

**Old Dominion University**

**College: Batten College of Engineering and Technology**

**Department: Engineering Management & Systems Engineering**

**Course ID and Title: MSIM795 Principles of Combat Modeling and Simulation**

## **MSIM795 Principles of Combat Modeling and Simulation**

### **1 Meet the Professor**

#### **1.1 Instructor Contact Information**

Name	Andreas Tolk, Ph.D.
Office Location	KH 242
Office Hours	MON 9AM-1PM (VMASC), TUE 1PM-5PM (ODU)
Email Address	atolk@odu.edu
Telephone Number(s)	757-683-4500

#### **1.2 Contact Policy**

Preferred contact is via email, as the course is taught as a web-based course.

#### **1.3 About the Professor**

##### **Teaching and Education Background**

I teach master-level and PhD.-level courses since 1997. I am teaching at ODU since 2002. I am teaching courses in the domain of military operations research and military M&S since 1997.

##### **Research Interests**

Interoperability of Systems and Composability of Models; System-of-System Engineering support by M&S; Operational use of M&S services

##### **Selected Papers and Publications**

Please visit <http://myprofile.cos.com/atolk>

#### **1.4 Teaching Philosophy**

I cannot leave my European roots behind, which means that I offer my students a lot of material and support, but they will have to learn - and think - for themselves. I prefer to offer non-mandatory papers and materials that can be used not only for the course, but in particular later in the real world. Also, I would like to learn as well, so I need your feedback to improve the course for the next generation of students.

### **2 Student Help Resources**

#### **2.1 Online Student Orientation**

<http://www.clt.odu.edu/oso>

#### **2.2 Blackboard Support Website**

<http://www.clt.odu.edu/bb>

### 2.3 Technical Support Center

<http://occs.odu.edu/>, [occs-help@odu.edu](mailto:occs-help@odu.edu), 757-683-3192

### 2.4 Study Guides Strategies

<http://www.studygs.net/>

### 2.5 Papers Citation Styles: MLA, APA, Chicago & CBE

<http://www.dianahacker.com/resdoc>

## 3 Course Readings

### 3.1 Required Materials

All required materials will be presented in the course.

### 3.2 Optional Materials

All mandated materials will be presented in the course.

## 4 Course Description

### 4.1 ODU Catalog Description

Course Number	19456
Pre- or Co-requisites	Algorithmic thinking; statistics; higher programming language (preferable Java);
Official Description	This course will be taught web-based, so no location and lecture hours will be assigned.

### 4.2 Instructor Course Description

The course will teach the principles of combat modeling and simulation, which means that the student will understand the basics and some applications, but we will not dive into the depths of professional combat simulation systems. However, the course will touch on all important topics and will offer material for additional self-study. Some modules are optional, but for the real understanding it is highly recommended to take all 20 modules of the course. The modules are grouped into four units:

- (1) Introduction, in which we deal with best practice, history, and definitions;
- (2) Combat Modeling, in which we learn the main algorithms and constraints to model movement, sensing, effects, communications, and behavior;
- (3) Combat Simulation, in which we look at the standards and major systems; and
- (4) Integration and Composability, in which we focus on Interoperability and the Integration into operational Environments, such as Command and Control systems.

### 4.3 Recommendations For Success

While it is possible to take the course early within the MSIM program, the basic knowledge taught in the core courses of the MSIM program is required for a full understanding of the modules.

## 5 Course Objectives and Expectations

### 5.1 Course Objectives

The student will understand the main principles of combat modeling and simulation. He will know the basic algorithms, constraints, and application areas. He will understand the principles of distributed applications important for military applications, including the integration of combat M&S into command and control environments.

## 5.2 Course Expectations

This course can only introduce the basic principles of this broad topic. However, the student will have a solid fundament for further self studies or additional courses in special topics of military M&S.

## 6 Teaching and Learning Methods

### 6.1 Delivery Method

The course will be web-based. The 20 modules are separated into four units. Two modules are optional, i.e., they are not required to pass the examinations.

### 6.2 Instructional Approach

Every module comprises presentations of the main material and assignments/activities, i.e., mandatory and optional reading material. Where appropriate, optional exercises allow the student to self reflect on the applicability of the lectured material. In some modules, additional software packages have to be downloaded in order to fulfill the assignments. Tests will be conducted online after the second, third, and fourth unit.

### 6.3 Course Interaction

#### Discussion Board (Blackboard)

The Discussion Board of ODU's blackboard will allow students to communicate with the teacher and other students. These discussion contributions will be used to determine the final grade (see section 8)

### 6.4 Feedback

#### Mid-semester Evaluation Form

[http://www.clt.odu.edu/bb/tutorials/mid\\_course\\_fast\\_feedback/](http://www.clt.odu.edu/bb/tutorials/mid_course_fast_feedback/)

#### Course Final Evaluation

[http://www.odu.edu/oduhome/course\\_eval.shtml](http://www.odu.edu/oduhome/course_eval.shtml)

## 7 Course Schedule

### 7.1 Course Schedule

Time management (see section 9.1) is within the responsibility of the student. When the student take the mandatory lectures and how long they actually work on them has to be determined by the student. The following table is a recommendation on how to work through the lecture material within the fall 2007 semester.

All examinations must be completed by December 12, 2007

Additional assignments for Ph.D. students must be turned in via email not later than December 5, 2007.

