SYLLABUS: BMED9000 - Section HAY - Fall 2026

Georgia Institute of Technology & Emory University
Wallace H. Coulter Department of Biomedical Engineering

Course Title: **Doctoral Thesis**
Semester: **Fall 2026**
Format: **Thesis Research**

Credit hours: 1 - 21 credit hours

Instructor: Dr. Karmella Haynes
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COURSE DESCRIPTION

This course provides students with the opportunity to engage in independent research under the supervision of a faculty advisor. Students will contribute to ongoing research projects in biomedical engineering, with emphasis on experimental design, data collection and analysis, and interpretation of results.

Research topics may include areas such as synthetic biology, epigenetic engineering, cancer biology, and related interdisciplinary fields. Students are expected to actively participate in the research process and develop skills in scientific reasoning, problem-solving, and communication.

LEARNING OBJECTIVES

By the end of this course, students will be able to:

- Design and execute independent or team-based research projects
- Analyze and interpret experimental or computational data
- Critically evaluate scientific literature

- Communicate research findings effectively (written and/or oral)
- Demonstrate reliable and professional conduct in a research environment

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ASSESSMENT / EVALUATION

Evaluation will be based on:

- Progress toward dissertation research goals
- Quality and rigor of research activities
- Clear and consistent documentation of experiments in an electronic notebook
- Engagement with advisor and/or committee
- Documentation of research progress

GRADING SCALE

S = Satisfactory

U = unsatisfactory

SCHEDULE

This course follows the standard Georgia Tech academic calendar, with the exception of final exam periods, which are not applicable to independent research courses. Detailed research schedules (e.g., day-to-day activities) are arranged individually between the student and the research advisor. Expectations for time commitment and research milestones will be defined at the beginning of the term.

LAB SAFETY AND COMPLIANCE

Work will take place in a BSL-2 lab. The Standard Operating Procedures are available upon request. Students must have an email address registered by Georgia Tech or at Emory University, complete all required laboratory safety training in accordance with training offered through SciShield, and adhere to institutional safety protocols. Failure to comply with safety requirements may result in removal of access to the laboratory.

COURSE MATERIALS

There are no required textbooks for this course. Access to an electronic notebook, approved by the professor (e.g. Benchling) is provided at no cost. Students are expected to engage with primary scientific literature relevant to their research projects. Georgia Tech provides access to a wide range of high-quality scientific journals and databases through the University Library. Students are encouraged to use resources such as **PubMed** and **Web of Science** to identify, access, and evaluate peer-reviewed literature. Additional materials, including relevant articles, protocols, or datasets, may be provided or recommended by the research advisor based on the specific project.

STATEMENT ON ACADEMIC INTEGRITY

Georgia Tech strives to cultivate a community grounded in trust, academic integrity, and honor. Students are expected to uphold the highest ethical standards in all academic work.

Review Georgia Tech's Academic Honor Code:

https://policylibrary.gatech.edu/student-life/academic-honor-code

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STATEMENT ON MENTAL HEALTH AND WELL-BEING

Your instructors and the Biomedical Engineering Department are committed to supporting student mental health and well-being. Students are encouraged to utilize Georgia Tech's mental health resources:

https://mentalhealth.gatech.edu

For immediate support:

- Call 404-894-2575
- After-hours counselor available
- Emergency: 911 or GT Police (404-894-2500)

STATEMENT ON ADA / ACCESSIBILITY

If you are a student with a disability and require accommodations, please contact the Office of Disability Services at 404-894-2563 and notify the instructor as soon as possible.

USE OF ARTIFICIAL INTELLIGENCE (AI)

AI tools may be used for support activities such as brainstorming, outlining, or improving clarity of writing. AI may not be used to generate original scientific content or analyses submitted as your own work. All AI use must be disclosed and must comply with Georgia Tech policies.

DOCTORAL RESEARCH ACCOUNTABILITY POLICY

This course incorporates the **Epigenetic Control Systems Engineering Lab PhD Research Progress & Meeting Accountability Policy**, which establishes clear expectations for research progress, meeting participation, and evaluation criteria. This policy aligns with Biomedical Engineering PhD program standards and provides a structured framework for assessing Satisfactory/Unsatisfactory (S/U) performance based on documented research progress, engagement, and milestone completion. All students enrolled in BMED 9000 - Section HAY are expected to adhere to the policies outlined below.

1. Biweekly Meetings: All PhD students are expected to attend scheduled biweekly research meetings.

Cancellation Policy

- One cancellation per semester with ≥ 24 hours' notice: acceptable.
- Two cancellations in a semester: written reminder and documentation.

Three or more missed or late-cancelled meetings in a semester: triggers formal performance review and may result in an Unsatisfactory (U) semester evaluation unless documented extenuating circumstances are provided.

Failure to attend meetings without notice will be documented immediately.

2. Biweekly Written Progress Update

Due **24 hours before each scheduled meeting.** Maximum 1 page. Must include:

A. Goals from Previous Period
   - Bullet list of stated deliverables.
   - Marked: Completed / Not Completed.

B. Evidence of Completion
   - List and describe the concrete outputs produced during the period (e.g., “Figure draft of …,” “Flow cytometry dataset for …,” “Cloning verification gel showing …”).
   - “Worked on analysis” is not sufficient; tangible outputs are required.
   - Do not insert raw data or figures into the report. Present the underlying data at the meeting.

C. Obstacles Encountered
   - Specific and actionable.

D. Goals for Next Two Weeks
   - 2 - 3 measurable, well-described deliverables.
   - Must be concrete (e.g., “Submit Figure 3 draft for …,” not “Continue analysis of …”).

If no written update is submitted:

- The meeting may be canceled.
- The absence will be documented.

3. Research Ownership & Analysis Expectations. For tasks specifically assigned to the student …

Students are responsible for:	The PI provides:	The PI will not:
● Executing agreed-upon analyses. ● Preparing figures and drafts. ● Iterating on feedback. ● Creating an effective work schedule.	● Conceptual guidance. ● Strategic direction. ● *Editorial* revision. ● Resource acquisition, locally and via MTAs as needed.	● Redo incomplete analyses. ● Execute data processing on behalf of students. ● Absorb repeated failure to meet agreed deliverables. ● Incomplete work will be returned for revision.

4. Milestone Accountability

Each student will have defined semester milestones (e.g., manuscript draft, data analysis completion, proposal submission). Repeated failure to meet milestones without a documented recovery plan may result in:

- Written performance warning.
- Meeting with co-advisor and/or committee.
- Assignment of Unsatisfactory (U) for the semester.

5. Criteria for Semester Evaluation (S/U)

Satisfactory (S)	**Unsatisfactory (U)**
● Consistent attendance at biweekly meetings. ● Timely submission of written updates.	● Repeated missed or canceled meetings.

● ≥75% completion of agreed deliverables. ● Demonstrable forward progress on thesis objectives. ● Increasing independence in data analysis and writing.	● Failure to submit required progress updates. ● Missed milestones without a recovery plan. ● Persistent dependence on PI for execution-level tasks. ● Lack of measurable progress across the semester.

Semester evaluations will be based on documented evidence, not subjective impressions.

6. Professional Standard

PhD training requires:

- Reliability.
- Independent problem-solving.
- Responsiveness to feedback.
- Consistent progress over time.

This structure is designed to:

- Promote clarity.
- Reduce ambiguity.
- Align expectations.
- Protect research momentum.

Real consequences include:

- Dissertation defense failure.
- Journal manuscript rejection and/or loss of authorship.
- Premature dismissal from the lab or program.