

I. PROGRAM PHILOSOPHY

Business Education/Computer Science Department

The Business Education/Computer Science Department of Linden High School believes that the mission of business education/computer science is to teach for and about business/computer science. Business education/computer science prepares learners to make wise personal economic and career choices while developing knowledge, skills, and attitudes necessary to succeed in the workforce or to succeed in advanced educational programs at business or technical schools, two-year colleges, and four-year colleges and universities.

Business education means instruction about various roles that all learners will play as economically literate citizens. This instruction includes personal consumer economic skills, knowledge of social and government responsibility, and an understanding of business operations. Learning about business also means developing interpersonal and leadership skills for functioning in multicultural business settings. Preparation for business means building on these general understandings about business in a way that prepares learners to be employed in a variety of careers.

Computer science means the study of computer hardware and computer software design. It includes systems analysis and design, application and system software design, and programming and data center operations. Computer programmers write, test, and maintain detailed instructions that list in a logical order the steps computers must execute to perform their functions. Computer scientists emphasize the application of theory to design computers and software as theorists, researchers, or inventors. Computer engineers apply the theories and principles of science and mathematics to design hardware, software, networks, and processes to solve technical problems. Systems analysts study business, scientific, or engineering data processing problems and design new solutions using computers.

WE BELIEVE THAT, as identified in *Skills and Tasks for Jobs: A SCANS(Secretary's Commission on Achieving Necessary Skills)Report for America 2000 and Skills for the 21st Century*, the business education/computer science curriculum must prepare competent workers who need:

- **Basic Skills:** reading, writing, arithmetic and mathematics, speaking, and listening.
- **Thinking Skills:** ability to learn, to reason, to think creatively, to make decisions, and to solve problems.
- **Personal Qualities:** individual responsibility, self-esteem and self-management, sociability, integrity, and honesty.

WE BELIEVE THAT, as identified in *Skills and Tasks for Jobs: A SCANS Report for America 2000 and Skills for the 21st Century*, the business education/computer science curriculum must prepare effective workers who can productively use:

- **Resources:** they know how to allocate time, money, materials, space, and staff.
- **Interpersonal skills:** they can work on teams, teach others, serve customers, lead, negotiate, and work well with people from culturally diverse backgrounds.
- **Information:** they can acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information.
- **Systems:** they understand social, organizational, and technological systems; monitor and correct performance; and design or improve systems.
- **Technology:** they can select equipment and tools, apply technology to specific tasks, and maintain and troubleshoot equipment.

WE BELIEVE THAT the New Jersey Core Curriculum Cross-Content Workplace Readiness Standards establish the framework for the business education/computer science curriculum. Furthermore, the business education/computer science curriculum supports, addresses, and utilizes many elements of the Language Arts and Literacy Standards, Mathematics Standards, and Science Standards. These standards enable learners to succeed in the workplace and in post-secondary educational programs.

- **Cross-Content Workplace Readiness Standards**

- ✓ Career planning
- ✓ Critical-thinking skills
- ✓ Decision-making skills
- ✓ Problem-solving skills
- ✓ Safety principles
- ✓ Self-management skills
- ✓ Use information
- ✓ Use other tools
- ✓ Use technology
- ✓ Workplace-readiness skills

- **Language Arts and Literacy Standards**

- ✓ Listen actively
- ✓ Read various materials
- ✓ Speak formally and informally
- ✓ Use non-textual visual information
- ✓ Write clear, concise, organized language

- **Mathematics Standards**
 - ✓ Communicate mathematically
 - ✓ Connect mathematics to other learning
 - ✓ Measurement
 - ✓ Number sense
 - ✓ Numerical operations
 - ✓ Reasoning skills
 - ✓ State and solve mathematical problems
 - ✓ Use algebraic concepts/processes to solve problems
 - ✓ Use calculators and computers
 - ✓ Use concepts/methods of discrete mathematics
 - ✓ Use geometric properties/relationships to solve problems
 - ✓ Use high levels of mathematical thought
- **Science Standards**
 - ✓ Formulate usable questions and hypotheses
 - ✓ Plan experiments, investigation, or research
 - ✓ Conduct systematic observations or collect data
 - ✓ Interpret and analyze data
 - ✓ Draw conclusions
 - ✓ Communicate results

