Technology Applications (Computer Science) Ind. Study
Syllabus for 2016-2017

Instructor
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Introduction
Computer Science Independent Study is offered for seniors who have completed the first three computer science courses and wish to continue their computer science study. Students will learn discrete mathematics and a modern functional language (ML). They will accomplish this by working through the *Discrete Mathematics and Functional Programming* book and supplementing it with other resources as needed.

Course work will be self-directed under the approval and direction of the instructor.

Text


Class Rules and Responsibilities
The entire TAG family works hard to provide you with an exemplary educational experience. We endeavor to provide a quality environment, instruction, equipment, and facilities. Be respectful of our commitment by honoring the following rules and responsibilities. Help your peers act appropriately as well.

Class rules
- Participate in computer science related activities for the entire class period. A maximum of one student initiated pass is allowed each 6-weeks. A doctor’s note is required for additional bathroom or water fountain passes.

- Follow all school rules. All electronic devices must stay in backpacks during school hours unless use is preapproved by Hromcik or Martin.
• All work you submit must reflect your own understanding. Plagiarism or other cheating will have significant consequences including but not limited to zero grades and parent notification.

• TAG computers are for school related work only. Do not use them to play games, listen to music, watch videos, view social media, download or install software. Do not deface property, make any configuration changes, use proxies, or do anything to computers that might disrupt others’ use.

• When the tardy bell rings, your backpack & electronic devices must be in your cubby (309) or the backpack corral (311), and you must be in your seat with all materials ready.

• Do not eat or drink in the classroom or lab unless specifically permitted. Water is permitted except at computers.

• Wear your ID badge at all times.

Responsibilities

• Your efforts and conduct need to be consistent with the Technology Applications Independent Study Prospective Student Information and Expectations document.

• Plan your work so that you work so that you complete as much of the Discrete Mathematics and Functional Programming book as possible during the school year.

• Conduct appropriate “outside” research as needed.

• Use higher-order thinking and problem solving skills as well as time management skills to complete your work in the specified time frame.

• You will not be able to make suitable progress using only class time. Plan to work outside of class on an ongoing basis.

• Complete your deliverables on schedule.

• Communicate progress weekly by submitting weekly progress reports with appropriate supporting work.

Assessment

Grading will be determined based on weekly progress and timely progress report submission.

Work is expected to be on-time and of the highest quality.

The Course

This is an advanced course in computer science. The mathematical content is based on the Discrete Mathematics and Functional Programming book.
Goals
The goals will be defined by the student and negotiated with me.

Computer Language
Standard ML of New Jersey

Equipment
Students have access to computers in room 311 during class as well as before and after school. These computers contain the Standard ML of New Jersey environment.

Topic Outline
Following is an outline of the topics relevant to this course. This outline comes from the Texas Essential Knowledge and Skills (TEKS) for Independent Study in Technology Applications (§126.49).

(1) Creativity and innovation. The student demonstrates creative thinking, constructs knowledge, and develops innovative products and processes using technology. The student is expected to:

(A) apply existing knowledge to promote creativity in designing new technology products or services;
(B) design and implement procedures to track trends, set timelines, and review and evaluate progress for continual improvement in process and product;
(C) produce electronic documentation to illustrate the progress of a project;
(D) seek and respond to input from peers and professionals in delineating technological tasks and problem solving;
(E) make necessary revisions and/or proceed to the next stage of study;
(F) use technology terminology appropriate to the independent study course;
(G) develop and apply advanced creativity and innovation employed in technology applications skills;
(H) identify and solve problems, individually and with input from peers and professionals, using research methods and advanced creativity and innovation skills used in a selected profession or discipline;
(I) develop products that meet standards identified by the selected profession or discipline; and
(J) produce original work to solve an identified problem and publish a product in electronic media and print.

(2) Communication and collaboration. The student uses digital media and environments to communicate and work collaboratively, including at a distance,
to support individual learning and contribute to the learning experience of others. The student is expected to:

(A) format developed projects according to defined output specifications, including target audience and viewing environment;
(B) present findings to a panel for comment and professional response;
(C) determine and implement the best method of presenting or publishing findings;
(D) synthesize and publish information in a variety of print or digital formats;
(E) use evolving network and Internet resources and appropriate technology skills to create, exchange, and publish information;
(F) develop cultural understanding and global awareness by interacting with learners of other cultures through evolving digital formats and communication methods;
(G) collaborate with others to identify a problem to be solved, hypotheses, and strategies to accomplish a task;
(H) participate with electronic communities as a learner, initiator, contributor, and facilitator/mentor; and
(I) participate in relevant, meaningful activities in the larger community and society to create electronic projects.

(3) Research and information fluency. The student applies digital tools to gather, evaluate, and use information. The student is expected to:

(A) use evolving network and Internet resources for research and resource sharing of technology applications;
(B) apply appropriate search strategies in the acquisition of information from the Internet, including keyword and Boolean search strategies;
(C) pose hypotheses and questions related to a selected problem;
(D) acquire information using appropriate research strategies with source citations through electronic formats, including interactive components, text, audio, video, graphics, and simulations; and
(E) identify, create, and use available file formats, including text, image, video, and audio files.

(4) Critical thinking, problem solving, and decision making. The student uses critical-thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. The student is expected to:

(A) evaluate the design, functionality, and accuracy of the accessed information;
(B) conduct systematic research;
(C) demonstrate creative-thinking and problem-solving skills;
(D) integrate appropriate productivity tools, including network, mobile access, and multimedia tools, in the creation of solutions to problems;
(E) use enriched curricular content in the creation of products;
(F) synthesize and generate new information from data gathered from electronic resources;
(G) read and use technical documentation; and
(H) write simple technical documentation relative to the audience.

(5) **Digital citizenship.** The student understands human, cultural, and societal issues related to technology and practices legal and ethical behavior. The student is expected to:

(A) discuss intellectual property, privacy, sharing of information, copyright laws, and software licensing agreements;
(B) model ethical acquisition and use of digital information;
(C) model respect of intellectual property when editing graphics, video, text, and sound files;
(D) demonstrate proper etiquette, responsible use of software, and knowledge of acceptable use policies when using network resources;
(E) demonstrate best practices in understanding and applying information security;
(F) develop and maintain a technical documentation library in a variety of formats; and
(G) investigate how technology has changed and the social and ethical ramifications of computer usage.

(6) **Technology operations and concepts.** The student demonstrates a sound understanding of technology concepts, systems, and operations. The student is expected to:

(A) demonstrate knowledge and appropriate use of input devices, operating systems, software applications, and communication and networking components;
(B) select, acquire, and use appropriate digital tools;
(C) delineate and make necessary adjustments regarding compatibility issues, including digital file formats and cross-platform connectivity; and
(D) use appropriate technology terminology and naming conventions.