Academic Plan: Associate of Science - Physics

# Catalog Year: 2020/2021

# Total Credits: 60

The purpose of a statewide articulation agreement is to identify the courses a student at a Colorado public community college must complete as part of an AA/AS degree to be guaranteed to be able to complete the designated baccalaureate degree program at any public four-year college and university (hereafter referred to as receiving institutions) that offers that program within the minimum number of credits designated by the Colorado Commission on Higher Education.

# A - General Education Courses.

Arts / Humanities GT-AH1-AH43

Arts / Humanities GT-AH1-AH43

Arts / Humanities GT-AH1-AH43

ENG 121 - English Composition I: GT-CO1\*3

ENG 122 - English Composition II: GT-CO23

History GT-HI13

MAT 201 - Calculus I: GT-MA15

PHY 211 - Physics: Calculus-Based I with Lab: GT-SC1\*5

PHY 212 - Physics: Calculus-Based II with Lab: GT-SC1\*5

Social / Behavioral Science GT-SS33

# B - Additional Required Courses.

CHE 111 - General College Chemistry I with Lab: GT-SC1\*5

CHE 112 - General College Chemistry II GT-SC1 OR CSC 160 - Computer Science I\*4-5

MAT 202 - Calculus II: GT-MA15

MAT 203 - Calculus III OR MAT 204 - Calculus III w/Engineering Applications4-5

MAT 265 - Differential Equations OR MAT 261 - Differential Equations with Engineering Applications OR MAT 266 Differential Equations with Linear Algebra GT-MA1 3-4

PHY 213 - Physics III: Calculus-Based Modern Physics3

# Pre-Requisites, Co-Requisites, and Recommendations (grade C or better required)

Where requirements are listed as course categories (e.g. Electives, Arts/Humanities) rather than as specific courses, please note that depending upon course choice, pre-requisites may be required.

CHE 111 - General College Chemistry I with Lab: GT-SC1\*

Pre-Requisite: MAT 121 - College Algebra: GT-MA1 or equivalent placement scores

ENG 121 - English Composition I: GT-CO1\*

Co-Requisite: CCR 094 - Studio 121

ENG 122 - English Composition II: GT-CO2

Pre-Requisite: ENG 121 - English Composition I OR ENG 131 - Technical Writing I

MAT 201 - Calculus I: GT-MA1

Pre-Requisite: MAT 122 - College Trigonometry: GT-MA1 OR MAT 166 - Pre-Calculus: GT-MA1

MAT 202 - Calculus II: GT-MA1

Pre-Requisite: MAT 201 - Calculus I: GT-MA1

PHY 211 - Physics: Calculus-Based I with Lab: GT-SC1\*

Pre-Requisite: MAT 201 - Calculus I: GT-MA1

PHY 212 - Physics: Calculus-Based II with Lab: GT-SC1\*

Pre-Requisite: MAT 201 - Calculus I: GT-MA1

Pre-Requisite: PHY 211 - Physics: Calculus-Based I with Lab: GT-SC1

MAT 203 - Calculus III OR MAT 204 - Calculus III w/Engineering Applications

Pre-Requisite: MAT 202 - Calculus II: GT-MA1

PHY 213 - Physics III: Calculus-Based Modern Physics

Pre-Requisite: PHY 212 - Physics: Calculus-Based II with Lab: GT-SC1

MAT 265 - Differential Equations OR MAT 261 - Differential Equations with Engineering Applications OR MAT

Pre-Requisite: MAT 203 - Calculus III OR MAT 204 - Calculus III w/Engineering Applications

Pre-Requisite: MAT 204 - Calculus III with Engineering Applications: GT-MA1

CHE 112 - General College Chemistry II GT-SC1 OR CSC 160 - Computer Science I\*

Pre-Requisite: For CHE 112: CHE 111 and MAT 121

Pre-Requisite: For CSC 160: CSC 116 or CSC 119 and MAT 055/099 or higher

# Program Outcomes

Be prepared to successfully transfer to a Bachelor's program in physics.

Discuss and communicate foundational theories of physics and the evidence for these theories.

Use appropriate mathematical models to describe physical phenomena.

Perform experiments to reinforce physical models and discuss the limitations of these experiments.

# Notes

\*This course requires college level readiness as measured by Accuplacer, ACT, or SAT scores; approved high school course work that is less than five years old; or successful completion of appropriate college-readiness course.

AAA 101 – College 101: Student Experience is required for all new college students seeking degrees or transfer.

Course availability is subject to change.

