

Course Student Learning Outcomes Assessment

ASTR 112 Introduction to Cosmology

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General Information (Course Student Learning Outcomes Assessment)

Standing Requirements

📖 Course Description

An introduction to the origin structure and evolution of the universe with an emphasis on major cosmological models. Discussions will include fundamental concepts of light and matter and their connections to current research including dark matter and dark energy and their implications for the fate of the universe.

📖 Course Student Learning Outcomes

ASTR 112 Introduction to Cosmology Outcome Set

Outcome

Outcome

Mapping

Outcome 1

Upon successful completion of the course, students should be able to discuss how light is used by astronomers to learn about the universe as well as everyday phenomena.

Institutional Student Learning Outcomes: Act 1, Act 3, Communicate 1, Learn 1, Think 1, Think 2

Outcome 2

Upon successful completion of the course, students should be able to discuss how gravity is related to the formation, interaction and evolution of objects in the universe, including those on Earth.

Institutional Student Learning Outcomes: Act 1, Act 3, Communicate 1, Learn 1, Think 1, Think 2

Outcome 3

Upon successful completion of the course, students should be able to demonstrate a thorough understanding of how empirical observations led to current accepted theories in cosmology.

Institutional Student Learning Outcomes: Act 1, Act 3, Communicate 1, Learn 1, Think 1, Think 2

2014-2015 Assessment Cycle

Measurements

Outcomes and Measures

ASTR 112 Introduction to Cosmology Outcome Set

Outcome

Outcome 1

Upon successful completion of the course, students should be able to discuss how light is used by astronomers to learn about the universe as well as everyday phenomena.

▼ **Measure:** Final Exam Embedded question
Course level; Direct - Exam

Description of Measurement Tool: Embedded exam questions, pertaining to specific astronomical phenomena, are analyzed and scored to assess the student's mastery of a given topic.

Criteria for Success: Individual & Collective Student Criterion: A successful student must score 60% or higher on the embedded questions to be successful. A class is successful if 60% of the students are successful in achieving the outcome.

Cycle of Assessment: Adopted Cycle of assessment (only a spring semester course):

Data Gathered: Spring 2015, 2016, 2017, 2018

Data Analyzed: Summer 2015, 2016, 2017, 2018

Data Reported: Fall 2015, 2016, 2017, 2018

Who is Responsible for Assessment Activity?: The instructor of record for the sections is responsible for administering the assessment and collection of data. Spring 2015 assessment was coordinated, analyzed, and reported by Professor Barembaum.

Outcome 2

Upon successful completion of the course, students should be able to discuss how gravity is related to the formation, interaction and evolution of objects in the universe, including those on Earth.

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Course level; Direct - Exam

Description of Measurement Tool: Embedded exam questions, pertaining to specific astronomical phenomena, are analyzed and scored to assess the student's mastery of a given topic.

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Outcome 3

Upon successful completion of the course, students should be able to demonstrate a thorough understanding of how empirical observations led to current accepted theories in cosmology.

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Findings

Finding per Measure

ASTR 112 Introduction to Cosmology Outcome Set

Outcome

Outcome 1

Upon successful completion of the course, students should be able to discuss how light is used by astronomers to learn about the universe as well as everyday phenomena.

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Data Reported: Fall 2015, 2016, 2017, 2018

Who is Responsible for Assessment Activity?: The instructor of record for the sections is responsible for administering the assessment and collection of data. Spring 2015 assessment was coordinated, analyzed, and reported by Professor Barembaum.

Findings for Final Exam Embedded question

Summary of Findings: 10 questions were embedded into the final exam that 28 students took. An average over the ten questions found that 76% of the student successfully answered the questions. Of the ten questions, 8 questions had success rates over 60%. The two of the remaining questions had a success rate had a success rate of 57% and the third had a success rate of 39%.

Results: Criteria for Success Achievement Status: Exceeded

Analysis of Findings: At an overall success rate of 76%, we are confident that the students can discuss how light is used by astronomers to learn about the universe.

Recommendations: Faculty are encouraged to continue to seek ways to improve instruction including student-centered format. Faculty are encouraged to review exam questions and ascertain whether those questions continue to be appropriate. Faculty should also review previous year's assessment to determine whether the 60% threshold should be revised upward.