WE BELIEVE THAT the following content areas identified by the National Business Education Association constitute a quality business/computer science education:

- **Accounting**
- **Business Law**
- **Career Development**
- **Communications**
- **Computation**
- **Cooperative Work Experience**
- **Economics and Personal Finance**
- **Entrepreneurship**
- **International Business**
- **Interrelationships of Business Functions**
- **Management**
- **Marketing**

- **Safety Principles**
- **Information Technology**

WE BELIEVE THAT our institution of the College Board Advanced Placement Computer Science program and the International Baccalaureate Computer Science program and Business and Management courses enhances our overall program by providing a rigorous preuniversity environment within which we can meet the needs of highly motivated students.

WE BELIEVE THAT a strong business education/computer science program is responsive to shifting educational and instructional paradigms. Therefore, curriculum revision must be continuous and based on a sound, carefully thought-out assessment of many variables. Some variables to consider include changing technology, changing demographics, the economy, political developments with their accompanying rules and regulations, and local educational policies and practices.

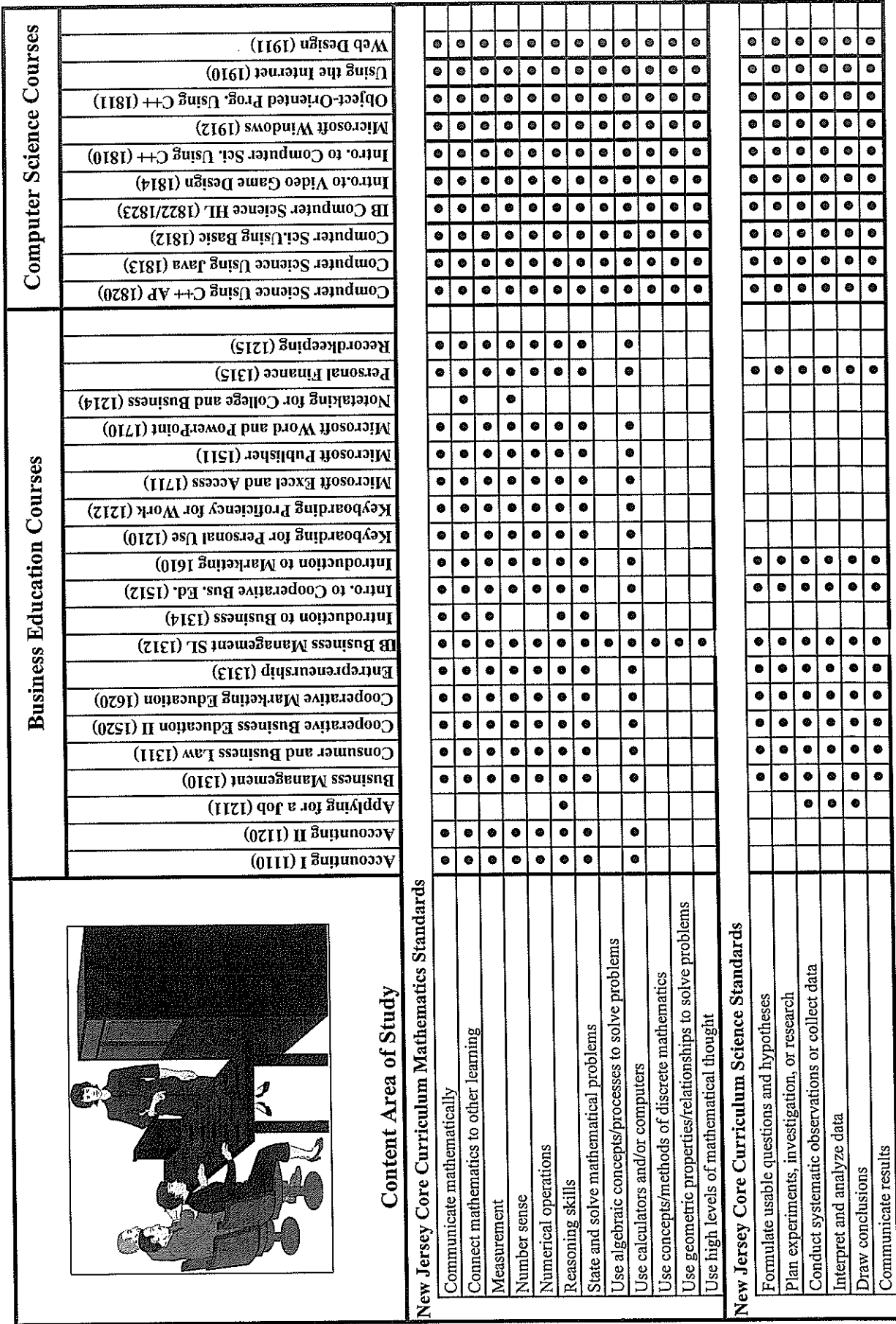
WE BELIEVE THAT education for and about business/computer science should be guided by a global vision recognizing business/computer science as an essential educational component involving all learners in real-life applications

