- Military Service Technician

Upon completion of this Technical Program, students will be better prepared for post-secondary education in the follow courses of study:

- Automotive Technology
- Aircraft Technology
- Marine Technology
- Heavy Equipment Technology
- Transportation Service Management
- Transportation Service Advising

BIOTECHNOLOGY

Kimberly Stencel, Lead Teacher

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Biotechnology – Exploratory

This one week course provides the 9th grade student with an overview of the biotechnology program. The student is introduced to safety, biotechnology skills and equipment, and different types of careers available to biotechnology students. The topics and lab activities include micropipetting, gel electrophoresis, microscopy, and techniques in forensic science analysis. Written tests, class assignments, and lab activities are used to determine students' potential success in the biotechnology industry.

Biotechnology - Grade 9

Students entering the 9th grade shop/laboratory are provided with the basic knowledge and skills necessary for success in the biotechnology industry. Students receive practical instruction on lab safety and how to maintain a clean, organized lab environment. Practical work will include use of microscopes, cell staining, agarose gel electrophoresis, proper growth of bacteria in sterile media, and preparation of solutions. The effect of pH, antibiotics, and disinfectants on bacterial cell growth will be investigated. Students are graded weekly on their lab notebooks, lab reports, class assignments, and quizzes.

Related theory instruction is an inclusive component of the shop/laboratory class. Grade 9 related theory includes basic technical instruction and studies including life skills, communicating for success, lab safety, biotechnology documentation, standard operating procedures, and maintaining a laboratory notebook. pH and development of an acid-base scale will also be explored. Capabilities of Microsoft Office and Google docs and their applications in biotechnology will be covered. Instruction includes demonstrations, hands on practice, writing and reading assignments, reports, quizzes and tests to determine competency levels.

Biotechnology Grade 10

This course is designed to further develop the basic skills and knowledge needed for success in the biotechnology field. Students will work with restriction enzymes, gel electrophoresis, polymerase chain reaction (PCR), and spectrophotometry techniques. The students will design an original research project to complete and present to peers and judges. Practical work will include the use of autoclaves and incubators. Students are graded with weekly reflections, lab notebooks, lab reports, class assignments, and quizzes.

Related theory instruction is an inclusive component of the grade 10 shop/laboratory class. Grade 10 theory is designed to further develop the comprehension of basic biotechnology theories and technical instruction. Students receive instruction in genetics, molecular biology, genomics, and bioethics. They will explore the theory behind DNA gel electrophoresis, and learn about protein synthesis and enzyme activity. Process control systems used in biotechnology will be studied. Instruction includes demonstrations, hands on practice, writing and reading assignments, reports, quizzes and tests to determine competency levels.

Biotechnology Grade 11

This course is designed to give students the opportunity to advance their knowledge and technical skills in the biotechnology program. Students receive advanced instruction in maintenance of animal cells and plant cells in culture, including media preparation and cell type identification. They will perform ELISA, analysis using polyacrylamide gel electrophoresis, as well as size exclusion chromatography. Lab activities demonstrating cell processes such as cell

respiration, diffusion, and photosynthesis will also be explored. Practical work will include use of biological safety cabinets. The students will design an original research project to complete and present to peers and judges. Students are graded weekly on their lab notebooks, lab reports, classwork assignments, and quizzes.

Related theory instruction is an inclusive component of the grade 11 shop/laboratory class. Grade 11 theory is designed to give the students an opportunity to advance their knowledge and technical skill in the biotechnology program. Students will receive instruction in immunology, cell culture techniques, and molecular biology. They will learn about Good Manufacturing Practices (GMP) and Good Laboratory Practices (GLP), and the drug and facility approval process mandated by the FDA and other regulatory agencies. Instruction includes demonstrations, hands on practice, writing and reading assignments, reports, quizzes and tests to determine competency levels.