Outcome 2

Upon successful completion of the course, students should be able to discuss how gravity is related to the formation, interaction and evolution of objects in the universe, including those on Earth.

▼ **Measure:** Final Exam Embedded question
Course level; Direct - Exam

Description of Measurement Tool: Embedded exam questions, pertaining to specific astronomical phenomena, are analyzed and scored to assess the student's mastery of a given topic.

Criteria for Success: Individual & Collective Student Criterion: A successful student must score 60% or higher on the embedded questions to be successful. A class is successful if 60% of

the students are successful in achieving the outcome.

Cycle of Assessment: Data Gathered: Spring 2015, analyzed and reported Fall 2015.

Adopted Cycle of assessment (only a spring semester course):

Data Gathered: Spring 2015, 2016, 2017, 2018

Data Analyzed: Summer 2015, 2016, 2017, 2018

Data Reported: Fall 2015, 2016, 2017, 2018

Who is Responsible for Assessment Activity?: The instructor of record for the sections is responsible for administering the assessment and collection of data. Spring 2015 assessment was coordinated, analyzed, and reported by Professor Barembaum.

Findings for Final Exam Embedded question

Summary of Findings: Eight questions were embedded into the final exam that 28 students took. An average over the eight questions found that 74% of the students successfully answered the questions. Of the eight questions, five questions had success rates over 60%. The remaining questions had success rates of 57% and 18%. The average success rate of the questions (excluding the question with 18% success rate) is 82%.

Results: Criteria for Success Achievement Status: Exceeded

Analysis of Findings: The overall success rate was 74%. At an overall success rate of 74%, we are confident that the students can discuss how gravity is related to the formation, interaction and evolution of the objects in the universe. The question with an 18% success rate requires students to consider how two variables would affect the force simultaneously. Students consistently struggle with that question.

Recommendations: Faculty are encouraged to continue to seek ways to improve instruction including student-centered format. Faculty are encouraged to review exam questions and ascertain whether those questions continue to be appropriate. The question with the poor success rate should be reviewed and modified. Faculty should also review previous year's assessment to determine whether the 60% threshold should be revised upward.

Outcome 3

Upon successful completion of the course, students should be able to demonstrate a thorough understanding of how empirical observations led to current accepted theories in cosmology.

▼ **Measure:** Final Exam Embedded question
Course level; Direct - Exam

Description of Measurement Tool: Embedded exam questions, pertaining to specific astronomical phenomena, are analyzed and scored to assess the student's mastery of a given topic.

Criteria for Success: Individual & Collective Student Criterion: A successful student must score 60% or higher on the embedded questions to be successful. A class is successful if 60% of the students are successful in achieving the outcome.

Cycle of Assessment: Adopted Cycle of assessment (only a spring semester course):

Data Gathered: Spring 2015, 2016, 2017, 2018

Data Analyzed: Summer 2015, 2016, 2017, 2018

Data Reported: Fall 2015, 2016, 2017, 2018

Who is Responsible for Assessment Activity?: The instructor of record for the sections is responsible for administering the assessment and collection of data. Spring 2015 assessment was coordinated, analyzed, and reported by Professor Barembaum.

Findings for Final Exam Embedded question

Summary of Findings: 15 questions were embedded into the final exam that 28 students took. An average over the fifteen questions found that 68% of the student successfully answered the questions. Of the fifteen questions, eleven questions had success rates over 60%. The remaining questions had success rates of 32%, 20%, 20%, and 43%. When these four questions are removed from the average, the success rate for the remaining eleven questions is 74%.

Results: Criteria for Success Achievement Status: Met

Analysis of Findings: At an overall success rate of 68%, we are confident that the students are able to demonstrate a thorough understanding of how empirical observations lead to currently

accepted theories in cosmology.

Recommendations: Faculty are encouraged to continue to seek ways to improve instruction including student-centered format. Faculty are encouraged to review the exam questions and ascertain whether those questions continue to be appropriate. In particular, those four under-performing questions should be reviewed. Faculty should also review previous year's assessment to determine whether the 60% threshold should be revised upward.

