**COLUMBIA UNIVERSITY**

**MASTER OF SCIENCE IN QUANTUM SCIENCE & TECHNOLOGY**

**CURRICULUM CHECKLIST**

**March 2025**

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| Name (please print): |
| UNI: |

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| Core Courses | | | * 30 points required for the MS * 15 points Required Core Courses * 15 points Track Electives Courses. * Engineering Track requires 15 points of Engineering Track Electives. * Physics Track requires 3 points of Physics Track Electives and 12 points of Engineering Track Electives * No credit for 3000 level or lower courses * GPA above 2.7 * No more than 6 points research (e.g. ELEN E4998) * Completion within 5 years * No grade of P, UW, R (with the exception of ENGI E4000) |
| Number | Name | Points |
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| Track Electives Courses | | |
| Number | Name | Points |
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| ***Sample Curriculum for Engineering Track*** | ***Sample Curriculum for Physics Track*** |
| COMS W4281 Introduction to Quantum Computing  ENGI E4000 Professional Development and Leadership  PHYS GU5081 Quantum Physics Laboratory  PHYS GR5084 Quantum Simulation and Computing Lab  PHYS GU4021 Quantum Mechanics I  PHYS GR4022 Quantum Mechanics II | COMS W4281 Introduction to Quantum Computing  ENGI E4000 Professional Development and Leadership  PHYS GU5081 Quantum Physics Laboratory  PHYS GR5084 Quantum Simulation and Computing Lab  PHYS GU4021 Quantum Mechanics I  PHYS GR4022 Quantum Mechanics II |
| APPH E4112 Laser Physics  APPH E4114 Quantum and Nonlinear Photonics  ELEN E4411 Fundamentals of Photonics  ELEN E6333 Semiconductor Device Physics  ELEN E6414 Photonic Integrated Circuits | ELEN E4411 Fundamentals of Photonics  ELEN E6333 Semiconductor Device Physics  ELEN E6414 Photonic Integrated Circuits  ELEN E6730 Quantum Sensing Theory  PHYS GU4024 Applied Quantum Mechanics |

**Approved by the Faculty Advisor: Date:**

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| **Required Core Courses - 15 Credits** |
| 1. COMS W4281 Introduction to Quantum Computing 2. ENGI E4000 Professional Development and Leadership (0-credit requirement) 3. PHYS GU5081 Quantum Physics Laboratory 4. PHYS GR5084 Quantum Simulation and Computing Lab 5. PHYS GU4021 Quantum Mechanics I 6. PHYS GR4022 Quantum Mechanics II |
| **ENGINEERING TRACKS ELECTIVES (Choose 5 for the Engineering Track, Choose 4 for the Physics Track)** |
| APMA E4001 Principles of Applied Math  APMA E4008 Advanced Linear Algebra  APMA E4150 Applied Functional Analysis  APPH E4112 Laser Physics  APPH E4114 Quantum and Nonlinear Photonics  APPH E6082 Solid State II  CHEN E4880 Atomistic Simulation for Science and Engineering  COMS W4236 Introduction to Computational Complexity  CSEE W4824 Computer Architecture  CSEE W6998 Formal Verification of Systems Software  CSOR E4231 Analysis of Algorithms  ELEN E4411 Fundamentals of Photonics  ELEN E4730 Quantum Optimization and Quantum Machine Learning  ELEN E6333 Semiconductor Device Physics  ELEN E6414 Photonic Integrated Circuits  ELEN E6717 Classical and Quantum Information Theory  ELEN E6718 Classical and Quantum Error Correcting Codes  ELEN E6730 Quantum Sensing Theory  ELEN E6945 Device Nanofabrication  MSAE E4206 Electronic and Magnetic Properties of Solids  MECE E6137 Nanoscale Actuation and Sensing  MECE E6720 Nano/Microscale Thermal Transport Processes  ELEN E4998 Research (Consult your faculty advisor) |
| **PHYSICS TRACKS ELECTIVES (Choose 1 for Physics Track)** |
| PHYS GR6020 Frontiers of Condensed Matter  PHYS GR6060 Atomic Physics  PHYS GR6065 Quantum Optics  PHYS GR6080 Scientific Computing  PHYS GR6082 Condensed Matter Physics I  PHYS GR6083 Condensed Matter Physics II  PHYS GR8036 Advanced Statistical Mechanics  PHYS GU4024 Applied Quantum Mechanics  ELEN E4998 Research (Consult your faculty advisor) |