Biotechnology Grade 12

This course is designed to provide students with the opportunity to master their technical skills and comprehension level in the biotechnology program. Students will be able to isolate DNA from bacteria, yeast, and animal cells. Polymerase chain reactions (PCR) will be used to amplify DNA. Experiments involving genetic transformation of bacterial and animal cells will be conducted, as well as the use of fermentation flasks in biomanufacturing. Affinity chromatography will be used to purify yeast fermentation products. Large scale growth of cultures and cell production using batch records will be conducted. Analysis of the bacterial cell product by hydrophobic interaction chromatography and SDS-PAGE will be completed. The students will design an original research project to complete and present to peers and judges.

Related theory instruction is an inclusive component of the grade 12 shop/laboratory class. Grade 12 theory is designed to prepare students for the professional workplace. Students will receive instruction on the business of biotechnology, seeking employment, preparing for and selecting college, resume writing, managing money and financial planning, management and entrepreneurship. Students will be familiar with many different aspects of the industry. Technical focus will be on the biochemistry of cell energy supply. The theory behind genetic engineering and PCR will be studied, as well as the applications of hybridoma cells and their use in biotechnology. Strategies for scaling up unit operations and production processes are presented.

This technical program offers the following certification(s) for students:

Career Safe Certification, recognized by the Occupational Safety and Health Administration (OSHA)

Career opportunities upon completion of the program include but are not limited to:

- Research Laboratory Assistant

- Purification Technician
- Fermentation Technician
- Media Prep Technician
- Documentation Specialist
- Quality Control Analyst
- Clinical Science Technician
- Regulatory Specialist
- Laboratory Animal Care Technician
- Veterinary Assistant

Upon completion of this technical program, students will be better prepared for post-secondary education in the following courses of study:

- Biotechnology
- Biology/Marine Biology
- Biochemistry
- Chemical Engineering
- Biomedical engineering
- Microbiology
- Genetics
- Forensic Sciences
- Criminal Justice
- Animal/Veterinary Sciences
- Pharmacy

Business Technology

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Business Technology – Exploratory

This one week course focuses on skills used in the real world, regardless of whether or not they select the Business Technology program as their shop choice. Students learn the value of a dollar, work in teams, and independently; they learn the realities of budgeting; use Microsoft applications, including Excel, Word and PowerPoint; how marketing works and why companies consistently target young adults. They learn about checks, what an ABA number is; how to write checks, how to pay bills and use a check register and lastly, they learn, first hand, the importance

of investing. Students work in teams to create a business concept which includes a logo, slogan, budget and advertisement. They create a PowerPoint to market their business idea to their classmates. They learn to understand cultural differences and the importance of diversity in the workplace.

Business Technology – Grade 9

The students that enter the Business Technology program their first year learn basic fundamental business components from which other principles are built. Curriculum their first year includes a basic overview of office safety and the proper methodologies for maintaining a clean, ergonomically correct work area and station. Students learn the importance of good, effective customer service and how more than 85% of positive customer service skills result in return clientele; record keeping skills, such as the seven rules of filing alphabetic data provide a solid foundation for curriculum to be taught in subsequent years. Also setting the foundation for subsequent years in the proper use of the 10-key adding machine. Grade 9 theories include basic technical instruction and studies including life skills, effective communication both in and out of the workplace, and how to *exceed* being just a contributor to society. Instruction is expedited via use of group assignments, demonstrations, individual hands-on practice, written work, open discussion, quizzes and tests to ascertain a certain level of learning.

Business Technology – Grade 10

The sophomore year in the Business Technology program of studies is designed to bring student learning and understanding of business culture to the next level. Students will begin studying basic accounting principles for a service based company, this includes, analyzing source documents, journalizing entries, use of a general ledger and preparation of a trial balance. Students also begin studying the importance of business ethics; they learn how to improve their personal effectiveness by prioritizing and managing their time more efficiently. Basic Microsoft Word fundamentals also prepare students with a solid foundation in preparation for the Microsoft Word certification test to be executed when students meet a minimum grade requirement on the practice test. Students learn more intermediate and advanced Word functionality in final preparation for their certification exam. Students begin designing, creating and managing basic HTML web pages. Students study financial literacy, including managing your money properly and being self-sufficient as they become young adults. Intermediate PowerPoint is taught in preparation for certification in this software as well. Office Procedures I, office simulation, and records management also occurs during student's sophomore year. Finally, students take their 10-hour OSHA certification test. Instruction will be taught in the form of group assignments, demonstrations, individual hands-on practice, written work, open discussion, quizzes and tests to ascertain a certain level of understanding

