

Appendix E
College of Micronesia-FSM

Course Modification Request

SC 130 Physical Science
Course Number and Title

Division of Natural Sciences and Mathematics
Department

No change
Recommended Course Number and Title

No Change
Department

New Course Objectives:

Course objectives unchanged from prior outline.

New Course Description:

Course description retained from prior description.

Justification for Revising the Course:

New outline format requirements.

Division Chairperson

Date

Chairperson, Curriculum Committee

Date

President, COM-FSM

Date

Official Use Only

New Course Number and Title:

APPENDIX C

COLLEGE OF MICRONESIA-FSM

COURSE OUTLINE COVER PAGE

Physical Science
Course Title

Division of Natural Sciences and Mathematics SC 130
Department and Number

Course Description: A one semester natural science with laboratory course exploring motion, dynamics, heat, earth sciences, weather, climate, sound, optics, light, electricity, chemistry, and astronomy, with a focus on mathematical models and an emphasis on written communication skills.

Course Prepared by: Dana Lee Ling Campus/site: National site

Course Type	Hours Per Week	No. of weeks	Total Hrs	Divisor	Sem. Credits
Lecture	3	× 16	= 48	/16	= 3
Laboratory	3	× 16	= 48	/48	= 1
Total Semester Credits = 4					

(Hours per week × number of weeks = total hours) (Total hour/divisor = semester credits)

Divisors

Lecture: /16	Lect/Lab: /16	Co-op education /30	Workshop: /48	Practicum: /48
Internship: /48	Field study: /48	Studio: /48	Lab: /48	

Purpose of Course: Degree requirement X
Degree elective X
Certificate
Other

This course meets the following general education program learning outcomes:

- 1.1 Write a clear, well-organized paper using documentation and quantitative tools when appropriate.
- 3.2 Present and interpret numeric information in graphic forms.
- 3.4 Define and explain the concepts, principles, and theories of a field of science.
- 3.5 Perform experiments that gather scientific information and to utilize, interpret, and explain the results of experiments and field work in a field of science

Prerequisite Course: [ESL 089 Reading V] AND [a grade of "C" or better in MS 095 OR mathematical placement in MS 096 or higher]

Signature, Chairperson, Curriculum Committee: _____ Date: _____

Signature, President, COM-FSM: _____ Date: _____

Appendix B

College of Micronesia-FSM

COURSE OUTLINE FORMAT

A. Program Learning Outcomes:

1. 1.1 Write a clear, well-organized paper using documentation and *quantitative* tools when appropriate.
2. 3.2 Present and interpret numeric information in graphic forms.
3. 3.4 Define and explain the concepts, principles, and theories of a field of science.
4. 3.5 Perform experiments that gather scientific information and to utilize, interpret, and explain the results of experiments and field work in a field of science

B. Course Learning Outcomes:

1. Demonstrate core scientific skills
2. Perform experiments in mechanics
3. Perform experiments in material and earth sciences
4. Perform experiments in wave based phenomena

C. Matrices

CLO	PLO 1.1	PLO 3.2	PLO 3.4	PLO 3.5
1	D	I, D	I	
2			I,D	I,D
3			I,D	I,D
4			I,D	I,D

CLO	PLO 1.1	PLO 3.2	PLO 3.4	PLO 3.5
1	1.3	1.2	1.1	
2			2.1, 2.2, 2.3, 2.4	2.1, 2.2, 2.3 2.4
3			3.1, 3.2, 3.3, 3.4, 3.5	3.1, 3.2, 3.3, 3.4, 3.5
4			4.1, 4.2, 4.3, 4.4	4.1, 4.2, 4.3, 4.4

D. Student Learning Outcomes:

CLO₁ Demonstrate core scientific skills

Student learning outcomes	Assessment strategies
1.1 Explore physical science systems using scientific methodologies	Laboratory reports.
1.2 Generate mathematical models for physical science systems	
1.3 Write up the results of experiments in a formal format using spreadsheet and word processing software	

CLO₂ Perform experiments in mechanics

Student learning outcomes	Assessment strategies
2.1 Determine the relationship between time and space for an object undergoing linear motion	Quizzes, tests, midterm, final examination, laboratory reports.
2.2 Determine the relationship between time and space for an object undergoing accelerated motion	
2.3 Measure momentum and determine whether momentum is conserved in a collision	
2.4 Calculate forces, determine whether a material is linear elastic	

