

Innovative Design Technology

Fall 2014

Instructor: Dr. Mark Hines

Location: MPI Quad Block Office (across from H4)

Phone: 808-441-3784

E-Mail: mhines@midpac.edu

Course Description: This course introduces the design cycle model—a fundamental concept underpinning the design process and central to a learner’s understanding of design activities. Each element of the design cycle represents how designers progress through the design process to refine the design solution in increasing detail. You will analyze and understand the strengths and limitations of designed prototypes and apply modifications, thereby participating in an iterative engineering design process. The topic then moves on to focus on the strategies that designers use to arrive at solutions to problems and the varied nature of the skills and knowledge they need to carry out their activities successfully. Hands-on topics will include, but will not be limited to; Design Process, Product Innovation, Green Design, Materials, Product Development, Product Design, Evaluation, Energy, Structures, Mechanical Design, and Sustainable Development. Using various 3D technologies and exploring several 3D modeling software packages you will turn your ideas into real products with cutting edge 3D printers and scanners. The course assumes no prior knowledge in design or technology.

Course Requirements & Recommendations: “Be prepared for lots of hands on designing, modeling, construction and building!” Three-ring binder, composition book, *Evernote Account*, charged iPad, colored pens, No. 2 pencil, blue or black pen, curiosity, imagination, a love-of-learning, ability to laugh and have fun, creativity, and a desire for excellence is required!

Course Philosophy: To emphasize the path taken, not the destination! For you to succeed in this course you must understand the following principles:

- Learners bring a unique prior knowledge and beliefs to any learning situation
- Knowledge is constructed uniquely and individually, in multiple ways, through a variety of resources
- Learning is an active, social and reflective process
- We learn by assimilating, accommodating, or rejecting new information
- Social interaction introduces multiple perspectives on learning and planning
- Learning is internally controlled (Intrinsic) and mediated by the learner

Most of the experiences are designed to develop your creative problem solving, critical-thinking, and presentation-of-learning skills. Each is universally transferable and valuable in whatever future path you may choose. In addition, each project will contain core science concepts expected and embedded in the project design.

Content Overview: Hands on topics will include, but will not be limited to:

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| • create graphics | • plan and layout publications |
| • digitize video | • experience computer simulations |
| • design technical CAD drawings | • acquire data with sensors |
| • create computer animations | • understand and create mechanical systems |
| • create multimedia presentations | • collaborate |
| • control robots and machines | • document our own learning |
| • design and technological methods/techniques | |

Be prepared to create, build, design, and construct! Throughout this course, you will have hands-on experiences in:

Design Process	Product Innovation
Green Design	Materials
Product Development	Product Design
Evaluation	Energy
Structures	Mechanical Design
Sustainable Development	

Cooperative Environment: Unlike most classes where you work individually, and are typically discouraged from working with other students, the Innovative Design Technology course experience requires you to work with partners to combine your skills and experience to construct meaning of what you are doing. Cooperative learning means that you and your partner(s) are expected to communicate with each other and help each other understand the concepts being studied. While the work you do will be with others, the documentation you submit should be your own work. This places responsibility on each of you to develop good interpersonal, communication, and documentation skills.

Course Structure: Innovative Design Technology is an outcome-based course consisting of several learning experiences. Working with your partners you will select and design appropriate and challenging projects as you progress through the various learning experiences. Furthermore, no two presentations or products will be exactly alike even when dealing with the same technologies because you and your partner play a major role in your own learning.

School Owned iPads: Use of Mid-Pacific Institute's computing facilities/resources and use of the Internet must be consistent with the educational objectives of the school. Students may not jailbreak, modify, or in any other way tamper with the iPad's iOS operating system. Removing any or all installed MPI Profiles is strictly forbidden. Inappropriate media and content of any kind including but not restricted to photos, wallpapers, images, music, sound, documents, files, iOS apps or games is prohibited. Failure to abide by this policy can result in disciplinary action and loss of iPad privileges for a time to be determined by Mid-Pacific Institute administration.

Assessment: Your grade in this course will be based on documenting your learning, team activities, and oral presentations. You will be keeping a portfolio of your daily learning and it will form the basis for your e-portfolios. In particular your participation will be graded in the following ways:

- **Daily Documentation:** You will be documenting and keeping a daily journal that should focus on your accomplishments and discoveries for that day. You will build a set of learning artifacts that can be selected to demonstrate accomplishments in understanding the design process and science concepts learned. In addition you will be expected to keep track of your work and manage time through effective timelines. Artifacts should include but are not limited to detailed explanations of what was completed in class, labeled diagrams, images, detailed background information/research, description of the problems encountered, steps taken to solve the problems, and goals. Each day a reflective journal entry is completed. The journal should address the following: (1) Highlights of what you completed and learned in class for the day (2) Thoughts and feelings of the day's events (3) What you are planning in the following session. Your Evernote portfolios will be graded and must be *kept up-to-date daily*.
- **Informal Presentations:** During the design activities, you and your partners will give a short presentation of learning, explaining your accomplishments, discoveries, and final outcomes.
- **Exhibition / Final Design Project:** A learner's final exam grade will be based on an exhibition of work sometime in the last couple days of the semester (everyone will be notified of the date when it is finalized). This will be an opportunity for teams to show off their work to the facilitators and invited guests. The grade for this will be based on their electronic portfolio, participation, model display, and explanations by each of the team members, and presentation to guests.
- **Science Concepts:** Learners must develop a portfolio of their work to defend their science learning as well as the design process.

Late Work: Work may be submitted no more than one week after the due date will be graded. Late work will be penalized half a grade for each day after the due date.

Absences: All absences need to be made up. If you're absent you must make the appropriate arrangements the day you return. All absences must be made up no more than one week after your return to school.

Grading: Grades will be based on a single category point system (total points earned divided by total points possible) that includes: reflective writing, research, drafts and prototypes, effective individual and group competencies, and final products and the expositions. Semester Grades will be calculated using 40% First Quarter Grade, 40% Second Quarter Grade, 20% Final Activity (Final Exam Grade).

Thank you for all your hard work and creativity: We all hope you will find this experience rewarding, challenging, and fun!

Print Student Name: _____ Period: _____

Student Signature

Date

Parent / Guardian Signature

Date