A.S. in Physical Sciences

College Learning Outcomes Matrix: Rate each course from 1 to 5 with 5 being the most important.

A.S. in Physical Sciences Biology	Semester of SLO Assessment	1. Effective Communication	2. Scientific and Quantitative Reasoning	3. Critical Thinking 4. Problem Solving:	5. Information Literacy:	GE	DEGREE
BIOL 112A Biology for Biology Majors I	**11/12**	3	4	3	3	X	X
BIOL 112B Biology for Biology Majors II	**11/12**	3	4	3	3	X	X
BIOL 112C Biology for Biology Majors III *	**11/12**	3	5	3	3	X	X
BIOL 112A Biology for Biology Majors I	**11/12**	3	4	3	3	X	X

A.S. in Physical Sciences

GENERAL EDUCATION SLOS
WHAT ASSIGNMENTS DO YOU GIVE IN THESE CLASSES THAT ASSESS THE FOLLOWING GE SLOS? What assessment tools do you use? Assess only SLOs that you rated 4 or 5.

A.S. in Physical Sciences Biology	1. Effective Communication	2. Scientific and Quantitative Reasoning	3. Critical Thinking 4. Problem Solving:	5. Information Literacy:	GE	DEGREE
BIOL 112A Biology for Biology Majors I		Questions applying scientific method	Case studies		X	X
BIOL 112B Biology for Biology Majors II	Essays, MC Test	Essays, MC Test	Essays, MC Test	Essays, MC Test	X	X
BIOL 112C Biology for Biology Majors III *		Laboratory exercises & experiments	Genetics problems; restriction fragment analysis; notebook discussions.		X	X

A.S. in Physical Sciences

College Learning Outcomes Matrix: Rate each course from 1 to 5 with 5 being the most important

A.S. in Physical Sciences CHEMISTRY	Semester of SLO Assessment	1. Effective Communication	2. Scientific and Quantitative Reasoning	3. Critical Thinking:	4. Problem Solving:	5. Information Literacy:	GE	DEGREE
CHEM 131 General Chemistry I	**Fall 12**	3	5	3	3	2	X	X
CHEM 132 General Chemistry II	**Spring 12**	3	5	3	3	2	X	X
CHEM 231 Organic Chemistry I	**Fall 12**	3	5	3	3	2	X	X
CHEM 232 Organic Chemistry II	**Spring 12**	3	5	3	3	2	X	X

Assessment Methods:

Communication

Write a coherent logical explanation in a paragraph.
Write a full lab report, a coherent description/explanation of a whole experiment (method/data/analysis/conclusion)
Clearly articulate reasoning and methodology during problem solving

Scientific Reasoning / Critical Thinking / Problem Solving

(In most science classes, it is difficult to distinguish between these three categories. Problem solving in general is VERY important.)
Exam questions requiring multi-step problem solving and demonstration of scientific reasoning
Lab reports that require analysis and interpretation of experimental data

Information Literacy

Most courses require locating data in appropriate tables within one textbook or standard reference source
Some courses require additional research to obtain information from print or internet sources

A.S. in Physical Sciences

A.S. in Physical Sciences COMPUTER SCIENCE	Semester of SLO Assessment	1. Effective Communication:	2. Scientific and Quantitative Reasoning:	3. Critical Thinking:	4. Problem Solving:	5. Information Literacy:	GE	DEGREE
COMP 130 Introduction to Programming in JAVA	**Fall 12**	3	3	3	5	3		X
COMP 135 Introduction to Programming in C++	**Spring 12**	3	3	3	5	3		X
COMP/ENGG 150 Programming in MATLAB for Engineers	**Spring 12**	3	4	3	5	2		X
COMP 160 Computer Organization: An Assembly Language Perspective	**Fall 12**	3	3	3	5	2		X
COMP 220 Data Structures and Algorithms	**Spring 12**	3	3	3	5	3		X
COMP 232 Advanced Programming in JAVA	**Spring 12 (cancelled)**	3	3	3	5	3		X
COMP 235 Advanced Programming in C++	**Spring 12**	3	2	3	5	3		X

Assessment Methods:

Communication
Clearly articulate reasoning and methodology during problem solving
Clearly structure and document program code to facilitate understanding of problem-solving approach

Scientific Reasoning / Critical Thinking / Problem Solving
(In most science classes, it is difficult to distinguish between these three categories. Problem solving in general is VERY important.)
Exam problems, lab reports, and programming assignments

A.S. in Physical Sciences

College Learning Outcomes Matrix: Rate each course from 1 to 5 with 5 being the most important.

A.S. in Physical Sciences ENGINEERING	Semester of SLO Assessment	1. Written, Oral and Visual Communication	2. Scientific and Quantitative Reasoning:	3. Critical Thinking:	4. Problem Solving:	5. Information Literacy:	GE	DEG REQ
ENGG 110	Fall 12	3	4	4	5	3		X
ENGG 125 Introductory Engineering Graphics	Fall 12	4	4	4	5	3		X
ENGG 220 Electric Circuit Analysis	Spring 12	3	4	5	5	1		X
ENGG 220L Electric Circuits Laboratory	Spring 12	3	5	5	5	2		
ENGG 235 Engineering Mechanics - Statics	Fall 12	3	5	5	5	2		X
ENGG 245 Engineering Materials Science	Spring 12	4	5	5	5	3		X

Assessment Methods:

Communication
Write a coherent logical explanation in a paragraph. (110, 125, 245)
Write a full lab report, a coherent description/explanation of a whole experiment (method/data/analysis/conclusion) (220L, 245)
Clearly articulate reasoning and methodology during problem solving (All)

Scientific Reasoning / Critical Thinking / Problem Solving
(In most science classes, it is difficult to distinguish between these three categories. Problem solving in general is VERY important.)
Exam problems, project assignments, and lab reports (for 220L, 245)

Information Literacy
Most courses require locating data in appropriate tables within one textbook or standard reference source
Some courses require additional research to obtain information from print or internet sources (110, 125, 220L, 245)

A.S. in Physical Sciences

College Learning Outcomes Matrix: Rate each course from 1 to 5 with 5 being the most important.

