课程编号 空间生物学(Space Biology)

1. 课堂讲授学时 **Lecture Hours： 28**
2. 课堂实验学时 **Laboratory Hours： 4**
3. 课下研讨学时 **Colloquia Hours： 0**
4. 学生课下投入学时 **Individual Study Hours：0**
5. 学分 **Credits：2**
6. 开课学年学期（如果有强制性的要求则必须填，否则可以不填） **Occurrence: Summer Course**
7. 先修课程 **Prerequisite(s): None**
8. 课程概要 **Course Description:** It delves into space biology frontiers and strategic national needs. It features expert lectures on space life sciences, astromedicine, and deep-space biotechnologies. Core modules include international space biology frontiers, microgravity cell biology, and space biotech applications, integrating cutting-edge methods and standards. Hands-on lab courses and project-based learning with simulated microgravity experiments and data analysis are offered at national key labs.
9. 课程预期学习成果 **Course Outcomes:**

   (1) Describe the basic concepts of space biology, including how microgravity affects living organisms.

   (2) Identify key technologies used in space life science research and deep-space exploration.

   (3) Work with peers to conduct simple simulated microgravity experiments and interpret basic experimental data.

   (4) Discuss the importance of space biology for future human space travel and national space programs.
10. 教学内容与学时分配 **Course Content, Laboratories and Laboratory Hours（有则填，没有则不填）, Colloquia Hours（有则填，没有则不填）：** 各章节目录与学时，实验内容与学时，研讨内容与学时

    (1) Introduction to Space Biology (4 Class Hour)

    - Classroom 3 hours
    - Discussion 1 hour

    (2) International Frontiers in Space Life Sciences (4 Class Hour)

    - Classroom 3 hours

- Guest lecture & Q&A 1 hour

(3) Microgravity Cell Biology (4 Class Hour)

- Classroom 3 hours
- Case study discussion 1 hour

(4) Space Biotechnology Applications (4 Class Hour)

- Classroom 2 hours
- Group discussion 1 hour
- In-class exercise 1 hour

(5) Experimental Methods & Simulated Microgravity (4 Class Hour)

- Classroom 2 hours
- Practice (data analysis) 2 hours

(6) Astromedicine & Deep Space Biotechnologies (4 Class Hour)

- Classroom 2 hours
- Student project presentations (integrated) 2 hours

(7) Research Frontiers & Future Challenges (4 Class Hour)

- Classroom 3 hours
- Final Q&A and wrap-up 1 hour

(8) Laboratory Visit & Hands-on Experiment (4 Class Hour)

- Lab orientation 1 hour
- Hands-on experiment 3 hours
- Location: Liangxiang Campus, Ecological Building, Building C

11. 考核与成绩评定 **Grading:**

Homework 1: 20%

Homework 2: 20%

Group presentation: 60%……

12. 教材，参考书 **Text & Reference Book:**

Ruyters, G., Betzel, C., Grimm, D. Biotechnology in Space. Springer, 2017. ISBN

978-3-319-64053-2.

Qian, A.-R., Lin, X., Patil, S. C., & Farooq, H. M. U. (Eds.). Space Biology and Space Biotechnology. 1st ed. Elsevier, 2025. ISBN 978-0-443-36338-2.

13. 编写教师 **Course Lecturer：**

Zhe Li

编写教师 **Course Lecturer**（签字）：