Follow the Recommended Course Sequence on the following pages of this document.

In order to meet program requirements, students registered for ENG 121 or ENG 131 must also register for CCR 094 unless they can demonstrate otherwise meeting the CCR 094 standard through assessment testing, prior college coursework, or recent High School coursework. See an Advisor for details.

Recommended courses are listed above for certain electives; consult with the Academic Advising Office

(advising@arapahoe.edu or 303.797.5664) or the Physics Department for additional elective recommendations.

Refer to 20/21 catalog for specific requirements and important information about this degree.

Students planning to transfer to Fort Lewis College or University of Colorado - Colorado Springs must take both CSC 160 and CHE 112.

Students planning to transfer to University of Colorado Boulder must take CHE 112 (not CSC 160).

Students planning to transfer to University of Northern Colorado must take CSC 160 (not CHE 112).

The Colorado Department of Higher Education website has additional information about this statewide agreement.

# Graduation Requirements

All courses required for this degree must be completed with a "C" or better to be considered for transfer to another Colorado institution. Transferability of courses to colleges or universities outside of Colorado is determined by the receiving institution.

To graduate, students must apply for graduation [here](http://www.arapahoe.edu/departments-and-programs/graduation) by the deadline and meet all degree requirements.

# RECOMMENDED COURSE SEQUENCE FULL-TIME TRACK

## Year 1: Fall

3Arts / Humanities GT-AH1-AH4

~Recommended Arts / Humanities Course(s)~

ART 110 - Art Appreciation GT-AH1\*

HUM 115 - World Mythology: GT-AH2\*

LIT 115 - Introduction to Literature I: GT-AH2\*

MUS 120 - Music Appreciation: GT-AH1\*

PHI 112 - Ethics: GT-AH3\*

PHI 218 - Environmental Ethics: GT-AH3\*

SPA 211 - Spanish Language III: GT-AH4

5CHE 111 - General College Chemistry I with Lab: GT-SC1

3ENG 121 - English Composition I: GT-CO1

5MAT 201 - Calculus I: GT-MA1

## Year 1: Spring

3Arts / Humanities GT-AH1-AH4

~Recommended Arts / Humanities Course(s)~

ART 112 - Art History Renaissance to Modern: GT-AH1\*

HUM 115 - World Mythology: GT-AH2\*

HUM 121 - Humanities: Early Civilization: GT-AH2\*

MUS 125 - History of Jazz: GT-AH1\*

PHI 111 - Introduction to Philosophy: GT-AH3\*

PHI 113 - Logic: GT-AH3\*

PHI 114 - Comparative Religions: GT-AH3\*

3ENG 122 - English Composition II: GT-CO2

5MAT 202 - Calculus II: GT-MA1

5PHY 211 - Physics: Calculus-Based I with Lab: GT-SC1

## Year 2: Fall

4-5CHE 112 - General College Chemistry II GT-SC1 OR CSC 160 - Computer Science I

~Recommended Course(s)~

CSC 160 - Computer Science I\*

3History GT-HI1

~Recommended History Course(s)~

HIS 101 - Western Civilization: Antiquity-1650: GT-HI1\*

HIS 102 - Western Civilization: 1650-Present: GT-HI1\*

HIS 111 - The World: Antiquity-1500: GT-HI1\*

HIS 112 - The World: 1500-Present: GT-HI1\*

HIS 121 - U.S. History to Reconstruction\*

HIS 225 - Colorado History: GT-HI1\*

HIS 247 - 20th Century World History: GT-HI1\*

4-5MAT 203 - Calculus III OR MAT 204 - Calculus III w/Engineering Applications

~Recommended Math Course(s)~

MAT 203 - Calculus III: GT-MA1

5PHY 212 - Physics: Calculus-Based II with Lab: GT-SC1

## Year 2: Spring

3Arts / Humanities GT-AH1-AH4

~Recommended Arts / Humanities Course(s)~

ART 110 - Art Appreciation GT-AH1\*

HUM 123 - Humanities: Modern World: GT-AH2\*

MUS 120 - Music Appreciation: GT-AH1\*

MUS 125 - History of Jazz: GT-AH1\*

PHI 112 - Ethics: GT-AH3\*

PHI 218 - Environmental Ethics: GT-AH3\*

SPA 212 - Spanish Language IV: GT-AH4

3-4MAT 265 - Differential Equations OR MAT 261 - Differential Equations with Engineering

