Naval Postgraduate School

Department of Computer Science

Graduation Checklist for MSCS Degree (368)

6203P Subspecialty Code

**(Revised: SUMMER AY18)**

Name/Rank/Service:

Month/Year Enrolled:

Projected Graduation Date:

CS Specialization:

**1. Thesis/Capstone: *proposal must be approved by end the 4th academic quarter (not counting Qtr-0). Proposal must be approved in order to take CS0810 thesis research blocks.***

Title:

Advisor(s):

Co-Advisor / Second Reader (*circle one*):

Joint Thesis Members, if applicable:

**2. Core Courses: *all of the courses below must be completed or validated to graduate. Students must submit by the end of their 4th academic quarter a plan for completing all core courses not yet taken as part of their Specialization selection, and also populate their course matrix in Python.***

Completed Planned Qtr

\_\_\_CS2011 Computing System Principles (4-0) (F/Sp) \_\_\_\_\_\_\_\_

\_\_\_CS3040 Low-Level Programming I (4-2) (F/Sp) \_\_\_\_\_\_\_\_

\_\_\_CS3025 Formal Foundation of Computer Science (4-2) (F/Sp) \_\_\_\_\_\_\_\_

\_\_\_OS3307 Modeling Practices for Computing (4-1) (F/Sp) \_\_\_\_\_\_\_\_

\_\_\_CS3200 Computer Architecture (3-2) (W/S) \_\_\_\_\_\_\_\_

\_\_\_CS3021 Intermediate Programming & Data Structures (4-2) (W/S) \_\_\_\_\_\_\_\_

\_\_\_CS3502 Computer Communications & Networks (4-2) (W/S) \_\_\_\_\_\_\_\_

\_\_\_CS3070 Operating Systems (3-2) (W/S) \_\_\_\_\_\_\_\_

\_\_\_CS4900 Technology & Transformation (2-0) (W/S) \_\_\_\_\_\_\_\_

\_\_\_CS3600 Introduction to Computer Security (4-2) (Fall/Win/Spr/Sum) \_\_\_\_\_\_\_\_

\_\_\_CS3140 Low-Level Programming II (3-2) (F/Sp) \_\_\_\_\_\_\_\_

\_\_\_CS3101 Theory of Formal Languages and Automata (4-2) (F/Sp) \_\_\_\_\_\_\_\_

\_\_\_CS3310 Artificial Intelligence (4-1) (F/Sp) \_\_\_\_\_\_\_\_

\_\_\_CS3250 Intro to Cyber Physical Systems (3-2) (W/S) \_\_\_\_\_\_\_\_

\_\_\_CS3150 Design and Analysis of Algorithms (3-2) (W/S) \_\_\_\_\_\_\_\_

\_\_\_CS3315 Big Data and Machine Learning (3-1) (Fall/Spr) \_\_\_\_\_\_\_\_

\_\_\_CS3060 Database Systems (3-1) (W/S) \_\_\_\_\_\_\_\_

\_\_\_SW3460 Software Methodology (4-2) (F/Sp) \_\_\_\_\_\_\_\_

\_\_\_CS3315 Big Data and Machine Learning (3-1) (F/Sp) \_\_\_\_\_\_\_\_

\_\_\_CS3004 Human Computer Sys. Interaction (3-2) (F/Sp) \_\_\_\_\_\_\_\_

\_\_\_CS4901 Research Methods (1-0) (W/S) – *only if offered* \_\_\_\_\_\_\_\_

**3. Specialization: All CS students must complete one of the following Specialization areas. Circle choice, and initial each completed course or annotate when it will be taken.**

**Variations or combinations of any area are permissible, subject to *Coordinator* approval.
See the NPS catalog for prerequisites and offering quarters for all courses listed below*.***

# AUTONOMOUS SYSTEMS AND DATA SCIENCE (ASDS): (Coordinator: Dr. Rowe)

Students must take the following ASDS Core Sequence:

\_\_\_CS4330 Intro to Computer Vision (3-2) (Sp) (College-level programming)

