

## **Emphasis in Microbiology and Immunology**

The Microbiology and Immunology emphasis is intended for those students interested in the microbial infections and host responses that impact the head and neck. The coursework in this emphasis area is flexible in order to accommodate the diverse research areas represented.

### **RECOMMENDED COURSES**

*minor in Microbiology, Immunology & Cancer Biology (MICaB):*

|            |                                                           |           |
|------------|-----------------------------------------------------------|-----------|
| MICA 8002  | Structure, Function, and Genetics of Bacteria and Viruses | 4 credits |
| MICA 8003  | Immunity and Immunopathology                              | 4 credits |
| MICA 8004  | Cellular and Cancer Biology                               | 4 credits |
| MICA 8010  | Microbial Pathogenesis                                    | 3 credits |
| MICA 8910  | Seminar: Faculty Research Topics                          | 0 credits |
| OBIO 8018  | Oral Pathobiology                                         | 2 credits |
| OBIO 8021* | Oral Microbiology                                         | 2 credits |
| OBIO 8026* | Salivary Glands and Secretions                            | 2 credits |
| OBIO 8028* | Molecular Basis of Cellular and Microbial Adhesion        | 2 credits |
| OBIO 8371  | Mucosal Immunobiology                                     | 3 credits |

\*All PhD students in the Oral Biology graduate program, regardless of emphasis, must satisfactorily complete 8 credits of oral biology topics courses (OBIO 8012, 8018, 8020-8028, 8371), and register and participate in the oral biology student seminar series (OBIO 8030) each semester.

### **CONTACTS**

Prof. Raj Gopalakrishnan, Director of Graduate Studies (DGS)

16-108B Moos Tower

[gopal007@umn.edu](mailto:gopal007@umn.edu)

Ann Hagen, Assistant to the DGS

17-160 Moos Tower

[hagen055@umn.edu](mailto:hagen055@umn.edu)

Prof. Louis M. Mansky, Track Advisor

18-242 Moos Tower

[mansky@umn.edu](mailto:mansky@umn.edu)

### **REPRESENTATIVE FACULTY**

[Massimo Costalonga, DMD, PhD](#)

[Sven-Ulrik Gorr, PhD](#)

[Shelley Grimes, PhD](#)

[Mark C. Herzberg, DDS, PhD](#)

[Paul Jardine, PhD](#)

[Louis Mansky, PhD](#)

[Karen Ross, PhD](#)

[Joel Rudney, PhD](#)

[Wei Zhang, PhD](#)

Information in this document is subject to change. Students are responsible for verifying information with their advisors and all relevant departments.

**CALENDARS**

Option 1A: starting in even-number year

**Year 1**

| <b>Fall</b>           | <i>Months 1-4</i> | <b>Spring</b>         | <i>Months 5-9</i> | <b>Summer</b>                  | <i>Months 10-12</i> |
|-----------------------|-------------------|-----------------------|-------------------|--------------------------------|---------------------|
| MICA 8003             | 4 cr              | MICA 8003             | 4 cr              | Summer enrollment is optional. |                     |
| MICA 8010             | 3 cr              | MICA 8004             | 4 cr              |                                |                     |
| OBIO 8026             | 2 cr              | OBIO 802x             | 2 cr              | OBIO 8666                      | 6 cr                |
| OBIO 8030             | 1 cr              | OBIO 8030             | 1 cr              |                                |                     |
| <i>Total credits:</i> | <i>10</i>         | <i>Total credits:</i> | <i>11</i>         | <i>Total credits:</i>          | <i>6</i>            |

**Year 2**

| <b>Fall</b>           | <i>Months 13-16</i> | <b>Spring</b>                   | <i>Months 17-21</i> | <b>Summer</b>                  | <i>Months 22-24</i> |
|-----------------------|---------------------|---------------------------------|---------------------|--------------------------------|---------------------|
| MICA 8002             | 4 cr                | OBIO 8030                       | 1 cr                | Summer enrollment is optional. |                     |
| OBIO 8021             | 2 cr                | Statistics                      | 4 cr                |                                |                     |
| OBIO 8030             | 1 cr                | MICA 8910                       | 0 cr                | If prelims completed:          |                     |
| OBIO 8371             | 3 cr                | Electives/research              | 1-3 cr              | OBIO 8888                      | 6 cr.               |
|                       |                     | Written prelim. exam            |                     | If prelims not completed:      |                     |
|                       |                     | Oral prelim. exam (by month 18) |                     | OBIO 8666                      | 6 cr.               |
| <i>Total credits:</i> | <i>8</i>            | <i>Total credits:</i>           | <i>6-8</i>          | <i>Total credits:</i>          | <i>6</i>            |

**Year 3**

| <b>Fall</b>           | <i>Months 25-28</i> | <b>Spring</b>         | <i>Months 29-33</i> | <b>Summer</b>                  | <i>Months 34-36</i>                           |
|-----------------------|---------------------|-----------------------|---------------------|--------------------------------|-----------------------------------------------|
| OBIO 8030             | 1 cr                | OBIO 8030             | 1 cr                | Summer enrollment is optional. |                                               |
| OBIO 8888             | 8 cr                | OBIO 8888             | 8 cr                |                                |                                               |
| <i>Total credits:</i> | <i>9</i>            | <i>Total credits:</i> | <i>9</i>            | OBIO 8888                      | 2 or 8 cr<br>(depends on # taken in Summer 2) |