Applications

~Recommended Math Course(s)~

MAT 265 - Differential Equations: GT-MA1

3PHY 213 - Physics III: Calculus-Based Modern Physics

3Social / Behavioral Science GT-SS3

~Recommended Social / Behavioral Science Course(s)~

ANT 107 - Introduction to Archaeology: GT-SS3\*

COM 220 - Intercultural Communication: GT-SS3\*

ECO 201 - Principles of Macroeconomics: GT-SS1\*

GEO 105 - World Regional Geography: GT-SS2\*

PSY 101 - General Psychology I: GT-SS3\*

PSY 102 - General Psychology II: GT-SS3\*

SOC 207 - Environmental Sociology: GT-SS3\*

# RECOMMENDED COURSE SEQUENCE PART-TIME TRACK

## Year 1: Fall

3ENG 121 - English Composition I: GT-CO1

5MAT 201 - Calculus I: GT-MA1

## Year 1: Spring

3Arts / Humanities GT-AH1-AH4

~Recommended Arts / Humanities Course(s)~

ART 110 - Art Appreciation GT-AH1\*

HUM 115 - World Mythology: GT-AH2\*

LIT 115 - Introduction to Literature I: GT-AH2\*

MUS 120 - Music Appreciation: GT-AH1\*

PHI 112 - Ethics: GT-AH3\*

PHI 218 - Environmental Ethics: GT-AH3\*

SPA 211 - Spanish Language III: GT-AH4

5PHY 211 - Physics: Calculus-Based I with Lab: GT-SC1

## Year 1: Summer

3Arts / Humanities GT-AH1-AH4

~Recommended Arts / Humanities Course(s)~

ART 112 - Art History Renaissance to Modern: GT-AH1\*

HUM 115 - World Mythology: GT-AH2\*

HUM 121 - Humanities: Early Civilization: GT-AH2\*

MUS 125 - History of Jazz: GT-AH1\*

PHI 111 - Introduction to Philosophy: GT-AH3\*

PHI 113 - Logic: GT-AH3\*

PHI 114 - Comparative Religions: GT-AH3\*

3History GT-HI1

~Recommended History Course(s)~

HIS 101 - Western Civilization: Antiquity-1650: GT-HI1\*

HIS 102 - Western Civilization: 1650-Present: GT-HI1\*

HIS 111 - The World: Antiquity-1500: GT-HI1\*

HIS 112 - The World: 1500-Present: GT-HI1\*

HIS 121 - U.S. History to Reconstruction\*

HIS 225 - Colorado History: GT-HI1\*

HIS 247 - 20th Century World History: GT-HI1\*

## Year 2: Fall

3ENG 122 - English Composition II: GT-CO2

5MAT 202 - Calculus II: GT-MA1

## Year 2: Spring

5CHE 111 - General College Chemistry I with Lab: GT-SC1

5PHY 212 - Physics: Calculus-Based II with Lab: GT-SC1

## Year 2: Summer

3Arts / Humanities GT-AH1-AH4

~Recommended Arts / Humanities Course(s)~

ART 110 - Art Appreciation GT-AH1\*

HUM 123 - Humanities: Modern World: GT-AH2\*

MUS 120 - Music Appreciation: GT-AH1\*

MUS 125 - History of Jazz: GT-AH1\*

PHI 112 - Ethics: GT-AH3\*

PHI 218 - Environmental Ethics: GT-AH3\*

SPA 212 - Spanish Language IV: GT-AH4

3Social / Behavioral Science GT-SS3

~Recommended Social / Behavioral Science Course(s)~

ANT 107 - Introduction to Archaeology: GT-SS3\*

COM 220 - Intercultural Communication: GT-SS3\*

ECO 201 - Principles of Macroeconomics: GT-SS1\*

GEO 105 - World Regional Geography: GT-SS2\*

PSY 101 - General Psychology I: GT-SS3\*

PSY 102 - General Psychology II: GT-SS3\*

SOC 207 - Environmental Sociology: GT-SS3\*

## Year 3: Fall

4-5CHE 112 - General College Chemistry II GT-SC1 OR CSC 160 - Computer Science I

~Recommended Course(s)~

CSC 160 - Computer Science I\*

4-5MAT 203 - Calculus III OR MAT 204 - Calculus III w/Engineering Applications

~Recommended Math Course(s)~

MAT 203 - Calculus III: GT-MA1

## Year 3: Spring

3-4MAT 265 - Differential Equations OR MAT 261 - Differential Equations with Engineering

Applications

~Recommended Math Course(s)~

MAT 265 - Differential Equations: GT-MA1

3PHY 213 - Physics III: Calculus-Based Modern Physics