\_\_\_MV4025 Cognitive and Behavioral Models for Simulations (3-2) (S) (CS3310)

\_\_\_CY3650 Cyber Data Management and Analytics (4-0) (AR) (CY3520, CS3502 or

IS3502)

***In addition, students must choose three (3) of the following ASDS electives (or other course in ASDS by approval of Advisor or ASDS Manager):***

\_\_\_CS4313 Advanced Robotic Systems (3-2) (W) (CS3310)

\_\_\_CS4317 Language Systems (3-2) (AR)

\_\_\_CS4558 Network Traffic Analysis (3-2) (F/Sp) (CS3502 and CS4550)

\_\_\_CS4677 Computer Forensics (3-2) (F/Sp) (CS3600)

\_\_\_CS492x Seminar on Advanced Autonomous Systems Topics (4-1)

\_\_\_MV4655/OA4655 Introduction to Joint Combat Modeling (4-0) (F/SP) (programming and statistics)

\_\_\_OA3304 Decision Theory (4-0) (AR)

\_\_\_OA4106 Advanced Data Analysis (3-1) (F/Sp) (OA3103)

\_\_\_OA4108 Data Mining (2-2) (OA3103, OA4106) (Sp)

\_\_\_OA4118 Statistical and Machine Learning (3-0) (W) (OA4106)

# CYBER OPERATIONS (CO): (Coordinator: Dr. Irvine)

Students must take the following CO Core Sequence:

\_\_\_CS3690 Network Security (4-1) (W/S) (CS3600 & CS3502 (or IS3502 or EC3710))

\_\_\_CS4679 Advances in Cyber Security Operations (4-1) (AR)

\_\_\_CY4700 Applied Defensive Cyber Operations (3-3) (W/S) (CY3000 & CS3690)

\_\_\_CY4710 Adversarial Cyber Operations (3-3) (F/Sp) ((CY3000 & CS3690; or consent of

 instructor

***In addition, students must choose two (2) of the following CO electives:***

\_\_\_CS4558 Network Traffic Analysis (3-2) (F, Sp) (CS3502)

\_\_\_CS4600 Secure Computer Systems (3-2)

\_\_\_CS4648 Advanced Cyber Munitions (3-2)

\_\_\_CS4678 Advanced Cyber Vulnerability Assessment (4-2)

\_\_\_CS4684 Cyber Security Incident Response & Recovery (3-2)

# CYBER SECURITY & DEFENSE (CSD): (Coordinator: Dr. Irvine)

Students must take the following CSD Core Sequence:

\_\_\_CS3670 Secure Management of Systems (3-2) (F/Sp) (CS3600)

\_\_\_CS3690 Network Security (4-1) (W/S) (CS3600 & CS3502 (or IS3502 or EC3710))

\_\_\_CS4600 Secure Computer Systems (3-2) (F/Sp)

\_\_\_CY4700 Applied Defensive Cyber Operations (3-3) (W/S) (CY3000 & CS3690)

***In addition, students must choose two (2) of the following CSD electives:***

\_\_\_CS4558 Network Traffic Analysis (3-2) (F, Sp) (CS3502)

\_\_\_CS4615 Formal Analysis of Cryptographic Protocols (3-1) (AR) (CS3600

\_\_\_CS4650 Fundamentals of Information System Security Engineering (3-1) (AR) (CS4600)

\_\_\_CS4680 Introduction to Certification and Accreditation (3-2) (AR) (CS3670 or consent)

\_\_\_CS4684 Cyber Security Incident Response & Recovery (3-2) (F/W/S) (CS3690 or

 consent of instructor)

\_\_\_CS4690 Security for Cyber Physical Systems (3-1) (AR) (CS3690, CS3070, CS3140)

# MOVES Option: (Coordinator: Dr. C. Darken)

# Students interested in a CS degree with a focus on modeling, virtual environments and simulation may choose the MOVES Option as their Specialization.

