

**NORCO COLLEGE  
SLO to PLO MATRIX**

NORCO COLLEGE SLO to PLO MATRIX		PLOs	PLO 1: Apply the basic operations of mathematics on the set of real and complex numbers,	PLO 2: Apply the principles of the scientific method, including the use of inductive and deductive reasoning to pose, test and accept or reject	PLO 3: Recognize and determine the role of mathematics and the sciences as investigative and reasoning	PLO 4:	PLO 5:	PLO 6:	PLO 7:
			CERTIFICATE/PROGRAM: Math & Science						
<b>COURSE</b>	<b>AMY 10</b>								
SLO 1									
SLO 2									
SLO 3	Demonstrate a basic understanding of the levels of structural organization, the relationship between various systems of the body, and the importance of homeostasis.				X				
SLO 4									
SLO 5									
SLO 6	State the major functions and organs of each system of the human body and demonstrate a basic understanding of physiology significant to each system.				X				
<b>COURSE: AMY 2A</b>									
SLO 1									
SLO 2									
SLO 3	Complete basic mathematical tasks including metric conversions	X							
SLO 4									
SLO 5									
SLO 6									
SLO 15	Identify and discuss basic clinical disorders, diseases, and applications, associated with each topic.		X	X					
SLO 16	Integrate principles from different systems and critically evaluate clinical problems.		X	X					
<b>COURSE: AMY 2B</b>									
SLO 1									
SLO 2									
SLO 3									

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SLO 4									
SLO 5									
SLO 6									
SLO 9	Identify and discuss basic clinical disorders, diseases, and applications, associated with each topic.		<b>X</b>	<b>X</b>					
SLO 10	Integrate principles from different systems and critically evaluate clinical problems.		<b>X</b>	<b>X</b>					
<b>COURSE: ANT 1</b>									
SLO 1	Explain the development of modern evolutionary theory.				<b>X</b>				
SLO 2	Apply classical and modern genetic approaches to the study of taxonomy and evolution.				<b>X</b>				
SLO 3	Analyze non-human primate and hominid behavior, social organization, and morphology.				<b>X</b>				
SLO 4	Integrate biological, geological, and archaeological evidence within the framework of the scientific method, in order to formulate interpretations of human evolution.		<b>X</b>	<b>X</b>					
SLO 5	Integrate biological and social perspectives in the description and explanation of human diversity.				<b>X</b>				
SLO 6	Assess current debates in human biological evolution and diversity.		<b>X</b>	<b>X</b>					

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CERTIFICATE/PROGRAM: Math & Science								
<b>COURSE: BIO 1</b>								
SLO 1	List the steps of the scientific method, and understand the process of science.		<b>X</b>					
SLO 2								
SLO 3								
SLO 4	Compare and contrast individual organisms, and populations dynamics which include heritability, adaptation, and evolutionary principles.			<b>X</b>				
SLO 5	Explain the ecosystems, and the dynamics of the biosphere.			<b>X</b>				
SLO 6								
SLO 7	Use appropriate biological terminology in discussing biological principles and relationships.			<b>X</b>				
<b>COURSE: BIO 10</b>								
SLO 1	Describe the process of science and the scientific method.		<b>X</b>					
SLO 2								
SLO 3								
SLO 4								
SLO 5	Apply knowledge of biology to personal, local and global issues (including cloning, genetic engineering, disease, and environmental issues) to an informed citizenship.			<b>X</b>				
SLO 6	Describe the mechanisms of evolutionary change and its role in the history of life on earth.			<b>X</b>				
SLO 7	Describe the biodiversity of life on earth and the impact of mankind on biodiversity.			<b>X</b>				
SLO 8	Apply basic scientific knowledge to a possible pursuit of future studies in biological sciences.			<b>X</b>				

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CERTIFICATE/PROGRAM: Math & Science										
<b>COURSE: BIO 5</b>										
SLO 1	Identify and then relate the basic biological properties of the chemistry of life, cell theory, and Mendelian genetics to the study of plants.					X				
SLO 2										
SLO 3										
SLO 4	List the major advancements in genetic engineering in relation to the human uses of plants and their genes					X				
SLO 5										
SLO 6	Discuss how plants contribute to the health of our global and more local ecosystems.					X				
SLO 7										
SLO 8	Explain the scientific method of inquiry and hypothesis testing and be able to apply these to problem solving and analysis of experimental plant data.			X						
SLO 9	Relate how the key steps and characteristics of the scientific method can be used and applied in one's everyday life so as to more effectively and critically evaluate non-fictional literature.			X						
<b>COURSE: BIO 7</b>										
SLO 1										
SLO 2										
SLO 3	Distinguish between organisms of different divisions and phyla by comparing and contrasting morphological and/or developmental similarities and differences.					X				
SLO 4	Prepare a scientific laboratory report in which data has been collected, compiled, organized and presented, and inferences have been made and justified by analysis of the data, and			X						

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	conclusions have been drawn, supported and justified by the data.								
SLO 5	Differentiate among the following marine ecosystems, describe the physical, chemical and biological factors which control each system, relate the importance of each to the biosphere, and design and perform research methods for monitoring each system (estuarine, rocky intertidal, sandy beach, coral reefs, near shore and off shore pelagic realms).				X				
SLO 6	Analyze the effects of human interaction in the above mentioned ecosystems				X				
<b>COURSE: BIO 8</b>									
SLO 1									
SLO 2	Gain an appreciation for the scientific method of inquiry and hypothesis testing, and be able to apply these problem solving and analysis of ecological data.		X						
SLO 3	Interpret the relationships between adaptations, and environmental conditions which the organisms live.				X				
SLO 4	Be able to analyze species diversity, community interactions, and food and nutrient webs.				X				
SLO 5	Comprehend the role of natural selection in the establishment of ecological relationships among organisms.				X				
SLO 6	Reasonably discuss the impact of humans on local, regional, and global ecological systems, as well as understand the ecological impact of pollution, conservation, and human population biology.				X				
<b>COURSE: BIO 11</b>									
SLO 1									
SLO 2	Explain the scientific method and dissect the process of scientific		X						