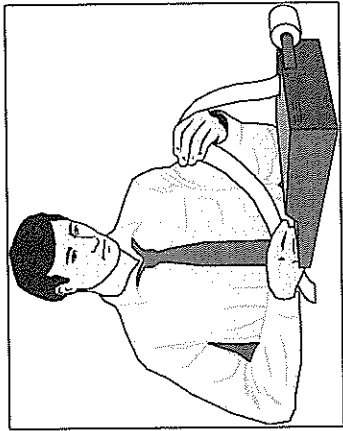
II. PROGRAM GOALS

- Develop career planning and workplace readiness skills
- Use information, technology, and other tools
- Use critical thinking, decision-making, and problem-solving skills
- Demonstrate self-management skills
- Apply safety principles

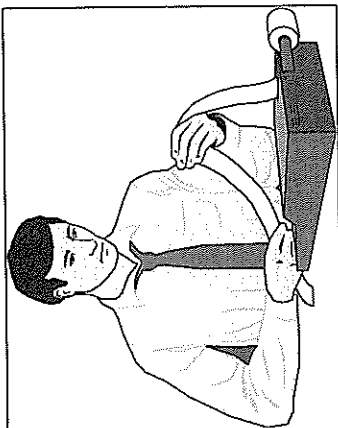
Business Education/Computer Science Department