A.S. in Physical Sciences MATHEMATICS	**Semester of SLO Assessment**	**1. Written, Oral and Visual Communication**	**2. Scientific and Quantitative Reasoning:**	**3. Critical Thinking:**	**4. Problem Solving:**	**5. Information Literacy:**	**GE**	**DEGREE**
MATH 116 Linear Algebra	**12/13**	3	3	5	5	1	X	X
MATH 117 Discrete Mathematics	**12/13**	3	3	5	5	1	X	X
MATH 123 Analytic Geometry and Calculus I	**12/13**	3	3	5	5	1	X	X
MATH 124 Analytic Geometry and Calculus II	**12/13**	3	3	5	5	1	X	X
MATH 223 Analytic Geometry, Vector Analysis and Calculus III	**12/13**	3	3	5	5	1	X	X
MATH 224 Elementary Differential Equations	**12/13**	3	3	5	5	1	X	X

A.S. in Physical Sciences

GENERAL EDUCATION SLOS
WHAT ASSIGNMENTS DO YOU GIVE IN THESE CLASSES THAT ASSESS THE FOLLOWING GE SLOS? What assessment tools do you use? Assess only SLOs that you rated 4 or 5.

A.S. in Physical Sciences MATHEMATICS	1. EFFECTIVE Communication	2. Scientific or Quantitative Reasoning	3. Critical Thinking	4. Problem Solving	5. Information Literacy	GE	DEGREE
MATH 116 Linear Algebra		Final Exam (course SLO questions)	Final Exam (course SLO questions)	Final Exam (course SLO questions)		X	X
MATH 117 Discrete Mathematics		Final Exam (course SLO questions)	Final Exam (course SLO questions)	Final Exam (course SLO questions)		X	X
MATH 123 Analytic Geometry and Calculus I		Final Exam (course SLO questions)	Final Exam (course SLO questions)	Final Exam (course SLO questions)		X	X
MATH 124 Analytic Geometry and Calculus II		Final Exam (course SLO questions)	Final Exam (course SLO questions)	Final Exam (course SLO questions)		X	X
MATH 223 Analytic Geometry, Vector Analysis and Calculus III		Final Exam (course SLO questions)	Final Exam (course SLO questions)	Final Exam (course SLO questions)		X	X
MATH 224 Elementary Differential Equations		Final Exam (course SLO questions)	Final Exam (course SLO questions)	Final Exam (course SLO questions)		X	X

A.S. in Physical Sciences

College Learning Outcomes Matrix: Rate each course from 1 to 5 with 5 being the most important.

A.S. in Physical Sciences PHYSICS	Semester of SLO Assessment	1. Written, Oral and Visual Communication	2. Scientific and Quantitative Reasoning:	3. Critical Thinking:	4. Problem Solving:	5. Information Literacy:	GE	DEGREE
PHYS 108A General Physics I	**Fall 12**	3	5	3	3	3	X	X
PHYS 108AC - General Physics I (Calculus Supplement)	**Fall 12**	3	5	3	3	3	X	X
PHYS 108B General Physics II	**Spring 12**	3	5	3	5	3	X	X
PHYS 108BC General Physics II (Calculus Supplement)	**Spring 12**	3	5	3	3	3	X	X
PHYS 207A Mechanics and Properties of Matter	**Fall 12**	4	5	3	3	3	X	X
PHYS 207B Electricity and Magnetism	**Fall 12**	3	5	3	3	1	X	X
PHYS 207C Heat, Light, Sound, and Modern Physics	**Spring 12**	3	5	3	3	1	X	X

Assessment Methods:

Communication
Write a coherent logical explanation in a paragraph.
Write a full lab report, a coherent description/explanation of a whole experiment (method/data/analysis/conclusion)
Clearly articulate reasoning and methodology during problem solving

Scientific Reasoning / Critical Thinking / Problem Solving
(In most science classes, it is difficult to distinguish between these three categories. Problem solving in general is VERY important.)
Exam questions requiring multi-step problem solving and demonstration of scientific reasoning
Lab reports that require analysis and interpretation of experimental data

Information Literacy
Most courses require locating data in appropriate tables within one textbook or standard reference source
Some courses require additional research to obtain information from print or internet sources

A.S. in Physical Sciences

18 units that include at least three different disciplines from those course outlined below:
Biology 112A, 112B, 112C
Chemistry 131, 132, 231, 232
Computer Science 117*, 130, 135, 150*, 160, 220, 232, 235
Engineering 110 or (110A and 110B), 125, 150*, 220, 235, 245
Math 116, 117*, 123, 124, 223, 224
Physics 108A, 108AC, 108B, 108BC, 207A, 207B, 207C

Student Learning Outcomes for AS in Physical Sciences

A. Solve problems by applying scientific theories, concepts, and methods.

B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.

C. Communicate analytical reasoning and conclusions in a clear and articulate manner.

A.S. in Physical Sciences

A. THESE DEGREE OUTCOMES EQUAL WHICH COURSE OUTCOMES FOR THESE COURSES?

A.S. in Physical Sciences Biology	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
BIOL 112A Biology for Biology Majors I	2,3	1,3	3
BIOL 112B Biology for Biology Majors II	5,6	5,6	5,6
BIOL 112C Biology for Biology Majors III *	7,8,9	1,7,8.9	7,9

A.S. in Physical Sciences

B. IN WHICH COURSES ARE THESE DEGREE SLOS ASSESSED? Use "I" for Intro, "P" for Practice and "M" for Mastery.

A.S. in Physical Sciences Biology	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
BIOL 112A Biology for Biology Majors I	M	M	P
BIOL 112B Biology for Biology Majors II	P	P	P
BIOL 112C Biology for Biology Majors III *	M	P	P

A.S. in Physical Sciences

C. DEGREE SLOS
WHAT ASSIGNMENTS DO YOU GIVE IN THESE CLASSES THAT ASSESS THE FOLLOWING DEGREE SLOS? What assessment tools do you use?

