

An Experiment with Open-Source Introduction to Astronomy
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Abstract:

The cost of higher education is going up at the same time that federal support for higher education is going down. The cost of buying text books is becoming a major hardship at schools who have a large number of students from non-privileged backgrounds. In an attempt to reach more students, we are starting a project to provide freely down loadable texts and labs using the a modified wiki model. The content will be primarily submitted by users of the texts. Proposed content will be submitted to an editor, and chapters will be peer reviewed.

FreeSTAR: Free Standard Text for Astronomy with Resources

Rational:

With the sequester, the most needy college students may loose up to \$1000 a year in aid. Students complain about not having enough money to buy textbooks, while at the same time a growing number are carrying tablets. The era of the printed text is starting to fade, just of the era of the photographic plate started to wane in the 80s. The future of astronomy education is on screen not on paper. The bulk of students taking Introduction to Astronomy are not at elite private universities. They are at community colleges and state universities; and many are greatly financially overextended. The introduction of a free astronomy text book will save students thousands of dollars at my university alone; and \$10,000s to \$100,000s for students nation wide.

Existing Models:

Free down-loadable texts are already available in Physics and other science fields (<http://openstaxcollege.org/textbooks/college-physics>); but there is not one in Astronomy that I have found yet. There is a free wiki model text available on-line at (http://en.wikibooks.org/wiki/General_Astronomy) but the text is not formally peer reviewed and can change as a semester goes on. A changing text complicates assignments and quality assurance.

Text Level: The text will be aimed at a broad audience, but standards based. The text will be useful to in a teacher education curriculum because the K-12 Earth science, space science, and astronomy standards will be addressed.

Proposed Model:

1. We will start simple and the text will be PDF format. Active web and other versions would be later.
2. Download from website.
3. Users may download PDF of full text or individual chapters.
4. Presentation Format: Topic, telling question(s), news paper information mode; i.e. summary of main ideas first followed by more detailed and developed

information. Why? Most students do not really read a text. Give students who want a C the information needed to get a C. Give students who want an A the information needed to get an A.

5. To allow the text to be used at more than one mathematical level, numerical mathematical examples will be presented as Mathematics Focus sections in separate boxes.

6. Initially there will be study questions after chapters, later we hope to add interactive project ideas.

7. Update continuously using errata and supplements. Update periodically (on a semester basis) with dated editions.

FreeSTAR

Free Standard Text for Astronomy with Resources

Initial Units

Introduction to Astronomy

Chapters

0. Mathematical Tools

1. Astronomy overview

2. Naked eye astronomy

Road to Astronomy: Development of astronomy and Physics needed to understand astronomy

3. Early history of astronomy

4. Newton and Beyond (Physics)

5. Light

6. Telescopes

The Solar system

7. The Earth as a planet

8. Solar system compare and contrast (include formation here)

9. Terrestrial Planets

10. Jovian Planets

11. Other solar system objects

Stars

12. The Sun as a star

13. Measuring stars and stellar characteristics

14. Star formation and stellar fusion life time

15. Star Death and stellar corpses (physics)

16. Extra-solar Planets

17. Life in the Universe

The Galaxy and Beyond

18. The Milky Way

19. Typical Galaxies

20. Galaxies: change over time, change over space, extreme physics in galaxies

21. Cosmology

Volunteers Needed

Positions:

Advisory Board: determine priorities, goals, and procedures for FreeSTAR

Chapter Co-authors: write a chapter

Chapter Editors: update and maintain a chapter (You may both write and edit.)

Reviewers: review a chapter

Graphics artists: help with graphic on a chapter

Associate Editors: e.g. graphics editor, pedagogy editor, copy editor, propose one

Who:

Graduate Students teaching Astronomy (build up your CV)

Junior Faculty teaching Astronomy (build up your tenure portfolio)

Community College Faculty teaching Astronomy (help out your students)

All others interested in Astronomy teaching (help out our community)

Initial Goal: Release of PDF version of text by August 2014.

Work Method: remote

Collaboration in Google+, e-mail, phone, etc.

Sign up to help:

Sign up sheet here (choose chapter and/or role)

E-mail at freestarproject@gmail.com

Go to survey monkey at <http://www.surveymonkey.com/s/2XWLX9W>

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