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	thought using some historically important examples									
SLO 3										
SLO 4										
SLO 5	Discuss the properties of life and expound on the current theories of the origin and evolution of life.					X				
SLO 6										
SLO 8	Explain how biological systems are regulated at the gene and cellular level					X				
SLO 9	Relate gene technology and other biological principles to other biological disciplines and to life in general.					X				
SLO 13	Integrate evolutionary theory and principles into biological structure and function.					X				
SLO 15	Be able to critically analyze and critique scientific literature.				X					
SLO 16	Apply the scientific method and the metric system to laboratory experiments.	X		X						
SLO 17	Synthesize a coherent and educated hypothesis before performing any laboratory experiment				X					
SLO 18	Perform the calculations & procedures necessary to make up required chemical stock solutions and <i>dilutions in a reasonably accurate manner.</i>	X								
SLO 19	Become comfortable with scientific protocols and be able to write and follow an experimental flow chart.				X					
SLO 21	Analyze trends by the appropriate mathematical, graphical & statistical manipulation of raw data.	X		X						
SLO 22	Explain the differences between cause and effect, evidence and inference, qualitative, semi-quantitative and quantitative data.				X					
SLO 23	Critique and/or design an original biological experiment				X					
SLO 24	Write a scientific paper.				X					
SLO 26	Critically appraise experimental data, published experiments, scientific articles, and current biological				X					

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	theories and models.								
SLO 27	Discuss the contribution of both historical and recent biological research to the evolution of current biological thought.				X				
<b>COURSE</b>	<b>BIO 12</b>								
SLO 1	Design and implement controlled experiments using the scientific method, analyze the data using statistical analysis, and present the data in a scientific paper.			X					
SLO 2									
SLO 3	Explain evolutionary theory with an emphasis on natural selective forces and use of the Hardy-Weinberg equation.				X				
SLO 4	Describe ecological principles and forces including population dynamics, community interactions, and ecosystem connections, with reference to climate change and conservation biology.				X				
<b>COURSE:</b>	<b>BIO 30</b>								
SLO 1									
SLO 2	Explain the purpose of the major ethical principles that guide sexuality research, practice and education.				X				
SLO 3	Distinguish gender similarities and differences and the impact they have on roles, behavior and society.				X				
SLO 4									
SLO 5									
SLO 6									
SLO 9	Describe the principles and value of contraception/birth control use.				X				
SLO 10	Identify personal values and decision making processes associated with sexuality.				X				
SLO 11	List modes of transmission, symptoms and treatments of sexually				X				

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	transmitted infections.								
<b>COURSE: BIO 34</b>									
SLO 1									
SLO 2									
SLO 3	Compare and describe the steps of the cell cycle.				X				
SLO 4									
SLO 5	Explain and interpret pedigree patterns.				X				
SLO 6	Describe factors that can modify patterns of inheritance.				X				
SLO 9	Explain the genetic influences on various human diseases such as cancer, metabolic and immunological disorders.				X				
<b>COURSE: BIO 36</b>									
SLO 1	Use appropriate terminology in discussing biological principles and relationships. Dissect the complex web of interconnections that bind human society to the environment.				X				
SLO 2	List the present and future environmental difficulties the human species is faced with.				X				
SLO 3	Critically evaluate the scientific, ethical, economic and sociological evidence in support of the claims for each environmental problem.				X				
SLO 4									
SLO 5	Distinguish the environmental impacts of industrial and developing societies, and explain why different types of societies perceive different problems and pursue different solutions.				X				
SLO 6									
SLO 7	Express opinions on issues covered by this course orally and in writing with regard to world geography and international affairs.				X				
SLO 8	Relate the topics covered to decisions and choices made in your				X				

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	personal life.								
<b>COURSE</b>	<b>CHE-10 (Chemistry for Everyone)</b>								
SLO 1	Compare the scientific method with other methods of acquiring knowledge.			X	X				
SLO 2	Describe and apply the concepts of atoms, compounds, and reactions to industrial, environmental, organic, biological, and nuclear chemistry.	X	X	X					
SLO 3	Correlate the chemical concepts to the applications.	X	X	X					
SLO 4	Recognize and identify the scientific history of concepts. Relate the experimental results to the concepts at a certain periods in history (i.e. for the atom).		X	X					
SLO 5	Recognize a chemical vocabulary of approximately 100 words.	X							
SLO 6	Discuss the risks and benefits of use of different chemicals by individuals and society.	X	X	X					
<b>COURSE</b>	<b>CHE-1A (General Chemistry I)</b>								
SLO 1	Solve multi-step problems (using formulae and unit-analysis) relating to atoms and elements, chemical bonding and molecular geometry, chemical reactions and stoichiometry, properties of the states of matter, phase changes and solutions.	X	X	X					
SLO 2	Collect and analyze data from chemical experiments, including graphing, calculations and qualitative understanding of how data relates to the concept studied.	X	X	X					
SLO 3	Construct and manipulate equipment to secure reasonably accurate measurements.	X		X					
SLO 4	Describe, apply, and assess chemical concepts of atoms and elements, chemical bonding and molecular geometry, chemical reactions and stoichiometry, properties of the states of matter,	X	X	X					