A.S. in Physical Sciences Biology	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
BIOL 112A Biology for Biology Majors I	Design and complete original research project	Exam questions	Design and complete original research project
BIOL 112B Biology for Biology Majors II	Experiment: measure aquatic pH	Essays about fungal evolution	Essay question: ecological implications of oyster farming
BIOL 112C Biology for Biology Majors III *	Laboratory exercises & experiments; especially written discussions.	Group discussion of selected biological review papers.	Group discussion of selected biological review papers.

A.S. in Physical Sciences

A. THESE DEGREE OUTCOMES EQUAL WHICH COURSE OUTCOMES FOR THESE COURSES?

A.S. in Physical Sciences CHEMISTRY	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
CHEM 131 General Chemistry I	1,2	1,3	2,3
CHEM 132 General Chemistry II	1,2	1,3	2,3
CHEM 231 Organic Chemistry I	1,2,3,4	1,4	1,3
CHEM 232 Organic Chemistry II	1,2	2,3	3

A.S. in Physical Sciences

B. IN WHICH COURSES ARE THESE DEGREE SLOS ASSESSED? Use "I" for Intro, "P" for Practice and "M" for Mastery.

A.S. in Physical Sciences CHEMISTRY	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
CHEM 131 General Chemistry I	I	I	I
CHEM 132 General Chemistry II	P	P	P
CHEM 231 Organic Chemistry I	P	P	P
CHEM 232 Organic Chemistry II	M	M	M

A.S. in Physical Sciences

C. DEGREE SLOS

WHAT ASSIGNMENTS DO YOU GIVE IN THESE CLASSES THAT ASSESS THE FOLLOWING DEGREE SLOS? What assessment tools do you use?

A.S. in Physical Sciences CHEMISTRY	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
CHEM 131 General Chemistry I	Exam Problems	Lab Reports	Exam Questions and Lab Reports
CHEM 132 General Chemistry II	Exam Problems	Lab Reports	Exam Questions and Lab Reports
CHEM 231 Organic Chemistry I	Exam Problems	Lab Reports	Exam Questions and Lab Reports
CHEM 232 Organic Chemistry II	Exam Problems	Lab Reports	Exam Questions and Lab Reports

A.S. in Physical Sciences

A. THESE DEGREE OUTCOMES EQUAL WHICH COURSE OUTCOMES FOR THESE COURSES?

A.S. in Physical Sciences COMPUTER SCIENCE	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
COMP/ENGG 150 Programming in MATLAB for Engineers	1	1	2
COMP 160 Computer Organization: An Assembly Language Perspective	1-8		
COMP 220 Data Structures and Algorithms	1-6		1,6
COMP 232 Advanced Programming in JAVA	1-8		1
COMP 235 Advanced Programming in C++	1-6		1

A.S. in Physical Sciences

B. IN WHICH COURSES ARE THESE DEGREE SLOS ASSESSED? Use "I" for Intro, "P" for Practice and "M" for Mastery

A.S. in Physical Sciences COMPUTER SCIENCE	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
COMP/ENGG 150 Programming in MATLAB for Engineers	P	I	I
COMP 160 Computer Organization: An Assembly Language Perspective	P		
COMP 220 Data Structures and Algorithms	P		
COMP 232 Advanced Programming in JAVA	P		
COMP 235 Advanced Programming in C++	P		

A.S. in Physical Sciences

C. DEGREE SLOS

WHAT ASSIGNMENTS DO YOU GIVE IN THESE CLASSES THAT ASSESS THE FOLLOWING DEGREE SLOS? What assessment tools do you use?

A.S. in Physical Sciences COMPUTER SCIENCE	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
COMP/ENGG 150 Programming in MATLAB for Engineers	Exam problems, Programming assignments	Lab Reports	Exam Problems, Project assignment
COMP 160 Computer Organization: An Assembly Language Perspective	Exam problems, Programming assignments		
COMP 220 Data Structures and Algorithms	Exam problems, Programming assignments		
COMP 232 Advanced Programming in JAVA	Exam problems, Programming assignments		
COMP 235 Advanced Programming in C++	Exam problems, Programming assignments		

A.S. in Physical Sciences

A. THESE DEGREE OUTCOMES EQUAL WHICH COURSE OUTCOMES FOR THESE COURSES?

A.S. in Physical Sciences ENGINEERING	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
ENGG 110			1,2,3,4
ENGG 125 Introductory Engineering Graphics	1,2,3		1,4
ENGG 220 Electric Circuit Analysis	1,2,3		1
ENGG 220L Electric Circuits Laboratory		1-9	8
ENGG 235 Engineering Mechanics - Statics	1,2	1	1
ENGG 245 Engineering Materials Science	1,2	1,2	1,2

A.S. in Physical Sciences

B. IN WHICH COURSES ARE THESE DEGREE SLOS ASSESSED? Use "I" for Intro, "P" for Practice and "M" for Mastery

A.S. in Physical Sciences ENGINEERING	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
ENGG 110			I
ENGG 125 Introductory Engineering Graphics	I		I
ENGG 220 Electric Circuit Analysis	M		P
ENGG 220L Electric Circuits Laboratory	P	P	P
ENGG 235 Engineering Mechanics - Statics	M	P	P
ENGG 245 Engineering Materials Science	P	P	P

A.S. in Physical Sciences

C. DEGREE SLOS

WHAT ASSIGNMENTS DO YOU GIVE IN THESE CLASSES THAT ASSESS THE FOLLOWING DEGREE SLOS? What assessment tools do you use?

