include General Motors Corporation, General Electric, Pfizer, and Proctor and Gamble.

According to the Buearu of Labor Statistics (BLS), many occupations are growing at a faster than average rate. Occupations that are directly or indirectly associated with manufacturing are software developers, first-line supervisors, cost estimators, boilermakers, and logisticians. However, there will be keen competition for jobs because of the rate of employment growth in the industry.