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	phase changes and solutions.									
SLO 5	Describe and apply a chemical vocabulary of approximately 300 words and apply the IUPAC system of chemical nomenclature.			<b>X</b>						
<b>COURSE</b>	<b>CHE-1B (General Chemistry II)</b>									
SLO 1	Solve multi-step problems (using formulae and unit-analysis) relating to kinetics, equilibria, thermodynamics, electrochemistry, and other course content.			<b>X</b>	<b>X</b>	<b>X</b>				
SLO 2	Collect understanding of how data relates to the concept studied and analyze data from chemical experiments, including graphing, calculations and qualitative.			<b>X</b>	<b>X</b>	<b>X</b>				
SLO 3	Construct and manipulate equipment to secure reasonably accurate measurements.			<b>X</b>		<b>X</b>				
SLO 4	Describe and apply chemical concepts of kinetics, equilibria, thermodynamics, and electrochemistry.			<b>X</b>	<b>X</b>	<b>X</b>				
SLO 5	Describe and apply a chemical vocabulary of approximately 300 words and apply IUPAC nomenclature.			<b>X</b>						
<b>COURSE</b>	<b>CHE-2A (Introductory Chemistry I)</b>									
SLO 1	Solve basic level problems (using formulae and unit analysis) relating to unit conversions, stoichiometry, gas law equations, concentrations of solutions, pH, and nuclear chemistry.			<b>X</b>	<b>X</b>	<b>X</b>				
SLO 2	Describe and apply a chemical vocabulary of approximately 200 words.			<b>X</b>						
SLO 3	Apply the systematic naming system to name inorganic and simple organic compounds. Apply Lewis Theory to ionic and covalent bonding.			<b>X</b>	<b>X</b>	<b>X</b>				
SLO 4	Relate chemical concepts to physical phenomena in the areas of health, the environment, and their everyday lives.			<b>X</b>	<b>X</b>	<b>X</b>				

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SLO 5	Collect data using accurate qualitative observations and quantitative measurements of length, mass, temperature, and volume.		X	X	X				
SLO 6	Analyze experimental results and relate them to the relevant concept.		X	X	X				
<b>COURSE</b>	<b>CIS/CSC-5 (Computer Information Systems 5)</b>								
SLO 1	Create computer programs in C++ using the principles of structured programming. <ul style="list-style-type: none"> <li>Critical Thinking - Analyze and solve complex problems across a range of academic and everyday contexts</li> <li>Information Skills - Demonstrate computer literacy</li> </ul>		X		X				
SLO 2	Apply the principles of logical programming concepts to develop specific solutions for gaming, business, scientific and mathematics problems. <ul style="list-style-type: none"> <li>Critical Thinking - Generalize appropriately from specific contexts</li> <li>Breadth of Knowledge - Use the symbols and vocabulary of mathematics to solve problems and communicate the results</li> </ul>		X	X	X				
SLO 3	Identify the information input requirements, synthesize the algorithmic steps needed to transform the data input into the required output information, and organize the output format to facilitate user communication. <ul style="list-style-type: none"> <li>Critical Thinking - Integrate knowledge across a range of contexts</li> <li>Information Skills - Demonstrate computer literacy</li> <li>Information Skills - Locate, evaluate and use information effectively</li> </ul>		X		X				
SLO 4	Demonstrate the use of the C++ IDE and libraries. <ul style="list-style-type: none"> <li>Information Skills - Demonstrate computer literacy</li> </ul>								

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<b>COURSE</b>	<b>CIS/CSC-17A (Computer Information Systems 17A)</b>								
SLO 1	Analyze and understand the Object-Oriented C++ environment. <ul style="list-style-type: none"> <li>Information Skills - Locate, evaluate and use information effectively</li> </ul>		X						
SLO 2	Apply theoretical gaming, business, scientific, and mathematical concepts in writing and executing programs in the C++ language using Object-Oriented programming methodology. <ul style="list-style-type: none"> <li>Critical Thinking - Analyze and solve complex problems across a range of academic and everyday contexts</li> <li>Application of Knowledge - Maintain and transfer academic and technical skills to workplace</li> </ul>		X	X	X				
<b>COURSE</b>	<b>CIS/CSC-17B (Computer Information Systems 17B)</b>								
SLO 1	Write medium to large C++ programs individually and as part of a programming team effort. <ul style="list-style-type: none"> <li>Critical Thinking - Analyze and solve complex problems across a range of academic and everyday contexts</li> </ul>		X	X	X				
SLO 2	Create programs that run in a multiprocessor environment such as but not limited to multimedia components. <ul style="list-style-type: none"> <li>Critical Thinking - Generalize appropriately from specific contexts</li> </ul>		X		X				
SLO 3	Use C++ database connectivity "ODBC" with basic SQL to maintain and update records. <ul style="list-style-type: none"> <li>Critical Thinking - Integrate knowledge across a range of contexts</li> </ul>		X		X				
<b>COURSE</b>	<b>CIS/CSC-17C (Computer Information Systems 17C)</b>								
SLO 1	Analyze and understand the use of data structures in the development of algorithms. <ul style="list-style-type: none"> <li>Critical Thinking - Analyze and solve complex problems across a range of academic and everyday contexts</li> </ul>		X	X	X				
SLO 2	Design and create C++ programs using stacks, trees, queues, lists and trees.		X		X				