***Students will work with their Advisor(s) to create a six (6) course sequence applicable to this specialization area. Their course plan must be listed below, and approved by their Thesis Advisor or MOVES Specialization Manager (para 7 below).***

# NETWORK & MOBILITY (N&M): (Coordinator: Dr. Xie)

***Students must take the following N&M Core Sequence:***

\_\_\_CS4533 Wireless Mobile Computing (3-2) (AR) (CS2020)

\_\_\_CS4535 Mobile Devices (3-2) (AR) (CS2020)

\_\_\_CS4537 Wireless Data Services (3-2) (AR) (CS4533 & CS4535)

\_\_\_CS4552 Network Design & Programming (3-3) (S) (Advanced programming, CS3502 or

equivalent)

\_\_\_CS4554 Network Modeling & Analysis (4-0) (Sp) (CS3502)

\_\_\_CS4538 Mobile Device and Wireless Security (3-2) (AR) ((CS3600, CS3690, CS4537)

 or CS4558 Network Traffic Analysis (3-2) (F/S) (CS3502)

# SOFTWARE ENGINEERING (SwE): (AR) (Coordinator: Dr. Luqi)

Students must take the following SwE Core Sequence:

\_\_\_SW4520 Advanced Software Engineering (3-0)

\_\_\_SW4530 Software Engineering R&D in DoD (3-1)

***In addition, students must choose four (4) of the following SwE electives:***

\_\_\_SW4510 Computer-Aided Prototyping (3-0)

\_\_\_CS4313 Advanced Robotic Systems (3-2)

\_\_\_CS4330 Introduction to Computer Vision (3-2)

\_\_\_CS4678 Advanced Cyber Vulnerability Assessment (4-2)

\_\_\_CS4xxx Automatic Programming I (4-2)\*

\_\_\_CS4xxx Automatic Programming II (4-2)\*

\_\_\_MV4025 Cognitive and Behavioral Modeling for Simulations (3-2)

\_\_\_OS4118 Statistical and Machine Learning (3-0)

\_\_\_CC4101 System Engineering for Joint C4I Systems (4-2)

\_\_\_CY3650 Cyber Data Management and Analytics (4-0)

\_\_\_SS3613 Military Satellite Communications (3-0)

\_\_\_AE4860 Military Space Maneuvers (2-2)

 *\* Future Projection.*

**4. Additional Military Requirements:**

# All U.S. Navy Line Officer students (*except* Engineering Duty Officers) take JPME Phase 1:

\_\_\_NW3230 Strategy & Policy (4-2)

\_\_\_NW3275 Joint Maritime Operations Part 1 (4-0)

\_\_\_NW3276 Joint Maritime Operations Part 2 (2-2)

\_\_\_NW3285 National Security Decision Making (4-0)

# All U.S. Marine Corps students

\_\_\_MN3331 Principles of System Acquisition & Program Management (5-1)

May be dropped with concurrence of the Senior Marine Office.

# International Military students (*as required by the International Office*)

\_\_\_IT1500 Informational Program Seminar for International Officers (4-0)

\_\_\_IT1600 Communication Skills for International Officers (3-0)

\_\_\_IT1700 Academic Writing for International Officers (2-0)

**5. Credit Hour Requirements:**

\_\_\_40 graduate credit hours at 3000-4000 level, with at least 12 of those hours at 4000 level.

\_\_\_28 of the 40 graduate credit hours must be in CS, MOVES, SW courses.

***\*\* No more than 4 total sections of CS0810 may be taken, and no more than 2 sections may be taken during a given quarter.***

**6. Student Certification:** I certify that the information on this form is correct, and that I have completed all requirements for the MSCS degree, with any course deviations from my Specialization sequence listed below (must be approved by Advisor or Specialization Manager). In addition, I have listed my one (1) required **Breadth Elective,** a 3000 or 4000-level general elective consisting of any course not in the core nor taken for a specialization.

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**7. Advisor or Specialization Manager approval:** Specialization courses above are approved.

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**8. Program Officer final review:** Checklist complete.

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_