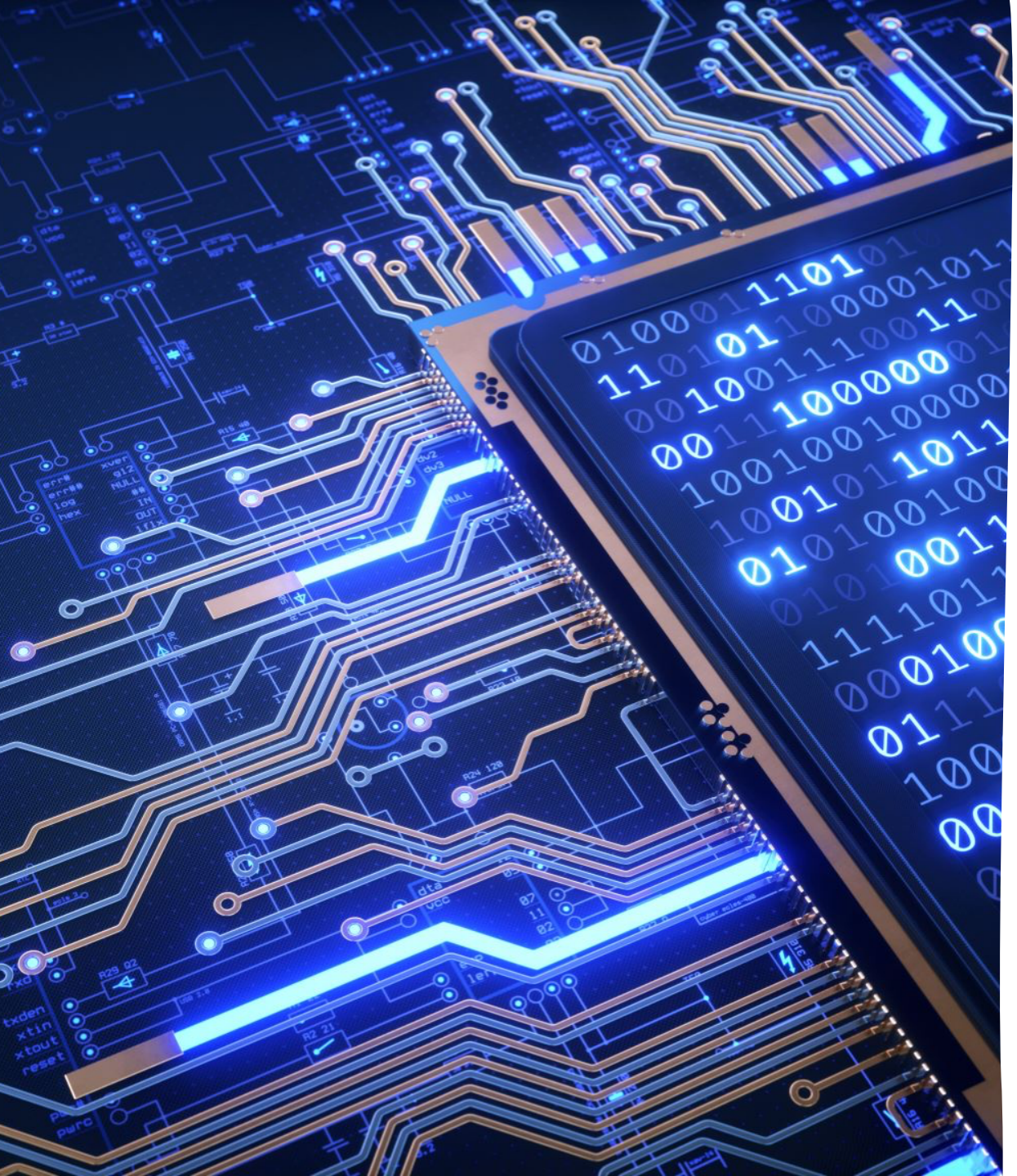

IT 101 - Computer Programming and Problem Solving

Dr Bhanu Bhaskara

About me…..in brief

- Ph.D from NIT, Rourkela, Orissa
- 33 yrs of teaching experience (India, Malaysia, Saudi Arabia)
- Taught at NITR for 13 yrs
- Currently located in Hyderabad

About the Course

- IT 101- Computer Programming and Problem Solving
  - 3 Lectures per week
  - 3 credits
- IT 161 – CP&PS Lab (3 hrs per week, 2 credits)
  - Will be handled by TAs

IT 101- Computer Programming and Problem Solving

Objectives & Learning Outcomes

Objectives: The course provides concepts of computer programming and its roles in problem solving. It also introduces how to develop well-structured programs.

