Name/Rank/Service: ________________________________________________________________
Month/Year Enrolled: ____________________________________________________________
Projected Graduation Date: _______________________________________________________
CS Specialization: ________________________________________________________________

**General Notes:**
- Students are responsible for meeting the requirements and timelines of this checklist.
- Consult the NPS Python Course Catalog for course prerequisites and offerings.

1. **Thesis/Capstone:** Proposal must be approved **by end of 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 to the Program Officer and Educational Technician.

<table>
<thead>
<tr>
<th>Completed</th>
<th>Planned Qtr</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS2011 Computing System Principles (4-0)</td>
<td></td>
</tr>
<tr>
<td>CS3040 Low-Level Programming I (4-2)</td>
<td></td>
</tr>
<tr>
<td>CS3001 Formal Foundation of Computer Science (4-2)</td>
<td></td>
</tr>
<tr>
<td>OS3307 Modeling Practices for Computing (4-1)</td>
<td></td>
</tr>
<tr>
<td>CS3200 Computer Architecture (3-2)</td>
<td></td>
</tr>
<tr>
<td>CS3021 Intermediate Programming &amp; Data Structures (4-2)</td>
<td></td>
</tr>
<tr>
<td>CS3502 Computer Communications &amp; Networks (4-2)</td>
<td></td>
</tr>
<tr>
<td>CS3070 Operating Systems (3-2)</td>
<td></td>
</tr>
<tr>
<td>CS3600 Introduction to Computer Security (4-2)</td>
<td></td>
</tr>
<tr>
<td>CS3140 Low-Level Programming II (3-2)</td>
<td></td>
</tr>
<tr>
<td>CS3101 Theory of Formal Languages and Automata (4-2)</td>
<td></td>
</tr>
<tr>
<td>CS3310 Artificial Intelligence (4-1)</td>
<td></td>
</tr>
<tr>
<td>CS4900 Technology &amp; Transformation I (2-0)</td>
<td></td>
</tr>
<tr>
<td>CS3250 Intro to Cyber Physical Systems (3-2)</td>
<td></td>
</tr>
<tr>
<td>CS3150 Design and Analysis of Algorithms (4-0)</td>
<td></td>
</tr>
<tr>
<td>CS3060 Database Systems (3-1)</td>
<td></td>
</tr>
<tr>
<td>SW3460 Software Methodology (4-2)</td>
<td></td>
</tr>
<tr>
<td>CS3315 Introduction to Machine Learning and Big Data (3-1)</td>
<td></td>
</tr>
<tr>
<td>CS3004 Human-Computer Interaction (3-2)</td>
<td></td>
</tr>
<tr>
<td>CS4903 Research Methods in CS (2-0)</td>
<td></td>
</tr>
</tbody>
</table>
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 and/or Thesis Advisor approval.*

- **ARTIFICIAL INTELLIGENCE (AI):**
  
  *(Coordinator: Dr. Rowe)*
  
  **Students must take the following AI Core Sequence:**
  
  - CS4330 Intro to Computer Vision (3-2)
  - MV4025 Cognitive and Behavioral Models for Simulations (3-2)
  - CY3650 Cyber Data Management and Analytics (4-0)
  
  **In addition, students must choose three of the following AI electives:**
  
  - CS4313 Advanced Robotic Systems (3-2)
  - CS4317 Language Systems (3-2)
  - CS4558 Network Traffic Analysis (3-2)
  - CS4677 Computer Forensics (3-2)
  - CS492x Seminar on Advanced Autonomous Systems Topics (4-1)
  - IS4205 Big Data Management, Architecture, and Applications (3-2)
  - MV4655/OA4655 Introduction to Joint Combat Modeling (4-0)
  - OA3304 Decision Theory (4-0)
  - OS4106 Advance Data Analysis (3-0)
  - OA4108 Data Mining (2-2)

- **CYBER OPERATIONS (CO):**
  
  *(Coordinator: Dr. Irvine)*
  
  **Students must take the following CO Core Sequence:**
  
  - CS3690 Network Security (4-1)
  - CS4679 Advances in Cyber Security Operations (4-1)
  - CY4700 Applied Defensive Cyber Operations (3-3)
  - CY4710 Adversarial Cyber Operations (3-3)
  
  **In addition, students must choose two of the following CO electives:**
  
  - CS4558 Network Traffic Analysis (3-2)
  - 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)
NPS Graduation Checklist for MSCS Degree

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

  *Students must take the following CSD Core Sequence:*
  - CS3670 Secure Management of Systems (3-2)
  - CS3690 Network Security (4-1)
  - CS4600 Secure Computer Systems (3-2)
  - CY4700 Applied Defensive Cyber Operations (3-3)

  *In addition, students must choose two of the following CSD electives:*
  - CS4558 Network Traffic Analysis (3-2)
  - CS4615 Formal Analysis of Cryptographic Protocols (3-1)
  - CS4650 Fundamentals of Information System Security Engineering (3-1)
  - CS4680 Introduction to Certification and Accreditation (3-2)
  - CS4684 Cyber Security Incident Response & Recovery (3-2)
  - CS4690 Security for Cyber Physical Systems (3-1)

- **MOVES:** (Coordinator: Dr. C. Darken)

  Students interested in a CS degree with a focus on Modeling, Virtual Environments and Simulation (MOVES) may choose the MOVES Option as their Specialization. *Students will work with their Advisor(s) to create a six course sequence applicable to this specialization area. Their course plan must be listed below, and approved by the MOVES Specialization Coordinator.*

  ____________________________________________________________
  ____________________________________________________________
  ____________________________________________________________
  ____________________________________________________________
  ____________________________________________________________

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

  *Students must take the following N&M Core Sequence:*
  - CS4533 Wireless Mobile Computing (3-2)
  - CS4535 Mobile Devices (3-2)
  - CS4537 Wireless Data Services (3-2)
  - CS4552 Network Design & Programming (3-3)
  - CS4554 Network Modeling & Analysis (4-0)
  - CS4538 Mobile Device and Wireless Security (3-2)
  - or CS4558 Network Traffic Analysis (3-2)
SOFTWARE ENGINEERING (SwE):  

Students must take SW3460, CS3315, and CS3004 in the core.

In addition, students must choose six of the following SwE electives:

- SW4520 Advanced Software Engineering (3-0)
- SW4530 Software Engineering R&D in DoD (3-1)
- CS4313 Advanced Robotic Systems (3-2)
- CS4315 Introduction to Machine Learning and Data Mining (3-1)
- CS4678 Advanced Cyber Vulnerability Assessment (4-2)
- CS4670 Quantum Computing (4-0)
- CS3910 Science of Programming
- MV4025 Cognitive and Behavioral Modeling for Simulations (3-2)
- MV4655 Introduction to Joint Combat Modeling (4-0)
- OS4118 Statistical and Machine Learning (3-0)
- CC4101 System Engineering for Joint C4I Systems (4-2)
- CY3650 Cyber Data Management and Analytics (4-0)

4. Additional Military Requirements:

All U.S. Navy Line Officer students (except Engineering Duty Officers) must complete JPMME 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 (may be dropped with concurrence of the Senior Marine Office; optional for U.S. Army students):

- MN3331 Principles of System Acquisition & Program Management (5-1)

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 or 4000 level, with at least 12 of those hours at the 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 the Specialization Coordinator). In addition, I have listed my **one 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. **Specialization Coordinator or Thesis Advisor approval:** Specialization courses above are approved.

Signature: ____________________________ Date: __________

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

Signature: ____________________________ Date: __________