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	<ul style="list-style-type: none"> <li>Breadth of Knowledge - Understand the basic content and modes of inquiry of the major knowledge fields</li> </ul>								
SLO 3	Apply practical business processes, theoretical scientific and mathematical concepts to write and execute computer programs in the C++ language using data structures. <ul style="list-style-type: none"> <li>Critical Thinking - Integrate knowledge across a range of contexts</li> <li>Application of Knowledge - Maintain and transfer academic and technical skills to workplace</li> </ul>		X	X	X				
<b>COURSE</b>	<b>CIS/CSC-18A (Computer Information Systems 18A)</b>								
SLO 1	Demonstrate an understanding of the Java IDE programming environment sufficient to write small to medium sized programs. <ul style="list-style-type: none"> <li>Application of Knowledge - Maintain and transfer academic and technical skills to workplace</li> </ul>		X		X				
SLO 2	Demonstrate an understanding of object-oriented development Sufficient to create and use classes as the foundation the fundamentals of JAVA application programs. <ul style="list-style-type: none"> <li>Critical Thinking - Generalize appropriately from specific contexts</li> <li>Critical Thinking - Integrate knowledge across a range of contexts</li> </ul>		X		X				
<b>COURSE</b>	<b>CIS/CSC-18B (Computer Information Systems 18B)</b>								
SLO 1	Write medium to large Java programs individually and as part of a programming team effort. <ul style="list-style-type: none"> <li>Critical Thinking - Analyze and solve complex problems across a range of academic and everyday contexts</li> <li>Application of Knowledge - Maintain and transfer academic and technical skills to workplace</li> </ul>		X	X	X				
SLO 2	Create programs that run in a multiprocessor environment such as but not limited to multimedia components.		X		X				

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	<ul style="list-style-type: none"> <li>Critical Thinking - Generalize appropriately from specific contexts</li> </ul>							
SLO 3	Use Java database connectivity “JDBC” with basic SQL to maintain and update records. <ul style="list-style-type: none"> <li>Critical Thinking - Integrate knowledge across a range of contexts</li> </ul>	X		X				
<b>COURSE</b>	<b>CIS/CSC-18C (Computer Information Systems 18C)</b>							
SLO 1	Analyze and understand the use of data structures in the development of algorithms. <ul style="list-style-type: none"> <li>Critical Thinking - Analyze and solve complex problems across a range of academic and everyday contexts</li> </ul>	X	X	X				
SLO 2	Design and create Java programs using stacks, trees, queues, lists and trees. <ul style="list-style-type: none"> <li>Breadth of Knowledge - Understand the basic content and modes of inquiry of the major knowledge fields</li> </ul>	X	X	X				
SLO 3	Apply practical business processes, theoretical scientific and mathematical concepts to write and execute computer programs in the Java language using data structures. <ul style="list-style-type: none"> <li>Critical Thinking - Integrate knowledge across a range of contexts</li> <li>Application of Knowledge - Maintain and transfer academic and technical skills to workplace</li> </ul>	X	X	X				
<b>COURSE:</b>	<b>ELE 21</b>							
SLO 1	Solve basic electronic problems involving current, voltage, and power.	X						
SLO 2	Explain the relationship between current, voltage, resistance and power.	X						
SLO 3	Discuss the relationship between electricity and magnetism.	X						
SLO 4	Describe the construction, operation, and purpose of resistors, potentiometers, switches, fuses, relays, and batteries.		X					
SLO 5	Describe the operation of a basic AC generator.		X					

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SLO 6	Define the terms inductance, capacitance, and resonance, and explain the relationship of inductors and capacitors in various circuit configurations.		X						
SLO 7	Explain transformer action and determine the voltage, current, and power ratios for a given transformer.		X						
<b>COURSE: ELE 22</b>									
SLO 1	Demonstrate knowledge of the basic concepts of electrical circuit analysis.		X						
SLO 2	Demonstrate knowledge of the principles of network analysis.		X						
SLO 3	Demonstrate knowledge of AC circuit analysis.		X						
SLO 4									
SLO 5									
SLO 6									
<b>COURSE: ELE 23</b>									
SLO 1	Describe the physical nature and electrical characteristics of materials which are classified as semiconductors.				X				
SLO 2	Explain the operation and biasing requirements of diodes, bipolar transistors, field effect transistors, thyristors, and optoelectronic devices.		X						
SLO 3	Discuss the construction and uses of analog and digital integrated circuits.		X						
SLO 4	Discuss the three basic types of transistor amplifier configurations, describe their operation, and compare the characteristics of each.		X						
SLO 5	Identify and explain the operation of power supplies and their circuitry.		X						
SLO 6	Explain the basic principles of operation of both sinusoidal and		X						

**NORCO COLLEGE  
SLO to PLO MATRIX**

NORCO COLLEGE SLO to PLO MATRIX		PLOs	PLO 1: Apply the basic operations of mathematics on the set of real and complex numbers, expressions and	PLO 2: Apply the principles of the scientific method, including the use of inductive and deductive reasoning to	PLO 3: Recognize and determine the role of mathematics and the sciences as investigative	PLO 4:	PLO 5:	PLO 6:	PLO 7:
	nonsinusoidal oscillators.								
<b>COURSE: ELE 24</b>									
SLO 1	Perform a mathematical analysis of power supply and regulator circuits.		X						
SLO 2	Perform a mathematical analysis of amplifier circuits.		X						
SLO 3	Perform a mathematical analysis of oscillator circuits.		X						
SLO 4	Perform a mathematical analysis of electronic control circuits.		X						
SLO 5									
SLO 6									
<b>COURSE: ELE 25</b>									
SLO 1	Convert between the binary and decimal number systems and recognize the most commonly used binary codes.		X						
SLO 2	Explain the operation of digital logic gates.		X						
SLO 3	Identify the more commonly used integrated circuit families used in digital equipment and discuss their operation and characteristics.		X						
SLO 4	Use Boolean algebra to express logic operations and minimize logic circuits in design.		X						
SLO 5	Discuss the operation and application of counters, shift registers, and other sequential and combinational logic circuits.		X						
SLO 6									
<b>COURSE: ENE 10</b>									
SLO 1	Identify the most common engineering disciplines.				X				