Business Technology – Grade 11

This course is designed to give students the opportunity to advance their knowledge and technical skills in the Business Technology program. An introduction to Excel is introduced where students begin to explore special functions and recognize the power of the software. Studies of intermediate Excel also prepare students for the certification test. Microsoft Access and Outlook are introduced. Students are taught additional knowledge for designing, building and managing websites using Dreamweaver software. Office procedures II are taught, scaffolding on the basic fundamentals of Office Procedures I. Intermediate accounting, including preparation of the Income Statement, Statement of Changes in Owner's Equity and Balance Sheet, preparation and execution of adjusting and closing entries, as well as preparing a post-close trial balance are all achieved during their junior year in Business Technology. Payroll accounting is introduced and all aspects of previously studied accounting principles are embedded in the payroll accounting curriculum. Students begin learning computerized accounting via the use of QuickBooks Pro software. Students will finally begin utilizing the entrepreneurship fundamentals previously learned to build a working business plan over the course of the entire year. Instruction is in the form of group assignments, demonstrations, individual hands-on practice, written work, open discussion, quizzes and tests to ascertain a certain level of understanding.

Business Technology – Grade 12

This course is designed to provide students with the opportunity to master their technical skills and comprehension level in Business Technology, the world of business, its culture and attributes. By their senior year students should be certified in Microsoft Word, Excel, PowerPoint and Outlook. Master users may reach their certification on the four aforementioned programs as well as Microsoft Access. Entrepreneurship is also explored, as are the foundations for beginning preparation of a self-contained business plan, fully executed by each individual student. International Marketing is introduced to prepare them for adulthood in a global marketplace. Career prep, in conjunction with Sr. Project, corporate ethics and advanced financial literacy determine their ideal career opportunity as they study advanced investment opportunities. The theory of accounting is embraced to prepare students for college-level studies. Strategies will be utilized to foster independent and critical thinking as it pertains to problem resolution and forward thinking. Instruction will be in the form of group assignments, individual hands-on practice, reading and written work, quizzes and tests to ascertain a certain level of understanding has been achieved.

This Technical Program is certified in the following areas:

- Microsoft Office Authorized Testing Center

This Technical Program offers the following certifications for students:

- Career Safe Certification, recognized by the Occupational Safety and Health Administration (OSHA)

- Microsoft Office National Certification in:

  Word
  Excel
  Access
  PowerPoint
  Outlook
  Business Professionals of America National Leadership Academy Certificates
  Business Professionals of America Workplace Skills Assessment recognition at the state and national level in four categories: Finance, Administrative Support, Information Technology and Human Resources/Marketing/Management.

Career Opportunities upon completion of this Technical Program include but are not limited to:

- Finance – accounting clerical to certified public accountant
- Administrative Support – office assistant to administrative assistant
- Management – at all levels in a wide range of business
- The competencies provide the basic skills needed to begin a business career in any field or pursue an entrepreneurial enterprise

Upon completion of this Technical Program, students will be better prepared for post-secondary education in the follow courses of study:

- Administration
- Finance
- Management
- Marketing

COMPUTER PROGRAMMING AND WEB DEVELOPMENT

Steve Pleau, Lead Teacher

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Grades are comprised of technical performance, productivity, and professional development. Instruction includes hands-on practice, individual and group projects, round table discussions, laboratories, case studies, audio-visual presentations/demonstrations, online/interactive self-paced training programs, individual instruction, individual computer based assignments, and lectures. Assessments include writing and reading assignments, projects, class participation, professional development, quizzes, presentations, peer assessments, case studies, and tests. Students are introduced to the latest in development tools and software currently utilized in the industry.

