

<b>COURSE NUMBER:</b> Vg101		<b>COURSE TITLE:</b> Introduction to Computers & Programming	
<b>CREDIT:</b> 4		<b>PREREQUISITES:</b> None	
<b>TEXTBOOKS/REQUIRED MATERIAL:</b> Various		<b>PREPARED BY:</b> Gang Zheng <b>DATE OF PREPARATION:</b> Sept. 29, 2012 <b>DATE OF UC APPROVAL:</b> Oct. 30, 2013	
<b>INSTRUCTOR(S):</b> Gang Zheng, Shensheng Zhang, Jigang Wu		<b>SCIENCE/DESIGN:</b> n/a	
<b>CATALOG DESCRIPTION:</b> This course is to introduce students in Engineering to basic algorithmic method and specific languages including MATLAB and C/C++. Algorithms are an organized means to construct the solution of a problem, structured as a well-defined set of steps that can be carried out by a mechanism such as a computer. MATLAB is widely used to solve engineering problems and for quick prototyping of solutions. And C and C++ are within the most popular programming languages in current information industry. Vg101 focuses on the development of algorithms to solve problems of relevance in engineering practice and on the implementation of these algorithms using MATLAB and C/C++.		<b>COURSE TOPICS:</b> 1. Introduction to Computing 2. Introduction to MATLAB 3. MATLAB statements and programming 4. MATLAB functions, graphics, and file I/O 5. Introduction to C, data types and expression 6. Control statements, loop statements 7. Functions and Algorithms, file I/O 8. Array, string, pointer 9. Arrays and applications 10. Graphics in C, OpenGL 11. Introduction to OOP, class, objects 12. Introduction to C++, I/O streams` 13. Object-based programming in C++	
<b>COURSE STRUCTURE/SCHEDULE:</b> Lecture: two 90 minutes lectures in each week in Fall, plus one additional 45 minutes lectures in Summer. Laboratory: 1 per week, 2.5 hrs			
<b>COURSE OBJECTIVES</b> [Course Outcomes in brackets]	<ol style="list-style-type: none"> <li>To introduce students to algorithmic thinking in their approach to solving problems. [9]</li> <li>To have students solve open ended problems including the development of understanding, designing a solution, implementing it, testing it, and judging its effectiveness and aesthetics. [1-8]</li> <li>To provide students with a foundation on which to base their later applications of computers to engineering. [1-8]</li> <li>To teach students to implement algorithms in C and C++ languages [1-8]</li> <li>To teach students to implement algorithms in MATLAB. [1-8]</li> <li>To have students apply their knowledge of elementary physics and calculus in the solution of problems.[3,7,8]</li> </ol>		
<b>COURSE OUTCOMES</b> [Program Outcomes in brackets]	After completing Vg101, students should demonstrate proficiency with: <ol style="list-style-type: none"> <li>Data representation and naming [k]</li> <li>Data input and output [k]</li> <li>Programming with math and logical operators and functions [a, k]</li> <li>Designing, testing, and implementing functions and procedures [a, c, e, k]</li> <li>Control flow using selection and iteration [k]</li> <li>Use of pre-defined data structures [k]</li> <li>Primitive and complex data types [k]</li> <li>Visualization of data [k]</li> <li>Algorithm design for engineering analysis [a, c, e, k]</li> </ol>		
<b>ASSESSMENT TOOLS</b> [Course Outcomes in brackets]	Homework [1-9] Midterm Exam [1-8] Final Exam [1-9] Lab experiment [1-9]		

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