A.S. in Physical Sciences ENGINEERING	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
ENGG 110			Essays, presentations
ENGG 125 Introductory Engineering Graphics	Design projects, Exam problems		Project Reports
ENGG 220 Electric Circuit Analysis	Exam Problems		Exam Problems
ENGG 220L Electric Circuits Laboratory	Lab Reports	Lab Reports	Lab Reports
ENGG 235 Engineering Mechanics - Statics	Exam Problems	Project	Exam Problems, Project report
ENGG 245 Engineering Materials Science	Exam Problems	Exam Problems, Lab Reports	Exam Problems, Lab Reports

A.S. in Physical Sciences

A. THESE DEGREE OUTCOMES EQUAL WHICH COURSE OUTCOMES FOR THESE COURSES?

A.S. in Physical Sciences MATHEMATICS	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
MATH 116 Linear Algebra			1,2,3
MATH 117 Discrete Mathematics			1,2,3
MATH 123 Analytic Geometry and Calculus I			1,2,3
MATH 124 Analytic Geometry and Calculus II			1,2,3
MATH 223 Analytic Geometry, Vector Analysis and Calculus III			1,2,3
MATH 224 Elementary Differential Equations			1,2,3

A.S. in Physical Sciences

B. IN WHICH COURSES ARE THESE DEGREE SLOS ASSESSED? Use "I" for Intro, "P" for Practice and "M" for Mastery

A.S. in Physical Sciences MATHEMATICS	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
MATH 116 Linear Algebra			M
MATH 117 Discrete Mathematics			M
MATH 123 Analytic Geometry and Calculus I			M
MATH 124 Analytic Geometry and Calculus II			M
MATH 223 Analytic Geometry, Vector Analysis and Calculus III			M
MATH 224 Elementary Differential Equations			M

A.S. in Physical Sciences

C. DEGREE SLOS

WHAT ASSIGNMENTS DO YOU GIVE IN THESE CLASSES THAT ASSESS THE FOLLOWING DEGREE SLOS? What assessment tools do you use?

A.S. in Physical Sciences MATHEMATICS	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner.
MATH 116 Linear Algebra			Final Exam
MATH 117 Discrete Mathematics			Final Exam
MATH 123 Analytic Geometry and Calculus I			Final Exam
MATH 124 Analytic Geometry and Calculus II			Final Exam
MATH 223 Analytic Geometry, Vector Analysis and Calculus III			Final Exam
MATH 224 Elementary Differential Equations			Final Exam

A.S. in Physical Sciences

A. THESE DEGREE OUTCOMES EQUAL WHICH COURSE OUTCOMES FOR THESE COURSES?

A.S. in Physical Sciences PHYSICS	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner
PHYS 108A General Physics I	1,2,5	3,4,5,6	1,4
PHYS 108AC	1,2	4	3
PHYS 108B General Physics II	1,2,5	3,4,5,6	1,4
PHYS 108BC General Physics II (Calculus Supplement)	1,2	4	3
PHYS 207A Mechanics and Properties of Matter	1,2	2,3	2,3
PHYS 207B Electricity and Magnetism	1,2	2,3	2,3
PHYS 207C Heat, Light, Sound, and Modern Physics	1,2	2,3	2,3

A.S. in Physical Sciences

B. IN WHICH COURSES ARE THESE DEGREE SLOS ASSESSED? Use "I" for Intro, "P" for Practice and "M" for Mastery

A.S. in Physical Sciences PHYSICS	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner
PHYS 108A General Physics I	I	I	I
PHYS 108AC	I		
PHYS 108B General Physics II	P	P	P
PHYS 108BC General Physics II (Calculus Supplement)	P		
PHYS 207A Mechanics and Properties of Matter	I	I	I
PHYS 207B Electricity and Magnetism	P	P	P
PHYS 207C Heat, Light, Sound, and Modern Physics	P	P	P

A.S. in Physical Sciences

C. DEGREE SLOS

WHAT ASSIGNMENTS DO YOU GIVE IN THESE CLASSES THAT ASSESS THE FOLLOWING DEGREE SLOS? What assessment tools do you use?

A.S. in Physical Sciences PHYSICS	A. Solve problems by applying scientific theories, concepts, and methods	B. Critically analyze, interpret, and evaluate data to draw valid scientific conclusions.	C. Communicate analytical reasoning and conclusions in a clear and articulate manner
PHYS 108A General Physics I	Exam Problems	Lab Reports	Exam Problems, Lab Reports
PHYS 108AC	Exam Problems		
PHYS 108B General Physics II	Exam Problems	Lab Reports	Exam Problems, Lab Reports
PHYS 108BC General Physics II (Calculus Supplement)	Exam Problems		
PHYS 207A Mechanics and Properties of Matter	Exam Problems	Lab Reports	Exam Problems, Lab Reports
PHYS 207B Electricity and Magnetism	Exam Problems	Lab Reports	Exam Problems, Lab Reports
PHYS 207C Heat, Light, Sound, and Modern Physics	Exam Problems	Lab Reports	Exam Problems, Lab Reports

A.S. in Physical Sciences

BIOL_112A	Majors' Biology: Animals, Protozoa, Evolution and Classification	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Demonstrate the ability to engage in clear and careful scientific inquiry and show that they can ask pertinent questions about zoological phenomena and formulate hypotheses based on those questions, drawing on scientific concepts and principles. 2. Apply deliberate and through observational skills in conducting an experiment and collecting data and be able to test hypotheses, and show that they can organize and summarize data and render them in a way that is accurate and comprehensible in both verbal and graphical modes. 3. Draw conclusions from data that allow the students to support or refute hypothesis and make a case for alternative hypotheses. 4. Understand and will be able to demonstrate knowledge of the characteristics of all the major animal phyla as well as a thorough understanding of the circumstances under which these phyla evolved.		

