Course Approval Form

Action Requested:  
X Create new course  
Delete existing course  
Modify existing course (check all that apply)  
Title  
Prereq/coreq  
Credits  
Schedule Type  
Repeat Status  
Restrictions  
Grade Type

Course Level:  
X Undergraduate  
Graduate

College/School:  
VS-IT&E

Department:  
CEIE

Submitted by:  
Tomasz Arciszewski

Ext:  
3-1513

Email:  
larciszge@gmu.edu

Subject Code:  
CEIE

Number:  
894

Effective Term:  
Fall  
Spring  
Year 2010  
Summer

Title:  
Current  
Banner (30 characters max including spaces)  
New  
Design and Inventive Engineering

Credits:  
X Fixed  
3 or (check one)  
Variable

Repeat Status:  
X Not Repeatable (NR)  
Repeatable within degree (RD)  
Repeatable within term (RT)  
Total repeatable credits allowed:

Grade Mode:  
X Regular (A, B, C, etc.)  
Satisfactory/No Credit  
Special (A, B, C, etc. +IP)  
(check one)

Schedule Type Code(s):  
Lecture (LEC)  
Lab (LAB)  
Recitation (RCT)  
Seminar (SEM)  
Independent Study (IND)  
Internship (INT)  
Studio (STU)  
(check all that apply)

Prerequisite(s):  
Corequisite(s):

Special Instructions:  
(detailed description of modification, add restrictions for major, college, or degree; cross-listed courses; hard-coding; etc.)  
This course is being created to replace the recently deleted IT 894 course.

Catalog Copy for NEW Courses Only  
(Consult University Catalog for models)

<table>
<thead>
<tr>
<th>Description (No more than 60 words, use verb phrases and present tense)</th>
<th>Notes (List additional information for the course)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topics include Fundamentals: successful intelligence and creative intelligence, creative class, the Medici Effect, the Renaissance Man and Da Vinci’s Seven Principles, engineering creativity; Design Engineering: system designing and architecting, designing as search, evolutionary designing, constraint search, constructive induction, Axiomatic and Inferential Design Theories; Inventive Engineering: Brainstorming, Synectics, Morphological Analysis, TRIZ, Visual Thinking, Inventive Design in Practice; Project Presentations</td>
<td>It is a transdisciplinary course focused on creativity in engineering and science and it is open to all graduate students in the Volgenau School of IT and Engineering, graduate students from other schools are encouraged to register with the instructor’s permission</td>
</tr>
</tbody>
</table>

Indicate number of contact hours:  
Hours of Lecture or Seminar per week:  
3  
Hours of Lab or Studio: 
When Offered: (check all that apply)  
X Fall  
Summer  
Spring

Approval Signatures

Department Approval  
Date  
College/School Approval  
Date

If this course includes subject matter currently dealt with by any other units, the originating department must circulate this proposal for review by those units and obtain the necessary signatures prior to submission. Failure to do so will delay action on this proposal.

Unit Name  
Unit Approval Name  
Unit Approver’s Signature  
Date

For Graduate Courses Only

Graduate Council Member  
Provost Office  
Graduate Council Approval Date

For Registrar Office’s Use Only:  
Banner  
Catalog  
revised 10/7/09
IT 894 – DESIGN AND INVENTIVE ENGINEERING

Instructor: Tomasz Arciszewski, Professor

Office: Nguyen Engineering Building, Room 1407

Email: tarcisze@gmu.edu

Textbook: No single textbook is recommended. The list of readings related to the individual topics will be provided in the detailed course outline

Grading Scheme:

1. Three home assignments 30 %.
2. Research project 40 %.
3. Final exam (take home exam) 30 %.

Course Organization

Fundamentals (lectures 1-3)

1. Introduction, transdisciplinarity, successful intelligence, creative class
2. The Medici Effect, The Renaissance Man
3. Leonardo Da Vinci and Seven Principles

Design Engineering (lectures 4-8)

4. System designing, system architecting
5. Design and Inventive Engineering, Engineering Method, heuristics and decision rules: from Praxiology to Computer Science
6. AI in design, designing as search, constraint search, constructive induction
7. Evolutionary designing

Inventive Engineering (lectures 9-13)

9. Brainstorming,
10. Synectics
11. Morphological Analysis
12. TRIZ and Directed Evolution,
13. Visual thinking in inventive design, inventive design in practice

Project Presentations (lecture 14)