**MORGAN STATE UNIVERSITY**

**\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_Computer Science Department\_\_\_\_\_\_\_\_\_\_\_\_**

*Name of academic unit*

**Curriculum Committee**

PROPOSAL FOR A COURSE

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| 1. **Course Number, Title and Number of Credits:**   **Course Number: COSC xxx**  **Course Title: Applied Quantum Technologies and Sensing**  **Number of Credit Hours: 3** |

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| **2. Number of Contact Hours:**  **Lecture: \_\_\_\_\_3\_\_\_\_\_\_\_ Laboratory \_\_\_\_\_\_1\_\_\_\_\_\_\_** |

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| 1. **Catalog Description:**   **COSC xxx Applied Quantum Technologies and Sensing**  – *Three hours of lecture, 3 credits*. *One hour of lab.*  This course covers the various quantum technologies that enable quantum computation, random number generators, quantum key distribution, and quantum sensing.  **Prerequisite:** Quantum Mechanics for Computer Scientists (COSC xxx) |

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| 1. **Course Objectives (Broad Objectives of the Course):**   Upon completion of this course, students will be able to do the following:   * **Describe** quantum technologies that enable quantum computation, encryption, and sensing * **Analyze** the connections between quantum mechanical principles and actual technologies * **Demonstrate** skills by conducting quantum labs and using the resulting data |

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| 1. **Course Content (Statement of Subject Matter):**   **Unit 0:** Review of quantum principles  **Unit 1:** Quantum computing and qubits  **Unit 2:** Coherent light and lasers  **Unit 3:** Quantum optics  **Unit 4:** Quantum magnetometry  **Unit 5:** Heisenberg uncertainty and squeezing  **Unit 6:** Quantum entanglement and information technologies  **Unit 7:** Quantum ghost imaging and spectroscopy  **Unit 8:** Atom interferometry and gravimetry  **Unit 9:** Quantum time and navigation  **Unit 10:** Real-world quantum technology examples |

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| 1. **Relationship to Curriculum Sequence (Elective or Required; Need):**   This is an elective course for the BS in Computer Science program. |

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| 1. **Relationship to Similar Course Offerings in Other Departments:**   None. |

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| 1. **Bibliography:**   Course deliverables: lectures, notes, tutorials will be provided according to the topics covered.   * Quantum Mechanics for Beginners: With Applications to Quantum Communication and Quantum Computing. Suhail Zubairy. Oxford University Press. ISBN-13: 978-0198854234, 2020. * Introduction to Quantum Technologies. Alto Osada. Springer. ISBN-13: ‎ * 978-9811946431, 2022. |

**Note: A course outline and course syllabus must be submitted with this form.**

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| **Approved by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  *Department Curriculum Chairperson Date*  **Approved by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  *Department Chairperson Date*  **Approved by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  *Chairperson, School Curriculum Committee Date*  **Approved by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  *Dean/Director Date*  **Approved by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  *Office of the Vice President for Academic Affairs Date* |