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SLO 2	Write laboratory experiments using the scientific method.			X					
SLO 3									
SLO 4									
SLO 5									
SLO 5									
SLO 6									
<b>COURSE: ENE 1A</b>									
SLO 1									
SLO 2	Analyze and solve surveying problems from field notes.		X	X					
SLO 3									
SLO 4	Apply fundamental concepts to adjust data and develop a preliminary route plan.		X	X					
SLO 5									
SLO 6									
SLO 6									
<b>COURSE: ENE 1B</b>									
SLO 1									
SLO 2	Analyze and solve surveying problems from field notes.		X		X				
SLO 3	Effectively execute various types of field surveys using instruments such as measuring tapes, automatic levels, theodolites, and electronic distance measurement equipment.		X		X				
SLO 4									
SLO 5									
SLO 6									

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<b>COURSE</b>	<b>ADJ-2</b>								
SLO 1	<p>Demonstrate a knowledge of the historical development of law and the American Criminal Justice System and the trends in its implementation and procedural evaluation.</p> <ul style="list-style-type: none"> <li>Critical Thinking - Generalize appropriately from specific contexts</li> </ul>			X					
SLO 2	<p>Define the basic legal concepts of the Criminal Justice System and the roles of the police, the prosecuting attorney, defense counsel, the court, and corrections, at the local, state, and federal levels.</p> <ul style="list-style-type: none"> <li>Communication Skills - Read college-level materials with understanding and insight</li> <li>Breadth of Knowledge - Understand the basic content and modes of inquiry of the major knowledge fields</li> <li>Information Skills - Locate, evaluate and use information effectively</li> </ul>								
SLO 3	<p>Describe the issues of consensual encounter, detention, arrest, search, search and seizure, arraignment, pre-trial proceedings, court trial, counsel assistance, pre-trial motions, jury matters, verdicts, appeals, sentencing, and victims' rights.</p> <ul style="list-style-type: none"> <li>Critical Thinking - Recognize and assess evidence from a variety of sources</li> <li>Critical Thinking - Integrate knowledge across a range of contexts</li> <li>Information Skills - Locate, evaluate and use information effectively</li> </ul>		X	X					
SLO 4	<p>Demonstrate an understanding of both the pervasiveness and limitations of the criminal justice system, by describing a proper role for the community in working with the criminal justice system in developing a strategy for dealing with 21<sup>st</sup> Century</p>			X					

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	challenges, in light of the Preamble to the U.S. Constitution-We, the people- and the U.S Patriot Act.								
	<ul style="list-style-type: none"> <li>• Critical Thinking - Recognize and assess evidence from a variety of sources</li> <li>• Critical Thinking - Integrate knowledge across a range of contexts</li> <li>• Communication Skills - Write with precision and clarity to express complex thought</li> </ul>								
<b>COURSE: ENE 22</b>									
SLO 1									
SLO 2	Apply principles of mechanical drawing to the solution of various drawing problems.				X				
SLO 3									
SLO 4	Analyze and create drawing problems based upon the synthesis of information presented in lecture, from their reading, and from technical reference material.				X				
SLO 5									
SLO 6									
<b>COURSE: ENE 23</b>									
SLO 1	The student will be able to properly relate and analyze points, lines and planes as they interpret three dimensional problems orthographically (two-dimensionally).		X		X				
SLO 2	The student will develop the ability to graphically describe constituent surface boundary lines and surface planes.		X		X				
SLO 3	The student will be able to graphically describe, analyze and design three-dimensional problems using spatial visualization.		X		X				
SLO 4									

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SLO 5									
SLO 6									
<b>COURSE: ENE 28</b>									
SLO 1									
SLO 2									
SLO 3									
SLO 4	Describe the concepts of the mechanical design process and identify how those concepts relate to the various stages of manufacturing.				X				
SLO 5									
SLO 6									
SLO 9	Calculate position tolerance using Geometric Dimension and tolerance.		X						
<b>COURSE: ENE 30</b>									
SLO 1									
SLO 2									
SLO 3	Synthesize information and apply critical thinking skills to solve instructional problems typical of industry.				X				
SLO 4	Apply the principles of two-dimensional CAD in the solution of various design problems.				X				
SLO 5									
SLO 6									
<b>COURSE ENE 31</b>									
SLO 1									
SLO 2									
SLO 3									

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SLO 4									
SLO 5	Use the CAD system's vector based graphics to solve complex design problems most commonly found in industry.				X				
SLO 6									
<b>COURSE: ENE 35</b>									
SLO 1	Solve simple and compound force diagrams using both graphical and analytical methods involving algebraic expressions and trigonometry.		X						
SLO 2	Use of free body diagrams to solve engineering problems commonly encountered in engineering mechanics.				X				
SLO 3	Analyze beams and members under loads to identify the internal forces and reactions at the supports.				X				
SLO 4	Solve applied problems related to static machines and structures to determine internal forces and external reactions.				X				
SLO 5	Apply the principles of physics and engineering analysis to everyday problems in engineering.				X				
SLO 6									
<b>COURSE: GEG-1 (Physical Geography)</b>									
SLO 1	Identify and explain basic facts, rules, principles, and mechanisms of the atmosphere, lithosphere, hydrosphere, and biosphere;		X	X	X				
SLO 2	Assess the impact of location on the elements of air, water, land, and the biosphere;		X	X	X				
SLO 3	Ascertain interrelationships between the four spheres and demonstrate a problem solving perspective to interconnections;		X	X	X				
SLO 4	Communicate geographic and scientific information correctly including the ability to articulate multiple perspectives on		X	X	X				

