BT 652: Introduction to Programming

Course Number & Title: **BT652 & Introduction to Programming**
L-T-P-C: 2**-0-2-6**
Type of Letter Grading (Regular Letter Grades / PP or NP Letter Grades): **Regular**
Kind of Proposal (New Course / Revision of Existing Course): **New Course**
Offered as (Compulsory / Elective): **Elective**
Offered to: **PhD/MTech**
Offered in (Odd/ Even / Any): **Any**
Offered by (Name of Department/ Center): **BSBE**
Pre-Requisite: **NIL**
Preamble / Objectives (Optional):
Preamble This course aims to teach computer language programming to MTech and PhD students of BSBE Dept. It is assumed that these students have no prior knowledge in computer programming. Thus, the course will start from the basics of programming. Course is designed to include lab sessions where students will write and execute their program codes. Later students shall be introduced to programming using Python and MATLAB. Subsequently, students will also write codes addressing specific research problems in areas like General Biology/ Biophysics/ Biochemical Engineering/ Bioengineering/ Bioinformatics and so on. **Course Content:** Introduction: Computers, programming languages, compiler, interpreter, loader, linker, text editors, operating systems, flowcharts; Basic features of programming (Using C): data types, variables, operators, expressions, statements, control structures, functions; Advanced programming features: arrays and pointers, recursion, records (structures), memory management, files, input/output, standard library functions, programming tools, testing and debugging; Introduction to Python language: Basic programming features of Python; Introduction to MATLAB: Basic commands and codes, simple simulations; Use of programming tools to model: Growth of bacteria, Enzyme kinetics, Diffusion by random walk, Metabolic flux analysis or similar topics.

References	
1.	Stephen G. Kochan, *Programming in C*, 4th edition, Addison-Wesley Professional, 2015.
2.	B Kernighan and D Ritchie, *The C Programming Language*, 2nd Edition, Prentice Hall of India, 1988.
3.	*Paul Barry, Head First Python: A Brain-Friendly Guide*, 2nd Edition, Shroff/O'Reilly, 2016.
4.	Stormy Attaway, *MATLAB: A Practical Introduction to Programming and Problem Solving,* 5th Edition, Butterworth-Heinemann, 2018
5.	Andrew P. King and Paul Aljabar, *MATLAB Programming for Biomedical Engineers and Scientists*, 1st Edition, Academic Press, 2017