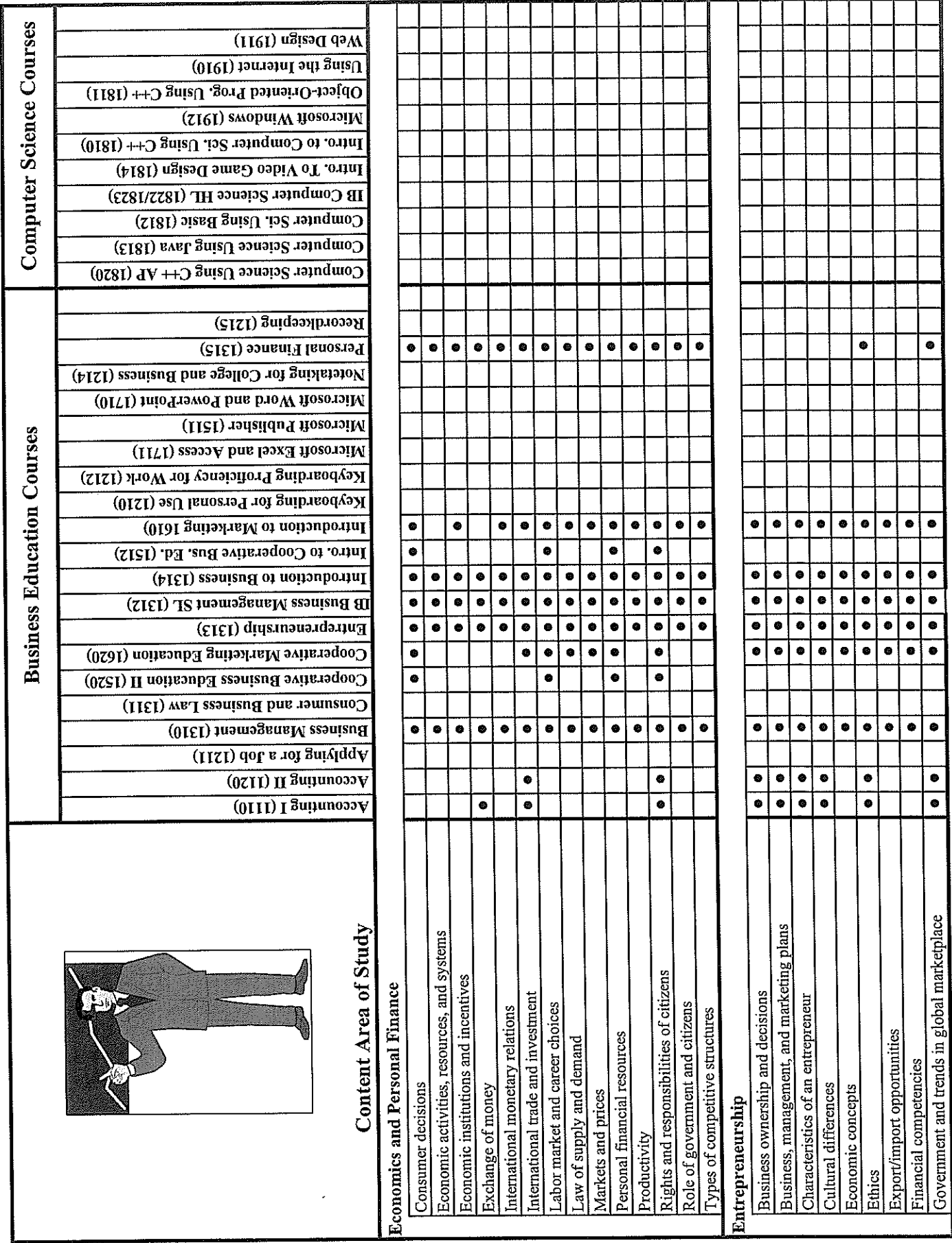
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