CLO₃ Perform experiments in material and earth sciences

Student learning outcomes	Assessment strategies
3.1 Determine the heat conductivity of different materials	Quizzes, tests, midterm, final examination, laboratory reports.
3.2 Determine the electrical conductivity of different materials	
3.3 Calculate the relationship between minutes of longitude/latitude and meters	
3.4 Identify different types of precipitation and clouds	
3.5 Identify whether solutions are acidic or basic	

CLO₄ Perform experiments in wave based phenomena

Student learning outcomes	Assessment strategies
4.1 Determine wavelength, frequency, period, amplitude, for waves and measure the speed of sound	Quizzes, tests, midterm, final examination, laboratory reports.
4.2 Determine the relationships for optical depth behind a mirror and below the surface of water	
4.3 Identify continuous and discrete spectra, list the orders of colors in spectra, and explore the combinations of primary colors of light used to produce secondary and other colors of light.	
4.4 Determine the relationship between current and voltage for an electrical circuit	

E. Required textbooks and course materials

[*Physical Science*, Dana Lee Ling, COM-FSM, Palikir, 2010, or subsequent editions.]

OR

[*An Introduction to Physical Science*; Shipman, Wilson, and Todd; Houghton Mifflin, Boston, 2007, 11th or subsequent editions. ISBN-10: 0618472320 ISBN-13: 978-0618472321

AND

Physical Science Laboratory Manual, Relinda Abellera, COM-FSM, Palikir, 2007]

Scientific calculator with basic statistics functionality, ruler. Highly recommended:
Sunglasses.

F. Reference materials

G. Methods of Instruction The course will be taught by lecture and exploratory laboratories. Students will be encouraged to utilize computer labs outside of class for completion of formal laboratory assignments.

H. Course contents

1. Measurement
2. Motion
3. Momentum and energy
4. Force
5. Temperature and heat
6. Planetary place and time
7. Weather and climate
8. Sound and waves
9. Optics
10. Electricity
11. Chemistry
12. Astronomy
13. Cosmology

I. Instructional costs for the college See Appendix A

J. Evaluation Quizzes, tests, midterm, final examination, laboratory reports.

K. Attendance policy As per the current college catalog.

L. Academic honesty policy As per the current college catalog.

M. Credit-by-examination None.

Appendix A: Equipment lists

Physical Science Laboratory Manual by Relinda Abellera

1. Acetic acid
2. Alcohol (ethanol)
3. Aluminum foil
4. Ammonium chloride
5. Ammonium hydroxide
6. Atwood's machines (pulley frames with weight lifters)
7. Axles
8. Balloons
9. Bar magnets
10. Barium chloride
11. Beakers
12. Bismuth Nitrate
13. Bunsen burners
14. Calcium hydroxide
15. Calorimeters
16. Cardboard sheets
17. Charcoal
18. Combs (plastic)
19. Compasses
20. Copper (II) sulfate
21. Copper coils, 400 turns
22. Copper coils, 500 turns
23. Copper strips
24. Dry ice (frozen carbon dioxide)
25. Dry sand
26. Flashlight bulbs
27. Flashlight cells 1.5 V
28. Flashlight
29. Galvanometer
30. Glycerol
31. Goggles
32. Graduated cylinder
33. Horseshoe magnets
34. Hydrochloric acid
35. Hydrogen peroxide
36. Inclined planes
37. Induction coil
38. Iron filings
39. Iron nails
40. Iron rods, soft
41. Lemon

42. Lithium (elemental)
43. Litmus paper, blue
44. Litmus paper, red
45. Magnesium ribbon
46. Markers
47. Masking tape
48. Mass balances
49. Masses, e.g. 100 gram
50. Medicine dropper
51. Metal pins
52. Meter stick
53. Methyl orange
54. Mineral hardness specimens
55. Naphthalene
56. Nitric acid
57. Paste
58. Phenolphthalein
59. Plane mirror
60. Plastic covers
61. Plastic foam sheet
62. Potassium chromate
63. Potassium hydroxide
64. Protractors
65. Pulleys
66. Resistance circuits with three resistors
67. Ring stand
68. Rocks, igneous, sedimentary, and metamorphic
69. Rubber bands
70. Sandpaper
71. Silver nitrate
72. Slotted weights
73. Sodium chloride
74. Sodium hydroxide
75. Sodium sulfate
76. Stopwatches
77. String
78. Sugar
79. Sulfuric acid
80. Tablespoon
81. Teaspoon
82. Thermometers
83. Thread
84. Tin shot
85. Tissue paper
86. Tongs
87. Triple beam balances

