

Fundamentals of Programming II

Code CS-116	Credit Hours 0-1
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COURSE DESCRIPTION:

This course introduces students to more advanced programming concepts. Students will learn to create more powerful programs within a specific programming language of Python and MATLAB. The study of Python and MATLAB will provide a basic understanding of the fundamentals of procedural program development using structured, modular concepts. Emphasizes logical program design involving user-defined functions and standard structure elements. Discussions will include the role of data types, variables, structures, function and advanced concepts of programming

TEXT AND MATERIAL

Text 1. Guttag, John. *Introduction to Computation and Programming Using Python: With Application to Understanding Data Second Edition*. MIT Press, 2016. ISBN: 9780262529624

Book: 2. MATLAB programming for Engineers by Stephen J. Chapman. 4th ed.

Reference 1. Fluent Python: Clear, Concise, and Effective Programming 1st Edition, Luciano Ramalho, 2015

Books: 2. Introduction to MATLAB for Engineers by William J. Palm III. 3rd ed.
3. MATLAB user guide: The language of technical computing

ASSESSMENT SYSTEM FOR LAB:

Quizzes	10%
Assignments	10%
Project	10%
MSE	30%
ESE	40%

Lab outline

Lab No	Description
1	Introduction to Python: Installation and overview of different variants of python and their purpose
2	Basic elements of Python: Objects expressions, numerical types, variables and assignments
3	Branching programs, Type Str and input, iterations
4	Basic numerical programming: For loops, approximate solution and bisection search.
5	Functions and Abstraction
6	Structured types, mutability and higher order functions
7	Strings, tuples, lists and dictionaries
8	Debugging and testing
9	Introduction to MATLAB: Overview of MATLAB Environment
10	MATLAB basics: variables, arrays, multidimensional arrays, displaying output data, Introduction to plotting
11	Branching statements and program design, Loops
12	User defined functions
13	Complex data handing and multi-dimensional plotting.
14	Advanced features and GUI design
15	Introduction to Simulink: overview of different libraries