BIOL_112B	Majors' Biology: Plants, Algae, Fungi and Ecology	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Describe the scope and goals of ecology in relation to other biological and non-biological areas of inquiry 2. Describe the major levels of ecological structure and function and their essential and emergent properties 3. Describe a species' habitat and niche 4. Construct simple population models and explain their usefulness 5. Perform a biodiversity assessment 6. Conduct a trophic analysis of ecological communities 7. Explain the importance of ecological engineering in analysis of ecosystems 8. Explain the importance of the major types of ecological interactions in the world 9. Describe the structure and function of vascular plants at the organismal, organ, organ system, tissue and cell levels of organization 10. Describe the reproductive biology of vascular plants, showing understanding of the structures involved 11. Name the major groups of algae, plants and fungi and place correctly in the modern biological classification system 12. Describe the reproductive biology of major groups of fungi, showing understanding of the structures involved 13. Explain the special features of the ecology of algae plants and fungi		

BIOL_112C	Majors' Biology: Molecules, Cells, Prokaryotes and Genetics	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. learn the basic principles of biology that govern cells and organisms. 2. develop skill in applying the scientific method. 3. learn how to critically evaluate scientific data. 4. develop the fundamentals of writing and presenting scientific studies.		

A.S. in Physical Sciences

CHEM_131	General Chemistry I	Revise Course
Expected Outcomes for Student:		
1) Explain the macroscopic physical and chemical properties of a substance in terms of its atomic-level structure. 2) Develop solutions to complex chemistry problems using quantitative and qualitative techniques, and articulate your answers. 3) Obtain and record careful laboratory measurements and observations, carry out qualitative and quantitative analyses of these data, and present the results in a formal laboratory report.		

CHEM_132	General Chemistry II	Revise Course
Expected Outcomes for Student:		
1) Predict chemical reactivity based on your knowledge of chemical kinetics, thermodynamics and equilibrium. 2) Develop solutions to complex chemistry problems using quantitative and qualitative techniques, and articulate your answers. 3) Obtain and record careful laboratory measurements and observations, carry out qualitative and quantitative analyses of these data, and present the results in a formal laboratory report.		

CHEM_231	Organic Chemistry I	Revise Course
Expected Outcomes for Student:		
Upon completion of the course, students will be able to: 1. gain knowledge of structure, properties, and stereochemistry of organic compounds and use this information in a comprehensive analysis to explain reactivity. 2. compare and contrast functional group transformations with carbon carbon bond forming reactions to synthesize (theoretically and practically) compounds from these reactions. 3. demonstrate knowledge of IUPAC nomenclature for functional groups and apply knowledge to a wide variety of organic compounds to communicate them to the scientific community. 4. use nuclear magnetic resonance, infrared spectroscopy, mass spectrometry and/or UV/Vis data to identify unknown compounds and/or confirm the structure of a target molecule in a synthesis.		

CHEM_232	Organic Chemistry II	Revise Course
Expected Outcomes for Student:		
Upon completion of the course, students will be able to: 1) synthesize a target molecule given a list of starting materials and readily available reagents, while following common safety protocols. 2) use analytical techniques such as HNMR, CNMR, FTIR, GC/MS, chemical analysis and physical properties to identify the structure of an unknown compound or confirm the structure of a known compound or synthetic target molecule. 3) interpret patterns of reactivity on the basis of mechanistic reasoning and report results in scientific terms.		

A.S. in Physical Sciences

COMP_150	Programming in MATLAB for Engineers	New Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Utilize a methodical approach to identify, formulate, and solve computational problems. (A,B,C,H)* a. Design algorithms and flowcharts to facilitate programming and problem solutions. b. Create, test, and debug computer programs using procedural and object-oriented approaches. c. Apply numeric techniques and computer simulations to solve engineering-related computational problems. d. Creat and apply MATLAB computer programs to analyze data and to generate tables, charts, and graphs. 2. Communicate analytical approaches and results according to standard engineering practices. (E,H)* a. Document reports and assignments in a careful and complete manner so as to effectively communicate the results of the analysis. b. Design and document computer programs in a careful and complete manner so as to facilitate analysis and debugging by another programmer, and to anticipate and resolve user errors. *Capital letters after major outcomes indicate how this course contributes to the program-level learning outcomes listed below. Upon completion of the A.S. Engineering Major or the Engineering Transfer Program, students will be able to: 1. apply their knowledge of math, science, and engineering to identify, formulate, and solve engineering problems. 2. design and perform experiments, as well as to analyze and interpret data. 3. design a system, component, or process to meet desired needs. 4. demonstrate professional ethical responsibilty. 5. communicate effectively and perform on multi-disciplinary teams. 6. judge the effects of engineering projects on society and the environment. 7. engage in life-long learning and explain contemporary issues. 8. use the techniques, skills, and modern engineering tools necessary for engineering pracitice.		

COMP_160	Computer Organization: An Assembly Language Perspective	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Distinguish and categorize the architectural components of a microcomputer 2. Apply microcomputer design principles to identify architectural components of the Intel family of microprocessors and demonstrate ability to utilize microcomputer capabilties through assembly language programs 3. Create a complete set of source modules using standard design tools 4. Prepare executable assembly language programs which include at least one subroutine library module 5. Create programs which carry out binary arithmetic operations, floating-point, and BCD (binary-coded decimal) 6. Demonstrate ability to convert numbers to and from decimal, binary, octal, and hexadecimal 7. Use the BIOS (basic input-output system) 8. Write an interrupt handle		

COMP_220	Data Structures and Algorithms	Revise Course
Expected Outcomes for Student:		
By the end of the semester, students will be able to: 1. Compare and contrast data structures. 2. Build abstract data types. 3. Analyze the time and space complexity of algorithms. 4. Demonstrate a sound knowledge of important sorting algorithms. 5. Design and program in recursion. 6. Use C++ STL framework in their software design.		

COMP_232	Advanced Programming in JAVA	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Construct and apply Java syntax and structure. 2. Define and use classes and methods to implement algorithms. 3. Construct and apply object-oriented programming in Java. 4. Use the Java Application Programming Interface to utilize Java classes. 5. Construct programs to read and write files with exception handling. 6. Demonstrate concurrent processing and implement Java threads to manage concurrency 7. Identify objects and data items that form natural groups and apply appropriate Java collections to manage them. 8. Demonstrate client server concepts and program simple network applications using Java sockets.		