Learning Outcomes: On successful completion of this course, students should be able to:

1. Understand the basic computing environment, limitations, and usage.
2. Understand basic problem solving and programming concepts.
3. Visualize and model the basic real-life problems into computational problems.
4. Analyze a given computational problem and convert it into an algorithm and flowchart.

IT 101 - Syllabus

- **Introduction to Computers:** Computer Systems, Computing Environments.
- **Introduction to Programming:** Programming methods, paradigms, problem solving techniques, algorithm development, flow charts, Editor, compiler, debugger, Software development.
- **Basics of Procedural Programming**: Constants, variables, expressions, operators, assignment, basic input and output, built-in functions, program debugging.
- **Variables and Operators:** Basic data types, precedence and order of evaluation, pointers, memory allocation of variables.
- **Control Structures:** Selection statements, iteration statements.

IT 101 - Syllabus

- **Functions and Program Structure:** Return values, actual and formal parameters, parameter passing: call by value versus call by reference, external variables, scope rules, header files, and recursion.
- **Arrays:** Character arrays, one and two dimensional arrays; pointer arrays, command-line arguments.
- **I/O:** ASCII data files, file pointers, end-of-file.
- **Basic Data Structures:** Structures, defining new types, enumerations, dynamic memory allocation, dynamic arrays, linked lists and other pointer-based structures.

IT 101 – Books

Text Book:

C How to Program, 7th Ed., P Deitel and H Deitel, Prentice Hall of India, 2012.

Reference Books:

1. *C programming language*, 2nd Ed., Kernighan, Brian W. & Ritchie, Dennis M, New Delhi. Prentice Hall of India, 1998.

2. *A Structured Programming Approach Using C*, 1st Ed., Forouzan, Behrouz, Course Technology, 2012.

3. *Practical C Programming*, 3rd Ed, Oualline, Steve, Shroff Publishers, 2000.

4. *Programming In ANSI C* by E. Balagurusamy.

About the Associated Lab

- IT 161 – Computer Programming and Problem Solving Lab
  - 3 hrs per week
  - 2 credits

IT 161 – Computer Programming and Problem Solving Lab

Objectives: The course provides a platform to enhance the analyzing and problem solving skills and learn to implement a list of programs in C or Python programming language.

Learning Outcomes: On successful completion of this course, students should be able to:

1. Given a problem, identify and model the computational task involved.
2. Select a programming environment and convert the algorithm (or flowchart) into a program.
3. Choose the relevant data representation format based on the requirements of the problem.
4. Execute the program in the given environment. Understand the type of errors evolved if any. Produce convincing arguments to resolve the issues. Analyze the program execution environment.
5. Work as a team member among your peers.

IT 161 – Computer Programming and Problem Solving Lab

List of Laboratory Assignments:

Part A (10 weeks):

1. Program to find area and circumference of circle.
2. Program to convert temperature from degree centigrade to Fahrenheit.
3. Program to calculate sum of 5 subjects and find percentage.
4. Program to show swap of two no's without using third variable.
5. Program to reverse the digits of a given number.
6. Program to print a table of any number.
7. Program to find greatest in 3 numbers.
8. Program to find that entered year is leap year or not.
9. Program to shift input data by two bits to the left.

IT 161 – Computer Programming and Problem Solving Lab

10. Program to display arithmetic operator using switch case.
11. Program to print stars Sequences (right triangular, Isosceles triangle, etc.).
12. Program to print Fibonacci series up to 100.
13. Program to find factorial of a number.
14. Program to find whether given no. is a prime no. or not.
15. Program to add two number using pointers.
16. Program to find the largest number in an array.
17. Program for removing the duplicate element in an array.
18. Program to add two matrices.
19. Program to multiply two matrices.
20. Program to find transpose of a matrix.

IT 161 – Computer Programming and Problem Solving Lab

21. Program to swap two numbers using functions.
22. Program to show call by reference.
23. Program to find whether a string is palindrome or not.
24. Program to find occurrences of vowels, consonants, words, spaces and special characters in the given statement.
25. Program to create enumerated data type for 12 months. Display their values in integer constants.
26. Program for linear and binary search.
27. Program for bubble sort and insertion sort.
28. Program that would sort a list of names in alphabetical order.
29. Program to use (++,--) operator with return value of function.
30. Program to read characters from a text file and print number of vowels, consonants and other characters in the file. Assume that the file will consist of mostly English-language letters.

IT 161 – Computer Programming and Problem Solving Lab

Part B (4-6 weeks)

A small project will be given in groups (at most 4 persons in each group). The objective is to apply knowledge of programming language primitives such as functions, structures and/or files in day-to-day applications.

Reference: Laboratory Instructions and handouts.

Questions?