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	physical processes;								
SLO 5	Utilize geographic tools appropriately, such as maps, graphs, data, and images to develop critical thinking and problem solving skills;		X	X	X				
SLO 6	Apply geographic methods to analyze, evaluate, and explain spatial issues and problems in ways that demonstrate critical thinking.		X	X	X				
<b>COURSE</b>	<b>GEG-1L (Physical Geography Lab)</b>								
SLO 1	Exhibit competency in the use of maps by determining distance, area, slope, elevation and height;		X		X				
SLO 2	Demonstrate proper use of instruments for measuring and location;		X		X				
SLO 3	Interpret and analyze data in a variety of formats;		X	X	X				
SLO 4	Follow instructions, rules, and guidelines in the implementation of scientific analysis;		X	X	X				
SLO 5	Demonstrate problem-solving skills in individual and group work		X	X	X				
SLO 6	Formulate and test hypotheses about physical processes		X	X	X				
SLO 7	Formulate analyses and critical thinking about the development of landforms.		X	X	X				
<b>COURSE:</b>	<b>MAT 10</b>								
SLO 1	Solve polynomial, radical, exponential, logarithmic, trigonometric, parametric and absolute value equations.		X						
SLO 2	Graph polynomial, radical, exponential, logarithmic, trigonometric, parametric, absolute value equations, conics and their translations.		X						
SLO 3	Describe the behavior of the graph of the function from its equation.				X				

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SLO 4	Analyze the patterns found in geometric and arithmetic sequences to find terms and evaluate series.		X						
SLO 5	Apply the Binomial Theorem to higher order polynomials.		X						
SLO 6	Prove algebraic conjectures by using Mathematical Induction.			X					
<b>COURSE: MAT 1A</b>									
SLO 1	Calculate the limit of a function.		X						
SLO 2	Determine the continuity of a function.				X				
SLO 3	Find the derivatives of algebraic and transcendental functions.		X						
SLO 4	Solve related rates problems.		X		X				
SLO 5	Apply the absolute and relative extrema to curve sketching and optimization problems.		X		X				
SLO 6	Use Newton's method to approximate the roots of a function.		X		X				
SLO 7	Evaluate a definite integral using Riemann sums.		X						
<b>COURSE: MAT 1B</b>									
SLO 1	Evaluate definite and indefinite integrals using techniques of integration.		X						
SLO 2	Solve applications of integration problems, including those involving area, volume, work, arc, length and force.		X		X				
SLO 3	Employ the basic concepts of convergence and divergence of infinite sequences and series.		X		X				
SLO 4	Derive Taylor Series and approximate polynomials of analytic functions.		X						
SLO 5	Perform differentiation and integration on parametric equations and polar forms.		X						
SLO 6									

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<b>COURSE: MAT 1C</b>									
SLO 1	Write vector dot and cross products and apply dot and cross product to writing equations for lines and planes and surfaces in space.		X						
SLO 2	Write Cartesian equations in Spherical and cylindrical coordinates.		X						
SLO 3	Differentiate and integrate vector valued functions.		X						
SLO 4	Apply integration and differentiation to finding velocity and acceleration of bodies in space.		X		X				
SLO 5	Find unit tangent and unit normal vectors and their application to velocity, acceleration and curvature.		X		X				
SLO 6	Compute partial derivatives, differentials, directional derivatives and gradients.		X						
SLO 7	Apply partial derivatives and Lagrange multipliers to solve the Optimization Problems.		X		X				
SLO 8	Compute double and triple integrals and apply double and triple integration to the solution of center of mass, area and volume problems.		X		X				
SLO 9	Use the Jacobian and transformation of coordinates to solve multiple integration problems.		X						
SLO 10	Graph vector fields.		X						
SLO 11	Compute line and surface integrals.		X						
SLO 12	Use Green's Divergence and Stoke's Theorems to solve various types of physical applications.		X		X				
<b>COURSE: MAT 25</b>									
SLO 1	Apply fundamental relations and operations on sets.		X						
SLO 2	Apply fundamental concepts of logic.			X	X				

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SLO 3	Associate mathematical models with real world situations from other disciplines.				X				
SLO 4	Apply statistical methods and interpret results in business and humanities applications.				X				
SLO 5	Apply permutations, and combinations in statistical applications.		X		X				
SLO 6	Integrate historical context with many of the topics in mathematics.				X				
<b>COURSE: MAT 3</b>									
SLO 1	Solve systems of linear algebraic equations using Gaussian elimination or Cramer's rule.		X						
SLO 2	Calculate and apply determinants to a variety of problems including but not limited to areas, volumes, and cross products.		X		X				
SLO 3	Determine the rank and the dimension of the kernel for a matrix operator.		X						
SLO 4	Find bases for the range and the kernel of linear operators.		X						
SLO 5	Find Eigenvalues and related Eigenvectors for a square matrix.		X						
SLO 6	Use the Gram-Schmidt process to produce an orthonormal.		X						
SLO 7	Use an orthonormal basis to diagonalize a square matrix.		X						
SLO 8	Prove fundamental theorems in linear algebra.			X					
<b>COURSE: MAT 32</b>									
SLO 1									
SLO 2									
SLO 3									
SLO 4	Present arguments in argument form and determine whether they are valid and sound.			X					
SLO 5	Construct symbolizations of arguments and determine their validity		X		X				