COMP_235	Advanced Programming in C++	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Write efficient, secure, elegant, and easily maintainable codes in C++ 2. Create user-defined or abstract data types 3. Create software using object-oriented design/programming in C++ 4. Use advanced features and techniques in C++ 5. Use or develop their own C++ libraries 6. Write industrial quality applications		

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ENGG_110A	Introduction to the Engineering Profession	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Describe the role of engineers in society, and list a number of important historical successes and failures, as well as present challenges, that demonstrate the influence of the engineering profession in shaping modern society. *(F,G) 2. Classify different types of engineers, their typical job functions, the designs they make, and the problems they solve. *(E,F) 3. Describe the academic preparation, continuing education, and ethical responsibilities that are inherent in an engineering career. *(D,G) 4. Develop a personal educational plan, and employ academic and professional success strategies, in order to achieve stated career objectives. *(E,G,H) *Capital letters after major outcomes indicate how this course contributes to the program-level learning outcomes listed below. Upon completion of the A.S. Engineering Major or the Engineering Transfer Program, students will be able to: A. Apply their knowledge of math, science, and engineering to identify, formulate, and solve engineering problems. B. Design and perform experiments, as well as to analyze and interpret data. C. Design a system, component, or process to meet desired needs. D. Demonstrate professional ethical responsibility. E. Communicate effectively and perform on multi-disciplinary teams. F. Judge the effects of engineering projects on society and the environment. G. Engage in life-long learning and explain contemporary issues. H. Use the techniques, skills, and modern engineering tools necessary for engineering practice.		

ENGG_110B	Introduction to Engineering Design	Revise Course
Expected Outcomes for Student:		
A. Develop a team oriented engineering design and problem solving protocol. B. Develop a flow chart of the design process C. Work in teams toward the solution of engineering problems D. Solve simple engineering problems from each discipline using mathematical models E. Develop, design, and perform simple experiements F. Evaluate and analyze the data from an experiment G. Generate graphs and tables for presentation of data H. Write an engineering report using word processing software I. Prepare and give a presentation using presentation software J. Define real world problems in engineering terms K. Research and analyze alternative solutions L. Describe the function of devices from a systems approach M. Incorporate practical constraints into design process N. Address environmental impacts of design choices O. Develop a quantative, criteria based approach to comparison of candidate solutions P. Develop final specifications Q. Prepare written and graphical communication of final design for technicians		

ENGG_125	Introductory Engineering Graphics	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to... [1] Generate two- and three-dimensional engineering drawings using manual and computer-aided techniques for an engineering product using standard drawing conventions recognized in the engineering field. [2] Demonstrate three-dimensional spatial visualization skills by creating isometric, orthographic, and sectional views. [3] Use the engineering design process to solve engineering problems and develop a product design. [4] Demonstrate teamwork, technical writing, and oral presentation skills.		

ENGG_220	Electric Circuit Analysis	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Utilize standard engineering approaches to model electrical circuits and devices: (A,B,C,E,H)* a. Demonstrate an understanding of the i-v characteristics of idealized independent and dependent sources, and basic R, L, and C elements, and appreciate the practical limitations of such models. b. Use combinations of ideal basic circuit elements to construct models of practical circuits. c. Draw and interpret circuit diagrams, and use standard practices to document analyses and assumptions. d. Apply idealized transistor, op amp, and transformer models to the analysis of basic circuit configurations. 2. Utilize a variety of techniques to analyze electric circuit models, evaluate the relative efficacy of each technique for a particular analysis, and use redundant techniques to verify the accuracy of results:(A,H)* a. Apply Kirchoff's laws in systematic fashion to formulate circuit equations and solve for desired values of current and voltage in circuits. b. Apply equivalence concepts, circuit reduction techniques, and network theorems to simplify the process or generalize the results of circuit analysis. c. Perform transient analysis of natural and forced responses of RLC circuits by deriving and solving applicable first and second-order differential equations. d. Use complex phasors to represent steady-state sinusoidal (AC) signals and impedances, and extend DC circuit anlysis techniques to the analysis of AC circuits. e. Use computer simulation to perform steady and transient analyses of circuits. 3. Apply analytical techniques and results to the practice of engineering design: (A,C,H)* a. Optimize circuit parameters to achieve specified design objectives. b. Generate circuit designs to perform a specified function. c. Use current and/or voltage functions to determine charge, power, and/or energy in circuit elements. d. Analyze and optimize power consumption in load circuits connected to DC or AC supplies. *Capital letters after major outcomes indicate how this course contributes to the program-level learning outcomes listed below. Upon completion of the A.S. Engineering Major or the Engineering Transfer Program, students will be able to: A. apply their knowledge of math, science, and engineering to identify, formulate, and solve engineering problems. B. design and perform experiments, as well as to analyze and interpret data. C. design a system, component, or process to meet desired needs. D. demonstrate professional ethical responsibility. E. communicate effectively and perform on multi-disciplinary teams. F. judge the effects of engineering projects on society and the environment. G. engage in life-long learning and explain contemporary issues. H. use the techniques, skills, and modern engineering tools necessary for engineering practice.		