Overall Recommendations

No text specified

Plans of Action

Status Reports

2013-2014 Assessment Cycle

Measurements

Outcomes and Measures

ASTR 112 Introduction to Cosmology Outcome Set

Outcome

Outcome 1

Upon successful completion of the course, students should be able to discuss how light is used by astronomers to learn about the universe as well as everyday phenomena.

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Course level; Direct - Exam

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Criteria for Success: Individual & Collective Student Criterion: A successful student must score 60% or higher on each embedded question to be successful. A class is successful if 60% of the students are successful in achieving the outcome.

Cycle of Assessment: Data Gathered: Spring 2013, analyzed and reported Fall 2014
Adopted Cycle of assessment (only a spring semester course):

Data Gathered: Spring 2014, 2015, 2016, 2017, 2018 (yearly until course is offered in Fall semester.

Data Analyzed: Summer 2014, 2015, 2016, 2017, 2018 (yearly until course is offered in Fall semester.

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Who is Responsible for Assessment Activity?: The instructor of record for the sections is responsible for administering the assessment and collection of data. Spring 2013 assessment was coordinated, analyzed, and reported by Professor Barembaum.

Outcome 2

Upon successful completion of the course, students should be able to discuss how gravity is related to the formation, interaction and evolution of objects in the universe, including those on Earth.

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Course level; Direct - Exam

Description of Measurement Tool: Embedded exam questions, pertaining to specific astronomical phenomena, are analyzed and scored to assess the student's mastery of a given topic.

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Outcome 3

Upon successful completion of the course, students should be able to

▼ **Measure:** Final Exam Embedded question
Course level; Direct - Exam

demonstrate a thorough understanding of how empirical observations led to current accepted theories in cosmology.

Description of Measurement Tool: Embedded exam questions, pertaining to specific astronomical phenomena, are analyzed and scored to assess the student's mastery of a given topic.

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Findings

Finding per Measure

ASTR 112 Introduction to Cosmology Outcome Set

Outcome

Outcome 1

Upon successful completion of the course, students should be able to discuss how light is used by astronomers to learn about the universe as well as everyday phenomena.

▼ Measure: Final Exam Embedded question Course level; Direct - Exam

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Who is Responsible for Assessment Activity?: The instructor of record for the sections is responsible for administering the assessment and collection of data. Spring 2013 assessment was coordinated, analyzed, and reported by Professor Barembaum.

Findings for Final Exam Embedded question

Summary of Findings: Seven questions were embedded into the final exam.

Twenty-six students took the final exam. An average over the seven questions found that 86.81% of the student successfully answered the questions. Of the seven questions, six questions had success rates over 60%. The remaining question had a success rate had a success rate of 53%.

Results: Criteria for Success Achievement Status: Exceeded

Analysis of Findings: The overall success rate of 86.81%. At an overall success rate of 86.81%, we are confident that the students can discuss how light is used by astronomers to learn about the universe.

Recommendations: Faculty are encouraged to continue to seek ways to improve instruction including student-centered format. Faculty are encouraged to review exam questions and ascertain whether those questions continue to be appropriate. Faculty should also review previous year's assessment to determine whether the 60% threshold should be revised upward.

Outcome 2

Upon successful completion of the course, students should be able to discuss how gravity is related to the formation, interaction and evolution of objects in the universe, including those on Earth.

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Findings for Final Exam Embedded question

Summary of Findings: Eight questions were embedded into the final exam.

Twenty-six students took the final exam. An average over the eight questions found that 78.4% of the student successfully answered the questions. Of the eight questions, seven questions had success rates over 60%. The remaining question had a success rate had a success rate of 42%.

Results: Criteria for Success Achievement Status: Exceeded

Analysis of Findings: The overall success rate was 78.4%. At an overall success rate of 78.4%, we are confident that the students can discuss how gravity is related to the formation, interaction and evolution of the objects in the universe.

Recommendations: Faculty are encouraged to continue to seek ways to improve instruction including student-centered format. Faculty are encouraged to review exam questions and ascertain whether those questions continue to be appropriate. Faculty should also review previous year's assessment to determine whether the 60% threshold should be revised upward.