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<b>NORCO COLLEGE SLO to PLO MATRIX</b>		<b>PLOs</b>	<b>PLO 1: Apply the basic operations of mathematics on the set of real and complex numbers, expressions and equations.</b>	<b>PLO 2: Apply the principles of the scientific method, including the use of inductive and deductive reasoning to solve real world problems.</b>	<b>PLO 3: Recognize and determine the role of mathematics and the sciences as investigative sciences.</b>	<b>PLO 4:</b>	<b>PLO 5:</b>	<b>PLO 6:</b>	<b>PLO 7:</b>
	using truth value analysis.								
SLO 6	Derive valid conclusions from the premises using equivalences and rules of inference.			X	X				
<b>COURSE: MAT 36</b>									
SLO 1	Identify special triangles and their related angle and side measures.		X						
SLO 2	Evaluate the trigonometric function of an angle in degree and radian measure.		X						
SLO 3	Manipulate and simplify a trigonometric expression.		X						
SLO 4	Solve trigonometric equations, triangles, and applications.		X		X				
SLO 5	Graph the basic trigonometric functions and apply changes in period, phase and amplitude to generate new graphs.		X						
SLO 6	Prove trigonometric identities.		X	X					
<b>COURSE: MATH 4</b>									
SLO 1	Employ matrices to solve system of equations.		X						
SLO 2	Apply matrices to real world problems.		X		X				
SLO 3	Apply linear programming by using the Simplex Method to solve maximum and minimum problems.		X		X				
SLO 4	Organize sets of data and calculate a variety of statistics for a given set of data (e.g. mean, median, and variance).		X		X				
SLO 5	Count the number of possible outcomes for various sequences of events, including permutations and combinations.		X		X				
SLO 6	Identify the sample space for a probability experiment and determine probabilities for events of a given probability experiment.		X		X				
SLO 7	Apply the tools of logic to practical situations.		X	X	X				
<b>COURSE: MATH 5</b>									

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SLO 1	Employ the concept of functions, limits and continuity.		X						
SLO 2	Apply differentiation rules and integration techniques to algebraic functions.		X						
SLO 3	Use derivatives and integrals to solve real world problems.		X		X				
SLO 4	Determine derivatives and integrals of exponential and logarithmic functions.		X						
SLO 5									
SLO 6									
<b>COURSE: MAT 2</b>									
SLO 1	Recognize and solve separable, exact, and linear first-order differential equations.		X						
SLO 2	Solve higher-order homogeneous and non-homogeneous linear differential equations with constant coefficients and Cauchy Euler linear differential equations.		X						
SLO 3	Use the method of reduction of order and variation of parameters to solve higher-order homogeneous and non-homogeneous differential equations.		X						
SLO 4	Apply differential equations to the physical and biological sciences.		X		X				
SLO 5	Find power series solutions to differential equations about ordinary and singular points.		X						
SLO 6	Find the Laplace Transform and inverse Laplace Transform of functions.		X						
SLO 7	Solve systems of linear first-order differential equations.		X						
<b>COURSE: PHS-1 (Physical Science 1)</b>									
SLO 1	Analyze the unifying principles which underlie the various branches of scientific endeavor.			X	X				
SLO 2	Identify the basic physical concepts necessary for an understanding of the technology of the natural environment.		X	X	X				

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SLO 3	Guide the students to understand their role as a member of a society that is becoming increasingly dependent upon technological development			<b>X</b>	<b>X</b>				
<b>COURSE: PHY-10 (Physics 10)</b>									
SLO 1	Describe the SI System of units including the fundamental units of time, length, and mass. Define density, velocity and acceleration.		<b>X</b>		<b>X</b>				
SLO 2	Describe the forces acting on a static or moving object; determine the acceleration of an object using Newton's Second law; define the principle of conservation of energy; identify forms of mechanical energy; calculate the velocities of objects in a collision.		<b>X</b>	<b>X</b>	<b>X</b>				
SLO 3	Explain how the force of gravity behaves as a function of distance; apply the law of gravitation to orbital motion.		<b>X</b>	<b>X</b>	<b>X</b>				
SLO 4	Explain the structure of an atom; describe the different states of matter.		<b>X</b>	<b>X</b>	<b>X</b>				
SLO 5	Compare the principles of temperature and heat; classify phase transitions of matter; calculate the specific heat capacity of a substance.		<b>X</b>	<b>X</b>					
SLO 6	Define speed, wavelength, frequency and amplitude of a wave; give examples of sources of waves.		<b>X</b>	<b>X</b>					
SLO 7	Compute the Coulomb force between two electrically charged particles; apply Ohm's Law to calculate voltage, current and resistance of an electrical circuit; identify the source of magnetic field; utilize the law of induction to explain the operation of generators, motors and transformers; contrast the properties of alternating current and direct current.		<b>X</b>	<b>X</b>					
SLO 8	Explain the principles of reflection, refraction, interference and diffraction; describe how absorption, emission, reflection and transmission determine the color of an object.		<b>X</b>	<b>X</b>	<b>X</b>				
SLO 9	Identify sources and types of radioactivity; define the half-life of a radioactive isotope; compare the processes of nuclear fission and nuclear fusion.		<b>X</b>	<b>X</b>					