ENGG_220L	Electric Circuits Laboratory	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Operate basic electrical measurement equipment including oscilloscopes, multimeters, function generators and power supplies 2. Measure voltage, current, resistance, transient and steady state response 3. Read circuit schematics and construct simple linear circuits (RC, RL, RLC, Op amps) 4. Use computer simulation tools to model simple linear circuit behavior 5. Calculate predicted circuit responses 6. Test circuits, analyze data and compare performance to theory and simulation 7. Troubleshoot and repair simple electric circuits 8. Record and document results of lab work using text and graphs 9. Explain discrepancies between theory and experiment		

ENGG_235	Engineering Mechanics: Statics	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Utilize standard engineering approaches to model mechanical systems: (A,B,E,H)* a. Represent physical systems (actual or illustrated) with reasonable and complete free-body diagrams that are drawn and labeled to professional engineering standards. b. Isolate an object from its surroundings (or resolve a component from an assembly) by accurately representing all inter-component reactions. c. Accurately represent position, force, and moment quantities using vectors expressed in both geometric and Cartesian unit vector notation. d. Formulate and clearly document reasonable assumptions used to simplify analysis 2. Utilize a variety of techniques to analyze rigid-body equilibrium problems, select an appropriate technique for a particular analysis, and evaluate the quality of results: (A,C,H)* a. Utilize graphical and trigonometric approaches to analyze simple 2D particle and rigid body equilibrium problems. b. Apply Newton's Laws in conjunction with vector mathematical operations to formulate force and moment equilibrium equations in two and three dimensions, and solve them for desired variables using linear algebraic techniques and numerical tools (e.g., scientific calculators, spreadsheets, MATLAB, etc.). c. Extend basic rigid-body analysis techniques to systems of rigid bodies, in order to analyze inter-component reactions of trusses, frames, and machines, as well as internal forces in members. d. Use integral calculus and composite-body approaches to analyze distributed force systems (including hydrostatic pressure and centroid determination) and to calculate second moments of areas and volumes (i.e., area and mass moments of inertia). e. Incorporate consideration of dry friction into rigid body equilibrium analyses. *Capital letters after major outcomes indicate how this course contributes to the program-level learning outcomes listed below. Upon completion of the A.S. Engineering Major or the Engineering Transfer Program, students will be able to: A. apply their knowledge of math, science, and engineering to identify, formulate, and solve engineering problems. B. design and perform experiments, as well as to analyze and interpret data. C. design a system, component, or process to meet desired needs.		

D. demonstrate professional ethical responsibilty.
E. communicate effectively and perform on multi-disciplinary teams.
F. judge the effects of engineering projects on society and the environment.
G. engage in life-long learning and explain contemporary issues.
H. use the techniques, skills, and modern engineering tools necessary for engineering practice.

ENGG_245	Engineering Materials Science	Revise Course

Expected Outcomes for Student:

Upon completion of this course, students will be able to:
1. Demonstrate the knowledge, skills, and abilities needed to perform basic materials selection and design:
  a. Illustrate the various systems for classifying materials. (A,E)*
  b. Describe and critique the characteristics of common engineering materials, and rank their abilities to meet particular performance requirements. (A,C,F,G)*
  c. Obtain materials properties from standard tables, diagrams, and graphs. (A,C,H)*
  d. Assess the life-cycle societal impacts of materials design choices.(A,C,F,G,H)*
2. Demonstrate the knowledge, skills, and abilities needed to perform basic materials engineering:
  a. Distinguish the relationships between microscopic structures and macroscopic properties of materials, and compare differences between material classes. (A,C)*
  b. Summarize the methods of altering the microstruture of a material by mechanical, thermal, or chemical means to change macroscopic properties. (A,C,H)*
  c. Perform calculations relating to material properties. (A,H)*
  d. Use standard materials testing equipment to measure material properties and evaluate processing treatments, and then write lab reports that analyze and interpret the data. (A,B,C,E,H)*

*Capital letters after major outcomes indicate how this course contributes to the program-level learning outcomes listed below.

Upon completion of the A.S. Engineering Major or the Engineering Transfer Program, students will be able to:
  A. apply their knowledge of math, science, and engineering to identify, formulate, and solve engineering problems.
  B. design and perform experiments, as well as to analyze and interpret data.
  C. design a system, component, or process to meet desired needs.
  D. demonstrate professional ethical responsibility.
  E. communicate effectively and perform on multi-disciplinary teams.
  F. judge the effects of engineering projects on society and the environment.
  G. engage in life-long learning and explain contemporary issues.
  H. use the techniques, skills, and modern engineering tools necessary for engineering practice.

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MATH_116	Linear Algebra	Revise Course
Expected Outcomes for Student:		
At the end of Math 116, after studying and learning the content, a student will be able to do the following 1. Perform applicable arithmetic operations on vectors and matrices. 2. Determine when a function is or is not a linear transformation. 3. Given a linear transformation, a. Determine the range, kernel, rank and nullity. b. Determine if it is invertible, and if so then construct the inverse. 4. Construct elementary matrices corresponding to elementary row operations and use both to construct the inverse of an invertible square matrix. 5. Determine if a set of vectors is linearly independent. 6. Construct a basis for a given vector space, and determine its dimension. 7. Determine if a subset of a given vector space is a subspace. 8. Assess whether a given set and field with addition and scalar multiplication is or is not a vector space. 9. Compute the transition matrix between two bases. 10. Calculate the determinant of a square matrix and use it to determine the linear independence of row or column vectors, and determine invertibility. 11. Calculate a determinant by expansion in cofactors. 12. Calculate the eigenvalues and construct a basis for the eigenspaces of a matrix or linear transformation. 13. Construct the diagonal decomposition of a square matrix, or explain why the matrix cannot be diagonalized. 14. Construct orthonormal bases in Rn.		

MATH_117	Discrete Mathematics	Revise Course
Expected Outcomes for Student:		
Upon completion of this course students will be able to: 1. Define a finite-state machine (FSM) 2. Define the input and output symbols, state space, next-state and output functions. 3. Construct a transition diagram of an FSM. 4. Describe the role of input and output strings for an FSM. 5. Define a finite-state automaton (FSA), what an accepting state of an FSA is, how to find the strings an FSA accepts and how to determine if two FSAs are equivalent. 6. know the definitions of: a formal language and a phrase-structure grammar terminal and nonterminal symbols, and productions a derivation of a string a language generated by a grammar context-sensitive, context-free, and regular grammars and languages 7. Construct a regular grammar that generates the language that an FSA accepts, determine if a string is accepted by a nondeterministic FSA, determine if two nondeterministic FSA are equivalent,construct an FSA whose language is generated by a regular grammar and construct a deterministic model of a nondeterministic FSA.		