Computer Programming and Web Development - Exploratory

During one week exploratory program freshmen explorers develop a personal web page. The content of the web page is generated by programming in HTML and CSS. They are then introduced to the Alice programming language (object oriented, 3D, storytelling language) along with some basic hardware (including history), networking, and safety. The freshmen finish by applying any of the concepts learned during the week to produce and present a project of their choice.

Computer Programming and Web Development - Grade 9

Freshmen learn the fundamentals of HTML and Cascading Style Sheets (CSS) to build dynamic web sites which incorporate multimedia and Web tools. They also learn about computer hardware components, their functions, technologies, and how they communicate with one another. Students may build upon the basic concepts of computer programming using the Alice programming language. They will learn program design and implementation, scenarios and storyboards, built-in functions and expressions, control structures, classes, objects, methods, and parameters. 3D Animation will be introduced at this level to coincide with and allow for enhanced Alice programming development. Project management theory is introduced and reinforced as students work on class projects.

Computer Programming and Web Development - Grade 10

Sophomores continue learning HTML and CSS development to build web sites. JavaScript is introduced to make websites more dynamic. PHP is introduced to prepare for website database integration. External CSS files and JavaScript files are also introduced. The students begin work on their e-portfolio which includes their resume and several artifacts highlighting their IT skills. Students complete an online 10-hour OSHA General Industry certificate program. They also continue their programming experience using the Python programming language with Parallax Scribbler robots for a visual, hands-on experience. 3D Animation may also be expanded upon during this school year. Project management is expanded upon and reinforced as students work on class projects.

Computer Programming and Web Development - Grade 11

Juniors begin a two-year Cisco Networking curriculum by taking the Discovery I course. This course introduces students to fundamental networking concepts and technologies while providing hands-on use of industry standard tools and hardware. Cisco networking is taught by an adjunct professor of New Hampshire Technical Institute and the students have the opportunity to purchase three college credits upon successful completion of the course. Project management is expanded upon further and reinforced as students work on class projects and possible real world client work. HTML, CSS, JavaScript, PHP, and MySQL are utilized to complete the Web Development curriculum. An advanced programming language such as Java or C# may be introduced and/or Parrot AR Drone 2.0 and tablet programming utilized to complete the Programming curriculum. Students embark on a programming project learning four of the five software life cycle phases; requirements, design, development, and test; tracking their progress utilizing their project management techniques and tools. They are also required to produce a user guide for their programming project.

Computer Programming and Web Development - Grade 12

Seniors develop a CPWD capstone project of their choice specializing in Computer Programming or Web Development which they manage using project management tools. Students meet each week with their designated instructor for a one-on-one review. Students present their capstone project to a panel of IT professionals at the end of term 3. They update their e-portfolio which includes their resume and several artifacts highlighting their IT skills gained throughout their high school career. They also take the second Cisco Networking course, Discovery 2 which provides an introduction to routing and remote access, addressing and network services. It familiarizes students with servers providing email services, web space, and Authenticated Access. They have the opportunity to earn an additional three college credits.

Qualified seniors have the added opportunity for a Co-op position in lieu of a CPWD capstone project.

This Technical Program trains the student for the following certification exams:

- Career Safe Certification, recognized by the Occupational Safety and Health Administration (OSHA)
- Cisco CCENT Certification
- Adobe Certified Associate (ACA) – A global, validated, standards-based training and certification program for DreamWeaver, Flash, and/or Photoshop**.**

Career Opportunities upon completion of this Technical Program include but are not limited to:

- Entry-level Web Development
- Computer Programming Internships
- Assistant Network Administrator
- Computer Help Desk
- Computer Sales
- Entry-level Computer Programming
- Entry-level Game Programmer
- Assistant Systems Administrator
- Computer Maintenance Technician

Upon completion of this Technical Program, students will be better prepared for post-secondary education in the following courses of study:

- Web Development
- Networking
- Management Information Systems
- Engineering
- Computer Forensics
- Computer Science
- Game Design
- Information Technology
- 3D Animation