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<b>COURSE</b>	<b>PHY-11 (Physics 11)</b>								
SLO 1	Identify a problem and seek an experimental approach to its solution.		X	X	X				
SLO 2	Be able to collect accurate and precise data.		X	X	X				
SLO 3	Analyze data to compare and contrast the experimental results to the accepted results such as to justify the scientific principle involved.		X	X	X				
SLO 4	Represent data in a graph for better understanding of the relationship between variables.		X		X				
SLO 5	Identify the different types of errors that can occur in an experiment.		X		X				
<b>COURSE</b>	<b>PHY-4A (Physics 4A)</b>								
SLO 1	Explain the concepts of kinematics, such as velocity, displacement and acceleration, and their relationships to each other.		X	X	X				
SLO 2	Determine the forces and torques acting on an object and determine the motion of an object through application of the Laws of Motion.		X	X	X				
SLO 3	Explain the concepts of conservation of energy and conservation of momentum, and use each to solve problems in mechanics.		X	X	X				
SLO 4	Apply the definitions of oscillatory and wave motion to construct solutions to problems.		X	X	X				
SLO 5	Apply the methods of Newtonian mechanics to solve problems relating to extended objects in static equilibrium; and define stress, strain and elastic modulus.		X	X	X				
SLO 6	Define Newton's Law of gravity and the related gravitational potential energy function and apply the methods of Newtonian		X	X	X				

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	mechanics to analyze systems in the context of Newton's law of gravitation.								
SLO 7	Perform simple physical experiments that relate to the subject matter of the course; and analyze and interpret data collected in such experiments.		X	X	X				
<b>COURSE</b>	<b>PHY-4B (Physics 4B)</b>								
SLO 1	Determine the magnitude and direction of the electric field and force due to a charge distribution using the principles of superposition and vector addition.		X						
SLO 2	Determine torque and potential energy of electric dipole systems.		X						
SLO 3	Utilize Gauss's Law to calculate electric flux and to determine electric fields for highly symmetrical geometries.		X	X	X				
SLO 4	Determine the scalar electric potential using the principles of superposition and Faraday's Law and apply this concept to conservation of energy.		X	X	X				
SLO 5	Define capacitance and it's properties. Analyze capacitive circuits to determine their charge, voltage, energy and electric fields.		X						
SLO 6	Define current, resistance and electromotive force. Utilize Kirchoff's rules for DC circuits. Derive the RC circuit equations.		X						
SLO 7	Demonstrate proficiency in the use of multimeter, oscilloscope, waveform generator and power supply.		X						
SLO 8	Determine the magnitude and direction of the magnetic field using the principles of superposition and vector addition. Determine the Lorentz force on charges and current carrying wires in magnetic and electric fields. Analyze torque and potential energy of magnetic dipole systems.		X	X	X				
SLO 9	Obtain expressions for the magnetic field utilizing Ampere's law.		X	X	X				
SLO 10	Utilize Farady's law to calculate induced and motional. Determine the direction of current using Lenz's law. Explain the		X	X	X				

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	electic motor and generator.								
SLO 11	Determine the inductance of a circuit element. Analyze inductive circuits.		X						
SLO 12	Define and determine the impedance of an AC circuit and determine the current voltage phase relationships.		X						
SLO 13	State Maxwell's equations and demonstrate that a light wave is a solution to Maxwell's equations.		X	X	X				
<b>COURSE</b>	<b>PHY-4C (Physics 4C)</b>								
SLO 1	Apply the definitions of oscillatory and wave motion to construct solutions to problems.		X	X					
SLO 2	Define the concepts of fluid mechanics, including pressure, density, and buoyancy, and use them to solve appropriate problems.		X	X					
SLO 3	Explain the concepts of thermodynamics, such as temperature, heat and internal energy, and their relationships to each other and apply these concepts to solve problems.		X	X	X				
SLO 4	Apply the concepts of physical and geometric optics to construct solutions to problems related to these concepts		X	X	X				
SLO 5	Record and analyze measured data in a laboratory environment by applying concepts related to material presented in lecture.		X	X	X				
<b>COURSE</b>	<b>PSY-2 (Physiological Psychology)</b>								
SLO 1	Demonstrate knowledge of current biological psychological theories <ul style="list-style-type: none"> <li>• Critical Thinking - Consider and evaluate rival hypotheses</li> <li>• Breadth of Knowledge - Understand the basic content and modes of</li> </ul>			X	X				

**NORCO COLLEGE  
SLO to PLO MATRIX**

NORCO COLLEGE SLO to PLO MATRIX		PLOs	PLO 1: Apply the basic operations of mathematics on the set of real and complex numbers, expressions and equations.	PLO 2: Apply the principles of the scientific method, including the use of inductive and deductive reasoning to solve real-world problems.	PLO 3: Recognize and determine the role of mathematics and the sciences as investigative	PLO 4:	PLO 5:	PLO 6:	PLO 7:
	inquiry of the major knowledge fields								
SLO 2	Demonstrate the ability to integrate key theoretical concerns in biological psychology <ul style="list-style-type: none"> <li>• Critical Thinking - Integrate knowledge across a range of contexts</li> <li>• Breadth of Knowledge - Understand the basic content and modes of inquiry of the major knowledge fields</li> </ul>			X	X				
SLO 3	Identify and list biological factors that influence human behavior <ul style="list-style-type: none"> <li>• Breadth of Knowledge - Understand the basic content and modes of inquiry of the major knowledge fields</li> </ul>			X	X				
SLO 4	Demonstrate knowledge of methods used in biological psychological research <ul style="list-style-type: none"> <li>• Breadth of Knowledge - Understand the basic content and modes of inquiry of the major knowledge fields</li> </ul>			X	X				
SLO 5	Discuss the application of biological psychological theories and research to current social problems such as substance abuse and mental illness <ul style="list-style-type: none"> <li>• Critical Thinking - Analyze and solve complex problems across a range of academic and everyday contexts</li> <li>• Critical Thinking - Integrate knowledge across a range of contexts</li> </ul>				X				