Week	Topic	Date
1	Unit 1, Module 1 & 2 ( <i>Overview and Best Practices</i> )	Aug 25
2	Unit 1, Module 3 & 4 ( <i>History and Definitions</i> )	Sep 1
3	Unit 2, Module 5 ( <i>Scenario Elements</i> )	Sep 8
4	Unit 2, Module 6 ( <i>Environment</i> )	Sep 15
5	Unit 2, Module 7 ( <i>Movement</i> )	Sep 22
6	Unit 2, Module 8 ( <i>Sensing and Perceiving</i> )	Sep 29
7	Unit 2, Module 9 ( <i>Attrition and Effects</i> )	Oct 6
8	Unit 2, Module 10 ( <i>Communications</i> )	Oct 13
9	Unit 2, Module 11 ( <i>Behavior</i> )	Oct 20

10	Unit 3, Module 12 ( <i>Distributed Simulation</i> )	Oct 27
11	Unit 3, Module 13 ( <i>Federation Development</i> )	Nov 3
12	Unit 3, Module 14 ( <i>Experimentation</i> )	Nov 10
13	Unit 3, Module 15 ( <i>Verification and Validation</i> )	Nov 17
14	Unit 4, Module 17 ( <i>Interoperability and Composability</i> )	Nov 24
15	Unit 4, Module 18 ( <i>Operational Environment</i> )	Dec 1
16	Unit 4, Module 19 ( <i>Model-based Data Engineering</i> )	Dec 8

## 8 Grading Criteria

### 8.1 Grading Criteria

(A) Master students:

The grade will be determined based on three on-line examinations. The first exam has to be taken after unit two (modules 1 - 11), the second after unit three (modules 12-15), and the third after unit four (modules 17-19). Modules 16 and 20 are optional and not part of any test. The examinations are multiple choices. Each examination contributes 30% to the final grade. 10% are based on the quality and quantity of contributions to the discussions explained under section 6.3.

(B) Ph.D. students:

Ph.D. students need to submit an additional assignment in form of a conference-style paper on a special topic on combat modeling to be discussed with the teacher before the first examination is taken. This assignment will be graded and will contribute 30% to the final grade (while the other 70% are calculated following the formula of master-level students).

## 9 Student Responsibilities

### 9.1 Time Management

All four units and 20 modules are available. It is within the student's responsibility to finalize all assignments and test within the fall semester 2007.

### 9.2 Understanding the Syllabus Requirements

For students who have not finished the core coursework, a meeting with the teacher before the course is taken is recommended.

### 9.3 Utilizing Online Components

It is highly recommended to utilize the online components for communications with other students (see section 8.1). It is also recommended to utilize the optional components of this lecture.

## 10 Course Policies

### 10.1 Attendance

As this class is web-based, attendance is not expected.

### 10.2 Tests and Make-ups

Tests are web-based. Each of the three examinations can only be taken once. There are no make-ups. However, the student is free to take the test within his own time management (see 9.1) within the fall semester 2007. Last day to take the tests is December 12, 2007. Last day to submit additional assignments is December 5, 2007.

### 10.3 Course Disclaimer

Every attempt is made to provide a syllabus that is complete and that provides an accurate overview of the course. However, circumstances and events may make it necessary for the instructor to modify the syllabus during the semester. This may depend, in part, on the progress, needs, and experiences of the students.

## **11 University Policies**

### **11.1 Honor Pledge**

*I pledge to support the honor system of Old Dominion University. I will refrain from any form of academic dishonesty or deception, such as cheating or plagiarism. I am aware that as a member of the academic community, it is my responsibility to turn in all suspected violators of the honor system. I will report to Honor Council hearings if summoned.* By attending Old Dominion University you have accepted the responsibility to abide by this code. This is an institutional policy approved by the Board of Visitors. Refer to Student Honor Council [<http://studentservices.odu.edu/hc/>]

### **11.2 Special Needs**

In compliance with PL94-142 and more recent federal legislation affirming the rights of disabled individuals, provisions will be made for students with special needs on an individual basis. The student must have been identified as "special needs" by the University and an appropriate letter(s) must be provided to the course instructor. Provision will be made based upon written guidelines from the university "special needs students" resource office. All students are expected to fulfill all course requirements.

### **11.3 University Email Policy**

The Old Dominion University email system is the official electronic mail system for distributing course-related Communications, policies, Announcements, and other information. In addition, the University email user ID and password are necessary for authentication and access to numerous electronic resources (online courses, faculty webpages, etc.) NOTE: Effective August 23, 2004, all student accounts will utilize MIDAS passwords. [<https://midas.odu.edu>]  
<http://occs.odu.edu/accounts/studemail/index.shtml>

### **11.4 Withdrawal**

A syllabus constitutes a contract between the student and the course instructor. Participation in this course indicates your acceptance of its teaching focus, requirements, and policies. Please review the syllabus and the course requirements as soon as possible. If you believe that the nature of this course does not meet your interests, needs or expectations, if you are not prepared for the amount of work involved or if you anticipate that the class meetings, assignment deadlines or abiding by the course policies will constitute an unacceptable hardship for you, you should drop the class by the drop/add deadline, which is located in the ODU Schedule of Classes.

### **11.5 Student Acknowledgement**

"I, \_\_\_\_\_, have completely read this syllabus and understand and agree to the course requirements."