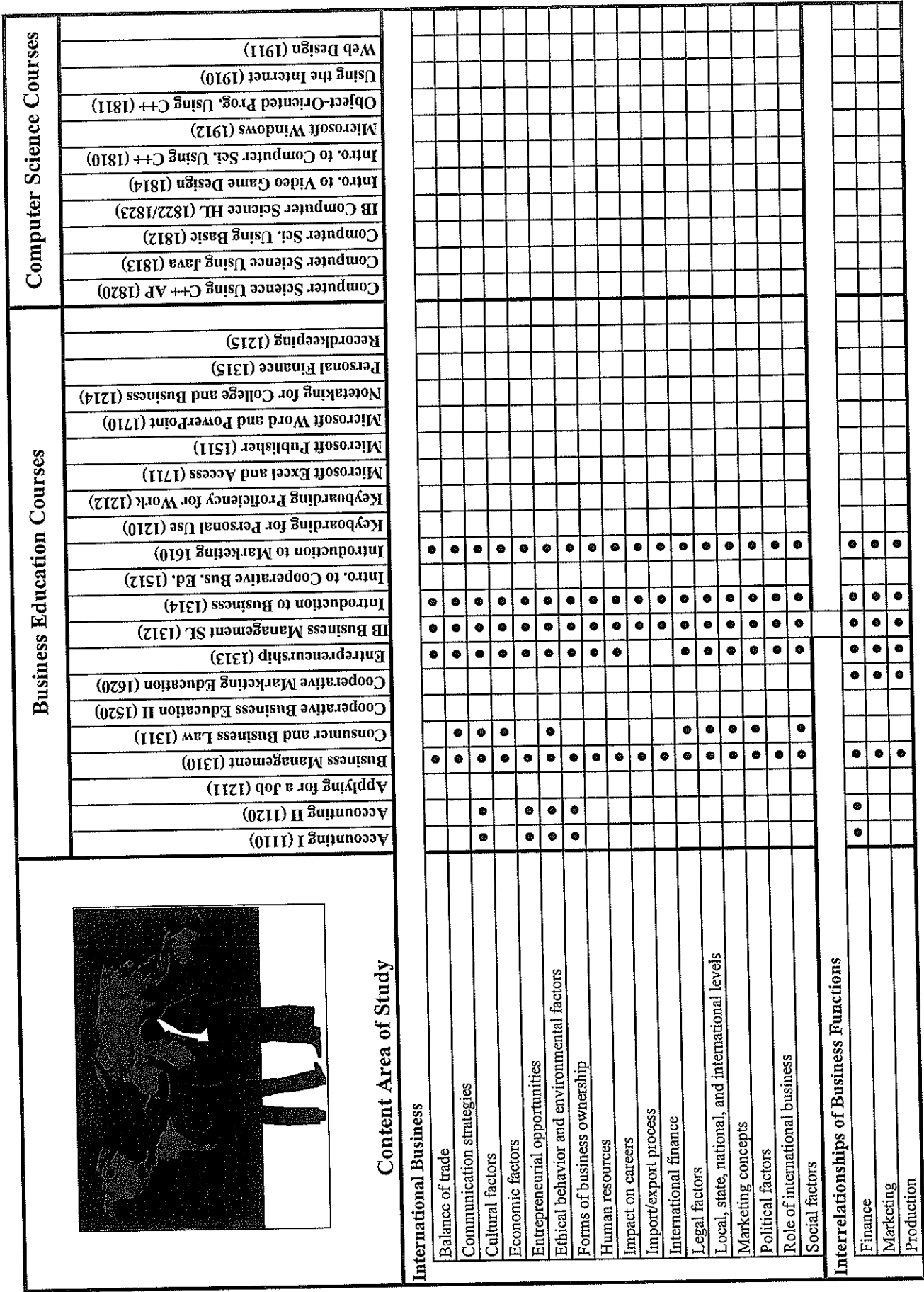