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MATH_123	Analytic Geometry and Calculus I	Revise Course
Expected Outcomes for Student:		
Student learning outcomes for Math 123 include but are not limited to the following: 1. Calculate limits using epsilon-delta definition and theorems for the limit of a function at a point; 2. Determine continuity and understand the intermediate value theorem; 3. Work with the definition of derivative, tangent lines; 4. Work with the derivatives of trigonometric functions; 5. Work with the differentiation rules (sum, product, quotient, chain) and implicit differentiation; 6. Make linear approximations and calculate the differential; 7. Apply Newton's method and solve related rates problems; 8. Sketch curves using extrema and critical points, first and second derivative tests. 9. Solve optimization problems; 10. Use the Mean Value Theorem; 11. Calculate Riemann sums, the Riemann integral, and understand its properties and existence; 12. Apply the Fundamental Theorems of Calculus; 13. Calculate change of variables and do numerical integration; 14. Calculate areas of plane regions, volumes; arc length and area of a surface of revolution; center of mass; work; fluid force on submerged lamina and other applications.		

MATH_124	Analytic Geometry and Calculus II	Revise Course
Expected Outcomes for Student:		
Student learning outcomes for Math 124 include the following: 1. Find an indefinite integral that requires the method of partial fraction decomposition. 2. Evaluate the limit of an indeterminate form.4. indeterminate forms; 3. Find the interval of convergence of a power series.		

MATH_223	Analytic Geometry, Vector Analysis, and Calculus III	Revise Course
Expected Outcomes for Student:		
1. Find the gradient of a particular scalar field z = f(x,y), the value D_u(f)(p) of the directional derivative of f at point p in the direction of the unit vector u, and the direction v and magnitude ||grad f|| of the maximum rate of increase of f at point p. 2. Set up and evaluate a double, iterated integral in polar coordinates. 3. Use the divergence theorem to evaluate the total flux integral of a particular vector field F through a bounded surface that encloses a simply connected region.		

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MATH_224	Elementary Differential Equations	Revise Course
Expected Outcomes for Student:		
1. Solve a standard first order initial value problem showing a proper written display of the appropriate method. 2. Solve a second order linear with constant coefficients, non homogeneous initial value problem showing (a) the solution of the associated non homogeneous problem and (b) a derivation of the particular solution. 3. Solve a second order boundary value problem, listing the eigenvalues and the eigenfunctions.		

PHYS_108A	General Physics 1	Revise Course
Expected Outcomes for Student:		
Upon completion of the course, the student will: 1.Communicate and utilize the physical laws of kinematics and thermodynamics via problem solving 2. Apply the physical laws of kinematics and thermodynamics to word problems in order to obtain clear solutions by mathematical analysis. 3.Conduct an experiment, collect and analyze data, including such tools as graphs, regressions and statistical analysis, and interpret results within the framework of the physical laws of kinematics and thermodynamics 4. Write a lab report explaining, both qualitatively and quantitatively, the scientific results of an experiment and the certainty of those results. 5.Use modern scientific practices relevant to the field of physics: including the formulation of a scientific theory based on and consistent with quantified observations. 6.Demonstrate critical thinking skills		
CourseID	**Tittle**	**Action**
PHYS_108AC	General Physics I - Calculus Supplement	New Course
Expected Outcomes for Student:		
1. To further develop students understanding of topics covered in Physics 108A. 2. To further develop the problem-solving skills of the students. In particular, to develop therir skills in the application of the principles of calculus to some specific problems in selected topics of physics.		

PHYS_108B	General Physics II	Revise Course
Expected Outcomes for Student:		
Upon completion of the course, the student will: 1.Communicate and utilize the physical laws of electricity and magnetism via problem solving 2.Apply the physical laws and techniques of electricity and magnetism to word problems and obtain clear solutions through mathematical analysis of these laws. 3.Conduct an experiment, collect and analyze data, including such tools as graphs, regressions and statistical analysis, and interpret results within the framework of the physical laws of electricity and magnetism 4.Write a lab report explaining, both qualitatively and quantitatively, scientific results of an experiment based in the field of electricity and magnetism and report the certainty of those results. 5.Use modern scientific practices relevant to the field of electricity and magnetism: including the formulation of a scientific theory based on and consistent with quantified observations.		

6.Demonstrate critical thinking skills		
PHYS_108BC	General Physics II - Calculus Supplement	New Course
Expected Outcomes for Student:		
1. To further develop students' understanding of topics covered in Physics 108B. 2. To further develop the problem-solving skills of the students. In particular, to develop their skills in the application of the principles of calculus to some specific problems in selected topics of physics.		

PHYS_207A	Mechanics and Properties of Matter	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Demonstrate a basic conceptual understanding of the fundamental concepts and definitions needed to solve problems in classical Newtonian mechanics. 2. Develop logical, causal and quantitative reasoning skills to obtain numerical or algebraic solutions to applied problems in Newtonian mechanics that are consistent with predictions and results 3. Carry out laboratory work, plan experiments, make observations and communicate results.		
PHYS_207B	Electricity and Magnetism	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Use the fundamental concepts and definitions to solve problems in classical Newtonian mechanics. 2. Explain applications and uses of the concepts of electricity and magnetism to real world problems and situations. 3. Carry out laboratory work, plan experiments, make observations and communicate results.		
PHYS_207C	Heat, Light, Sound and Modern Physics	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Demonstrate a basic conceptual understanding of the fundamental concepts and definitions needed to solve problems in classical Newtonian mechanics. 2. Develop logical, causal and quantitative reasoning skills to obtain numerical or algebraic solutions to applied problems in waves and modern physics that are consistent with predictions and results 3. Carry out laboratory work, plan experiments, make observations and communicate results.		