

Course Syllabus
MBMB 503 Integrative Biosciences
Academic year 2025

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| Course ID and Title | MBMB 503 Integrative Biosciences ชมชม ๕๐๓ ซีวีวิทยาศาสตร์เชิงบูรณาการ |
| Credits | 1 (0-2-1) |
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Credits: 1 (1-0-2)

Curriculum: Master of Science Program in **Molecular and Integrative Biosciences** (required course)

Doctor of Philosophy Program in **Molecular and Integrative Biosciences** (required course)

Semester offering: First semester

Pre-requisites: None

Course learning outcomes (CLOs) and their alignment with PLOs:

| CLOs | PLO1 | PLO2 | PLO3 | PLO4 |
|--|------|------|------|------|
| By the end of the course, student should be able to: | | | | |
| 1. Assess and critically evaluate various molecular bioscience technologies for addressing scientific and real-world challenges (Knowledge). | ✓ | | | |
| 2. Integrate advanced molecular and cellular biosciences concepts to develop innovative solutions, products, or therapeutic applications (Skills). | | ✓ | | |
| 3. Demonstrate and guide best practices for scientific integrity and professional responsibility (Ethics). | | | ✓ | |
| 4. Communicate developed ideas and products to peers and the general public (Characters). | | | | ✓ |

Alignment of Teaching and Assessment Methods to Course Learning Outcomes:

| Course Learning Outcomes | Teaching Method | Assessment Method |
|--|--|---|
| 1. Assess and critically evaluate various molecular bioscience technologies for addressing scientific and real-world challenges (Knowledge). | 1. Problem-based learning 2. Group discussion | 1. Class participation 2. Performance in problem-based learning class |
| 2. Integrate advanced molecular and cellular biosciences concepts to develop innovative solutions, products, or therapeutic applications (Skills). | 1. Problem-based learning 2. Group discussion | 1. Performance in problem-based learning class 2. Discussion performance |

| | | |
|--|--|--|
| 3. Demonstrate and guide best practices for scientific integrity and professional responsibility (Ethics). | 1. Problem-based learning 2. Group discussion | 1. Performance in problem-based learning class 2. Discussion performance 3. Presentation performance |
| 4. Communicate developed ideas and products to peers and the general public (Characters). | 1. Scientific presentation 2. Business pitch | 1. Presentation performance |

Course description:

Inspiration talk on integrative and innovative biosciences; innovation and design thinking process; cutting-edge biotechnology; identification and defining of problems; idea generation and evaluation; development of new products and technological innovation; scientific presentation; business pitching

การพูดคุยสร้างแรงบันดาลใจในเรื่องชีววิทยาศาสตร์เชิงบูรณาการและนวัตกรรม นวัตกรรมและกระบวนการคิดเชิงออกแบบ เทคโนโลยีชีวภาพที่ล้ำสมัย การระบุและกำหนดปัญหา การพัฒนาผลิตภัณฑ์ใหม่และนวัตกรรมทางเทคโนโลยี การนำเสนอทางวิทยาศาสตร์ การเสนอขายทางธุรกิจ

Course Schedule (Tentative):

(Classroom XXX)

| | Activities | Description | Time | Instructors and Assistants |
|-------|--|--|--------------|----------------------------|
| Day 1 | | | | |
| 1 | Inspiration talk: integrative and innovative biosciences | This class aims to inspire students on how to tackle innovation challenges from scientist-inventors. | 9.00 – 10.00 | Invited speakers |
| Day 2 | | | | |
| 1 | Discussion/workshop: Design thinking and innovation | The process of innovation and design thinking will be introduced and discussed. | 9.00 – 10.00 | TBA |

| | Activities | Description | Time | Instructors and Assistants |
|-------|---|---|---------------|----------------------------|
| 2 | Discussion/workshop: Cutting-edge biotechnology | Cutting-edge technologies related to the problem-based learning will be introduced and discussed. | 10.00 – 11.00 | TBA |
| Day 3 | | | | |
| 1 | Problem-based learning: Identification and defining of problems | To define problems and needs for innovative thinking. | 9.00 – 12.00 | TBA |
| Day 4 | | | | |
| 1 | Problem-based learning: Brainstorming, idea generation and evaluation | To generate ideas and evaluate them against problems and needs. | 9.00 – 12.00 | TBA |
| Day 5 | | | | |
| 1 | Problem-based learning: Development of new products and technological innovation | To develop, assess, and strengthen new products and technological innovation. | 9.00 – 12.00 | TBA |
| Day 6 | | | | |
| 1 | Scientific presentation and discussion | To present new products to the scientific community | 9.00 – 11.00 | All |
| Day 7 | | | | |
| 1 | Business pitch | To present new products to specialist and non-specialist audiences including investors. | 9.00 – 10.00 | All and invited investors |

| | Activities | Description | Time | Instructors and Assistants |
|---|------------------------------------|--|---------------|----------------------------|
| 2 | Reflection and after-action review | <ul style="list-style-type: none"> - To provide students opportunities to describe their learning experiences received from this course and how they can be applied to their future learning. - To collect comments, and suggestions from students for further improvements of the course. | 10.00 – 11.00 | All |

TBA: To Be Announced

Assessment Criteria:

| Assessment method | | Performance criteria | Scoring rubric |
|-------------------|--|--|---|
| 1 | Class attendance & participation (10%) | Attendance and punctuality (5%) | Punctually (4) 5 minutes late (3) 10 minutes late (2) 15 minutes late (1) > 20 minutes late or absent (0) |
| | | Participation (5%) | Frequently participates (4) Moderately participates (2-3) Seldom participates (1) Never participates (0) |
| 2 | Problem-based learning (65%) | Participation, discussion and performance (15%) | Active (4) Fairly active (2-3) Inactive (1) |
| | | Professional and interpersonal skills (responsibility, teamwork, and leadership) (10%) | Excellent (4) Above average (3) Average (2) Needs improvement (1) |
| | | Creative and high-order thinking skills (40%) | Excellent (4) Above average (3) |

| | | | |
|---|--|--|--|
| | | | Average (2) Needs improvement (1) |
| 3 | Scientific presentation and discussion (15%) | Organization (5%) | Excellent (4) Above average (3) Average (2) Needs improvement (1) |
| | | Scientific content/innovation (10%) | Excellent (4) Above average (3) Average (2) Needs improvement (1) |
| | | Subject knowledge/Answering questions (5%) | Excellent (4) Above average (3) Average (2) Needs improvement (1) |
| | | Presentation style (5%) | Excellent (4) Above average (3) Average (2) Needs improvement (1) |
| 4 | Business pitch (10%) | Product (science–business alignment) (5%) | Excellent (4) Above average (3) Average (2) Needs improvement (1) |
| | | Presentation style (2%) | Excellent (4) Above average (3) Average (2) Needs improvement (1) |
| | | Question handling (3%) | Excellent (4) Above average (3) Average (2) Needs improvement (1) |

Student’s achievement will be graded using symbols: A, B+, B, C+, C, D+, D and F, based on the criteria as follows:

| Percentage range | Grade | Description |
|------------------|-------|-------------|
| 80-100 | A | Excellent |

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|-------|----|-------------|
| 75-79 | B+ | Very Good |
| 70-74 | B | Good |
| 65-69 | C+ | Fairly Good |
| 60-64 | C | Fair |
| 55-59 | D+ | Poor |
| 50-54 | D | Very Poor |
| 0-49 | F | Fail |

Date of Revision: February 8, 2025