

Course Title	Problem-Solving Fundamentals and Measurements				
Course Code	ECE105				
Course Type	Compulsory				
Level	Bachelor (1st Cycle)				
Year / Semester	1 st Year / 1 st Semester				
Teacher's Name	TBA				
ECTS	6	Lectures / week	3 hours / 14 weeks	Laboratories / week	N/A
Course Purpose and Objectives	<p>The objective of this course is to provide students with the necessary problem-solving skills that are one of the key skills required by computer scientists and engineers to learn programming. Students will learn how to solve a problem by defining the problem, identifying possible solution alternatives, implementing a solution, evaluating the solution and finally troubleshooting the solution. The course follows an embedded laboratory approach, where students are required to utilize a variety of tools for the development of the solutions.</p>				
Learning Outcomes	<p>Upon successful completion of this course, students should be able to:</p> <ul style="list-style-type: none"> • Identify a real problem and define it in a correct way • Describe the various problem-solving characteristics and skills required by a scientist or engineer • Describe and utilize appropriate tools & techniques available to clearly define real problems • Explain and utilize creative skills such as brainstorming, vertical and lateral thinking, cross-fertilization and incubation of ideas • Describe and apply the implementation process of a solution for a problem • Evaluate solutions based on the expected solution • Explain and apply the troubleshooting process for any issues in the implemented solution 				
Prerequisites	None		Co-requisites	None	
Course Content	<p><u>Problem-Solving Strategies:</u> Understanding what the real problem is and formulating a correct problem definition avoiding the development of a wrong solution. Following a heuristic for successful problem-solving.</p> <p><u>Problem-Solving characteristics and skills:</u> Learning how to work effectively in teams to solve a problem. Identifying problems in group work such as criticism and resolving conflicts. Developing critical thinking skills necessary for problem-solving.</p>				

	<p><u>Techniques</u>: Using Duncker diagrams to define real problems. Using Statement-Restatement techniques. Using the Kepner-Tregoe Problem analysis technique. Brainstorming and identifying solution alternatives.</p> <p><u>Generating solutions</u>: Improving creative abilities, identifying risk and reward, brainstorming, vertical thinking, lateral thinking. Organizing ideas, Brainwriting, Futuring, Cross-Fertilization, Analogies, Incubating ideas.</p> <p><u>Implementing solutions</u>: Approval of the proposed solution by the team, carry through, follow up, setting goals.</p> <p><u>Solution Evaluation</u>: General evaluation guidelines, Ethical evaluations, safety considerations.</p> <p><u>Troubleshooting</u>: General troubleshooting guidelines, technical troubleshooting exercises.</p>								
Teaching Methodology	Face-to-Face								
Bibliography	<p><i>“Strategies for Creative Problem Solving”</i>, by H. Scott Fogler, Steven E. LeBlanc and Benjamin Rizzo</p> <p><i>“Engineering Problem Solving with C++: International Edition”</i> Delores M. Etter, and Jeanine A. Ingber</p> <p><i>“Engineering Problem Solving with C: International Edition”</i> by Delores M. Etter</p> <p><i>“Computer Architecture: A Quantitative Approach”</i> by John L. Hennessy</p> <p><i>“Digital Design and Computer Architecture”</i> by David Harris and Sarah Harris</p>								
Assessment	<table border="1" data-bbox="1002 1429 1241 1621"> <tr> <td data-bbox="555 1429 1002 1464">Examinations</td> <td data-bbox="1002 1429 1241 1464">60%</td> </tr> <tr> <td data-bbox="555 1464 1002 1500">Assignments/Lab</td> <td data-bbox="1002 1464 1241 1500">30%</td> </tr> <tr> <td data-bbox="555 1500 1002 1576">Class Participation and Attendance</td> <td data-bbox="1002 1500 1241 1576">10%</td> </tr> <tr> <td data-bbox="555 1576 1002 1621"></td> <td data-bbox="1002 1576 1241 1621">100%</td> </tr> </table>	Examinations	60%	Assignments/Lab	30%	Class Participation and Attendance	10%		100%
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	100%								
Language	English								