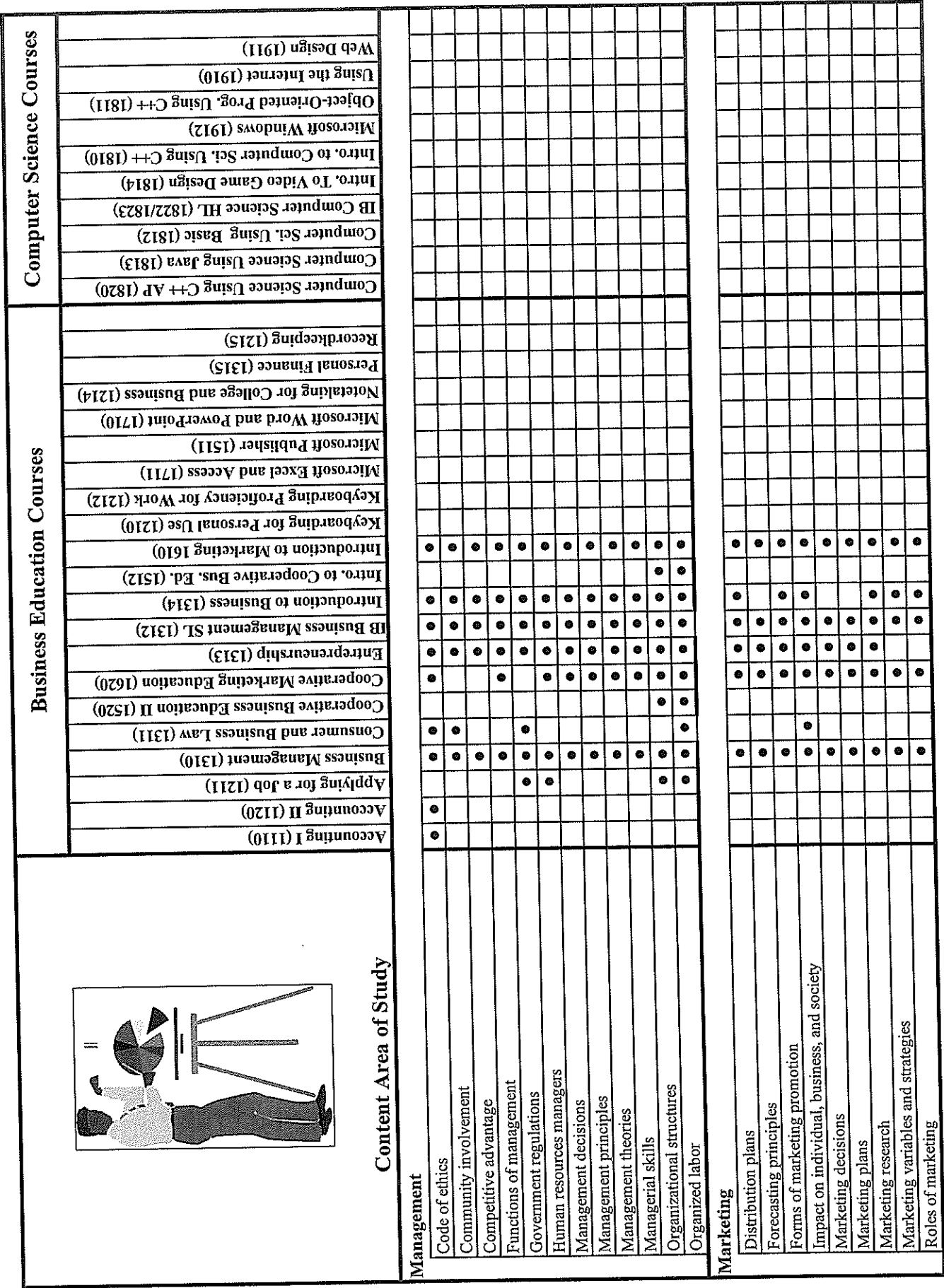


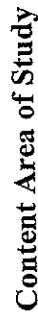
Content Area of Study

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Computer Science Courses		Business Education Courses	
Computer Science Using C++ AP (1820)	Computer Science Using Java (1813)	Computer Sci. Using Visual Basic (1812)	IB Computer Science HL (1822/1823)
Intro. to Computer Sci. Using BASIC (1814)	Intro. to Computer Sci. Using C++ (1810)	Microsoft Windows (1912)	Object-Oriented Prog. Using C++ (1811)
Using the Internet (1910)	Web Design (1911)		
Accounting I (1110)	Accounting II (1120)	Applying for a Job (1211)	Business Management (1310)
Consumer and Business Law (1311)	Cooperative Business Education II (1520)	Cooperative Marketing Education (1620)	Entrepreneurship (1313)
IB Business Management SL	Introduction to Business (1314)	Intro. to Cooperative Bus. Ed. (1512)	Introduction to Marketing (1610)
Keyboarding for Personal Use (1210)	Keyboarding Proficiency for Work (1212)	Microsoft Excel and Access (1711)	Microsoft Publisher (1511)
Microsoft Word and PowerPoint (1710)	Notetaking for College and Business (1214)	Personal Finance (1315)	Recordkeeping (1215)
Computer Science Using C++ AP (1820)	Computer Science Using Java (1813)	Computer Sci. Using Visual Basic (1812)	IB Computer Science HL (1822/1823)
Intro. to Computer Sci. Using BASIC (1814)	Intro. to Computer Sci. Using C++ (1810)	Microsoft Windows (1912)	Object-Oriented Prog. Using C++ (1811)
Using the Internet (1910)	Web Design (1911)		

Content Area of Study

Technology: Computer Science and Information Systems	
Algorithm design	
Careers and career paths	
Communications and networking systems	
Computer architecture	
Computer hardware	
Database software	
Desktop publishing software	
Display information and images (graphics)	
Functions and operation of computer systems	
Impact on society	
Limitations of computer systems	
Multimedia	
Operating system software	
Personal code of ethics	
Presentation graphics software	
Principles of designing/programming computer systems	
Programming languages	
Security plans	
Spreadsheet software	
Theoretical characteristics of computer systems	
Touch keyboarding	
Word processing software	

IV. COURSE DESCRIPTION

Introduction to Video Game Design

Prerequisite: Introduction to Computer Science Using C++

Credits: 5

Grades: 10, 11, and 12

Introduction to Video Game Design is designed for any student to take the role as a programmer in developing games, what games look like from a programmer's viewpoint, and how programmers translate game designs, artistic specifications and production requirements into code. It will include hands-on programming using C++ and Java. Issues of management are addressed in this course to begin to understand video game product development. Five phases of product development are covered: requirements to technical definition, development plan construction, plan management, problem management, process assessment, and improvement. Cross-discipline collaboration, communication, and compromise are key concepts in game development. Emphasis will be put on why you need to and how to get approval from a hardware manufacturer, the steps to manufacture, and the importance of a bug-free release. Students will get a chance to test new games coming out to the market and write reviews.

