

# 课程大纲

## COURSE SYLLABUS

|                   |  |   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
|-------------------|--|---|------------------|----------------------|------------------|--|------------------|---|------------------|---|------------------|-------------------------------|------------------|--------------------------------|------------------|--|------------------|--|------------------|------------------------------------|-------------------|--|-------|--|
| 1.                | <b>课程代码/名称</b><br><b>Course Code/Title</b>                         | ESS5034 观测地震学 Observational Seismology  |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| 2.                | <b>课程性质</b><br><b>Compulsory/Elective</b>                          | 专业选修课 Major Elective Courses  |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| 3.                | <b>课程学分/学时</b><br><b>Course Credit/Hours</b>                       | 3/48  |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| 4.                | <b>授课语言</b><br><b>Teaching Language</b>                            | 中英双语 English & Chinese  |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| 5.                | <b>授课教师</b><br><b>Instructor(s)</b>                                | 俞春泉 Chunquan Yu   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| 6.                | <b>先修要求</b><br><b>Pre-requisites</b>                               | ESS308 地球物理学基础 I (地震学原理) (仅对本科生)<br>ESS308 Fundamentals of Geophysics I (Seismology)  |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| 7.                | <b>教学目标</b><br><b>Course Objectives</b>                            | <p>本课程旨在通过理论讲授和实际操作，让学生熟悉观测地震学的主要研究课题，并为进一步深入研究地震和地球结构做好准备。本课程讲授的内容包括地震数据采集，存储和转换，数据处理和分析，地震台网，台阵地震学，地震源特征描述，地震波传播和合成地震图，地震图解释，波形拟合，以及地球内部结构反演等。</p> <p>This course is designed to get students familiar with major research topics in observational earthquake seismology, and prepare them for further studies of earthquakes and Earth structures through both lectures and hands on practice. The topics covered in this course include seismic data acquisition, storage and conversion, data processing and analysis, seismic networks, array seismology, earthquake source characterization, seismic wave propagation and synthetic seismograms, seismogram interpretation, waveform modeling, structural inversion and so on.</p>   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| 8.                | <b>教学方法</b><br><b>Teaching Methods</b>                             | <p>本课程旨在通过理论讲授和实际操作，让学生熟悉观测地震学的主要研究课题，并为进一步深入研究地震和地球结构做好准备。</p>   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| 9.                | <b>教学内容</b><br><b>Course Contents</b>                              | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;"><b>Section 1</b></td> <td><b>课程概述 Overview</b></td> </tr> <tr> <td><b>Section 2</b></td> <td><b>地震图基础 Introduction to seismograms</b></td> </tr> <tr> <td><b>Section 3</b></td> <td><b>地震仪及地震数据获取 Seismometers and seismic data acquisition</b></td> </tr> <tr> <td><b>Section 4</b></td> <td><b>地震数据分析工具 Seismic data analysis tools</b></td> </tr> <tr> <td><b>Section 5</b></td> <td><b>台阵地震学 Array seismology</b></td> </tr> <tr> <td><b>Section 6</b></td> <td><b>地震震源 Earthquake sources</b></td> </tr> <tr> <td><b>Section 7</b></td> <td><b>理论和计算地震学 Theoretical and computational seismology</b></td> </tr> <tr> <td><b>Section 8</b></td> <td><b>地震图解释以及波形拟合 Seismogram interpretation and waveform modeling</b></td> </tr> <tr> <td><b>Section 9</b></td> <td><b>地球结构反演 Structural inversion</b></td> </tr> <tr> <td><b>Section 10</b></td> <td></td> </tr> <tr> <td>.....</td> <td></td> </tr> </table> | <b>Section 1</b> | <b>课程概述 Overview</b> | <b>Section 2</b> | <b>地震图基础 Introduction to seismograms</b> | <b>Section 3</b> | <b>地震仪及地震数据获取 Seismometers and seismic data acquisition</b> | <b>Section 4</b> | <b>地震数据分析工具 Seismic data analysis tools</b> | <b>Section 5</b> | <b>台阵地震学 Array seismology</b> | <b>Section 6</b> | <b>地震震源 Earthquake sources</b> | <b>Section 7</b> | <b>理论和计算地震学 Theoretical and computational seismology</b> | <b>Section 8</b> | <b>地震图解释以及波形拟合 Seismogram interpretation and waveform modeling</b> | <b>Section 9</b> | <b>地球结构反演 Structural inversion</b> | <b>Section 10</b> |  | ..... |  |
| <b>Section 1</b>  | <b>课程概述 Overview</b>   |   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| <b>Section 2</b>  | <b>地震图基础 Introduction to seismograms</b>                           |   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| <b>Section 3</b>  | <b>地震仪及地震数据获取 Seismometers and seismic data acquisition</b>        |   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| <b>Section 4</b>  | <b>地震数据分析工具 Seismic data analysis tools</b>                        |   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| <b>Section 5</b>  | <b>台阵地震学 Array seismology</b>                                      |   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| <b>Section 6</b>  | <b>地震震源 Earthquake sources</b>                                     |   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| <b>Section 7</b>  | <b>理论和计算地震学 Theoretical and computational seismology</b>           |   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| <b>Section 8</b>  | <b>地震图解释以及波形拟合 Seismogram interpretation and waveform modeling</b> |   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| <b>Section 9</b>  | <b>地球结构反演 Structural inversion</b>                                 |   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| <b>Section 10</b> |  |   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |
| .....             |  |   |                  |                      |                  |  |                  |   |                  |   |                  |                               |                  |                                |                  |  |                  |  |                  |                                    |                   |  |       |  |

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| <b>10.</b> | <b>课程考核</b><br><b>Course Assessment</b>  |
|            | 请再此注明：①考查/考试；②分数构成。<br>考查：出勤 10% + 课堂表现 10% + 课程项目 20% + 作业 30% + 期末报告 30%   |
| <b>11.</b> | <b>教材及其它参考资料</b><br><b>Textbook and Supplementary Readings</b>   |
|            | <ol style="list-style-type: none"> <li>1. Lay, T., &amp; T.C. Wallace, <i>Modern Global Seismology</i>, Academic Press, 1995.</li> <li>2. Bormann, P. (Ed.) (2012). <i>New Manual of Seismological Observatory Practice</i>, IASPEI, GFZ German Research Centre for Geosciences, Potsdam.</li> <li>3. Helffrich, G., J. Wookey, and I. Bastow. <i>The seismic analysis code: A primer and user's guide</i>. Cambridge University Press, 2013.</li> </ol> |