Outcome 3

Upon successful completion of the course, students should be able to demonstrate a thorough understanding of how empirical observations led to current accepted theories in cosmology.

▼ **Measure:** Final Exam Embedded question
Course level; Direct - Exam

Description of Measurement Tool: Embedded exam questions, pertaining to specific astronomical phenomena, are analyzed and scored to assess the student's mastery of a given topic.

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Who is Responsible for Assessment Activity?: The instructor of record for the sections is responsible for administering the assessment and collection of data. Spring 2013 assessment was coordinated, analyzed, and reported by Professor Barembaum.

Findings for Final Exam Embedded question

Summary of Findings: Ten questions were embedded into the final exam.

Twenty-six students took the final exam. An average over the ten questions found that 73.0% of the student successfully answered the questions. Of the ten questions, eight questions had success rates over 60%. The remaining questions had success rates of 54% and 38%.

Results: Criteria for Success Achievement Status: Exceeded

Analysis of Findings: The overall success rate of 73.0% .At an overall success rate of 73.0%, we are confident that the students are able to demonstrate a thorough understanding of how empirical observations lead to currently accepted theories in cosmology.

Recommendations: Faculty are encouraged to continue to seek ways to improve instruction including student-centered format. Faculty are encouraged to review exam questions and ascertain whether those questions continue to be appropriate. Faculty should also review previous year's assessment to determine whether the 60% threshold should be revised upward.

Overall Recommendations

No text specified

Plans of Action

Status Reports

2012-2013 Assessment Cycle

Measurements

Outcomes and Measures

ASTR 112 Introduction to Cosmology Outcome Set

Outcome

Outcome 1

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Cycle of Assessment: The outcome is assessed during the Spring semester of even-numbered years.

Who is Responsible for Assessment Activity?: The instructor of record is responsible for administering the assessment. The department chair is responsible for compiling the data and sharing the results with the entire department.

Outcome 2

Upon successful completion of the course, students should be able to discuss how gravity is related to the formation, interaction and evolution of objects in the universe, including those on Earth.

▼ **Measure:** Embedded Exam Questions
Course level; Direct - Exam

Description of Measurement Tool: Embedded exam questions, pertaining to specific astronomical phenomena, are analyzed and score to assess the student's mastery of a given topic.

Criteria for Success: Individual & Collective Student Criterion: A class is successful if 60% of students are successful in achieving this outcome.

Cycle of Assessment: The outcome is assessed during the Spring semester.

Who is Responsible for Assessment Activity?: The instructor teaching the the course is responsible for the assessment.

Outcome 3

Upon successful completion of the course, students should be able to demonstrate a thorough understanding of how empirical observations led to current accepted theories in cosmology.

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Direct - Exam

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Findings

Finding per Measure

ASTR 112 Introduction to Cosmology Outcome Set

Outcome

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Summary of Findings: Seven questions were embedded into the final exam.

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Results: Criteria for Success Achievement Status: Met

Analysis of Findings: The overall success rate of 86.81%. At an overall success rate of 86.81%, we are confident that the students can discuss how light is used by astronomers to learn about the universe.

Recommendations: Faculty are encouraged to continue to seek ways to improve instruction including student-centered format. Faculty are encouraged to review exam questions and ascertain whether those questions continue to be appropriate.

Outcome 2

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Outcome 3

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Recommendations: Faculty are encouraged to continue to seek ways to improve instruction including student-centered format. Faculty are encouraged to review exam questions and ascertain whether those questions continue to be appropriate.

Overall Recommendations

No text specified

 **Plans of Action**

Actions

ASTR 112 Introduction to Cosmology Outcome Set

Outcome

Outcome 1

No actions specified

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the universe as well as
everyday phenomena.

Status Reports

Action Statuses

ASTR 112 Introduction to Cosmology Outcome Set

Outcome

Outcome 1

No actions specified

Upon successful completion of the course, students should be able to discuss how light is used by astronomers to learn about the universe as well as everyday phenomena.

Status Summary

No text specified

Summary of Next Steps

No text specified