V. COURSE GOALS AND OBJECTIVES

- Develop an understanding of video game design background
- Develop an understanding of a game designer's role
- Develop an understanding of designing a game
- Develop an understanding of creativity in designing games
- Develop an understanding of writing a design document
- Develop an understanding of control and loop structures
- Develop an understanding of functions and debugging and testing functions
- Develop an understanding of arrays and searching and sorting procedures
- Develop an understanding of records and files
- Develop an understanding of graphics and sound
- Develop an understanding of storytelling
- Develop an understanding of conflict and bugs
- Write small video game
- Understand how to write a game review (graphics, characters, strategy, set-up, options)
- Research game designers
- Critique games

VI. COURSE CURRICULUM CHART - Introduction to Video Game Design

UNIT/ TOPIC	OBJECTIVES	STANDARD	RESOURCE
Introduction to Game Design	• Discuss what a game is and use examples • Discuss what the concept of fun is and use examples • Explain how game design began • Explain blueprint analogy • Discuss and explain the game development cycle • Introduce the design document	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	See "Resources" Page
Game Designers and Their Role with Games	• Discuss what a game designer does • Research game designers • Discuss and explain the game designer's many jobs • Discuss how to create new ideas in games • Explain visualization • Explain prototyping and scripting • Learn the steps to begin the design of a game (maintain and revise, write dialog, implement, and test)	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	
Gathering and Reporting Information- Beginnings of Design	• Discuss how to gather information for a game • Learn to grow vocabulary and actively listen • Develop effective listening skills • Develop note taking skills • Explain mind mapping and give examples • Develop effective reading skills • Discuss information to research and read for game development • Discuss and demonstrate game playing • Research professional organizations • Learn how to express ideas through speaking, writing • Discuss how to use Wikis in writings	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	

UNIT/ TOPIC	OBJECTIVES	STANDARD	RESOURCE
Design Boot Camp: Creativity and Gray Matter	• Learn the importance of the mind with designing games • Discuss the care of mind and body (sleep, breathing, eating) • Discuss how to build memory to handle many thoughts • Learn how to describe and explain fully topics • Explain creativity in gaming • Discuss different stress that can interfere with clear thinking • Identify possible ideas for game topics • Explain brainstorming and complete exercises	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	See "Resources" Page
Design Document	• Explain a design document • Review design documents • Identify the process to designing a game document • Explain pitch documents • Write design documents • Review game magazines for information on games • Explain how to write a game review • Critique games in magazine • Review technical designs for the game	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	
Design Document (continued)	• Research game designers ideas for design document • Research specifics for the design document • Discuss tools for design • Discuss the marketing plan for the game • Discuss the target market • Review sample games and documents	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	

UNIT/ TOPIC	OBJECTIVES	STANDARD	RESOURCE
Choosing Variables, I/O, Operators, Functions, and Language	• Explain the different variable types used in C++ and how they differ from constants • Declare, name, and initialize variables in programs • Use constants in programs • User character variables • Explain the different floating-point types and use variables of those types • Describe Boolean variables • Define strings and literals • Explain classes and objects • Use the string class to store strings in your programs • Perform basic string operations • Use cin and cout • Use special characters • Format output • Accept characters and strings as input	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	See "Resources" Page
Choosing Variables, I/O, Operators, Functions, and Language (continued)	• Use relational operators • Use logical operators • Describe short-circuit evaluation • Describe selection structures • Describe loops • Use the break and continue statements • Nest loops	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	
Game Design Theory	• Explain game atoms • Explain goals, rules, and content of a game • Discuss problems with current games • Discuss ways to correct errors in games • Explain and discuss different perceptions • Explain importance of sound, music, sound effects, light, and color in a game • Discuss movements of player	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	

UNIT/ TOPIC	OBJECTIVES	STANDARD	RESOURCE
Game Design Theory (continued)	• Explain importance of emotions (flow, socializing, solving problems, movements) • Explain how to put all information together • Discuss and explain player actions • Discuss the importance of a challenge in a game • Explain how to make games flow • Discuss other variables that can affect a game • Review games using concepts learned Accept characters and strings as input	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	See "Resources" Page
Real-World Game Design	• Explain the user interfaces of a game • Discuss environment and interactivity • Explain conflicts and resolutions • Explain storytelling • Design a storyboard for a game • Test the game designed • Edit errors • Discuss how to get game in the business	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	
Safety Principles	• Explain common hazards in the computer laboratory and how to eliminate them • Explain common injuries that could occur in the computer laboratory • Identify laws established to promote safety and health in environments like the computer laboratory • Explain safety procedures for hands-on activities in the computer laboratory • Explain safe physical movement in the computer laboratory • Identify safety and protective devices in the computer laboratory • Explain the use of tools and equipment in the computer laboratory	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	

