DIGIPEN INSTITUTE OF TECHNOLOGY

Guidelines for Independent Study

An independent study course is defined as an area of study or research necessitating a high level of self-directed learning. This learning requires students to read, conduct research, complete written examinations, reports, projects, research papers, portfolios, or similar assignments that are designed to measure competency in the stated educational objectives. Courses currently offered through formal instruction, or a new topic within a specialized field not listed in the course catalog, can both be elected for independent study by a special arrangement with the instructor and approval by the department chair. It is the departmental decision that if the content or the difficulty level is appropriate for an independent study.

Independent study may be defined as work related to an academic discipline done outside of the formal (directly supervised) classroom or laboratory. This work may be experiential, directed reading, or independent research supervised by a faculty member and approved by the chairperson of the department under which the course is listed. If the department chair is the faculty member offering the independent study, then the study proposal must be reviewed and approved by an associate dean or the Dean of Faculty.

Requirements

Although it is at the discretion of each academic department to provide more rigorous and specific guidelines as deemed fit, the following minimum criteria must be met to ensure the overall outcomes of the educational experience, the success of the students, and the compliance with the accreditation standards:

1. Students who take independent studies must have a minimum cumulative GPA of 2.0.
2. The independent study must include comprehensive objectives and a written proposal.
3. The independent study must demonstrate the relevance and appropriateness to the program outcomes.
4. The independent study must promote a high level of self-directed learning.
5. The independent study must engage the students to interact with the instructors throughout the course.

Procedure

1. The student will develop a plan or idea for independent study and will approach a faculty member to discuss the feasibility and supervision of the work.
2. The student and the faculty member will develop the proposal containing, but not limited to, the following information:

   A. General information:
   - Course name and course number.
   - Course description and area of study.
   - Number of credits to be issued: 1 Credit hour = 45 hours of proposed independent study activity per semester.

   B. Specific information:
   - Learning objectives and outcomes.
   - Approach to be used (directed reading, instructions and supervision, and/or lab experience, exercises and projects, etc.).
   - Information on textbooks, references, and reading materials
   - Means of communication between student and faculty member throughout the course of independent study.

   C. Means of evaluation (one or more):
   - A tangible product such as a written project, written review of the literature.
   - Homework assignments and exams.
   - Grading policy and rubrics.

   D. Plan for implementation:
   - Guidelines, schedules, benchmarks and/or milestones.
   - Weekly task breakdowns throughout the semester.

   (See the attached document for a sample of the independent study proposal.)

3. Submit the completed *Independent Study Approval Form* (See the enclosed) with the *Independent Study Proposal* and the *current grade report* (printed from SRS) to the department chair for review and approval.

4. Through the course of the independent study, it is the student's responsibility to document the hours spent on independent study and communication with the instructor. Other activities, including (but not limited to) reading, conducting

research, completing written examinations, reports, projects, research papers, portfolios, or homework assignments, etc. must also be recorded.

It is recommended that the enclosed *Independent Study Activity Log Form* be used for this documentation purpose. The activity log must be filled out at least on a bi-weekly basis. The form must be signed, dated and submitted to the instructor supervising the independent study. All activity logs must be filed with the Registrar as a part of the independent study grade report at the end of the semester.

Note Concerning Credit Hours

Minimally, independent study credit award rationales must meet the following criteria: One semester credit hour for each 40 hours of documented independent study activities. The number of allowable independent study credits awarded in a program should be limited to less than or equal to 10% of any program to be offered via independent study.

In general, an independent study should not be used for resolving scheduling conflicts or alleviating faculty teaching load. The department chair and faculty member will determine the number of students and credit hours that can be supervised for independent study by that faculty person. The total number of credits for an independent study may be adjusted on the request of the student and supervising faculty person, if necessary, after the course is in progress. The credit hours may be adjusted in either direction.

Independent Study Proposal (Sample)

CS599: Non-Photorealistic Rendering Techniques

Course Proposal

Student Name:
Student ID:
Student Email:
Term: Spring 2012
Class Level: Semester 4 (MSCS)
Credit Hours: 3

Course Purpose:

To investigate, research and implement several common *Non-Photorealistic Rendering* (NPR) techniques usable in real-time systems and video games.

Goals and Objectives:

Through research and implementation, the student will gain a practical knowledge about current Non-Photorealistic Rendering techniques useable in real-time systems. Creating the framework for and implementing these techniques will exercise the student's knowledge of the graphical pipeline and graphics programming in general. Studying various NPR techniques will prove to be a good initial stepping stone for conceiving of new ways to add aesthetic uniqueness to future student game projects. It will also shed light onto possible areas of further study in the field that may prove to be viable thesis topics.

Means of Communication:

The student and faculty member will communicate regularly via email and will set up possibly a weekly meeting or at least a bi-weekly meeting to discuss progress and for student to present the learnt materials. The schedule for the meetings will be determined between the student and faculty member. On a non-meeting week, the student will send a status report via email to the faculty.

Means of Evaluation:

The student may present bi-weekly presentations on NPR topics. Typically, a presentation may focus on a single article, but multiple articles on similar topics may be combined for a presentation. At least FIVE presentations must be given, focusing on general or new techniques specified in the articles. In addition to presentations, the student will implement at least 3 NPR techniques. See the *Project Guidelines* for details.

