**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)
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| 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 ComputingENGI E4000 Professional Development and LeadershipPHYS GU5081 Quantum Physics LaboratoryPHYS GR5084 Quantum Simulation and Computing LabPHYS GU4021 Quantum Mechanics IPHYS GR4022 Quantum Mechanics II | COMS W4281 Introduction to Quantum ComputingENGI E4000 Professional Development and LeadershipPHYS GU5081 Quantum Physics LaboratoryPHYS GR5084 Quantum Simulation and Computing LabPHYS GU4021 Quantum Mechanics IPHYS GR4022 Quantum Mechanics II |
| APPH E4112 Laser PhysicsAPPH E4114 Quantum and Nonlinear PhotonicsELEN E4411 Fundamentals of PhotonicsELEN E6333 Semiconductor Device PhysicsELEN E6414 Photonic Integrated Circuits | ELEN E4411 Fundamentals of PhotonicsELEN E6333 Semiconductor Device PhysicsELEN E6414 Photonic Integrated CircuitsELEN E6730 Quantum Sensing TheoryPHYS 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
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| **ENGINEERING TRACKS ELECTIVES (Choose 5 for the Engineering Track, Choose 4 for the Physics Track)** |
| APMA E4001 Principles of Applied MathAPMA E4008 Advanced Linear AlgebraAPMA E4150 Applied Functional AnalysisAPPH E4112 Laser PhysicsAPPH E4114 Quantum and Nonlinear PhotonicsAPPH E6082 Solid State IICHEN E4880 Atomistic Simulation for Science and EngineeringCOMS W4236 Introduction to Computational ComplexityCSEE W4824 Computer ArchitectureCSEE W6998 Formal Verification of Systems SoftwareCSOR E4231 Analysis of Algorithms ELEN E4411 Fundamentals of PhotonicsELEN E4730 Quantum Optimization and Quantum Machine LearningELEN E6333 Semiconductor Device PhysicsELEN E6414 Photonic Integrated CircuitsELEN E6717 Classical and Quantum Information TheoryELEN E6718 Classical and Quantum Error Correcting CodesELEN E6730 Quantum Sensing TheoryELEN E6945 Device NanofabricationMSAE E4206 Electronic and Magnetic Properties of SolidsMECE E6137 Nanoscale Actuation and SensingMECE E6720 Nano/Microscale Thermal Transport ProcessesELEN E4998 Research (Consult your faculty advisor) |
| **PHYSICS TRACKS ELECTIVES (Choose 1 for Physics Track)** |
| PHYS GR6020 Frontiers of Condensed MatterPHYS GR6060 Atomic PhysicsPHYS GR6065 Quantum OpticsPHYS GR6080 Scientific ComputingPHYS GR6082 Condensed Matter Physics IPHYS GR6083 Condensed Matter Physics IIPHYS GR8036 Advanced Statistical MechanicsPHYS GU4024 Applied Quantum MechanicsELEN E4998 Research (Consult your faculty advisor) |