Course Number & Name: ENR 205 Advanced Computer-Aided Design  
Credit Hours: 3.0  Contact Hours: 3.0  Lecture: 2.0  Lab: 1.0  Other: N/A  
Prerequisites: Grade of “C” or better in ENR 105  
Co-requisites: None  Concurrent Courses: None  
Course Outline Revision Date: Fall 2010  

Course Description: This third course in Computer Aided Design (CAD) uses the latest release of AutoDesk software products in mechanical, architectural and civil engineering design. Students perform a number of hands-on projects using Inventor (parametric 3D-solid modeling), AutoCAD Architect (3D architectural design), and Civil 3D software. These projects cover general 3D design and detailing problems related to the above-mentioned disciplines.  

Course Goals: Upon successful completion of this course, students should be able to do the following:  
1. proficiently use AutoCAD, a general-purpose CAD system;  
2. utilize Inventor, a parametric 3D-solid modeling package, to design and detail mechanical parts and assembly;  
3. complete architectural design projects, including floor plans, profiles, sections, and detailing, using AutoCAD Architect; and  
4. proficiently use Civil 3D software, a highly-specialized software for civil engineers and surveyors.  

Measurable Course Performance Objectives (MPOs): Upon successful completion of this course, students should specifically be able to do the following:  
1. Proficiently use AutoCAD, a general-purpose CAD system:  
   1.1 examine the units of the drawing;  
   1.2 decide on the drawing scale;  
   1.3 set up template files for different disciplines and demonstrate their reuse; and  
   1.4 complete accurate drawings using AutoCAD  
2. Utilize Inventor, a parametric 3D-solid modeling package, to design and detail mechanical parts and assembly:  
   2.1 execute different feature creation operations of Inventor to complete a mechanical part;  
   2.2 employ annotation tools of Inventor to create working drawings; and  
   2.3 create assembly of parts with bill of materials
Measurable Course Performance Objectives (MPOs) (continued):

3. Complete architectural design projects, including floor plans, profiles, sections, and detailing, using AutoCAD Architect:
   3.1 set up AutoCAD Architect for creating 3D architectural design projects to generate floor plans and sectional views;
   3.2 create 3D mass models representing different architectural design concepts; and
   3.3 utilize AutoCAD Architect tools to add details including creating roofs and structural components

4. Proficiently use Civil 3D software, a highly-specialized software for civil engineers and surveyors:
   4.1 set AEC points and import/export field survey points using Civil 3D software;
   4.2 create alignments using lines and arcs;
   4.3 complete contour and profiles; and
   4.4 generate parcels and final maps

Methods of Instruction: Instruction will consist of lectures, demonstrations, and the independent completion of weekly projects.

Outcomes Assessment: Test and exam questions are blueprinted to course objectives. Checklist rubrics are used to evaluate the projects and portfolio for the presence of the course objectives. Data is collected and analyzed to determine the level of student performance on these assessment instruments in regards to meeting course objectives. The results of this data analysis are used to guide necessary pedagogical and/or curricular revisions.

Course Requirements: All students are required to:

1. Maintain regular attendance.
2. Complete assigned homework and weekly projects on time.
3. Take all tests and the final exam as scheduled.

Methods of Evaluation: Final course grades will be computed as follows:

<table>
<thead>
<tr>
<th>Grading Components</th>
<th>% of final course grade</th>
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<tbody>
<tr>
<td>20 or more Projects and a Course Portfolio</td>
<td>0 – 20%</td>
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<tr>
<td>The projects and the course portfolio will provide evidence of the extent to which students have mastered and synthesize course material and have met course objectives.</td>
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<tr>
<td>2 or more Tests (dates specified by the instructor)</td>
<td>45 – 60%</td>
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<tr>
<td>Tests will show evidence of the extent to which students have met course objectives.</td>
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Methods of Evaluation (continued):

<table>
<thead>
<tr>
<th>Grading Components</th>
<th>% of final course grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Exam</td>
<td>25 – 30%</td>
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</table>

The final exam will examine the extent to which students are proficient in using AutoCAD and have achieved all course objectives.