Grade	Explanation
A	Student displays strong command of the subject matter. Presentations and projects go above and beyond the expected requirements.
B	Student displays good understanding of the subject matter. Presentations are accurate and comprehensive. Projects faithfully implement the NPR techniques and produce the expected results.
C	Student displays some understanding of the subject. Presentations and projects meet most but not all of the requirements.
D	Student displays little knowledge of the subject. Presentations and projects fail to meet most of the requirements.
F	Student displays no knowledge of the subject. Presentations and projects meet no requirements or are not even submitted.

Grading policy

Projects:

(1) *Correctness* (70%)
(2) *Rendering effects* (20%)
(3) *Efficiency* (10%)

Presentations:

(1) *Perception* – understanding of the subject (40%)
(2) *Preparation* – PowerPoint slides , pictures, video clips (30%)
(3) *Presentation* – content delivery, time management (30%)

Implementation Guidelines

To gain practical knowledge of NPR techniques, the student will implement at least THREE common techniques, including toon-shading, half-toning, and hatching. In addition to implementing the technique, the student may attempt to implement a unique approach provided by the articles relevant to that particular technique. The professor may add additional requirements for the projects as he or she sees fit.

Framework Requirements

For implementing the projects, the student will create a graphical framework in C++ utilizing DirectX9. The framework will support object and screen-space shaders. The framework will allow mesh loading and input for transforming objects in the world. The professor may add additional requirements for the framework as he or she sees fit.

Course Planning:

The material for research will come from various published articles and white-papers either from books or from the SIGGRAPH or NPAR (Non-Photorealistic Animation and Rendering) conferences. The student will also fully utilize the ACM Digital Library as additional resource for reading materials and references. The following is a list of likely papers that will be covered:

- *Non-Photorealistic Rendering with Pixel and Vertex Shaders*, ShaderX: Vertex and Pixel Shader Programming Tips and Tricks, Wordware Publishing, Inc. 2002.
- *Image Processing with 1.4 Pixel Shaders in Direct3D*, ShaderX: Vertex and Pixel Shader Programming Tips and Tricks, Wordware Publishing, Inc. 2002.
- *Hatching, Stroke Styles, & Pointillism*. ShaderX2 : Shader Programming Tips & Tricks with DirectX9. Wordware Publishing, Inc. 2004.
- *Where Do People Draw Lines?* ACM Transactions on Graphics (Proc. SIGGRAPH). August 2008.
- *Painterly Rendering for Animation*. ACM Transactions on Graphics (Proc. SIGGRAPH). 1996.
- *Non-Photorealistic Rendering Techniques for Real-Time Character Animation*. Master's Thesis, Jerome Thoma, 2002.
- *Dynamic 2D Patterns for Shading 3D Scenes*. SIGGRAPH 2007.
- *Apparent Ridges for Line Drawing*. Tilke Judde Master's Thesis (MIT), SIGGRAPH 2007.

More articles will be added to cover the main topics in NPR not covered by these. The faculty member is free to recommend other materials or modify the current list as he or she sees fit.

Schedule

The schedule is a weekly breakdown of tasks and topics. It is ultimately up to the discretion of the professor if it should be modified. Also, the professor may opt to have presentations organized per article rather than per topic for clarity.

Week	Tasks and Topics
1	Formalization of schedule and texts. Collect papers and other materials
2	Research: Toon-shading principles and algorithms
3	Presentation and Project 1 implementation: Toon-Shading
4	Research: Half-toning techniques and algorithms
5	Research and presentation: Half-toning – *Dynamic 2D Patterns…*
6	Research: Contouring (silhouette/line-drawing) principles
7	Presentation and project 2 implementation: Half-Toning
8	Research: Contouring - *Apparent Ridges…*
9	Research: Outlines – *Edge drawing…*
10	Research and presentation: Hatching techniques
11	Research: Stoke Stylization / Painterly
12	Project 3 Implementation and demo: Hatching techniques
13	Research: Painterly image rendering using fuild dynamics
14	Research: Other advanced topics in NPR (TBA)

This is a rough initial estimate of the time and topics. Topics and timeline may be adjusted based on relative complexity and time to complete.

Independent Study Approval Form

DigiPen INSTITUTE OF TECHNOLOGY
9931 Willows Road NE
Redmond, WA 98052
Phone (425) 558-0299
Toll-Free (866) 478-5236
FAX (425) 558-0378
www.digipen.edu

Date of Request:_____/_____/_____

Student Full Name:_____ Student ID_____

Email: _____ Phone number:_____

Course: _____ # of Credits: ____ Semester: _____ Year: _____

Approval Process for Independent Study

1. Please fill out this form, attach the study proposal, print your current grade report from SRS, and submit them to the instructor to request for supervision.

Student Signature_____ Date_____

GPA _____ Number of independent study credits previously taken _____

2. Ask the faculty person to supervise the project and confirm that the proposal meets all requirements for Independent Study.

Instructor's Signature_____ Date_____

Instructor's Name (Print)_____

Comments_____

_____

3. Submit this proposal to the department chair for approval.

Department Chair's Signature_____ Date_____

Comments_____

_____

4. After all signatures and approvals have been obtained, submit this form to office of the registrar to process the override for the Independent Study Course.

Office of the Registrar Initials_____ Date_____

Course Code Assigned_____

Comments_____

_____

Independent Study Activity Log Form

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Phone (425) 558-0299
Toll-Free (866) 478-5236
FAX (425) 558-0378

www.digipen.edu

Report Period: From_____/_____/_____ To_____/_____/_____

Student Full Name:_____

Instructor Name: _____

Course: _____ **Number of Study Hours in this period**: _____

Independent Study Activities:
Communication with Instructor:

Student Signature: _____ **Date**: _____