**FI585 Stellar Physics**

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| Module name: | Stellar physics | |
| Module level, if applicable: | Undergraduate | |
| Code: | FI585 | |
| Sub-heading, if applicable: | - | |
| Classes, if applicable: | - | |
| Semester: | 7th | |
| Module coordinator: | Judhistira Aria Utama | |
| Lecturer(s): | Judhistira Aria Utama | |
| Language: | Bahasa Indonesia | |
| Classification within the curriculum: | Elective course | |
| Type of Teaching | Contact hours per week during the semester | Class Size |
| 1. Lecture (conceptual, contextual and problem-solving approaches through expository, discussions and presentation)<br>2. Structured activities (assignments based on conceptual, contextual and problem-solving approaches, Presentation)<br>3. Self-study (project) | 150 minutes | 20 |
| Workload: | Total workload is 136 hours 4.8 ECTS (8.160 minutes) per semester which consists of 2100 minutes (1.22 ECTS) lectures, 2520 minutes (1.58 ECTS) structured activities, 2520 minutes (1.58 ECTS) self-study per week for 14 weeks, 400 minutes (0.2 ECTS) for each exam, and 480 (0.22 ECTS) minutes for each exam preparation. | |
| Credit points: | 4.8 ECTS | |
| Pre-requisites course(s): | FI121 Basic Physics I, FI340 Mechanics | |
| Course Learning Outcomes (CLO): | After taking this course the students have the ability to:<br>CLO1. Explain the stellar atmosphere modeling, including absorption coefficients, emission coefficient, and emission conductivity equation<br>CLO2. Explain the inner-stellar structure, including pressure, temperature, mass density, differential equations of star structure, energy generation mechanisms<br>CLO3. Explain the interstellar matter and its role and influence on astronomical observations<br>CLO4. Explain stellar evolution, starting from star formation and main-sequence evolution, late life-history star | |

<table>
<tr><td></td><td>CLO5. Explain the characteristic time scale of stellar evolution, including dynamic time scale, thermal time scale, nuclear time scale, of star clusters, including star populations, galactic clusters and globular clusters, isochrons, and cluster ages, and variable stars<br>CLO6. Solve the emission differential equations, differential equations of star structures<br>CLO7. Determine the age of star clusters<br>CLO8. Explain the spectroscopic observations in helping to understand the composition of celestial objects<br>CLO9. Disseminate the results of research/scientific study results in the form of reports following standard scientific principles in the study<br>CLO10. Process of data acquisition and ethics in the use of public data</td></tr>
<tr><td>Content:</td><td>The stellar atmosphere modeling, including absorption coefficients, emission coefficient, and emission conductivity equation. The inner-stellar structure including pressure, temperature, mass density, differential equations of star structure, energy generation mechanisms. The interstellar matter and its role and influence on astronomical observations. The stellar evolution, starting from star formation and main-sequence evolution, late life-history star. The characteristic time scale of stellar evolution, including dynamic time scale, thermal time scale, nuclear time scale, of star clusters, including star populations, galactic clusters, and globular clusters, isochrons and cluster ages, and variable stars. The age of star clusters, the spectroscopic observations in helping to understand the composition of celestial objects</td></tr>
<tr><td>Study/exam achievements:</td><td>The final mark will be weight as follow:
<table>
<tr><th>No</th><th>CLO</th><th>Assessment Object</th><th>Assessment Techniques</th><th>Weight</th></tr>
<tr><td>1<br><br><br>2<br><br>3</td><td>1 – 3<br><br><br>4 – 8<br><br>9 – 10</td><td>Subject specific competence:<br>a. Individual assignments<br>b. Mid Exam<br>c. Individual assignments<br>d. Final Exam<br>e. Project presentation</td><td><br><br>Written<br>Written test<br><br>Written<br>Written test<br><br>Performance</td><td><br><br>15%<br>25%<br><br>15%<br>25%<br><br>20%</td></tr>
<tr><td colspan="4">Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Forms of media:</td><td>Board, LCD Projector, Laptop/Computer, LMS</td></tr>
<tr><td>Literature:</td><td>1. Karttunen, H. et al. (2017). Fundamental Astronomy 6th Edition. Springer.<br>2. Prialnik, D. (2009), An Introduction to the Theory of Stellar Structure and Evolution, 2nd Edition, Cambridge University Press<br>3. LeBlanc, F. (2010). An introduction to stellar astrophysics. Wiley.<br>4. Carroll, B.W., Ostlie, D.A. (2007). An Introduction to Modern Astrophysics 2nd Edition. Pearson Addison Wesley.</td></tr>
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**PLO and CLO mapping**

| | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 | PLO11 | PLO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLO1 | | √ | | | | | | | | | | |
| CLO2 | | √ | | | | | | | | | | |
| CLO3 | | √ | | | | | | | | | | |
| CLO4 | | √ | | | | | | | | | | |
| CLO5 | | √ | | | | | | | | | | |
| CLO6 | | √ | | | | | | | | | | |
| CLO7 | | √ | | | | | | | | | | |
| CLO8 | | √ | | | | | | | | | | |
| CLO9 | | √ | | | | | | | | | | |
| CLO10 | | √ | | | | | | | | | | |