UNIT/ TOPIC	OBJECTIVES	STANDARD	RESOURCE
Careers and Career Paths	• Explain career resources, success, and lifelong learning in game design • Explain goals and an individual career path in game design • Identify personal strengths and weaknesses as they relate to game design • Explain strategies for transition from school to work in game design • Explain work ethic as it relates to game design • Explain workplace communication skills as they relate to game design • Explain workplace diversity and relationships as they relate to game design • Identify schools for pursuing a degree in game design	3.1 F, G 3.3 A, B 3.4 A, B 8.1A&B 8.2A-C 9.1A&B 9.2A-F	See "Resources" Page

VII. EVALUATION

Introduction to Video Game Design requires students to be involved in a variety of learning activities: reading material, attending classes, answering questions, completing programming hands-on exercises and problems, developing a game design vocabulary, completing projects, and analyzing case studies.

The teaching strategies employed by the teacher are as varied as the learning experiences: lecture, one-to-one interaction with students, question/answer sessions, discussions encouraging students to explain procedures, class recitation, board work by teacher and students, use of visual aids, use of models and simulations, guided exploration and practice on the computer and game systems, assignment of homework problems and class review, programming projects and case studies requiring cumulative knowledge (individual or team efforts), quizzes, and tests.

Through the above learning activities and teaching strategies, an evaluation process occurs. Performance averages will be calculated for four grading periods. The student's performance on quizzes, tests, homework, and projects will determine the grading period average. Students will be judged on the quality of performance. Such factors as preparedness, attention to detail, completeness of assignments and adherence to instructions and standards will be considered.

Students are expected to attend class daily; excessive absences as outlined in the student handbook will have a detrimental effect on the student's performance and evaluation.

A final examination will be administered at the conclusion of the course.

The course grade reflecting the student's overall performance will consist of five parts: four grading period averages and the final examination grade.

VIII. RESOURCES

Books

Schuytema, Paul. *Game Design: A Practical Approach*. Boston, Massachusetts: Thomson Learning Inc., 2007.

Swamy, Nanu and Naveena Swamy. *Basic Game Design and Creation for Fun and Learning*. Boston, Massachusetts: Thomson Learning Inc., 2006.

Yuzwa, Erik and Francois Laramee. *Learn C++ by Making Games*. Boston, Massachusetts: Thomson Learning Inc., 2007.

Student Instructional Videos

- *National Treasure Parts 1 and 2*
- *Pirates of Silicon Valley*
- *The Net*
- *Personality Development for Work*
- *Preparing for Career Success*
- *Succeeding in the World of Work* (text and workbook)
- *WCG-Ultimate Gamer*
- *Welcome to Macintosh*
- *Video Games: Behind the Fun*
- *Video Game Invasion: The History of a Global Obsession*

Extra Resources

Use of gaming consoles to test and review games (Wii, Xbox360, and PS2)

Game Informer Magazine-read reviews of games, discuss

Visit to computer shows for seminars on gaming

Brain Builder exercise book

Gamer's Grub

Gamer's Fuel

www.the-other-view.com to view reviews written to see setup

www.gamestop.com to view new games coming to market

<http://www.makeuseof.com/tag/top-10-professional-sample-code-websites-for-programmers/> viewing coding
<http://simworkshops.stanford.edu/readings.html> information regarding how games help society
http://game-editor.com/Main_Page platform to create games
Websites related to the video game design field

Program and Course Development Reference Materials

- National Business Education Association. *Curriculum Forum*. <http://www.nbea.org/nbea.html>. 1998.
- New Jersey Department of Education. *New Jersey Core Curriculum Content Standards*. <http://www.injersey.com/Education/NJDOE/index.html>. 1996.
- Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor. *Excerpt from: What Work Requires of Schools, A Scans Report for America 2000*. <http://www.coe.uh.edu/math/resources/scan.html>. 1991.
- Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor. *Skills and Tasks for Jobs: A SCANS Report for America 2000*. <http://www2.southwind.net/~educate/scans.html>. 1992.