- 88. Tripods
- 89. Uninsulated wire
- 90. Utility clamps
- 91. Vegetable oil
- 92. Vinegar
- 93. Wheels
- 94. Wire ties
- 95. Wood splint
- 96. Wooden friction blocks
- 97. Zinc strips

Physical Science Laboratories by Dana Lee Ling

Item	lab	Suggested source
Aluminum foil	electricity	grocery store
Aluminum rod	heat	Unk
Ammeter, digital	electricity	Ace Hardware
Ammonia	pH	grocery store
Baking soda	pH	grocery store
Ball, four square	motion	Ace Office
Beakers Assorted 1ea of 10 sizes 50ml to 2000ml	pH	Amazon
Bicycle pump	motion	Ace Hardware
Bleach	pH	grocery store
Body Composition Analyzer Model BF-350	measurement	tanita.com
Bolts, steel	heat	Ace Hardware
Brass screws	heat	Ace Hardware
Calipers with 100ths of inch dial	measurement	Ace Hardware
Cells, D (batteries)	electricity	Ace Hardware
Chalk, sidewalk chalk	motion	Ace Hardware
Copper rods	heat	Unk
Copper wire, six gauge	heat	Ace Hardware
Corrugated sheet, plastic	motion	Ace Hardware
Crayons, 64	clouds	Ace Office
Cream of tartar	pH	TBD
Cylinder graduated 500ml	optics	Amazon
Deodorant soap	density	Ace Office
Dish pans	multiple	Ace Hardware

Item	lab	Suggested source
Drawing pads	clouds	Ace Office
elastic	Hooke's	A1 Fabric
Electrodeless spectrum tube	spectrum	Sargentwelch.com
Electrodeless spectrum tube power supply	spectrum	Sargentwelch.com
Flash light bulb sockets	electricity	Sci-supply.com
Flash light bulbs	electricity	Ace Hardware
Global Positioning Satellite receivers	latitude	Ace Hardware
Glue for glue gun	heat	Ace Hardware
Glue gun, dual heat	heat	Ace Hardware
Graduated Cylinders, Set of 7	optics	Amazon
Hot plates	multiple	Sciencekit.com
Hydrogen peroxide	pH	grocery store
Iron filings, 500g	magnetism	Amazon
Isopropyl alcohol	pH	grocery store
Ivory three pack soap	density	Ace Office
Knife Switch, Single Pole Single Throw	electricity	Sci-supply.com
Lactic acid	pH	Genesis
Lead weights	heat	Ace Hardware
Lime, fruit	pH	grocery store
Magnets	magnetism	Amazon
Magnifying glasses or lenses	optics	Ace Office
Marbles (50)	motion	Ace Hardware
Medicine Droppers Plastic, 12 ea	pH	Amazon
Metal bolts of various materials	heat	Ace Hardware
Meter sticks (12)	measurement	Amazon
Metric tape measures	measurement	Ace Hardware
Micrometer	measurement	Ace Hardware
Mirror tiles	optics	Ace Hardware
Paper towel	multiple	Ace Office
Quadruple Beam Balance	measurement	Sci-supply.com
Rulers	multiple	Ace Office
Sandpaper	multiple	Ace Hardware

Item	lab	Suggested source
Sodium hydroxide (Drano)	pH	Ace Hardware
Stopwatch-chrono, ultrak 360	measurement	Amazon
String	multiple	Amazon
Styrofoam cups	heat	grocery store
Superballs	motion	Ace Hardware
Surveyor's wheel	measurement	Ace Hardware
Tennis balls	site swap	Ace Hardware
Test tubes	pH	Amazon
Thermometers	heat	Amazon
Thread	multiple	A1 Fabric
Tuning Fork Metaform Pythagorean Set, 8 Piece	Sound	
Vinegar	pH	grocery store
Voltmeters	electricity	Ace Hardware
Wire strippers	electricity	Ace Hardware
Wire, electrical	electricity	Ace Hardware