**NOTE:** The instructor will provide specific weights, which lie in the above-given ranges, for each of the grading components at the beginning of the semester.

**Academic Integrity:** Dishonesty disrupts the search for truth that is inherent in the learning process and so devalues the purpose and the mission of the College. Academic dishonesty includes, but is not limited to, the following:

- plagiarism – the failure to acknowledge another writer’s words or ideas or to give proper credit to sources of information;
- cheating – knowingly obtaining or giving unauthorized information on any test/exam or any other academic assignment;
- interference – any interruption of the academic process that prevents others from the proper engagement in learning or teaching; and
- fraud – any act or instance of willful deceit or trickery.

Violations of academic integrity will be dealt with by imposing appropriate sanctions. Sanctions for acts of academic dishonesty could include the resubmission of an assignment, failure of the test/exam, failure in the course, probation, suspension from the College, and even expulsion from the College.

**Student Code of Conduct:** All students are expected to conduct themselves as responsible and considerate adults who respect the rights of others. Disruptive behavior will not be tolerated. All students are also expected to attend and be on time for all class meetings. No cell phones or similar electronic devices are permitted in class. Please refer to the Essex County College student handbook, *Lifeline*, for more specific information about the College’s Code of Conduct and attendance requirements.
**Course Content Outline:** based on the text *Advanced CAD Applications*, by H Assadipour; published by Yafa Educational; Montclair, NJ, 2010.

<table>
<thead>
<tr>
<th>Class Meeting (80 minutes)</th>
<th>Chapter/Section</th>
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</table>
| 1                          | ADVANCED COMPUTER-AIDED DESIGN  
Review of AutoCAD and AutoCAD’s graphical user interface  
*AutoCAD Review Projects*                  |
| 2                          | MULTILINE AND WORKING WITH MULTILINES  
*Project #1*                           |
| 3                          | INTRODUCTION TO 3D MODELING  
Parametric 3D solid modeling: Inventor software |
| 4                          | FEATURE AND PART CREATION IN INVENTOR/DRAWING PREPARATION  
*Project #2*                           |
| 5                          | CREATING EXTRUSION, REVOLVE FEATURES  
*Project #3*                           |
| 6                          | ADDING TEXT AND DIMENSIONS TO YOUR DRAWINGS  
*Project #4*                           |
| 7                          | CREATING SWEEP AND COIL FEATURES  
*Project #5*                           |
| 8                          | OTHER FEATURES & *Project #6*  
Dimension styles / *Test #1*          |
| 9                          | INTRODUCTION TO AUTOCAD ARCHITECT  
*Project #7*                           |
| 10                         | CREATING WALLS, DOORS, AND WINDOWS  
*Project #8*                           |
| 12                         | MASS MODELS  
*Project #9*                           |
| 13                         | ROOF & ROOF SLABS  
*Project #10*                          |
| 14                         | STRUCTURES  
*Project #11*                          |
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| 15 | SCHEDULES  
Project #12 / Test #2 |
| 16 | INTRODUCTION TO CIVIL 3D  
Project #13 |
| 19 | SETTING AEC POINTS & POINT GROUPS & Project #14 |
| 20 | IMPORTING/EXPORTING AEC POINTS & Project #15 |
| 21 | LINES & CURVES & Project #16 |
| 22 | MORE ON LINES & CURVES & Project #17 |
| 23 | MORE ON MAPPING & SURVEYING  
Constructing site plan & Project #18 |
| 24 | FINAL MAPS & Project #19 |
| 25 | ADDING LINES & CURVES |
| 26 – 27 | LINE & CURVE LABELING & Project #20 |
| 28 | Course review |
| 29 | Course review (continued) |
| 30 | Final Exam |