**Year 4**

| <b>Fall</b>           | <i>Months 37-40</i> | <b>Spring</b>                        | <i>Months 41-45</i> | <b>Summer</b>          | <i>Months 46-48</i> |
|-----------------------|---------------------|--------------------------------------|---------------------|------------------------|---------------------|
| OBIO 8030             | 1 cr                | OBIO 8030                            | 1 cr                | Dissertation writing   |                     |
| Research              |                     | Month 43: 6 month seminar            |                     | Final oral examination |                     |
|                       |                     | Month 45: Begin writing dissertation |                     |                        |                     |
| <i>Total credits:</i> | <i>1</i>            | <i>Total credits:</i>                | <i>1</i>            |                        |                     |

All students, regardless of emphasis, must satisfy the following course requirements:

- Complete a major core curriculum of at least 24 credits.
- Complete 8 credits of oral biology topics courses (OBIO 8012, 8018, 8021-8028, 8371).
- Complete one statistics course (STAT 5021, PUBH 6450, PUBH 7445, or equivalent).
- Register and participate in the oral biology student seminar series (OBIO 8030) each semester for 10 semesters or until graduation, whichever comes first.
- Complete a designated minor (minimum 12 credits) in a nonclinical discipline.
- Register for 24 thesis credits (OBIO 8888) after passing the preliminary written and oral exams.

Information in this document is subject to change. Students are responsible for verifying information with their advisors and all relevant departments.

Option 1B: starting in odd-number year

### Year 1

| <b>Fall</b>           | <i>Months 1-4</i> | <b>Spring</b>         | <i>Months 5-9</i> | <b>Summer</b>                  | <i>Months 10-12</i> |
|-----------------------|-------------------|-----------------------|-------------------|--------------------------------|---------------------|
| MICA 8003             | 4 cr              | MICA 8004             | 4 cr              | Summer enrollment is optional. |                     |
| OBIO 8021             | 2 cr              | OBIO 8028             | 2 cr              |                                |                     |
| OBIO 8030             | 1 cr              | OBIO 8030             | 1 cr              | OBIO 8666                      | 6 cr                |
| OBIO 8371             | 3 cr              |                       |                   |                                |                     |
| <i>Total credits:</i> | <i>10</i>         | <i>Total credits:</i> | <i>7</i>          | <i>Total credits:</i>          | <i>6</i>            |

### Year 2

| <b>Fall</b>           | <i>Months 13-16</i> | <b>Spring</b>                   | <i>Months 17-21</i> | <b>Summer</b>                  | <i>Months 22-24</i> |
|-----------------------|---------------------|---------------------------------|---------------------|--------------------------------|---------------------|
| MICA 8002             | 4 cr                | MICA 8910                       | 0 cr                | Summer enrollment is optional. |                     |
| MICA 8010             | 3 cr                | OBIO 8030                       | 1 cr                |                                |                     |
| OBIO 8026             | 2 cr                | STAT 5021                       | 4 cr                | If prelims completed:          |                     |
| OBIO 8030             | 1 cr                | Electives/research              | 1-3 cr              | OBIO 8888                      | 6 cr.               |
|                       |                     | Written prelim. exam            |                     | If prelims not completed:      |                     |
|                       |                     | Oral prelim. exam (by month 18) |                     | OBIO 8666                      | 6 cr.               |
| <i>Total credits:</i> | <i>10</i>           | <i>Total credits:</i>           | <i>6-8</i>          | <i>Total credits:</i>          | <i>6</i>            |

### Year 3

| <b>Fall</b>           | <i>Months 25-28</i> | <b>Spring</b>         | <i>Months 29-33</i> | <b>Summer</b>                  | <i>Months 34-36</i>                           |
|-----------------------|---------------------|-----------------------|---------------------|--------------------------------|-----------------------------------------------|
| OBIO 8030             | 1 cr                | OBIO 8030             | 1 cr                | Summer enrollment is optional. |                                               |
| OBIO 8888             | 8 cr                | OBIO 8888             | 8 cr                |                                |                                               |
| <i>Total credits:</i> | <i>9</i>            | <i>Total credits:</i> | <i>9</i>            | OBIO 8888                      | 2 or 8 cr<br>(depends on # taken in Summer 2) |

### Year 4

| <b>Fall</b>           | <i>Months 37-40</i> | <b>Spring</b>                        | <i>Months 41-45</i> | <b>Summer</b>          | <i>Months 46-48</i> |
|-----------------------|---------------------|--------------------------------------|---------------------|------------------------|---------------------|
| OBIO 8030             | 1 cr                | OBIO 8030                            | 1 cr                | Dissertation writing   |                     |
| Research              |                     | Month 43: 6 month seminar            |                     | Final oral examination |                     |
|                       |                     | Month 45: Begin writing dissertation |                     |                        |                     |
| <i>Total credits:</i> | <i>1</i>            | <i>Total credits:</i>                | <i>1</i>            |                        |                     |

All students, regardless of emphasis, must satisfy the following course requirements:

- Complete a major core curriculum of at least 24 credits.
- Complete 8 credits of oral biology topics courses (OBIO 8012, 8018, 8021-8028, 8371).
- Complete one statistics course (STAT 5021, PUBH 6450, PUBH 7445, or equivalent).
- Register and participate in the oral biology student seminar series (OBIO 8030) each semester for 10 semesters or until graduation, whichever comes first.
- Complete a designated minor (minimum 12 credits) in a nonclinical discipline.
- Register for 24 thesis credits (OBIO 8888) after passing the preliminary written and oral exams.

